TUGAS AKHIR

APLIKASI TURBO PASCAL
PADA DISAIN ELEMEN STRUKTUR BETON
DENGAN INPUTING DATA MICROFEAP

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JURUSAN TEKNIK SIPIL
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
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Diajukan kepada Universitas Islam Indonesia
untuk memenuhi sebagian persyaratan memperoleh
derajat Sarjana Teknik Sipil

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PRAKATA

Assalamu'alaikum Wr. Wb.

Alhamdulillah, segala puji syukur dipanjatkan kehadirat Allah SWT, atas nikmat serta kemudahan yang diberikanNya hingga Tugas Akhir ini dapat diselesaikan.

Tugas Akhir ini disusun untuk melengkapi persyaratan dalam memperoleh jenjang kesarjanaan Strata Satu (S1) pada Jurusan Teknik Sipil, Fakultas Teknik Sipil dan Perencanaan, Universitas Islam Indonesia.

Permasalahan atau topik dalam penulisan Tugas Akhir ini adalah aplikasi Turbo Pascal pada program disain elemen struktur beton dengan data "input" dan keluaran program Microfeap.

Sangat disadari bahwa penulisan Tugas Akhir ini serta program komputer yang dihasilkan masih belum sempurna dan membutuhkan pengembangan lebih lanjut karena masih banyak ide-ide yang dapat dituangkan di dalamnya

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Penyusun

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ABSTRAK

Laju perkembangan ilmu pengetahuan dan teknologi yang berkaitan dengan aplikasi program komputer pada bidang teknik sipil sangat pesat, begitu banyak program aplikasi teknik sipil yang ada, tetapi hampir tidak ada atau hanya sedikit sekali program disain elemen struktur (struktur portal beton khususnya) yang kompitibel dengan standar perencanaan atau peraturan yang berlaku di Indonesia.

Pada penelitian ini dibuat program dengan bahasa pemrograman Pascal dengan pertimbangan bahasa Pascal adalah salah satu bahasa tingkat tinggi komputer ("high level language"), yang umum digunakan untuk hampir semua penyelesaian pekerjaan di bidang teknik, ilmu pengetahuan eksak, administrasi/keuangan dan untuk proses data (statistik) dengan komputer.

Perencanaan elemen struktur beton biasanya dilakukan dengan cara coba-coba ("trial and error") yaitu mengamsumsikan dimensi-dimensi elemen struktur sebelum melakukan analisa struktur, untuk mendapatkan hasil yang efisien membutuhkan waktu yang cukup lama dan perhitungan yang berulang-ulang. Dengan program yang disain elemen struktur beton dengan "inputing" data Microfeap yang dibuat ini dapat mempermudah dan mempercepat pekerjaan perencanaan struktur beton yang sesuai dengan standar perencanaan dan peraturan yang berlaku di Indonesia, yaitu SK SNI T-15-1991-03. Program disain elemen struktur beton ini dapat digunakan pada perencanaan elemen struktur portal beton dengan jumlah tingkat yang tidak terbatas (tidak hanya terbatas dua tingkat) tetapi khusus untuk mendisain elemen fondasi terbatas pada fondasi telapak kolom setempat saja.

BAB I

PENDAHULUAN

1.1 Latar Belakang

Pesatnya laju perkembangan ilmu pengetahuan dan teknologi khususnya yang berkaitan dengan aplikasi program komputer pada bidang teknik sipil, menuntut pelajar sekolah kejuruan teknik, mahasiswa, teknisi, arsitek, praktisi dan rekayasawan yang bergerak di bidang rekayasa teknik sipil untuk terus mengikuti perkembangan tersebut.

Banyak perusahaan pembuat "software" yang menawarkan program analisis struktur dan disain elemen struktur seperti Microfeap, SAP 80 atau SAP 90 dan ETABS. Kedua program terakhir selain dapat dipakai untuk menghitung/menganalisis struktur juga bisa digunakan untuk mendisain elemen struktur beton dan baja. Program-program tersebut dalam mendisain elemen struktur memakai standar ACI untuk disain elemen struktur beton dan AISC untuk disain elemen struktur baja.

Microfeap cukup sederhana dan relatif lebih mudah untuk dipahami dan digunakan pada analisis struktur karena menggunakan analisis struktur dua dimensi.

Mengingat kondisi perkembangan ilmu pengetahuan dan teknologi, perangkat keras yang ada dan dasar-dasar perencanaan struktur beton di Indonesia, maka dirasakan perlu sebuah program disain elemen struktur beton yang dapat digunakan pada "micro computer" dan sesuai dengan kebutuhan/kondisi di Indonesia. Dengan kata lain analisis pada program komputer tersebut sesuai dengan standar perencanaan atau peraturan yang berlaku di Indonesia, yaitu SK SNI T-15-1991-03.

Turbo Pascal merupakan perangkat lunak bahasa Pascal yang banyak digunakan untuk komputer mikro. Bahasa Pascal adalah salah satu bahasa tingkat tinggi komputer ("high level language"), yang umum digunakan untuk hampir semua penyelesaian pekerjaan di bidang teknik, ilmu pengetahuan eksak, administrasi/keuangan dan untuk proses data (statistik) dengan komputer.

Program disain elemen struktur beton dengan data masukan dari keluaran program Microfeap yang memenuhi kebutuhan/kriteria di atas dapat dibuat menggunakan bahasa pemrograman Pascal.

Perencanaan elemen struktur beton biasanya dilakukan dengan cara coba-coba ("trial and error"), untuk mendapatkan hasil yang efisien membutuhkan waktu yang cukup lama dan perhitungan yang berulang-ulang. Dengan program yang dibuat untuk disain elemen struktur beton dengan "inputing" data Microfeap diharapkan dapat mempermudah dan mempercepat pekerjaan perencanaan struktur beton yang sesuai dengan standar perencanaan dan peraturan yang berlaku di Indonesia, yaitu SK SNI T-15-1991-03.

Program disain elemen struktur beton yang dimaksud tersebut harus mampu mengidentifikasi file keluaran program Microfeap yaitu berupa data hasil analisis

struktur dan mengolah data tersebut menjadi data "input" untuk proses disain/perencanaan elemen-elemen struktur beton dengan program komputer. Program ini berupa program terpadu, baik program "input" datanya maupun program proses disain elemen-elemen struktur beton dan program "output" hasil disainnya, yang dikontrol oleh sebuah program utama.

1.2 Tujuan dan Batasan Masalah

Tujuan penulisan topik tugas akhir ini ialah membuat program disain elemen struktur beton dengan "inputing" data Microfeap (berupa data hasil analisis struktur). Hasil yang diharapkan dengan pembuatan program tersebut adalah program dapat mendisain elemen: plat, balok, kolom, dan fondasi telapak dengan "output" berupa dimensi elemen dan kebutuhan baja tuiangannya.

Disain atau perencanaan elemen struktur beton pada program tersebut berdasarkan dasar-dasar perencanaan beton bertulang SK SNI T-15-1991-03. Program dibuat dengan bahasa Pascal menggunakan perangkat lunak Turbo Pascal versi 7.0, "inputing" data Microfeap dari Microfeap II (P1-Module). Struktur beton yang dimaksud disini adalah struktur portal/frame beton, yang elemen strukturnya terdiri dari fondasi, kolom, balok dan plat.

Bentuk tampang perencanaan elemen struktur beton pada program tersebut digunakan bentuk tampang persegi kecuali pada perencanaan elemen kolom selain bentuk tampang persegi juga digunakan bentuk tampang lingkaran.

Sistem penulangan perencanaan elemen struktur beton pada program tersebut berupa:

1. sistem tulangan sebelah (tulangan tarik saja) untuk elemen plat dan fondasi. Dan untuk elemen balok sesuai dengan kuat momen tahan maksimumnya, bila $Mr_{maksimum}$ >Mu maka balok direncanakan sebagai balok bertulangan sebelah,

2. sistem tulangan rangkap (tulangan tarik dan tulangan desak) untuk elemen kolom. Dan untuk elemen balok sesuai dengan momen tahanan maksimumnya, bila $Mr_{maksimum}$ <Mu maka balok direncanakan sebagai balok bertulangan rangkap,

3. tulangan geser untuk perencanaan elemen balok pada program tersebut dipakai tulangan sengkang tanpa tulangan geser miring. Dan tulangan gesesr untuk perencanaan elemen kolom digunakan tulangan sengkang atau tulangan spiral.

Fondasi yang memungkinkan untuk didisain dengan program tersebut adalah fondasi telapak kolom setempat dengan letak kolom simetris.

Elemen kolom yang dimaksud pada program tersebut adalah kolom tanpa pengaku arah lateral ("unbrace frame").

BAB II

TINJAUAN PUSTAKA

2.1 Perencanaan Elemen-elemen Struktur

Tahapan perencanaan secara garis besar dilakukan sebagai berikut:

1. mengumpulkan data perencanaan,

2. mengumpulkan data beban,

3. melakukan perhitungan struktur sebagai berikut:

    a. menentukan daktilitas struktur yang akan dihitung,

    b. menentukan faktor jenis struktur K,

    c. menentukan ketentuan-ketentuan batas dimensi dari komponen struktur (plat, balok, kolom dan dinding),

    d. merencanakan balok portal sebagai berikut:

        1) merencanakan kuat lentur perlu,

        2) merencanakan kuat geser perlu,

        3) merencanakan kuat torsi perlu,

    e. merencanakan kolom portal sebagai berikut:

        1) merencanakan kuat lentur perlu,

        2) merencanakan kuat geser perlu,

f. menentukan penulangan pada portal sebagai berikut:

   1) umum,

      a) untuk komponen struktur lentur,

      b) untuk komponen struktur tekan,

   2) menentukan panjang sambungan lewatan baja tulangan,

   3) menentukan penulangan geser portal sebagai berikut:

      a) untuk balok portal,

      b) untuk kolom portal,

2.1.1 Perencanaan elemen plat

Ringkasan langkah-langkah atau ikhtisar perencanaan plat terlentur satu arah adalah sebagai berikut:

1. menentukan syarat-syarat batas,

   a. syarat batas lebar jaringan penulangan:

$$s_{min} = 100 \text{ mm,}$$

$$s_{maks} = 5.h, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.1)$$

     atau $s_{maks} = 500$ mm,

        pilih s_{maks} yang terkecil,

   b. syarat batas rasio penulangan:

$$\rho_{min} = \frac{1,4}{fy}, \dots\dots\dots\dots\dots\dots\dots\dots\dots (2.2)$$

$$\rho_b = \frac{(0,85.fc'.\beta_1)}{fy} \cdot \frac{600}{600+fy}, \dotfill (2.3)$$

$$\rho_{maks} = 0,75.\rho_b, \dotfill (2.4)$$

2. menentukan panjang bentang,

3. menentukan tebal plat, dengan bantuan syarat lendutan pada Tabel 3.2.5(a) SK SNI T-15-1991-03,

4. menghitung beban-beban yang bekerja pada plat (q),

5. menghitung momen yang menentukan,

menghitung tulangan, memperkirakan dan menghitung tinggi efektif plat (d),

$$d = h - pb - \frac{1}{2}\phi p, \dotfill (2.5)$$

$$k = \frac{Mu}{\Phi bd^2}, \dotfill (2.6)$$

tentukan rasio penulangan ρ,

$$\rho = \frac{fc' - \sqrt{(fc')^2 - 2,36.k.fc'}}{1,18.fy}, \dotfill (2.7)$$

dimana $\rho_{min} \leq \rho \leq \rho_{maks}$, jika $\rho > \rho_{maks}$, maka tebal plat diperbesar, jika $\rho < \rho_{min}$, maka dipakai ρ_{min} untuk perhitungan As,

6. memilih tulangan,

$$As = \rho.1000.d, \dotfill (2.8)$$

$$Ad = \frac{1}{4}.\pi.Dp^2, \dotfill (2.9)$$

7. memeriksa lebar retak secara memeriksa lebar jaringan,

$$s = \frac{Ad.1000}{As}, \dotfill (2.10)$$

$s_{min} < s < s_{maks}$, jika $s < s_{min}$ maka tulangan diperbaharui (rincian g), jika $s > s_{maks}$ maka gunakan $s = s_{maks}$,

8. sesuai SK SNI T-15-1991-03 memilih tulangan untuk susut dan suhu sebagai berikut:

a. As = 0,0020 bh untuk baja mutu 30,.............................. (2.11a)

b. As = 0,0018 bh untuk baja mutu 40,.............................. (2.11b)

c. As = 0,0018 bh $\left[\frac{400}{fy}\right]$,.............................. (2.11c)

untuk mutu baja lebih tinggi dari 40, diukur pada regangan leleh sebesar 0,35 % dan dalam segala hal tidak boleh kurang dari

As = 0,0014 bh,.............................. (2.11d)

9. jumlah luas penampang tulangan baja pokok tidak boleh kurang dari jumlah luas penulangan susut dan suhu,

10. membuat sketsa rancangan.

Langkah-langkah perencanaan plat tersebut juga berlaku untuk perhitungan perencanaan plat terlentur dua arah.

2.1.2 Perencanaan elemen balok

Ringkasan langkah-langkah atau ikhtisar perencanaan balok persegi adalah sebagai berikut:

1. menentukan syarat-syarat batas,

a. syarat batas jarak bersih tulangan pokok:

$s_{min} = 25$ mm,

b. syarat batas jarak tulangan sengkang:

1) untuk geser murni:

$$Vc = (\tfrac{1}{6}\sqrt{fc'}).b.d, \quad\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.12)$$

$$Vs = \frac{Vu}{\Phi} - Vc, \quad\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.13)$$

$$V = (\tfrac{1}{3}\sqrt{fc'}).b.d, \quad\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.14)$$

bila $Vs \geq V$ maka $s_{maks} = 300mm$ $s_{maks} = \tfrac{1}{4}.d,$ $\dots\dots\dots\dots\dots$ (2.15a)

bila $Vs < V$ maka $s_{maks} = 600mm$ $s_{maks} = \tfrac{1}{2}.d,$ $\dots\dots\dots\dots\dots$ (2.15b)

pilih yang terkecil,

$s_{min} = 25$ mm,

2) untuk pengaruh torsi dan geser:

$$s_{maks} = \tfrac{1}{4}.(x_1 + y_1), \quad\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.16)$$

$s_{min} = 25$ mm,

c. syarat batas rasio penulangan:

$$\rho_{min} = \frac{1,4}{fy},$$

$$\rho_b = \frac{(0,85.fc'.\beta_1)}{fy} . \frac{600}{600 + fy},$$

$$\rho_{maks} = 0,75.\rho_b,$$

2. menentukan panjang bentang,

3. menentukan ukuran balok,

4. menghitung beban-beban ,

5. anggap d = h - 100 mm,

6. menghitung momen rencana total Mu,

7. melakukan pemeriksaan MR_{maks},

$$\omega = \frac{\rho_{maks} \cdot fy}{fc'}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.17)$$

$$k_{maks} = fc' . \omega . (1 - 0,59. \omega), \dots\dots\dots\dots\dots\dots\dots\dots\dots (2.18)$$

k_{maks} digunakan untuk menghitung MR_{maks} balok bertulangan tarik saja,

$$MR_{maks} = \Phi bd^2 k_{maks}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.19)$$

apabila MR_{maks}<Mu rencanakan balok sebagai balok bertulangan rangkap dan

apabila MR_{maks}>Mu balok direncanakan sebagai balok bertulangan tarik saja,

8. apabila harus direncanakan sebagai balok bertulangan rangkap:

a. menghitung rasio penulangan pasangan kopel gaya beton tekan dan tulangan

baja tarik,

$$\rho = 0,90(\rho_{maks}) = 0,90(0,75\rho_b), \dots\dots\dots\dots\dots\dots\dots (2.20)$$

nilai ρ tersebut digunakan untuk mencari k,

b. menentukan kapasitas momen dari pasangan kopel gaya beton tekan dan

tulangan baja tarik,

$$MR1 = \Phi bd^2 k , \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.21)$$

menghitung tulangan baja tarik yang diperlukan untuk pasangan kopel gaya

beton tekan dan tulangan baja tarik,

$$As_{1 perlu} = \rho bd , \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.22)$$

c. menghitung selisih momen atau momen yang harus ditahan oleh pasangan gaya tulangan baja tekan dan tarik tambahan,

$$MR2 = Mu - MR1,\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.23)$$

d. dengan berdasarkan pada pasangan kopel gaya tulangan baja tekan dan tarik tambahan, menghitung gaya tekan pada tulangan yang diperlukan (anggap d'=70 mm),

$$ND_2 = \frac{MR2}{\Phi(d-d')},\dots\dots\dots\dots\dots\dots\dots\dots (2.23a)$$

e. dengan ND2=As'.fs',\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.23b)

menghitung fs' sedemikian sehingga As' dapat ditentukan, hal tersebut dapat dilakukan dengan menggunakan letak garis netral dari pasangan gaya beton tekan dan tulangan baja tarik kemudian memeriksa regangan εs' pada tulangan tekan,

$$a = \frac{As_1.fy}{(0,85.fc').b},\dots\dots\dots\dots\dots\dots\dots\dots (2.24)$$

$$c = \frac{a}{\beta_1},\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.25)$$

$$\varepsilon s' = \frac{c-d'}{c}(0,003),\dots\dots\dots\dots\dots\dots\dots\dots (2.26)$$

apabila εs'≥εy tulangan baja tekan telah meluluh pada momen ultimit dan

$$fs' = Fy,\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.27a)$$

sedangkan apabila εs'<εy, menghitung

$$fs' = \varepsilon s'.Es,\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.27b)$$

dan gunakan tegangan tersebut untuk langkah berikutnya,

f. karena $ND_2 = As'.fs'$,

$$As'_{perlu} = \frac{ND_2}{fs'}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.28)$$

maka

g. menghitung $As_{2perlu} = \frac{As'.fs'}{fy}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.29)$

h. menghitung jumlah luas tulangan baja tarik total yang diperlukan,

$$As = As_1 + As_2, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.30)$$

i. memilih batang tulangan baja tekan As',

j. memilih batang tulangan baja tarik As, periksa lebar balok dengan

mengusahakan agar tulangan dapat dipasang dalam satu lapis saja,

$$s = \frac{b - 2.Pb - 2.Ds - n.Dp}{(n-1)}, \dots\dots\dots\dots\dots\dots\dots\dots\dots (2.31)$$

k. memeriksa d aktual dan bandingkan dengan d teoritis, apabila d aktual

sedikit lebih besar berarti rancangan agak konservatif (lebih aman), apabila d

aktual lebih kecil berarti perencanaan kurang aman, dilakukan perencanaan

ulang,

$$d_{aktual} = h - Pb - Ds - 0,5.Dp, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2.32)$$

9. apabila harus direncanakan sebagai balok bertulangan tarik saja:

a. menghitung d = h - 80 mm, hitung nilai k yang diperlukan dengan memakai

persamaan:

$$k = \frac{Mu}{\Phi bd^2},$$

b. menghitung rasio penulangan ρ,

$$\rho = \frac{fc' - \sqrt{(fc')^2 - 2,36.k.fc'}}{1,18.fy},$$

c. menghitung As yang diperlukan,

$$As_{perlu} = \rho bd, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.33)$$

d. menentukan batang tulangan yang akan dipasang, memeriksa ulang tinggi efektif aktual balok dan membandingkan dengan tinggi efektif yang dipakai untuk perhitungan, apabila tinggi efektif aktual lebih tinggi berarti hasil rancangan agak konservatif (berada dalam keadaan lebih aman), sebaliknya apabila tinggi efektif aktual kurang dari tinggi efektif yang diperhitungkan berarti dalam keadaan tidak aman dan harus dilakukan revisi perhitungan,

$$s = \frac{b - 2.Pb - 2.Ds - n.Dp}{(n-1)},$$

$$d_{aktual} = h - Pb - Ds - 0,5.Dp,$$

10. membuat sketsa hasil rancangan.

Prosedur umum perencanaan penulangan sengkang adalah sebagai berikut:

1. menghitung nilai geser berdasarkan diagram geser Vu untuk bentang bersih,

2. menentukan apakah dibutuhkan tulangan sengkang atau tidak, apabila diperlukan sengkang gambarkan diagram Vs,

$$Vc = (\tfrac{1}{6}\sqrt{fc'}).b.d,$$

bila $Vu < \tfrac{1}{2}\Phi Vc$,

maka diperlukan tulangan geser sengkang,

$$Vs_{perlu} = \frac{Vu}{\Phi} - Vc, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.34)$$

3. menentukan bagian dari bentangan yang memerlukan tulangan sengkang,

4. memilih ukuran diameter batang tulangan sengkang (gunakan sengkang vertikal), mengikuti petunjuk-petunjuk yang berkaitan dengan anggapan-anggapan yang berlaku dan analisis yang harus dilakukan,

$$Av = \frac{1}{4} . \pi . Ds^2, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.35)$$

5. menghitung kebutuhan jarak spasi sengkang berdasarkan kekuatan yang mampu disumbangkan oleh penulangan sengkang,

$$s_{perlu} = \frac{Av . fy . d}{Vs}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.36)$$

6. menentukan pola dan tata letak sengkang secara keseluruhan dan membuat gambar sketsanya.

Langkah-langkah perencanaan penulangan torsi pada umumnya dilakukan dengan urutan sebagai berikut:

1. menentukan apakah momen torsi berupa torsi keseimbangan atau keserasian,

2. menentukan penampang kritis, umumnya berjarak d dari muka tumpuan, menghitung momen torsi rencana Tu,

apabila $Tu < \Phi\left[(\frac{1}{24}\sqrt{fc'})\sum x^2 y\right], \dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (3.37)$

maka efek torsi boleh diabaikan,

3. menghitung kuat torsi nominal Tc badan beton sederhana sebagai berikut:

$$Tc = \frac{(\frac{1}{15}\sqrt{fc'})\sum x^2 y}{\sqrt{1+\left[\frac{0,4.Vu}{Ct.Tu}\right]^2}}, \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (3.38)$$

$$\text{dimana } Ct = \frac{bw.d}{\sum x^2 y}, \quad \dots\dots\dots\dots\dots \quad (2.39)$$

apabila komponen struktur mengalami gaya tarik aksial cukup besar tulangan

torsi harus direncanakan untuk memikul momen torsi total dan nilai Tc

dikalikan dengan;

$$\left[1+0,30\frac{Nu}{Ag}\right], \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.40)$$

dimana Nu bernilai negatif untuk tarik,

4. memeriksa apakah Tu > φTc, apabila tidak efek torsi boleh diabaikan, apabila

Tu>φTc hitunglah Ts, yaitu momen torsi yang harus ditahan oleh tulangan,

dengan batasan sebagai berikut:

untuk torsi keseimbangan Ts=Tn-Tc, $\dots\dots\dots\dots\dots\dots\dots$ (2.41)

dan untuk torsi keserasian $Ts = (\frac{1}{3}\sqrt{fy'})\sum \frac{1}{3}x^2 y - Tc, \dots\dots\dots\dots$ (2.42)

dipakai yang terkecil, sesuai dengan SK SNI T-15-1991-03 pasal 3.4.6

ditentukan bahwa untuk suatu komponen struktur yang menerima beban

kombinasi geser dan torsi, pengaruh torsi harus diperhitungkan bersama geser

dan lentur,

apabila $Tu > \Phi[(\frac{1}{20}\sqrt{fy'})\sum x^2 y], \dots\dots\dots\dots\dots\dots$ (2.43)

5. nilai Tn tidak kurang dari;

$$\frac{Tu}{\Phi}, \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.44)$$

dan apabila Ts > 4Tc penampang harus diperbesar,

6. memilih tulangan sengkang tertutup sebagai tulangan melintang dan gunakan diameter minimum D10, apabila jarak spasi sengkang s, hitunglah luas sengkang untuk torsi setiap satuan jarak lengan dengan menggunakan persamaan sebagai berikut:

$$\frac{At}{s} = \frac{Ts}{\alpha_t \cdot x_1 \cdot y_1 \cdot fy}, \dots \dots \dots \dots \dots \dots \dots \quad (2.45)$$

7. menghitung penulangan geser yang diperlukan untuk Av tiap satuan jarak di dalam penampang melintang, dengan Vu adalah gaya geser luar rencana pada penampang kritis, sedangkan Vc adalah kuat geser nominal badan beton dan Vs adalah gaya geser yang harus dipikul oleh sengkang:

$$\frac{Av}{s} = \frac{Vs}{fy \cdot d}, \dots \dots \dots \dots \dots \dots \dots \quad (2.46)$$

dimana Vs = Vn - Vc, $\dots \dots \dots \dots \dots \dots \dots$ (2.47)

$$Vc = \frac{(\frac{1}{6}\sqrt{fc'})bw \cdot d}{\sqrt{1 + \left[2,5.Ct\frac{Tu}{Vu}\right]^2}}, \dots \dots \dots \dots \quad (2.48)$$

nilai Vn tidak boleh lebih dari Vu/ϕ

8. menghitung luas tulangan memanjang Al yang diperlukan untuk torsi dimana:

$$Al = 2At\frac{x_1 + y_1}{s}, \dots \dots \dots \dots \dots \dots \quad (2.49a)$$

$$Al = \left[\frac{2,8.x.s}{fy}\left[\frac{Tu}{Tu + \frac{Vu}{3Ct}}\right] - 2At\right]\frac{x_1 + y_1}{s}, \dots \dots \dots \dots \quad (2.49b)$$

digunakan mana yang lebih besar dan apabila dihitung menggunakan persamaan

yang kedua tidak boleh melebihi:

$$Al = \left[\frac{2.8.x.s}{fy}\left[\frac{Tu}{Tu + \frac{Vu}{3Ct}}\right] - \frac{2}{3}\left(\frac{bw.s}{fy}\right)\right]\frac{x_1 + y_1}{s}, \dots\dots\dots\dots\dots\dots \quad (2.49c)$$

9. merencanakan tulangannya dan membuat sketsa rancangannya.

2.1.3 Perencanaan elemen kolom

Langkah-langkah perencanaan kolom pada umumnya adalah sebagai berikut:

1. menentukan kekuatan bahan-bahan yang dipakai, tentukan rasio penulangan

ρ_g yang direncanakan apabila diinginkan,

2. memeriksa kelangsingan kolom,

$$K = \frac{kl}{r}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.50)$$

jika $K \le 34 - 12\left(\frac{M1}{M2}\right)$, maka efek kelangsingan dapat diabaikan,

bila efek kelangsingan diperhitungkan:

$$Cm = 0,6 + 0,4.\left(\frac{M1}{M2}\right) \ge 0,4 \dots\dots\dots\dots\dots\dots\dots \quad (2.51)$$

$$EI = \frac{Ec.Ig}{2,50.(1 + \beta_d)}, \dots\dots\dots\dots\dots\dots\dots \quad (2.52)$$

$$Pc = \frac{\pi^2.EI}{(kl)^2}, \dots\dots\dots\dots\dots\dots\dots\dots \quad (2.53)$$

$$\delta_b = \frac{Cm}{1 - \frac{Pu}{\Phi Pc}}, \dots\dots\dots\dots\dots\dots\dots\dots \quad (2.54)$$

3. menentukan beban rencana terfaktor Pu,

4. menentukan luas kotor penampang kolom yang diperlukan Ag,

untuk penampang persegi:

$$Ag = b.h, \dotfill (2.55a)$$

untuk penampang lingkaran:

$$Ag = \frac{1}{4}.\pi.D^2, \dotfill (2.55b)$$

5. memilih bentuk dan ukuran penampang kolom, gunakan bilangan bulat,

6. menghitung beban yang dapat didukung oleh beton dan batang tulangan pokok memanjang, menentukan luas penampang batang tulangan baja memanjang yang diperlukan, kemudian memilih batang tulangan yang akan dipakai,

untuk penampang persegi:

$$\Phi P_{nb} = \Phi[0,85.fc'.a_b.b + As'.fs' - As.fy], \dotfill (2.56a)$$

jika $\Phi P_{nb} > Pu$,

$$m = \frac{fy}{0,85.fc'}, \dotfill (2.57)$$

$$Pn = 0,85.fc'.b.d.\left[\frac{h-2.e}{2.d} + \sqrt{(\frac{h-2.e}{2.d})^2 + 2.m.\rho.(1-\frac{d'}{d})}\right], \dotfill (2.58a)$$

jika $\Phi P_{nb} \le Pu$,

$$Pn = \frac{As'.fy}{\frac{e}{(d-d')}+0,50} + \frac{b.h.fc'}{\frac{3.h.e}{d^2}+1,18}, \dotfill (2.58b)$$

jika $\Phi Pn < Pu$,

maka perencanaan diulang kembali,

untuk penampang lingkaran:

$$\Phi P_{nb} = \Phi[0,85.fc'.a_b.b_{ek} + As'.fs' - As.fy], \dotfill (2.56b)$$

jika $\Phi P_{nb} > Pu$,

$$m = \frac{fy}{0,85.fc'},$$

$$\rho s = \frac{2.As}{Ag}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.59)$$

jika $\Phi P_{nb} \le Pu$,

$$Pn = 0,85.fc'.D^2.\left[\sqrt{(\frac{0,85.e}{D}-0,38)^2 + \frac{\rho s.m.Ds}{2.5.D}} - (\frac{0,85.e}{D}-0,38)\right], \dots \quad (2.60a)$$

jika $\Phi Pn < Pu$,

$$Pn = \frac{As.fy}{\frac{3.e}{Ds}+1,0} + \frac{Ag.fc'}{\frac{9,6.Ds}{(0,8.D+0,67.Ds)^2}+1,18}, \dots\dots\dots\dots \quad (2.60b)$$

maka perencanaan diulang kembali,

7. merancang tulangan pengikat, dapat berupa tulangan sengkang atau spiral,

$$As = \frac{1}{4}.\pi.ds^2, \dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.61)$$

bila pengikat spiral:

untuk penampang lingkaran:

$$Dc = D - 2.Pb, \dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.62)$$

$$Ac = \frac{1}{4}.\pi.Dc^2, \dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.63a)$$

$$\rho_s = 0,45.\left[\frac{Ag}{Ac}-1\right].\frac{fc'}{fy}, \dots\dots\dots\dots\dots\dots\dots \quad (2.64)$$

$$s = \frac{4.As.(Dc-ds)}{Dc^2(\rho_s)}, \dots\dots\dots\dots\dots\dots\dots\dots \quad (2.65a)$$

untuk penampang persegi:

$$Ac = (b-2.Pb).(h-2.Pb), \dots\dots\dots\dots\dots\dots \quad (2.63b)$$

$$\rho_s = 0,45.\left[\tfrac{Ag}{Ac} - 1\right]\frac{fc'}{fy},$$

$$s = \frac{As.2.((b-2.Pb-ds)+(h-2.Pb-ds))}{Ac.(\rho_s)}, \dots \dots \quad (2.65b)$$

bila berupa pengikat sengkang:

$$s = 16.Dp, \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \quad (2.66a)$$

$$s = 48.ds, \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \quad (2.66b)$$

untuk penampang lingkaran:

$$\text{bila } h_{ek} \geq b_{ck} \rightarrow s = b_{ck}, \dots \dots \dots \dots \dots \dots \quad (2.66c)$$

$$\text{bila } h_{ek} < b_{ek} \rightarrow s = h_{ck}, \dots \dots \dots \dots \dots \dots \quad (2.66d)$$

untuk penampang persegi:

$$\text{bila } h \geq b \rightarrow s = b, \dots \dots \dots \dots \dots \dots \dots \dots \quad (2.66e)$$

$$\text{bila } h < b \rightarrow s = h, \dots \dots \dots \dots \dots \dots \dots \dots \quad (2.66f)$$

8. membuat sketsa rancangannya.

2.1.4 Perencanaan elemen fondasi

Langkah-langkah perencanaan fondasi telapak empat persegi panjang adalah

sebagai berikut:

1. menentukan syarat-syarat batasan perencanaan dan beban rencana,

2. menentukan nilai berat rata-rata tanah dan beton fondasi (qr), menghitung

tekanan tanah yang timbul di bawah fondasi,

$$q_1 = df.qr, \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \quad (2.67)$$

3. menghitung tekanan tanah ijin efektif untuk mendukung beban total,

$$q_t = \bar{q} - q_1, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.68)$$

4. menghitung luas bidang telapak fondasi,

$$A_{perlu} = \frac{Pu}{q_t}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.69)$$

5. menentukan ukuran lebar bidang telapak fondasi b,

$$l = \frac{A_{perlu}}{b}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.70)$$

tentukan ukuran panjang yang dipakai l, hitung luas bidang telapak fondasi aktual,

$$A_p = b.l, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.71)$$

6. menghitung tekanan tanah aktual,

$$pu = \frac{Pu}{A_p}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.72)$$

7. menentukan tebal fondasi dan tebal selimut beton,

hitung d = t - pb - $\varnothing$pk, $\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots$ (2.73)

8. untuk arah kerja dua arah:

$$B = b_{kolom} + 2(\tfrac{1}{2}d), \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.74)$$

a. geser total terfaktor yang bekerja pada penampang kritis adalah:

$$Vu = pu(A_p - B^2), \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.75a)$$

b. kuat geser beton adalah:

$$Vc = (1 + \tfrac{2}{\beta c})(2\sqrt{fc'})b_0.d, \dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.76a)$$

dimana $\beta c = \dfrac{l_{kolom}}{b_{kolom}}$, ... (2.77)

$b_0 = 4.B$, ... (2.78)

dan nilai tersebut tidak boleh lebih besar dari:

$Vc = (4\sqrt{fc'})b_0.d$, ... (2.76b)

$Vn = \phi Vc$, ... (2.79)

dimana $\phi = 0,6$, ... (2.80)

c. memeriksa $Vu \leq \phi Vn$,

9. untuk arah kerja satu arah:

$G = \dfrac{(1 - b_{kolom})}{2} - d$, ... (2.81)

a. geser total terfaktor yang bekerja pada penampang kritis adalah:

$Vu = pu.b.G$, ... (2.75b)

b. kuat geser beton adalah:

$Vc = (\tfrac{1}{6}\sqrt{fc'})b.d$, ... (2.76c)

$\Phi Vn = \Phi Vc$,

dimana $\Phi = 0,6$

c. memeriksa $Vu \leq \phi Vn$,

10. memeriksa anggapan yang digunakan pada langkah awal mengenai berat tanah

berikut fondasi:

$q = 2,3.t + 15,7.(df - t)$, ... (2.82)

apabila $q > q_1$ revisi hitungan,

11. menghitung momen rencana:

    a. arah memanjang:

$$F = \frac{(l - l_{kolom})}{2}, \quad Mu = pu.\,F.\,(\tfrac{1}{2}F).\,b, \quad\dots\dots\dots\dots\dots\dots \text{(2.83a)}$$

    b. arah lebar:

$$F = \frac{(b - b_{kolom})}{2}, \quad Mu = pu.\,F.\,(\tfrac{1}{2}F).\,l, \quad\dots\dots\dots\dots\dots \text{(2.83b)}$$

12. merencanakan batang tulangan baja:

$$k = \frac{Mu}{\Phi bd^2},$$

$$\rho = \frac{fc' - \sqrt{(fc')^2 - 2,36.\,k.\,fc'}}{1,18.\,fy},$$

dimana $\rho_{min} \leq \rho \leq \rho_{maks}$,

$$As = \rho bd,$$

13. memeriksa jarak tulangan:

$$s = \frac{A\phi.\,b}{As}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(2.84)}$$

dimana $s_{min} \leq s \leq s_{maks}$,

$$jumlah\ \ batang\ (jbt) = \frac{b}{s}, \dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(2.85)}$$

$$\beta = \frac{l}{b}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(2.86)}$$

$$z = \frac{2}{\beta + 1}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(2.87)}$$

$$jb = z. \, jbt, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.88)$$

dipasang merata dalam rentang b sisanya dipasang dibagian luar dari rentang, untuk penulangan arah lebar gunakan momen rencana Mu arah lebar dan tulangan baja dipasang merata dalam arah lebar,

14. $j = \sqrt{\dfrac{A_p}{A_k}} \le 2,$ .... (2.89)

15. kuat tumpuan fondasi $Ptp = \Phi(0,85. \, fc'_p . \, A_k).(j),$ .... (2.90)

16. kuat tumpuan kolom $Ptk = \Phi(0,85. \, fc'_k . A_k),$ .... (2.91)

17. dimana $Pu \le Ptk \le Ptp,$

18. penulangan penampang pasak ("dowel"):

   a. As perlu $= 0,005. A_k,$ .... (2.92)

   menentukan batang tulangannya dan hitung $As_{tersedia},$

   b. panjang penyaluran:

$$ldb = \dfrac{\phi_{pk} . \, fy}{4\sqrt{fc'_p}}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.93)$$

$$ldb_{min} = 0,04. \, \phi_{pk} . \, fy, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.94)$$

$$ld_{min} = 200mm, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.95)$$

$$n = \dfrac{As_{perlu}}{As_{tersedia}}, \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (2.96)$$

   c. $ld = ldb.n,$ .... (2.97)

2.2 Program Microfeap

2.2.1 Umum

"Software" Microfeap II dikembangkan oleh K.N. Worsak, A. Somporn dan U. Sarun dari Asian Institut of Technology di Bangkok, sampai sekarang perkembangannya sudah sampai dengan versi 3.1. Program Microfeap II terdiri dari enam module, dari ke enam module tersebut yang dipasarkan hanya P1-Module dan P2-Module karena yang dianggap sudah valid.

Data yang diperlukan untuk analisis struktur dengan program Microfeap II (P1-Module) adalah:

1. data nodal berupa jumlah nodal, data koordinat dan data dukungan,

2. data elemen berupa jumlah elemen, jumlah set material struktur, data titik hubung masing-masing elemen, kode "hinge" (jika struktur mempunyai "hinge") dan data material penyusun struktur,

3. data pembebanan dapat berupa beberapa kasus pembebanan yang berupa data beban nodal, data "displacement" pada nodal (jika ada) dan data pembebanan pada elemen yang berupa data beban terpusat, data beban merata, data beban volume (jika ada), data beban temperatur (jika ada).

Pada proses penyelesaian atau solusi dan eksekusi dapat diberikan faktor pembebanan sesuai dengan kebutuhan, selain itu elemen juga dapat dibagi menjadi beberapa pias sehingga diperoleh gaya-gaya yang diperlukan.

Hasil hitungan setelah proses eksekusi berupa "displacement" dari berbagai kasus pembebanan maupun kombinasinya, gaya aksial, gaya geser, momen, reaksi tumpuan dan volume material. Hasil hitungan dapat didokumentasi pada layar, printer dan file teks, juga dapat ditampilkan dalam bentuk grafis.

2.2.2 Bekerja dengan Microfeap II (P1-Module)

Untuk dapat bekerja dengan program Microfeap II (P1-Module) harus dipersiapkan perangkat keras yang mendukung, minimal perangkat keras tersebut yaitu:

1. komputer IBM-PC/XT/AT atau kompitibel dengan memori RAM minimal 256 KB, Math-Processor tidak harus ada,

2. dua "disk-Drive" atau "HardDisk",

3. monitor monochrome, hercules atau CGA/VGA,

4. "printer" atau "ploter", tidak harus ada.

Microfeap II (P1-Module) mempunyai kemampuan:

1. untuk analisis struktur statis rangka-bidang dan kerangka-bidang/portal,

2. untuk analisis struktur statis dengan kombinasi "truss", "frame" dan "shear-wall",

3. analisis berdasarkan ketelitian "double-precission".

Semua satuan data isian Microfeap harus konsisten. File data yang tersimpan dalam disket kerja ada beberapa macam, sesuai dengan nama yang diberikan dan ekstension sesuai data yang tersimpan sebagai berikut :

Tabel 2.1 Ekstensi file data 1

Input	xxxxxxxx.DIR	Directory dari semua file data.
	Xxxxxxxx.CON	Parameter untuk kontrol proyek.
	Xxxxxxxx.COO	Data koordinat.
	Xxxxxxxx.ELE	Data elemen, material kode "hinge"/sendi, tambahan potongan.
	Xxxxxxxx.BOU	Data dukungan ("boundary").
	Xxxxxxxx.LCn	Data directory untuk kondisi pembebanan #n.
	xxxxxxxx.Fn	Gaya/"setlement" pada nodal untuk kondisipembebanan #n.
	xxxxxxxx.Pn	Data beban terpusat pada elemen untuk kondisi pembebanan #n.
	xxxxxxxx.Un	Data beban merata pada elemen untuk kondisi pembebanan #n.
	xxxxxxxx.Vn	Data beban volume pada elemen untuk kondisi pembebanan #n.
	xxxxxxxx.Tn	Data beban temperatur pada elemen untuk kondisi pembebanan #n.
Solusi	xxxxxxxx.Dn	Hasil "displacement" nodal untuk kondisi pembebanan #n.
	xxxxxxxx.DCO	Hasil kombinasi "displacement".
	Xxxxxxxx.Si	Hasil kombinasi blok tegangan #I, jumlah elemen blok tegangan sesuai dengan jumlah elemen dan penambahan potongan tiap elemen.
	Xxxxxxxx.DFA	Hasil reaksi dukungan dan nilai volume untuk masing-masing material.

2.3 Pemrograman dalam bahasa Pascal

Kegagalan suatu program komputer terjadi jika susunan dan aturan instruksi yang digunakan terlalu rumit. Pendekatan disiplin pemrograman adalah mempersiapkan algoritma/bagan alir yang akan menjelaskan struktur prosedur perintah-perintah kepada komputer.

Hal utama dalam pembuatan program Pascal adalah:

1. pembuatan algoritma,

2. pembuatan bagan alir ("flowchart"),

3. pembuatan program dalam bahasa Pascal.

2.3.1 Pembuatan algoritma

Bagian yang sangat penting untuk suksesnya pekerjaan terletak pada usaha membuat urutan/langkah penyelesaian secara rinci atau metode penyelesaian. Usaha ini disebut menulis algoritma bagi program komputer.

2.3.2 Pembuatan bagan alir ("flowchart")

Bagan alir merupakan diagram dari suatu algoritma, tujuan pembuatan bagan alir adalah usaha mempermudah menulis program, terutama pada penyelesaian pekerjaan yang berulang-ulang sehingga algoritmanya sangat panjang.

Simbol-simbol kotak dan pengertian yang acap digunakan pada suatu bagan alir adalah:

Data = simbol untuk menulis data/masukan maupun hasil/ output/dapatan,

Document = simbol tempat untuk menulis hasil proses eksekusi bagi dokumentasi,

Card = simbol bagi pembacaan data/input yang menggunakan kartu yang dilubangi ("punch card"),

Process = simbol memproses perintah atau pernyataan pada program,

Predefined process = simbol untuk eksekusi dengan menggunakan unit subprogram,

Terminator = menandakan awal dan akhir suatu program,

= simbol untuk melakukan tindakan pilihan berdasarkan terpenuhi tidaknya suatu syarat yang ditetapkan,
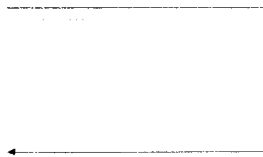
= notasi untuk tempat penjelasan. Dihubungkan ke bagan alir yang memerlukan penjelasan tambahan,
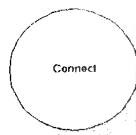
= penghubung. Menandai garis alir ke atau dari bagian tertentu bagan alir yang ditulis terpisah karena terbatasnya tempat penulisan baik pada satu bagian halaman maupun bagian yang ditulis di halaman yang berbeda.

Garis dengan tanda panah (————→) yang menghubungkan simbol-simbol menunjukkan arah aliran proses disebut garis alir.

2.3.3 Penulisan program

Program merupakan algoritma yang ditulis dalam bahasa komputer, dalam hal ini adalah bahasa Pascal. Didalam menulis program, semua perintah mutlak dirinci agar dilaksanakan oleh komputer, sesuai dengan prosedur dan aturan perintah-perintah bahasa Pascal.

Pertimbangan berikut dapat menjadi acuan untuk penulisan program Pascal yang baik:

1. program harus mudah dibaca dan mudah dipahami,

2. penulisan program diarahkan pada proses kontrol yang dimulai pada pekerjaan awal sampai penyelesaian akhir secara berurutan. Hal ini biasanya tergantung dari pilihan struktur program yang direncanakan,

3. menulis kelompok perintah untuk satu bagian penyelesaian pekerjaan dengan tata penulisan tertentu seperti memulai dari kolom yang berbeda dari kelompok perintah lainnya. Ini mempermudah usaha perbaikan apabila terjadi kesalahan-kesalahan,

4. pemikiran untuk alternatif bentuk struktur penulisan program yang berbeda, bila ternyata penulisan program yang digarap terlalu rumit,

5. tentukan lebih dahulu program penyajian data (masukan dan keluaran) untuk memudahkan pemeriksaan,

6. penulisan program sebagai semacam koleksi dari subprogram mengurangi kemungkinan kesalahan yang fatal dari penulisan, karena subprogram dapat merupakan program yang kemungkinan pemeriksaan kesalahannya tidak bergantung kepada struktur total penulisan program utama,

7. usahakan program yang sifatnya dapat disisipi program pemeriksaan, sehingga pada percobaan eksekusi program akan mudah memeriksa bagian program yang keliru.

Suatu program komputer yang baik mampu memberikan dokumentasi program yang terbaca oleh pemakainya. Ini disebut program yang portabel dan terpelihara.

Struktur program dalam bahasa Pascal mempunyai hirarki tatanan program yang terbagi dalam tiga bagian, yaitu:

1. Judul program.

Judul program dalam bahasa Pascal merupakan suatu pernyataan unik yang ditulis sebagai:

PROGRAM nama_program;

Kata PROGRAM; merupakan sintak bahasa yang baku dari bahasa Pascal dan mutlak harus ditulis seperti adanya, sedangkan kalimat nama_program merupakan indikasi untuk menulis nama program.

2. Deklarasi.

Dekalrasi dari program bahasa Pascal merupakan pernyataan yang menetapkan data dan obyek untuk digunakan dalam eksekusi program. Terdapat enam jenis deklarasi yang umum digunakan, yaitu:

a. deklarasi LABEL,

b. deklarasi CONST,

c. deklarasi TYPE,

d. deklarasi VAR,

e. deklarasi PROCEDURE,

f. deklarasi FUNCTION,

yang penulisannya di dalam tatanan program sumber (untuk Turbo Pascal/perangkat lunak bahasa Pascal) tidak perlu berurutan seperti di atas, kecuali dalam penulisan yang menggunakan bahasa Pascal yang baku.

3. Badan program utama.

Bagian badan program utama terdiri dari uraian rinci langkah-langkah eksekusi bagi data dan deklarasi yang telah dinyatakan dalam bagian deklarasi. Langkah-langkah eksekusi ini dinyatakan dalam pernyataan-pernyataan yang disusun berdasarkan algoritma/bagan alir. Secara sintak bahasa Pascal, pernyataan-pernyataan ini ditulis antara pernyataan BEGIN dan END. Tanda ; (titik koma) mengakhiri setiap pernyataan, kecuali pernyataan BEGIN dan tanda . (titik) setelah END adalah baku dan mutlak ditulis dalam setiap program. Dalam ketentuan bahasa Pascal, penjelasan program dapat dibuat diantara tanda { dan } atau tanda * dan *, penjelasan ini tidak berpengaruh pada eksekusi program, akan tetapi penting bagi pemahaman program.

BAB III

PROGRAM DISAIN ELEMEN STRUKTUR BETON

3.1 Program Utama

Program disain elemen struktur beton dengan "inputing" data Microfeap terdiri dari 36 buah program yaitu:

LOGO.EXE, DB.EXE, DBP.EXE, DE.EXE, GPL.EXE, GBL.EXE, GKO.EXE, GPO.EXE, DDPL.EXE, DDBL.EXE, DDKO.EXE, DDPO.EXE, PPL.EXE, PBL.EXE, PKO.EXE, PPO.EXE, TDPL.EXE, TDBL.EXE, TDKO.EXE, TDPO.EXE, CDPL.EXE, CDBL.EXE, CDKO.EXE, CDPO.EXE, TPL.EXE, TBL.EXE, TKO.EXE, TPO.EXE, CPL.EXE, CBL.EXE, CKO.EXE, CPO.EXE, SKETSPLT.EXE, SKETSBLK.EXE, SKETSKLM.EXE, SKETSPON.EXE, dan UII-CDP.EXE.

3.1.1 Algoritma dan bagan alir program

Untuk pembuatan program utama dibuat algoritma dan bagan alir program utama sebagai berikut:

1. Algoritma program utama.

Algoritma atau langkah penyelesaian program utama perencanaan elemen-elemen struktur beton bertulang adalah sebagai berikut:

a. menampilkan menu pilihan program disain elemen struktur beton yang dapat dieksekusi,

b. membaca pilihan program yang akan dieksekusi,

c. memproses program yang dipilih,

d. kembali ke menu pilihan.

2. Bagan alir program utama.
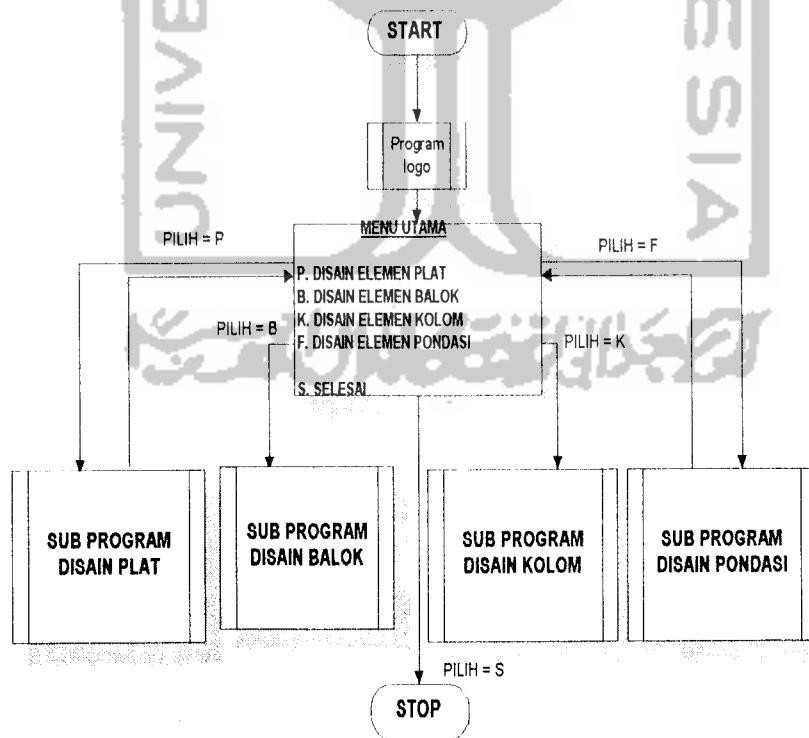
Gambar 3.1 Bagan alir program utama

3.1.2 Listing program

Mengacu pada algoritma dan bagan alir program utama di atas di buat

program sebagai berikut:

```
PROGRAM UTAMA;
{$M $4000,0,0}
Uses DOS,Crt,PRINTER;

TYPE
   FDAT = RECORD
        NPROY : string[19];
        NFDAT : string[8];
        NaFil : string[12];
        ENG   : string[19];
      END;
   FDMC = RECORD
        ELEM : INTEGER;
        SEC  : REAL;
        AX   : REAL;
        SHE  : REAL;
        MOM  : REAL;
      END;
VAR
   FTIPE,DATAMIC              : TEXT;
   NFILE              : FILE OF FDAT;
   RECORDFDAT              : FDAT;
   FMICRO             : FILE OF FDMC;
   RECORDFDMC             : FDMC;
   JTIPE,ELEMEN,NOREC,ISI,ADA,JUM,I : INTEGER;
   SECTION,AXIAL,SHEAR,MOMENT     : REAL;
   YA,PIL             : CHAR;
   PILIH,KOSONG             : BYTE;
   BENAR              : BOOLEAN;
   EL              : STRING[7];
   NFDA,NFD             : STRING[8];
   FTIP,NaFile,NaF,FBC        : STRING[12];
   NPRO,EN            : STRING[19];
   FTP,BBN,BBT,BEL,BGM,BDD,BLK,DATA,
   DIRAK,DIREK             : STRING;


PROCEDURE AKTIF;
BEGIN
   YA:='U'; ASSIGN(NFILE,'FILEDATA.DAT'); {$I-} RESET(NFILE); {$I+}
   IF IORESULT=0 THEN BEGIN JUM:=FILESIZE(NFILE);
      WITH RECORDFDAT DO BEGIN
         WHILE UPCASE(YA)='U' DO BEGIN
            CLRSCR; TEXTCOLOR(10);
            GotoXY(10,4); Write('FILE DATA YANG SEDANG AKTIF : ',NFDA);
            GotoXY(10,5); Write('DIRUBAH DENGAN FILE DATA    : ');
            TEXTCOLOR(11);
            GOTOXY(10,7); WRITE('U : ulang  L : lanjutkan ===> ');
            TEXTCOLOR(10); GOTOXY(1,9); I:=0;
            REPEAT
               I:=I+1; SEEK(NFILE,I-1); READ(NFILE,RECORDFDAT);
               WRITE(' ',RECORDFDAT.NFDAT);
            UNTIL I=JUM;
            GOTOXY(40,5); READLN(NFD); IF NFD=" THEN BEGIN GOTOXY(40,5);
            WRITE(NFDA); END; BENAR:=TRUE;
            WHILE BENAR DO BEGIN
               TEXTCOLOR(11); GOTOXY(41,7); ya:=READKEY; write(ya);
               IF UPCASE(YA)='U' THEN BENAR:=FALSE;
```

```pascal
            IF UPCASE(YA)='L' THEN BENAR:=FALSE; END;
            TEXTCOLOR(10); END; END;
     IF NFD<>" THEN BEGIN NFDA:=NFD;
       WHILE NOT EOF(NFILE) DO BEGIN READ(NFILE,RECORDFDAT);
         IF RECORDFDAT.NFDAT=NFDA THEN NaFile:=RECORDFDAT.NaFil; END;
       END; CLOSE(NFILE);
     END
     ELSE BEGIN
       CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('File Data Belum Pernah Dibuat !');
       WRITE(^G); READKEY; TEXTCOLOR(10); END;
END;


PROCEDURE BARU;
BEGIN
 YA:='U'; ASSIGN(NFILE,'FILEDATA.DAT'); {$I-} RESET(NFILE); {$I+}
 IF IORESULT <> 0 THEN REWRITE(NFILE); JUM:=FILESIZE(NFILE);
 WHILE UPCASE(YA)='U' DO BEGIN
  CLRSCR; TEXTCOLOR(10); GotoXY(20,4);
  WRITE(CHAR(201)); FOR I:=1 TO 46 DO WRITE(CHAR(205)); WRITE(CHAR(187));
  GotoXY(20,5); Write(CHAR(186),'   ');TEXTCOLOR(13);
  WRITE('PROGRAM DISAIN ELEMEN STRUKTUR BETON');TEXTCOLOR(10);
  WRITE('   ',CHAR(186));
  GotoXY(20,6); WRITE(CHAR(204)); FOR I:=1 TO 46 DO WRITE(CHAR(205));
  WRITE(CHAR(185)); GotoXY(20,7);
  Write(CHAR(186),' Nama Proyek          :                ',CHAR(186));
  GotoXY(20,8); Write(CHAR(186),
  ' Nama File Data       :            ',CHAR(186)); GotoXY(20,9);
  Write(CHAR(186),' File Data Microfeap II :            ',CHAR(186));
  GotoXY(20,10); Write(CHAR(186),' Engineer           :            ',
  CHAR(186)); GotoXY(20,11);
  WRITE(CHAR(200)); FOR I:=1 TO 46 DO WRITE(CHAR(205)); WRITE(CHAR(188));
  TEXTCOLOR(11); GOTOXY(20,14); WRITE('U : ulang   L : lanjutkan ===> ');
  TEXTCOLOR(10); KOSONG:=0; GOTOXY(47,7); READLN(NPRO); IF NPRO=" THEN KOSONG:=1;
  GOTOXY(47,8); READLN(NFD); IF NFD=" THEN KOSONG:=1; GOTOXY(47,9); READLN(NaF);
  IF NaF=" THEN KOSONG:=1; GOTOXY(47,10); READLN(EN); IF EN=" THEN KOSONG:=1;
  I:=0; ADA:=0;
  WITH RECORDFDAT DO BEGIN
   WHILE NOT EOF(NFILE) DO BEGIN READ(NFILE,RECORDFDAT);
    IF NFD=RECORDFDAT.NFDAT THEN BEGIN
     ADA:=1; NOREC:=I; TEXTCOLOR(11); GOTOXY(20,13);
     WRITE('File data sudah ada & akan ditumpangi !'); WRITE(^G);
     TEXTCOLOR(10); END; I:=I+1; END; BENAR:=TRUE;
   WHILE BENAR DO BEGIN
    TEXTCOLOR(11); GOTOXY(51,14); ya:=READKEY; write(ya);
    IF UPCASE(YA)='U' THEN BENAR:=FALSE;
    IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10);
   IF ADA = 0 THEN NOREC:=FILESIZE(NFILE);
   IF (KOSONG=0) THEN BEGIN
    NFDA:=NFD; NPROY:=NPRO; NFDAT:=NFD; NaFil:=NaF; ENG:=EN;
    SEEK(NFILE,NOREC); WRITE(NFILE,RECORDFDAT); NaFile:=NaFil; END; END;
  END; CLOSE(NFILE);
 IF KOSONG=0 THEN BEGIN
  FBC:=NFDA+'.DMC'; ASSIGN(FMICRO,FBC); {$I-} RESET(FMICRO); {$I+}
  IF IORESULT<>0 THEN REWRITE(FMICRO); ASSIGN(DATAMIC,NaFile); Reset(Datamic);
  While Not Eof(Datamic) Do Begin
   Readln(Datamic,Elemen,Section,Axial,Shear,Moment);
   WITH RECORDFDMC DO BEGIN
     ELEM := ELEMEN; SEC := SECTION; AX := AXIAL; SHE := SHEAR;
     MOM := MOMENT; WRITE(FMICRO,RECORDFDMC); END;
  END; CLOSE(DATAMIC); CLOSE(FMICRO); END;
 END;


PROCEDURE RUBAH;
BEGIN
 YA:='U'; ASSIGN(NFILE,'FILEDATA.DAT'); {$I-} RESET(NFILE); {$I+}
 IF IORESULT = 0 THEN BEGIN JUM:=FILESIZE(NFILE);
  WITH RECORDFDAT DO BEGIN I:=1;
   WHILE NOT EOF(NFILE) DO BEGIN READ(NFILE,RECORDFDAT);
```

```
IF RECORDFDAT.NFDAT=NFDA THEN BEGIN NOREC:=I-1;
 WHILE UPCASE(YA)='U' DO BEGIN
  CLRSCR; GotoXY(20,4);
  WRITE(CHAR(201)); FOR I:=1 TO 46 DO WRITE(CHAR(205)); WRITE(CHAR(187));
  GotoXY(20,5); Write(CHAR(186),'   ');TEXTCOLOR(13);
  WRITE('PROGRAM DISAIN ELEMEN STRUKTUR BETON');TEXTCOLOR(10);
  WRITE('   ',CHAR(186));
  GotoXY(20,6); WRITE(CHAR(204)); FOR I:=1 TO 46 DO WRITE(CHAR(205));
  WRITE(CHAR(185)); GotoXY(20,7);
  Write(CHAR(186),' Nama Proyek          :          ',CHAR(186));
  GotoXY(20,8); Write(CHAR(186),' File Data Microfeap II :         ',
  CHAR(186)); GotoXY(20,9);
  Write(CHAR(186),' Engineer           :          ',CHAR(186));
  GotoXY(20,10); WRITE(CHAR(200)); FOR I:=1 TO 46 DO WRITE(CHAR(205));
  WRITE(CHAR(188)); TEXTCOLOR(11); GOTOXY(20,12);
  WRITE('U : ulang  L : lanjutkan ===> '); TEXTCOLOR(10);
  GOTOXY(47,7); WRITE(NPROY); GOTOXY(47,8); WRITE(NaFil); GOTOXY(47,9);
  WRITE(ENG);
  GOTOXY(47,7); READLN(NPRO);IF NPRO<>'' THEN NPROY:=NPRO; GOTOXY(47,8);
  READLN(NaF); IF NaF<>'' THEN NaFil:=NaF; GOTOXY(47,9); READLN(EN);
  IF EN<>'' THEN ENG:=EN; BENAR:=TRUE;
  WHILE BENAR DO BEGIN
     TEXTCOLOR(11); GOTOXY(51,12); ya:=READKEY; write(ya);
     IF UPCASE(YA)='U' THEN BENAR:=FALSE;
     IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10);
  END; SEEK(NFILE,NOREC); WRITE(NFILE,RECORDFDAT); END; I:=I+1; END;
 END; CLOSE(NFILE);
 END
 ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE('File Data Belum Pernah Dibuat !'); WRITE(^G); READKEY; TEXTCOLOR(10);
 END;
END;


PROCEDURE FILEDATA;
Begin Pilih:=0;
  REPEAT
     CLRSCR; GotoXY(20,4);
     WRITE(CHAR(201)); FOR I:=1 TO 37 DO WRITE(CHAR(205)); WRITE(CHAR(187));
     GotoXY(20,5); Write(CHAR(186)); TEXTBACKGROUND(1); WRITE('       ');
     TEXTCOLOR(11); WRITE('>>> FILE DATA <<<'); TEXTCOLOR(10);
     WRITE('       '); TEXTBACKGROUND(0); WRITE(CHAR(186));
     GotoXY(20,6); WRITE(CHAR(204)); FOR I:=1 TO 37 DO WRITE(CHAR(205));
     WRITE(CHAR(185)); GotoXY(20,7); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
     WRITE(' '); TEXTCOLOR(15); WRITE('B'); TEXTCOLOR(10);
     WRITE(' MEMBUAT FILE DATA BARU       ');
     TEXTBACKGROUND(0); WRITE(CHAR(186));
     GotoXY(20,8); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
     WRITE(' '); TEXTCOLOR(15); WRITE('R'); TEXTCOLOR(10);
     WRITE(' MERUBAH FILE DATA YANG AKTIF   ');
     TEXTBACKGROUND(0); WRITE(CHAR(186));
     GotoXY(20,9); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
     WRITE(' '); TEXTCOLOR(15); WRITE('T'); TEXTCOLOR(10);
     WRITE(' MERUBAH ISI FILE DATA YANG AKTIF ');
     TEXTBACKGROUND(0); WRITE(CHAR(186));
     GotoXY(20,10); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
     WRITE(' '); TEXTCOLOR(15); WRITE('S'); TEXTCOLOR(10);
     WRITE(' SELESAI              ');
     TEXTBACKGROUND(0); WRITE(CHAR(186));
     GotoXY(20,11); WRITE(CHAR(204)); FOR I:=1 TO 37 DO WRITE(CHAR(205));
     WRITE(CHAR(185)); GotoXY(20,12);
     Write(CHAR(186)); TEXTCOLOR(15); TEXTBACKGROUND(4);
     WRITE(' ===> Pilih ?          '); TEXTCOLOR(10);
     TEXTBACKGROUND(0); WRITE(CHAR(186));
     GOTOXY(20,13); WRITE(CHAR(200)); FOR I:=1 TO 37 DO WRITE(CHAR(205));
     WRITE(CHAR(188)); PILIH:=0;
     While (Pilih<1) or (Pilih>4) Do Begin
       TEXTCOLOR(15); TEXTBACKGROUND(4); GotoXY(35,12);
       PIL:=READKEY; write(PIL); TEXTCOLOR(10); TEXTBACKGROUND(0);
```

```
        IF UPCASE(PIL)='B' THEN Pilih := 1;IF UPCASE(PIL)='R' THEN Pilih := 2;
        IF UPCASE(PIL)='I' THEN Pilih := 3;IF UPCASE(PIL)='S' THEN Pilih := 4;
        IF (PILIH<1) OR (PILIH>4) THEN Write(^G); End;
      Case Pilih of
          1: BEGIN CHDIR(DIREK); Baru; CHDIR(DIRAK); END;
          2: BEGIN CHDIR(DIREK); Aktif; CHDIR(DIRAK); END;
          3: BEGIN CHDIR(DIREK); Rubah; CHDIR(DIRAK); END; End;
    UNTIL PILIH=4; Write(^G);
END;


PROCEDURE DATAELEMEN;
Begin
 CHDIR(DIREK);
 FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
 IF IORESULT=0 THEN BEGIN READ(FTIPE,JTIPE); CLOSE(FTIPE); END
 ELSE JTIPE:=0; CHDIR(DIRAK); PILIH:=0;
 REPEAT
  ClrScr; GOTOXY(20,4);
  WRITE(CHAR(201)); FOR I:=1 TO 40 DO WRITE(CHAR(205)); WRITE(CHAR(187));
  GotoXY(20,5); Write(CHAR(186)); TEXTBACKGROUND(1); WRITE('          ');
  TEXTCOLOR(11); WRITE('>>> DATA <<<'); TEXTCOLOR(10);
  WRITE('          '); TEXTBACKGROUND(0); WRITE(CHAR(186));
  GOTOXY(20,6); WRITE(CHAR(204)); FOR I:=1 TO 40 DO WRITE(CHAR(205));
  WRITE(CHAR(185)); GotoXY(20,7); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
  Write(' '); TEXTCOLOR(15); WRITE('J'); TEXTCOLOR(10);
  WRITE(' JUMLAH TIPE ',EL:7,' : ',JTIPE:3,'          ');
  TEXTBACKGROUND(0); WRITE(CHAR(186));
  GotoXY(20,8); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
  Write(' '); TEXTCOLOR(15); WRITE('B'); TEXTCOLOR(10);
  WRITE(' DATA BAHAN               '); TEXTBACKGROUND(0);
  WRITE(CHAR(186)); GotoXY(20,9); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
  Write(' '); TEXTCOLOR(15); WRITE('E'); TEXTCOLOR(10);
  WRITE(' DATA ELEMEN ',EL:7,'          '); TEXTBACKGROUND(0);
  WRITE(CHAR(186)); GoToXY(20,10); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
  Write(' '); TEXTCOLOR(15); WRITE('G'); TEXTCOLOR(10);
  WRITE(' DATA GAYA YANG BEKERJA PADA ',EL:7,' '); TEXTBACKGROUND(0);
  WRITE(CHAR(186)); GotoXY(20,11); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
  Write(' '); TEXTCOLOR(15); WRITE('D'); TEXTCOLOR(10);
  WRITE(' DATA DIMENSI ',EL:7,'          '); TEXTBACKGROUND(0);
  WRITE(CHAR(186)); GotoXY(20,12); Write(CHAR(186)); TEXTBACKGROUND(5)  ;
  Write(' '); TEXTCOLOR(15); WRITE('S'); TEXTCOLOR(10);
  WRITE(' SELESAI                  '); TEXTBACKGROUND(0);
  WRITE(CHAR(186)); GOTOXY(20,13);
  WRITE(CHAR(204)); FOR I:=1 TO 40 DO WRITE(CHAR(205));
  WRITE(CHAR(185)); GotoXY(20,14);
  Write(CHAR(186)); TEXTCOLOR(15); TEXTBACKGROUND(4);
  WRITE(' ===> Pilih ?              '); TEXTCOLOR(10);
  TEXTBACKGROUND(0); WRITE(CHAR(186)); GOTOXY(20,15); WRITE(CHAR(200));
  FOR I:=1 TO 40 DO WRITE(CHAR(205)); WRITE(CHAR(188)); Pilih:=0;
  While (Pilih<1) or (Pilih>6) Do Begin
   TEXTCOLOR(15); TEXTBACKGROUND(4); GotoXY(35,14);
   PIL:=READKEY; write(PIL); TEXTCOLOR(10); TEXTBACKGROUND(0);
   if UPCASE(Pil)='J' Then Pilih := 1; if UPCASE(Pil)='B' Then Pilih := 2;
   if UPCASE(Pil)='E' Then Pilih := 3; if UPCASE(Pil)='G' Then Pilih := 4;
   if UPCASE(Pil)='D' Then Pilih := 5; if UPCASE(Pil)='S' Then Pilih := 6;
   IF (Pilih<1) or (Pilih>6) THEN WRITE(^G); End;
  Case Pilih of
  1: BEGIN CHDIR(DIREK); FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP);
     {$I-} RESET(FTIPE); {$I+}
     IF IORESULT=0 THEN BEGIN
       READ(FTIPE,JTIPE); CLOSE(FTIPE); END; YA:='U';
     WHILE UPCASE(YA)='U' DO BEGIN
     CLRSCR; GOTOXY(20,6); WRITE('JUMLAH TIPE ',EL,' DISAIN ? : ');
     TEXTCOLOR(11); GOTOXY(20,10); WRITE('U : ulang   L : lanjutkan ===> ');
     TEXTCOLOR(10); GOTOXY(51,6); WRITE(JTIPE); GOTOXY(51,6); READLN(JTIPE);
     BENAR:=TRUE;
     WHILE BENAR DO BEGIN
       TEXTCOLOR(11); GOTOXY(51,10); ya:=READKEY; write(ya);
       IF UPCASE(YA)='U' THEN BENAR:=FALSE;
```

```
            IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
        {$I-} RESET(FTIPE); {$I+}
        IF IORESULT<>0 THEN BEGIN
          REWRITE(FTIPE); WRITELN(FTIPE,JTIPE); CLOSE(FTIPE); END
        ELSE BEGIN
          CLOSE(FTIPE); ERASE(FTIPE); REWRITE(FTIPE);
          WRITELN(FTIPE,JTIPE); CLOSE(FTIPE); END; CHDIR(DIRAK); END;
    2: BEGIN
        IF JTIPE=0 THEN BEGIN
            TEXTCOLOR(11); CLRSCR; GOTOXY(20,10);
            WRITE('JUMLAH TIPE ',EL,' BELUM ADA....!');
            WRITE(^G); READKEY; TEXTCOLOR(10); END
        ELSE BEGIN
          DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BBN+' '+BBT;
          IF (EL='BALOK') OR (EL='KOLOM') THEN EXEC('DB.EXE',DATA);
          IF EL='PONDASI' THEN EXEC('DBP.EXE',DATA); END; END;
    3: BEGIN
          DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BEL;
        IF JTIPE=0 THEN BEGIN
            TEXTCOLOR(11); CLRSCR; GOTOXY(20,10);
            WRITE('JUMLAH TIPE ',EL,' BELUM ADA....!');
            WRITE(^G); READKEY; TEXTCOLOR(10); END
        ELSE EXEC('DE.EXE',DATA); END;
    4: BEGIN
        IF JTIPE=0 THEN BEGIN
            TEXTCOLOR(11); CLRSCR; GOTOXY(20,10);
            WRITE('JUMLAH TIPE ',EL,' BELUM ADA....!');
            WRITE(^G); READKEY; TEXTCOLOR(10); END
        ELSE BEGIN
            DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BEL+' '+BGM;
            IF EL='BALOK' THEN EXEC('GBL.EXE',DATA);
            IF EL='KOLOM' THEN EXEC('GKO.EXE',DATA);
            IF EL='PONDASI' THEN EXEC('GPO.EXE',DATA); END; END;
    5: BEGIN
        IF JTIPE=0 THEN BEGIN
            TEXTCOLOR(11); CLRSCR; GOTOXY(20,10);
            WRITE('JUMLAH TIPE ',EL,' BELUM ADA....!');
            WRITE(^G); READKEY; TEXTCOLOR(10); END
        ELSE BEGIN
            DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BEL+' '+BDD;
            IF EL='BALOK' THEN EXEC('DDBL.EXE',DATA);
            IF EL='KOLOM' THEN EXEC('DDKO.EXE',DATA);
            IF EL='PONDASI' THEN BEGIN
              DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BDD; EXEC('DDPO.EXE',DATA); END;
            END; END; End;
    UNTIL PILIH=6; WRITE(^G); PILIH:=0;
END;


Procedure DATAPLAT;
Begin
  CHDIR(DIREK); FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP);{$I-}RESET(FTIPE);{$I+}
  IF IORESULT=0 THEN BEGIN READ(FTIPE,JTIPE); CLOSE(FTIPE); END
  ELSE JTIPE:=0; CHDIR(DIRAK); PILIH:=0;
  REPEAT
  ClrScr; GOTOXY(20,4);
  WRITE(CHAR(201)); FOR I:=1 TO 40 DO WRITE(CHAR(205)); WRITE(CHAR(187));
  GotoXY(20,5); Write(CHAR(186)); TEXTBACKGROUND(1); WRITE('          ');
  TEXTCOLOR(11); WRITE('>>> DATA <<<'); TEXTCOLOR(10);
  WRITE('          '); TEXTBACKGROUND(0); WRITE(CHAR(186)); GOTOXY(20,6);
  WRITE(CHAR(204)); FOR I:=1 TO 40 DO WRITE(CHAR(205)); WRITE(CHAR(185));
  GotoXY(20,7); Write(CHAR(186)); TEXTBACKGROUND(5) ;
  Write(' '); TEXTCOLOR(15); WRITE('J'); TEXTCOLOR(10);
  WRITE(' JUMLAH TIPE ',EL:7,' : ',JTIPE:3,'          ');
  TEXTBACKGROUND(0); WRITE(CHAR(186));
  GotoXY(20,8); Write(CHAR(186)); TEXTBACKGROUND(5) ;
  Write(' '); TEXTCOLOR(15); WRITE('B'); TEXTCOLOR(10);
  WRITE(' DATA BAHAN                 '); TEXTBACKGROUND(0);
  WRITE(CHAR(186)); GotoXY(20,9); Write(CHAR(186)); TEXTBACKGROUND(5) ;
  Write(' '); TEXTCOLOR(15); WRITE('D'); TEXTCOLOR(10);
```

```pascal
WRITE(' DATA DIMENSI ',EL:7,'           '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GotoXY(20,10); Write(CHAR(186)); TEXTBACKGROUND(5) ;
Write(' '); TEXTCOLOR(15); WRITE('G'); TEXTCOLOR(10);
WRITE(' DATA GAYA YANG BEKERJA PADA ',EL:7,' '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GotoXY(20,11); Write(CHAR(186)); TEXTBACKGROUND(5) ;
Write(' '); TEXTCOLOR(15); WRITE('S'); TEXTCOLOR(10);
WRITE(' SELESAI            '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GOTOXY(20,12);
WRITE(CHAR(204)); FOR I:=1 TO 40 DO WRITE(CHAR(205)); WRITE(CHAR(185));
GotoXY(20,13); Write(CHAR(186)); TEXTCOLOR(15); TEXTBACKGROUND(4);
WRITE(' ===> Pilih ?              '); TEXTCOLOR(10);
TEXTBACKGROUND(0); WRITE(CHAR(186)); GOTOXY(20,14);
WRITE(CHAR(200)); FOR I:=1 TO 40 DO WRITE(CHAR(205)); WRITE(CHAR(188)); Pilih:=0;
While (Pilih<1) or (Pilih>5) Do Begin
  TEXTCOLOR(15); TEXTBACKGROUND(4); GotoXY(35,13);
  PIL:=READKEY; write(PIL); TEXTCOLOR(10); TEXTBACKGROUND(0);
  if UPCASE(Pil)='J' Then Pilih := 1; if UPCASE(Pil)='B' Then Pilih := 2;
  if UPCASE(Pil)='D' Then Pilih := 3; if UPCASE(Pil)='G' Then Pilih := 4;
  if UPCASE(Pil)='S' Then Pilih := 5;IF (Pilih<1) or (Pilih>5) THEN WRITE(^G);End;
Case Pilih of
  1: BEGIN CHDIR(DIREK); FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP);
     {$I-} RESET(FTIPE); {$I+}
     IF IORESULT=0 THEN BEGIN
       READ(FTIPE,JTIPE); CLOSE(FTIPE); END; YA:='U';
       WHILE UPCASE(YA)='U' DO BEGIN
       CLRSCR; GOTOXY(20,6); WRITE('JUMLAH TIPE ',EL,' DISAIN ? : ');
       TEXTCOLOR(11); GOTOXY(20,10); WRITE('U : ulang  L : lanjutkan ===> ');
       TEXTCOLOR(10); GOTOXY(51,6); WRITE(JTIPE); GOTOXY(51,6); READLN(JTIPE);
       BENAR:=TRUE;
       WHILE BENAR DO BEGIN
         TEXTCOLOR(11); GOTOXY(51,10); ya:=READKEY; write(ya);
         IF UPCASE(YA)='U' THEN BENAR:=FALSE;
         IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10);
     END; {$I-} RESET(FTIPE); {$I+}
     IF IORESULT<>0 THEN BEGIN
       REWRITE(FTIPE); WRITELN(FTIPE,JTIPE); CLOSE(FTIPE); END
     ELSE BEGIN
       CLOSE(FTIPE); ERASE(FTIPE); REWRITE(FTIPE); WRITELN(FTIPE,JTIPE);
       CLOSE(FTIPE); END; CHDIR(DIRAK); END;
  2: BEGIN
       DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BBN+' '+BBT;
       IF JTIPE=0 THEN BEGIN
         CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
         WRITE('JUMLAH TIPE ',EL,' BELUM ADA....!');
         WRITE(^G); READKEY; TEXTCOLOR(10); END
       ELSE EXEC('DB.EXE',DATA); END;
  3: BEGIN
       DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BBN+' '+BDD;
       IF JTIPE=0 THEN BEGIN
         CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
         WRITE('JUMLAH TIPE ',EL,' BELUM ADA....!');
         WRITE(^G); READKEY; TEXTCOLOR(10); END
       ELSE EXEC('DDPL.EXE',DATA); END;
  4: BEGIN
       DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BGM+' '+BDD;
       IF JTIPE=0 THEN BEGIN
         TEXTCOLOR(11); CLRSCR; GOTOXY(20,10);
         WRITE('JUMLAH TIPE ',EL,' BELUM ADA....!');
         WRITE(^G); READKEY; TEXTCOLOR(10); END
       ELSE EXEC('GPL.EXE',DATA); END; End;
  UNTIL PILIH=5; WRITE(^G); PILIH:=0;
END;


PROCEDURE OUTPUTHASIL;
BEGIN PILIH:=0;
  REPEAT
  ClrScr; GotoXY(20,4);
  WRITE(CHAR(201)); FOR I:=1 TO 41 DO WRITE(CHAR(205)); WRITE(CHAR(187));
  GOTOXY(20,5); Write(CHAR(186)); TEXTBACKGROUND(1); WRITE('        ');
```

```
TEXTCOLOR(11); WRITE('>>> HASIL DISAIN <<<'); TEXTCOLOR(10);
WRITE('        '); TEXTBACKGROUND(0); WRITE(CHAR(186));
TEXTCOLOR(10); GotoXY(20,6);
WRITE(CHAR(204)); FOR I:=1 TO 41 DO WRITE(CHAR(205)); WRITE(CHAR(185));
GotoXY(20,7); Write(CHAR(186)); TEXTBACKGROUND(5) ;
Write(' '); TEXTCOLOR(15); WRITE('L'); TEXTCOLOR(10);
WRITE(' MENAMPILKAN HASIL DISAIN PADA LAYAR   '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GotoXY(20,8); Write(CHAR(186)); TEXTBACKGROUND(5) ;
Write(' '); TEXTCOLOR(15); WRITE('P'); TEXTCOLOR(10);
WRITE(' MENAMPILKAN HASIL DISAIN PADA PRINTER '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GotoXY(20,9); Write(CHAR(186)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('S'); TEXTCOLOR(10);
WRITE(' SELESAI                '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GOTOXY(20,10);
WRITE(CHAR(204)); FOR I:=1 TO 41 DO WRITE(CHAR(205)); WRITE(CHAR(185));
GOTOXY(20,11); Write(CHAR(186)); TEXTCOLOR(15); TEXTBACKGROUND(4);
WRITE(' ===> Pilih ?                '); TEXTCOLOR(10);
TEXTBACKGROUND(0); WRITE(CHAR(186)); GOTOXY(20,12);
WRITE(CHAR(200)); FOR I:=1 TO 41 DO WRITE(CHAR(205)); WRITE(CHAR(188)); Pilih:=0;
While (Pilih<1) or (Pilih>3) Do Begin
 TEXTCOLOR(15); TEXTBACKGROUND(4); GotoXY(35,11);
 PIL:=READKEY; write(PIL); TEXTCOLOR(10); TEXTBACKGROUND(0);
 if UPCASE(Pil)='L' Then Pilih := 1; if UPCASE(Pil)='P' Then Pilih := 2;
 if UPCASE(Pil)='S' Then Pilih := 3; IF (Pilih<1)or(Pilih>3) THEN WRITE(^G);End;
 Case Pilih of
  1: BEGIN
      IF (EL='PLAT') OR (EL='BALOK') THEN BEGIN
       DATA:=DIREK+' '+NFDA+' '+EL+' '+BLK+' '+DIRAK;
       IF EL='PLAT' THEN EXEC('TPL.EXE',DATA);
       IF EL='BALOK' THEN EXEC('TBL.EXE',DATA); END;
      IF EL='KOLOM' THEN BEGIN
       DATA:=DIREK+' '+NFDA+' '+EL+' '+BDD+' '+BLK; EXEC('TKO.EXE',DATA); END;
      IF EL='PONDASI' THEN BEGIN
       DATA:=DIREK+' '+NFDA+' '+EL+' '+BLK; EXEC('TPO.EXE',DATA); END; END;
  2: BEGIN
      IF (EL='PLAT') OR (EL='BALOK') OR (EL='PONDASI') THEN BEGIN
       DATA:=DIREK+' '+NFDA+' '+EL+' '+BLK; IF EL='PLAT' THEN EXEC('CPL.EXE',DATA);
       IF EL='BALOK' THEN EXEC('CBL.EXE',DATA);
       IF EL='PONDASI' THEN EXEC('CPON.EXE',DATA); END
      ELSE BEGIN
       DATA:=DIREK+' '+NFDA+' '+EL+' '+BDD+' '+BLK; EXEC('CKO.EXE',DATA); END; END; END;
 UNTIL PILIH=3; Write(^G); PILIH:=0;
END;


PROCEDURE OUTPUTDATA;
BEGIN PILIH:=0;
 REPEAT
  ClrScr; GotoXY(20,4);
  WRITE(CHAR(201)); FOR I:=1 TO 41 DO WRITE(CHAR(205)); WRITE(CHAR(187));
  GOTOXY(20,5); Write(CHAR(186)); TEXTBACKGROUND(1); WRITE('        ');
  TEXTCOLOR(11); WRITE('>>> DATA DISAIN <<<'); TEXTCOLOR(10);
  WRITE('        '); TEXTBACKGROUND(0); WRITE(CHAR(186));
  TEXTCOLOR(10); GotoXY(20,6);
  WRITE(CHAR(204)); FOR I:=1 TO 41 DO WRITE(CHAR(205)); WRITE(CHAR(185));
  GotoXY(20,7); Write(CHAR(186)); TEXTBACKGROUND(5) ;
  Write(' '); TEXTCOLOR(15); WRITE('L'); TEXTCOLOR(10);
  WRITE(' MENAMPILKAN DATA DISAIN PADA LAYAR   '); TEXTBACKGROUND(0);
  WRITE(CHAR(186)); GotoXY(20,8); Write(CHAR(186)); TEXTBACKGROUND(5);
  Write(' '); TEXTCOLOR(15); WRITE('P'); TEXTCOLOR(10);
  WRITE(' MENAMPILKAN DATA DISAIN PADA PRINTER '); TEXTBACKGROUND(0);
  WRITE(CHAR(186)); GotoXY(20,9); Write(CHAR(186)); TEXTBACKGROUND(5);
  Write(' '); TEXTCOLOR(15); WRITE('S'); TEXTCOLOR(10);
  WRITE(' SELESAI                '); TEXTBACKGROUND(0);
  WRITE(CHAR(186)); GOTOXY(20,10);
  WRITE(CHAR(204)); FOR I:=1 TO 41 DO WRITE(CHAR(205)); WRITE(CHAR(185));
  GOTOXY(20,11); Write(CHAR(186)); TEXTCOLOR(15); TEXTBACKGROUND(4);
  WRITE(' ===> Pilih ?                '); TEXTCOLOR(10);
  TEXTBACKGROUND(0); WRITE(CHAR(186)); GOTOXY(20,12);
  WRITE(CHAR(200)); FOR I:=1 TO 41 DO WRITE(CHAR(205)); WRITE(CHAR(188)); Pilih:=0;
```

```
  While (Pilih<1) or (Pilih>3) Do Begin
   TEXTCOLOR(15); TEXTBACKGROUND(4); GotoXY(35,11);
   PIL:=READKEY; write(PIL); TEXTCOLOR(10); TEXTBACKGROUND(0);
   if UPCASE(Pil)='L' Then Pilih := 1;if UPCASE(Pil)='P' Then Pilih := 2;
   if UPCASE(Pil)='S' Then Pilih := 3;IF (Pilih<1) or (Pilih>3) THEN WRITE(^G);End;
  Case Pilih of
   1: BEGIN
      DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BBN+' '+BBT+' '+BEL+' '+BGM+' '+BDD+' '+DIRAK;
      IF EL='PLAT' THEN EXEC('TDPL.EXE',DATA);IF EL='BALOK' THEN EXEC('TDBL.EXE',DATA);
      IF EL='PONDASI' THEN EXEC('TDPO.EXE',DATA);
      IF EL='KOLOM' THEN EXEC('TDKO.EXE',DATA); END;
   2: BEGIN
      DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BBN+' '+BBT+' '+BEL+' '+BGM+' '+BDD;
      IF EL='PLAT' THEN EXEC('CDPL.EXE',DATA);IF EL='BALOK' THEN EXEC('CDBL.EXE',DATA);
      IF EL='PONDASI' THEN EXEC('CDPO.EXE',DATA);
      IF EL='KOLOM' THEN EXEC('CDKO.EXE',DATA); END; END;
  UNTIL PILIH=3; Write(^G); PILIH:=0;
END;


PROCEDURE DISAINPLAT;
Begin PILIH:=0;
 REPEAT
 ClrScr; GotoXY(20,4); WRITE(CHAR(201)); FOR I:=1 TO 28 DO WRITE(CHAR(205));
 WRITE(CHAR(187)); GOTOXY(20,5);
 Write(CHAR(186)); TEXTBACKGROUND(1); TEXTCOLOR(11);
 WRITE(' >>> DISAIN ELEMEN PLAT <<< '); TEXTCOLOR(10);
 TEXTBACKGROUND(0); WRITE(CHAR(186)); TEXTCOLOR(10); GotoXY(20,6);
 WRITE(CHAR(204)); FOR I:=1 TO 28 DO WRITE(CHAR(205));
 WRITE(CHAR(185)); GotoXY(20,7); Write(CHAR(186)); TEXTBACKGROUND(5) ;
 Write(' '); TEXTCOLOR(15); WRITE('D'); TEXTCOLOR(10);
 WRITE(' DATA          '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,8); Write(CHAR(186)); TEXTBACKGROUND(5) ;
 Write(' '); TEXTCOLOR(15); WRITE('P'); TEXTCOLOR(10);
 WRITE(' PROSES DISAIN       '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,9); Write(CHAR(186)); TEXTBACKGROUND(5) ;
 Write(' '); TEXTCOLOR(15); WRITE('M'); TEXTCOLOR(10);
 WRITE(' MENAMPILKAN DATA DISAIN '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,10); Write(CHAR(186)); TEXTBACKGROUND(5) ;
 Write(' '); TEXTCOLOR(15); WRITE('H'); TEXTCOLOR(10);
 WRITE(' HASIL DISAIN        '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,11); Write(CHAR(186)); TEXTBACKGROUND(5) ;
 Write(' '); TEXTCOLOR(15); WRITE('G'); TEXTCOLOR(10);
 WRITE(' SKETSA HASIL DISAIN   '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,12); Write(CHAR(186)); TEXTBACKGROUND(5) ;
 Write(' '); TEXTCOLOR(15); WRITE('S'); TEXTCOLOR(10);
 WRITE(' SELESAI          '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GOTOXY(20,13);
 WRITE(CHAR(204)); FOR I:=1 TO 28 DO WRITE(CHAR(205)); WRITE(CHAR(185));
 GOTOXY(20,14); Write(CHAR(186)); TEXTCOLOR(15); TEXTBACKGROUND(4);
 WRITE(' ===> Pilih ?       '); TEXTCOLOR(10);
 TEXTBACKGROUND(0); WRITE(CHAR(186)); GOTOXY(20,15);
 WRITE(CHAR(200)); FOR I:=1 TO 28 DO WRITE(CHAR(205));
 WRITE(CHAR(188)); Pilih:=0;
 While (Pilih<1) or (Pilih>6) Do Begin
 TEXTCOLOR(15); TEXTBACKGROUND(4); GotoXY(35,14);
 PIL:=READKEY; write(PIL); TEXTCOLOR(10); TEXTBACKGROUND(0);
 if UPCASE(Pil)='D' Then Pilih := 1; if UPCASE(Pil)='P' Then Pilih := 2;
 if UPCASE(Pil)='M' Then Pilih := 3; if UPCASE(Pil)='H' Then Pilih := 4;
 if UPCASE(Pil)='G' Then Pilih := 5; if UPCASE(Pil)='S' Then Pilih := 6;
 IF (PILIH<1) OR (PILIH>6) THEN Write(^G);End;
 Case Pilih of
 1: DATAPLAT;
 2: BEGIN
    DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BBN+' '+BBT+' '+BGM+' '+BDD+' '+BLK;
    EXEC('PPL.EXE',DATA); END;
 3: Outputdata;
 4: Outputhasil;
 5: BEGIN
    DATA:=DIREK+' '+NFDA+' '+FTP+' '+BDD+' '+BLK;
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```
    EXEC('SKETSPLT.EXE',DATA); END; End;
UNTIL PILIH=6; Write(^G); PILIH:=0;
END;


PROCEDURE DisainBalok;
Begin PILIH:=0;
 REPEAT
 ClrScr; GotoXY(20,4);
 WRITE(CHAR(201)); FOR I:=1 TO 29 DO WRITE(CHAR(205)); WRITE(CHAR(187));
 GOTOXY(20,5); Write(CHAR(186)); TEXTBACKGROUND(1); TEXTCOLOR(11);
 WRITE(' >>> DISAIN ELEMEN BALOK <<< '); TEXTCOLOR(10);
 TEXTBACKGROUND(0); WRITE(CHAR(186)); TEXTCOLOR(10); GotoXY(20,6);
 WRITE(CHAR(204)); FOR I:=1 TO 29 DO WRITE(CHAR(205)); WRITE(CHAR(185));
 GotoXY(20,7); Write(CHAR(186)); TEXTBACKGROUND(5);
 Write(' '); TEXTCOLOR(15); WRITE('D'); TEXTCOLOR(10);
 WRITE(' DATA            '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,8); Write(CHAR(186)); TEXTBACKGROUND(5);
 Write(' '); TEXTCOLOR(15); WRITE('P'); TEXTCOLOR(10);
 WRITE(' PROSES DISAIN       '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,9); Write(CHAR(186)); TEXTBACKGROUND(5);
 Write(' '); TEXTCOLOR(15); WRITE('M'); TEXTCOLOR(10);
 WRITE(' MENAMPILKAN DATA DISAIN '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,10); Write(CHAR(186)); TEXTBACKGROUND(5);
 Write(' '); TEXTCOLOR(15); WRITE('H'); TEXTCOLOR(10);
 WRITE(' HASIL DISAIN          '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,11); Write(CHAR(186)); TEXTBACKGROUND(5);
 Write(' '); TEXTCOLOR(15); WRITE('G'); TEXTCOLOR(10);
 WRITE(' SKETSA HASIL DISAIN   '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GotoXY(20,12); Write(CHAR(186)); TEXTBACKGROUND(5);
 Write(' '); TEXTCOLOR(15); WRITE('S'); TEXTCOLOR(10);
 WRITE(' SELESAI             '); TEXTBACKGROUND(0);
 WRITE(CHAR(186)); GOTOXY(20,13);
 WRITE(CHAR(204)); FOR I:=1 TO 29 DO WRITE(CHAR(205)); WRITE(CHAR(185));
 GOTOXY(20,14); Write(CHAR(186)); TEXTCOLOR(15); TEXTBACKGROUND(4);
 WRITE(' ===> Pilih ?         '); TEXTCOLOR(10);
 TEXTBACKGROUND(0); WRITE(CHAR(186)); GOTOXY(20,15);
 WRITE(CHAR(200)); FOR I:=1 TO 29 DO WRITE(CHAR(205)); WRITE(CHAR(188)); Pilih:=0;
 While (Pilih<1) or (Pilih>6) Do Begin
  TEXTCOLOR(15); TEXTBACKGROUND(4); GotoXY(35,14);
  PIL:=READKEY; write(PIL); TEXTCOLOR(10); TEXTBACKGROUND(0);
  if UPCASE(Pil)='D' Then Pilih := 1; if UPCASE(Pil)='P' Then Pilih := 2;
  if UPCASE(Pil)='M' Then Pilih := 3; if UPCASE(Pil)='H' Then Pilih := 4;
  if UPCASE(Pil)='G' Then Pilih := 5; if UPCASE(Pil)='S' Then Pilih := 6;
  IF (PILIH<1) OR (PILIH>6) THEN Write(^G);End;
 Case Pilih of
 1: DATAELEMEN;
 2: BEGIN
     DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BBN+' '+BBT+' '+BGM+' '+BDD+' '+BLK;
     EXEC('PBL.EXE',DATA); END;
  3: Outputdata;
  4: Outputhasil;
  5: BEGIN
     DATA:=DIREK+' '+NFDA+' '+FTP+' '+BDD+' '+BLK+' '+DIRAK;
     EXEC('SKETSBLK.EXE',DATA); END; End;
 UNTIL PILIH=6; Write(^G); PILIH:=0;
End;


PROCEDURE DISAINKOLOM;
Begin PILIH:=0;
   REPEAT
     ClrScr; GotoXY(20,4);
     WRITE(CHAR(201)); FOR I:=1 TO 29 DO WRITE(CHAR(205)); WRITE(CHAR(187));
     GOTOXY(20,5); Write(CHAR(186)); TEXTBACKGROUND(1); TEXTCOLOR(11);
     WRITE(' >>> DISAIN ELEMEN KOLOM <<< '); TEXTCOLOR(10);
     TEXTBACKGROUND(0); WRITE(CHAR(186)); TEXTCOLOR(10);
     GotoXY(20,6); WRITE(CHAR(204)); FOR I:=1 TO 29 DO WRITE(CHAR(205));
     WRITE(CHAR(185)); GotoXY(20,7); Write(CHAR(186)); TEXTBACKGROUND(5);
     Write(' '); TEXTCOLOR(15); WRITE('D'); TEXTCOLOR(10);
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```
WRITE(' DATA              '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GotoXY(20,8); Write(CHAR(186)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('P'); TEXTCOLOR(10);
WRITE(' PROSES DISAIN        '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GotoXY(20,9); Write(CHAR(186)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('M'); TEXTCOLOR(10);
WRITE(' MENAMPILKAN DATA DISAIN '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GotoXY(20,10); Write(CHAR(186)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('H'); TEXTCOLOR(10);
WRITE(' HASIL DISAIN         '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GotoXY(20,11); Write(CHAR(186)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('G'); TEXTCOLOR(10);
WRITE(' SKETSA HASIL DISAIN    '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GotoXY(20,12); Write(CHAR(186)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('S'); TEXTCOLOR(10);
WRITE(' SELESAI             '); TEXTBACKGROUND(0);
WRITE(CHAR(186)); GOTOXY(20,13);
WRITE(CHAR(204)); FOR I:=1 TO 29 DO WRITE(CHAR(205));
WRITE(CHAR(185)); GOTOXY(20,14);
Write(CHAR(186)); TEXTCOLOR(15); TEXTBACKGROUND(4);
WRITE(' ===> Pilih ?        '); TEXTCOLOR(10);
TEXTBACKGROUND(0); WRITE(CHAR(186));
GOTOXY(20,15); WRITE(CHAR(200)); FOR I:=1 TO 29 DO WRITE(CHAR(205));
WRITE(CHAR(188)); Pilih:=0;
While (Pilih<1) or (Pilih>6) Do Begin
  TEXTCOLOR(15); TEXTBACKGROUND(4); GotoXY(35,14);
  PIL:=READKEY; write(PIL); TEXTCOLOR(10); TEXTBACKGROUND(0);
  if UPCASE(Pil)='D' Then Pilih := 1; if UPCASE(Pil)='P' Then Pilih := 2;
  if UPCASE(Pil)='M' Then Pilih := 3; if UPCASE(Pil)='H' Then Pilih := 4;
  if UPCASE(Pil)='G' Then Pilih := 5; if UPCASE(Pil)='S' Then Pilih := 6;
  IF (PILIH<1) OR (PILIH>6) THEN Write(^G);End;
Case Pilih of
  1: DATAELEMEN;
  2: BEGIN
     DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BBN+' '+BBT+' '+BGM+' '+BDD+' '+BLK;
     EXEC('PKO.EXE',DATA); END;
  3: Outputdata;
  4: Outputhasil;
  5: BEGIN
     DATA:=DIREK+' '+NFDA+' '+FTP+' '+BDD+' '+BLK;
     EXEC('SKETSKLM.EXE',DATA); END;  End;
UNTIL PILIH=6; Write(^G); PILIH:=0;
End;


PROCEDURE DISAINPONDASI;
Begin PILIH:=0;
  REPEAT
    ClrScr; GotoXY(20,4); WRITE(CHAR(201)); FOR I:=1 TO 31 DO WRITE(CHAR(205));
    WRITE(CHAR(187)); GOTOXY(20,5); Write(CHAR(186)); TEXTBACKGROUND(1); TEXTCOLOR(11);
    WRITE(' >>> DISAIN ELEMEN PONDASI <<< '); TEXTCOLOR(10);
    TEXTBACKGROUND(0); WRITE(CHAR(186)); TEXTCOLOR(10); GotoXY(20,6);
    WRITE(CHAR(204)); FOR I:=1 TO 31 DO WRITE(CHAR(205)); WRITE(CHAR(185));
    GotoXY(20,7); Write(CHAR(186)); TEXTBACKGROUND(5);
    Write(' '); TEXTCOLOR(15); WRITE('D'); TEXTCOLOR(10);
    WRITE(' DATA              '); TEXTBACKGROUND(0); WRITE(CHAR(186));
    GotoXY(20,8); Write(CHAR(186)); TEXTBACKGROUND(5) ; Write(' '); TEXTCOLOR(15);
    WRITE('P'); TEXTCOLOR(10); WRITE(' PROSES DISAIN        '); TEXTBACKGROUND(0);
    WRITE(CHAR(186)); GotoXY(20,9);
    Write(CHAR(186)); TEXTBACKGROUND(5) ; Write(' '); TEXTCOLOR(15); WRITE('M');
    TEXTCOLOR(10); WRITE(' MENAMPILKAN DATA DISAIN  '); TEXTBACKGROUND(0);
    WRITE(CHAR(186)); GotoXY(20,10);
    Write(CHAR(186)); TEXTBACKGROUND(5) ; Write(' '); TEXTCOLOR(15);
    WRITE('H'); TEXTCOLOR(10); WRITE(' HASIL DISAIN         '); TEXTBACKGROUND(0);
    WRITE(CHAR(186)); GotoXY(20,11); Write(CHAR(186)); TEXTBACKGROUND(5) ;
    Write(' '); TEXTCOLOR(15); WRITE('G'); TEXTCOLOR(10);
    WRITE(' SKETSA HASIL DISAIN    '); TEXTBACKGROUND(0);
    WRITE(CHAR(186)); GotoXY(20,12); Write(CHAR(186)); TEXTBACKGROUND(5) ;
    Write(' '); TEXTCOLOR(15); WRITE('S'); TEXTCOLOR(10);
    WRITE(' SELESAI             '); TEXTBACKGROUND(0);
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     WRITE(CHAR(186)); GOTOXY(20,13); WRITE(CHAR(204)); FOR I:=1 TO 31 DO WRITE(CHAR(205));
     WRITE(CHAR(185)); GOTOXY(20,14); Write(CHAR(186)); TEXTCOLOR(15); TEXTBACKGROUND(4);
     WRITE(' ===> Pilih ?              '); TEXTCOLOR(10);
     TEXTBACKGROUND(0); WRITE(CHAR(186)); GOTOXY(20,15);
     WRITE(CHAR(200)); FOR I:=1 TO 31 DO WRITE(CHAR(205)); WRITE(CHAR(188)); Pilih:=0;
     While (Pilih<1) or (Pilih>6) Do Begin
      GotoXY(35,14); TEXTCOLOR(15); TEXTBACKGROUND(4);
      PIL:=READKEY; write(PIL); TEXTCOLOR(10); TEXTBACKGROUND(0);
      if UPCASE(Pil)='D' Then Pilih := 1;if UPCASE(Pil)='P' Then Pilih := 2;
      if UPCASE(Pil)='M' Then Pilih := 3;if UPCASE(Pil)='H' Then Pilih := 4;
      if UPCASE(Pil)='G' Then Pilih := 5;if UPCASE(Pil)='S' Then Pilih := 6;
      IF (PILIH<1) OR (PILIH>6) THEN Write(^G);End;
     Case Pilih of
        1: DATAELEMEN;
        2: BEGIN
           DATA:=DIREK+' '+NFDA+' '+EL+' '+FTP+' '+BBN+' '+BBT+' '+BGM+' '+BDD+' '+BLK;
           EXEC('PPO.EXE',DATA); END;
        3: Outputdata;
        4: Outputhasil;
        5: BEGIN
           DATA:=DIREK+' '+NFDA+' '+FTP+' '+BDD+' '+BLK;
           EXEC('SKETSPON.EXE',DATA); END; End;
   UNTIL PILIH=6; Write(^G); PILIH:=0;
End;


BEGIN
   GETDIR(0,DIRAK); IF (DIRAK='A:\') OR (DIRAK='C:\') OR (DIRAK='B:\') OR (DIRAK='D:\') OR
   (DIRAK='E:\') THEN CHDIR(DIRAK+'LOGO') ELSE CHDIR(DIRAK+'\LOGO'); EXEC('LOGO.EXE',DIRAK);
   YA:='U'; WHILE UPCASE(YA)='U' DO BEGIN
    CLRSCR; TEXTCOLOR(10);
    GotoXY(10,4); Write('DIREKTORI YANG SEDANG AKTIF : ',DIRAK);
    GotoXY(10,5); Write('DIREKTORI FILE DATA ANDA    : '); TEXTCOLOR(11);
    GOTOXY(10,7); WRITE('U : ulang   L : lanjutkan ===> '); TEXTCOLOR(10);
    GOTOXY(40,5); READLN(DIREK); IF (DIREK='') OR (DIREK=' ') OR (DIREK=' ') THEN BEGIN
    GOTOXY(40,5); WRITE(DIRAK); END; BENAR:=TRUE;
    WHILE BENAR DO BEGIN
      TEXTCOLOR(11); GOTOXY(41,7); YA:=READKEY; WRITE(YA);
      IF UPCASE(YA)='U' THEN BENAR:=FALSE;
      IF UPCASE(YA)='L' THEN BENAR:=FALSE; END;
      TEXTCOLOR(10); END;
   IF (DIREK='') OR (DIREK=' ') OR (DIREK=' ') THEN DIREK:=DIRAK;
   {$I-} CHDIR(DIREK); {$I+} IF IORESULT<>0 THEN MKDIR(DIREK); TEXTCOLOR(10);
   ASSIGN(NFILE,'FILEDATA.DAT'); {$I-} RESET(NFILE); {$I+}
   IF IORESULT = 0 THEN BEGIN
     WHILE NOT EOF(NFILE) DO BEGIN
       READ(NFILE,RECORDFDAT); NFDA:=RECORDFDAT.NFDAT; END; END; CHDIR(DIRAK);
   While True Do Begin
     ClrScr; GotoXY(20,4); WRITE(CHAR(201)); FOR I:=1 TO 46 DO WRITE(CHAR(205));
     WRITE(CHAR(187)); GOTOXY(20,5); Write(CHAR(186)); TEXTCOLOR(13);
     WRITE(' >>> PROGRAM DISAIN ELEMEN STRUKTUR BETON <<< ');
     TEXTCOLOR(10); WRITE(CHAR(186)); GotoXY(20,6);
     WRITE(CHAR(204)); FOR I:=1 TO 46 DO WRITE(CHAR(205)); WRITE(CHAR(185));
     GotoXY(20,7); WRITE(CHAR(186)); FOR I:=1 TO 46 DO WRITE(CHAR(0));
     WRITE(CHAR(186)); GotoXY(20,8);
     WRITE(CHAR(186)); FOR I:=1 TO 46 DO WRITE(CHAR(0)); WRITE(CHAR(186));
     GOTOXY(20,9); Write(CHAR(186),'   **** Nama File Data : ');
     TEXTBACKGROUND(15); TEXTCOLOR(1); WRITE(NFDA:8);
     TEXTBACKGROUND(0); TEXTCOLOR(10); WRITE('      ',CHAR(186));
     GotoXY(20,10); Write(CHAR(186)); Write('    '); TEXTCOLOR(11);
     WRITE('D'); TEXTCOLOR(10); WRITE(' FILE DATA               ');
     WRITE(CHAR(186)); GotoXY(20,11);
     Write(CHAR(186)); Write('    '); TEXTCOLOR(11); WRITE('P');
     TEXTCOLOR(10); WRITE(' DISAIN ELEMEN PLAT         '); WRITE(CHAR(186));
     GotoXY(20,12); Write(CHAR(186)); Write('    '); TEXTCOLOR(11); WRITE('B');
     TEXTCOLOR(10); WRITE(' DISAIN ELEMEN BALOK        '); WRITE(CHAR(186));
     GotoXY(20,13); Write(CHAR(186)); Write('    '); TEXTCOLOR(11); WRITE('K');
     TEXTCOLOR(10); WRITE(' DISAIN ELEMEN KOLOM        '); WRITE(CHAR(186));
     GotoXY(20,14); Write(CHAR(186)); Write('    '); TEXTCOLOR(11); WRITE('F');
     TEXTCOLOR(10); WRITE(' DISAIN ELEMEN PONDASI       '); WRITE(CHAR(186));
```

```
GotoXY(20,15); Write(CHAR(186)); Write('      '); TEXTCOLOR(11); WRITE('S');
TEXTCOLOR(10); WRITE(' SELESAI                '); WRITE(CHAR(186));
GOTOXY(20,16); WRITE(CHAR(204)); FOR I:=1 TO 46 DO WRITE(CHAR(205));
WRITE(CHAR(185)); GOTOXY(20,17); Write(CHAR(186)); TEXTCOLOR(11);
WRITE('     Pilih ? :                  '); TEXTCOLOR(10);
WRITE(CHAR(186)); GOTOXY(20,18);
WRITE(CHAR(200)); FOR I:=1 TO 46 DO WRITE(CHAR(205)); WRITE(CHAR(188)); Pilih:=0;
While (Pilih<1) or (Pilih>6) Do Begin
    TEXTCOLOR(11); GotoXY(41,17); PIL:=READKEY; write(PIL);
    IF UPCASE(PIL)='D' THEN Pilih := 1;IF UPCASE(PIL)='P' THEN Pilih := 2;
    IF UPCASE(PIL)='B' THEN Pilih := 3;IF UPCASE(PIL)='K' THEN Pilih := 4;
    IF UPCASE(PIL)='F' THEN Pilih := 5;IF UPCASE(PIL)='S' THEN Pilih := 6;
    IF (PILIH<1) OR (PILIH>6) THEN Write(^G); End; TEXTCOLOR(10);
Case Pilih of
    1: FILEDATA;
    2: BEGIN
        IF NFDA<>'' THEN BEGIN
            EL:='PLAT';FTP:='P';BBN:='.PBN';BBT:='.PBT';BEL:='.PEL';BGM:='.PGM';
            BDD:='.PDD';BLK:='.PLT';DISAINPLAT;END;WRITE(^G);END;
    3: BEGIN
        IF NFDA<>'' THEN BEGIN
            EL:='BALOK';FTP:='B';BBN:='.BBN';BBT:='.BBT';BEL:='.BEL';BGM:='.BGM';
            BDD:='.BDD'; BLK:='.BLK'; DISAINBALOK; END; WRITE(^G); END;
    4: BEGIN
        IF NFDA<>'' THEN BEGIN
            EL:='KOLOM';FTP:='K';BBN:='.KBN';BBT:='.KBT';BEL:='.KEL';BGM:='.KGM';
            BDD:='.KDD'; BLK:='.KOL'; DISAINKOLOM; END; WRITE(^G); END;
    5: BEGIN
        IF NFDA<>'' THEN BEGIN
            EL:='PONDASI';FTP:='F';BBN:='.FBN';BBT:='.FBT';BEL:='.FEL';BGM:='.FGM';
            BDD:='.FDD'; BLK:='.PON'; DISAINPONDASI; END; WRITE(^G); END;
    6: BEGIN
        Write(^G); CHDIR(DIRAK); TEXTBACKGROUND(0); TEXTCOLOR(15);
        CLRSCR; Exit; END; END; End;
End.
```

3.2 Program Disain Elemen Plat

Program disain elemen plat adalah subprogram pada program utama untuk mengontrol semua program yang berhubungan dengan perencanaan elemen plat.

3.2.1 Algoritma dan bagan alir program

Dengan mengacu pada langkah-langkah perencanaan plat dan rumus-rumus pada sub bab 2.1.1 dibuat algoritma dan bagan alir program disain elemen plat sebagai berikut:

1. Algoritma program disain elemen plat.

Algoritma atau langkah penyelesain perencanaan elemen struktur plat dengan program komputer adalah sebagai berikut:

1. data:

   a. data bahan:

      1) tegangan tekan beton (fc'),

      2) tegangan tarik baja tulangan (fy),

      3) modulus elastisitas baja tulangan (Es),

      4) diameter tulangan pokok yang digunakan (Dp),

      5) diameter tulangan susut yang digunakan (Ds),

   b. data dimensi:

      1) panjang bentang plat (y),

      2) lebar plat (x),

      3) selimut beton (Pb),

   c. data beban yang bekerja pada plat (q),

2. menentukan kondisi struktur,

3. untuk plat satu arah:

   a. menghitung ketebalan plat (h),

   b. menghitung momen yang menentukan (Mu),

$$d = h - Pb - \tfrac{1}{2}.Dp$$

$$k = \dfrac{Mu}{\Phi bd^2}$$

$$\rho = \dfrac{fc'_p - \sqrt{fc'^2_p - 2,36.k.fc'_p}}{1,18.fy}$$

memeriksa ρ terhadap ρ_{min} dan ρ_{maks},

$$\rho_b = \dfrac{(0,85.fc'_p.\beta_1)}{fy}\dfrac{600}{600+fy}$$

$$\rho_{maks} = 0,75.\rho_b$$

$$\rho_{min} = \dfrac{1,4}{fy}$$

bila $\rho > \rho_{maks} \rightarrow$ tebal plat diperbaharui,

bila $\rho < \rho_{min} \rightarrow \rho = \rho_{min}$,

$As = \rho ld$

menentukan As_{aktual},

$$s = \dfrac{Ad.l}{As_{aktual}}$$

$s_{maks} = 3.h$

$s_{maks} = 500$ mm

pilih s_{maks} yang terkecil sebagai s_{maks},

bila $s > s_{maks}$ maka perencanaan diulang kembali

4. untuk plat dua arah:

a. menghitung ketebalan plat (h),

b. menghitung momen yang menentukan (Mu_x dan Mu_y),

$d = h - Pb - \frac{1}{2}.Dp_x \rightarrow$ untuk arah x,

$d = h - Pb - Dp_x - \frac{1}{2}.Dp_y \rightarrow$ untuk arah y,

$$k = \frac{Mu}{\Phi bd^2}$$

$$\rho = \frac{fc'_p - \sqrt{fc'^2_p - 2,36.k.fc'_p}}{1,18.fy}$$

memeriksa ρ terhadap ρ_{min} dan ρ_{maks},

$$\rho_b = \frac{(0,85.fc'_p.\beta_1)}{fy} \frac{600}{600+fy}$$

$$\rho_{maks} = 0,75.\rho_b$$

$$\rho_{min} = \frac{1,4}{fy}$$

bila $\rho > \rho_{maks} \rightarrow$ tebal plat diperbaharui,

bila $\rho < \rho_{min} \rightarrow \rho = \rho_{min}$,

$As = \rho l d$

menentukan As_{aktual},

$$s = \frac{Ad.l}{As_{aktual}}$$

$s_{maks} = 3.h$

$s_{maks} = 500$ mm

pilih s_{maks} yang terkecil sebagai s_{maks},

bila $s > s_{maks}$ maka perencanaan diulang kembali

5. merencanakan penulangan susut dan suhu:

bila mutu baja $30 \rightarrow As_s = 0,0020.b.h$,

bila mutu baja $40 \rightarrow As_s = 0,0018.b.h$,

bila mutu baja $> 40 \rightarrow As_s = 0,0018.b.h.(\frac{400}{fy})$,

$$\text{bila } A\varsigma > 0,0014.\,b.\,h \text{ maka } As_s = 0,0014.\,b.\,h$$

6. bila $As < As_s$ maka $As = As_s$,

1. Bagan alir program disain elemen plat.

Berdasarkan algoritma program disain elemen plat, secara umum dibuat bagan alir program disain elemen plat sebagai berikut:
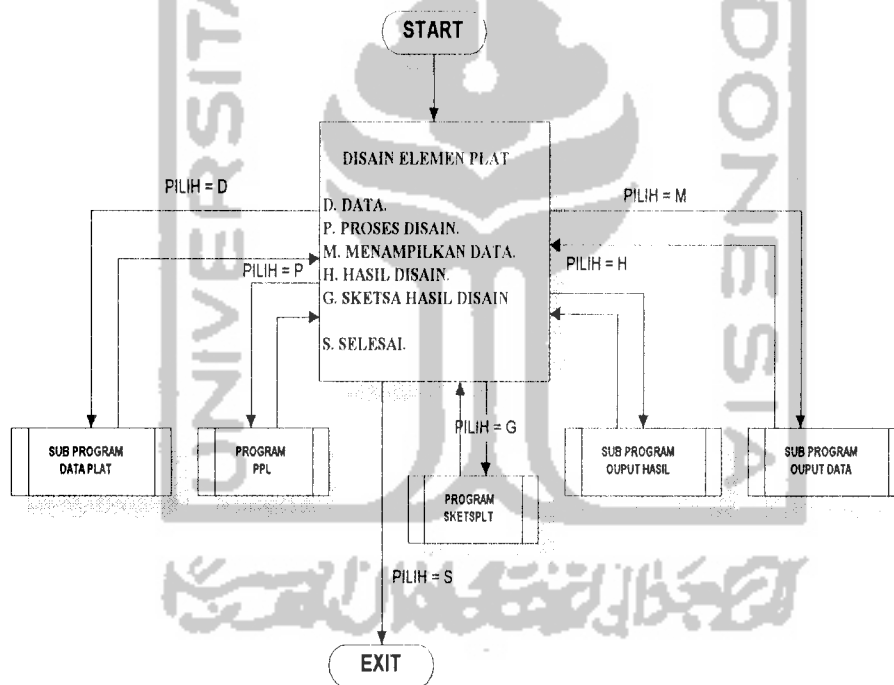
Gambar 3.2 Bagan alir sub program disain elemen plat
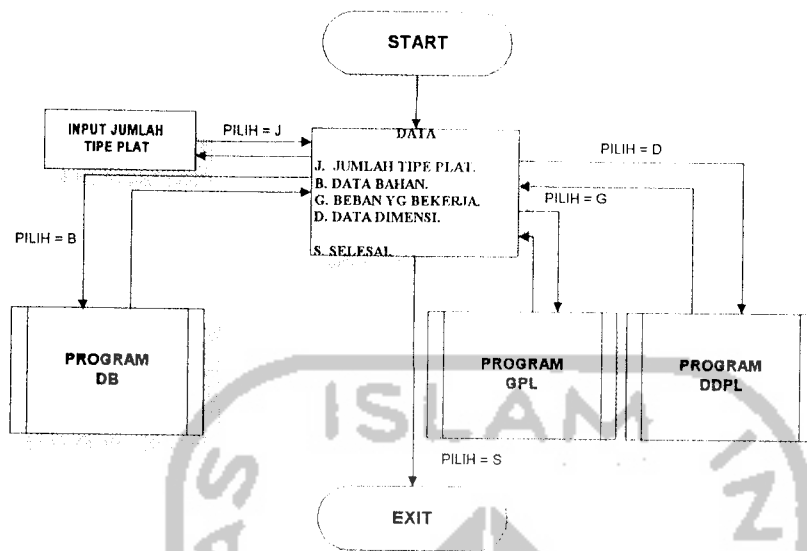
Gambar 3.3 Bagan alir sub program data plat
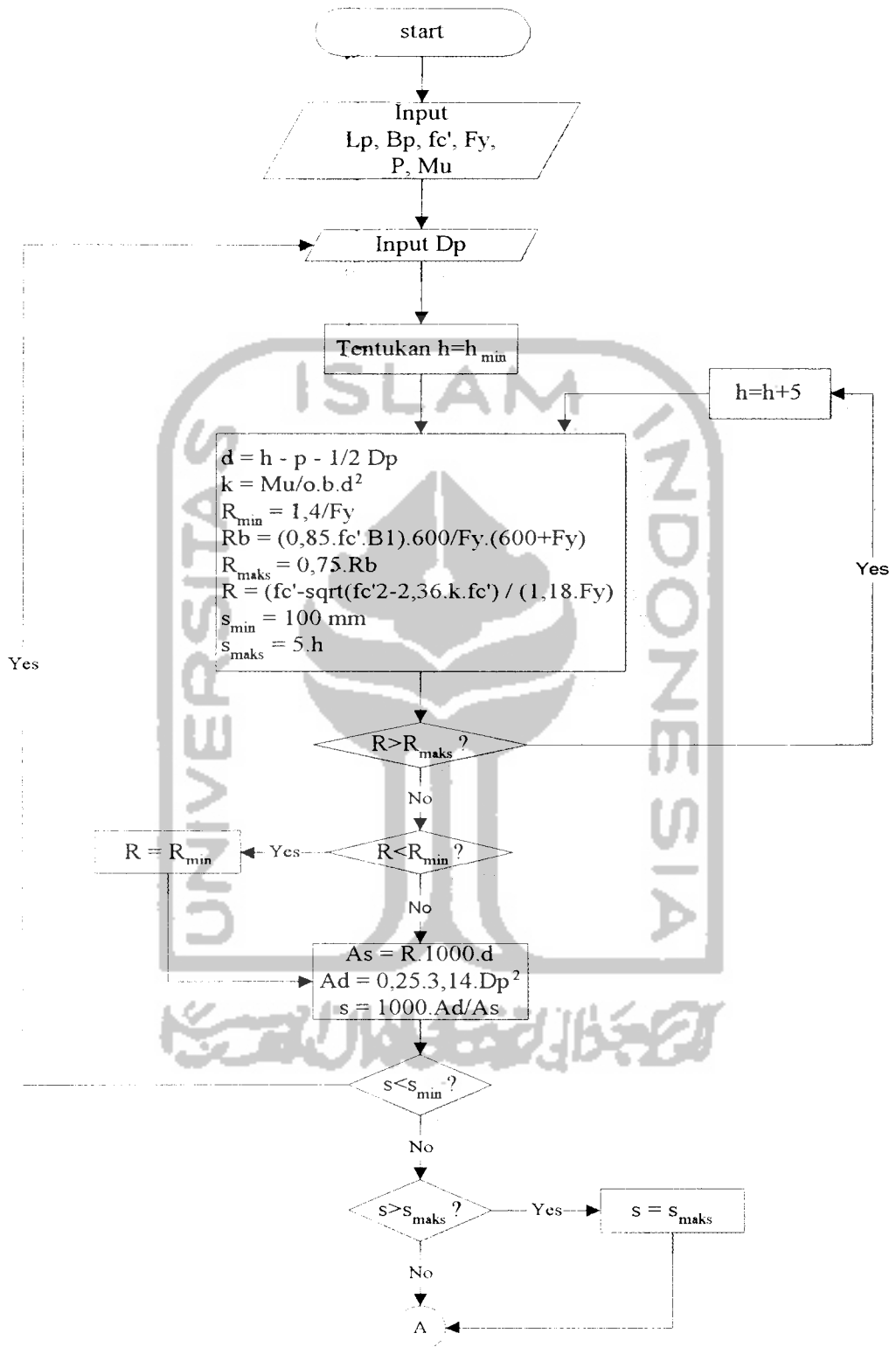
Gambar 3.4 Bagan alir proses disain plat 1

Gambar 3.5 Bagan alir proses disain plat 2 (lanjutan)

3.2.2 Listing program

Dengan berdasarkan bagan alir subprogram disain PLAT di atas dibuat program dan subprogram yang terkait dengan perencanaan disain elemen PLAT, baik dalam hal "input" data, proses disain maupun "output" hasil disain. Subprogram disain elemen PLAT tersebut berada pada program utama yang akan dieksekusi bila pilihan disain elemen PLAT diberikan.

Subprogram disain PLAT tersebut akan mengeksekusi subprogram data PLAT, subprogram "output" data dan "output" hasil yang juga berada pada program utama.

Dengan subprogram data PLAT tersebut dieksekusi program-program sebagai berikut: program DB ("input" data bahan PLAT), program GPL ("input" gaya maksimum yang bekerja pada PLAT), program DDPL ("input" data dimensi PLAT). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram data PLAT dan bila subprogram data PLAT sudah selesai dieksekusi maka program akan kembali ke subprogram disain PLAT.

Dengan subprogram "output" data dieksekusi program-program sebagai berikut: program TDPL ("output" data PLAT ke layar) dan program CDPL ("output" data PLAT ke printer). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram "output" data dan bila subprogram "output" data sudah selesai dieksekusi maka program akan kembali ke subprogram disain PLAT.

Dengan subprogram "output" hasil dieksekusi program-program sebagai berikut: program TPL ("output" hasil disain PLAT ke layar) dan program CPL ("output" hasil disain PLAT ke printer). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram "output" hasil dan bila subprogram "output" hasil sudah selesai dieksekusi maka program akan kembali ke subprogram disain PLAT.

Program-program yang langsung dapat dieksekusi (tidak melalui subprogram) oleh subprogram disain PLAT adalah program PPL (program proses disain PLAT) dan program sketsa PLAT (program sketsa hasil disain PLAT).

Dan bila subprogram disain PLAT telah selesai dieksekusi maka program kembali ke program utama (menu utama).

Listing program untuk program-program yang berada di bawah kontrol subprogram disain PLAT di atas dapat dilihat pada lampiran 1.

3.3 Program Disain Elemen Balok

Program disain elemen balok adalah subprogram pada program utama untuk mengontrol semua program yang berhubungan dengan perencanaan elemen balok.

3.3.1 Algoritma dan bagan alir program

Dengan mengacu pada langkah-langkah perencanaan balok dan rumus-rumus pada sub bab 2.1.2 dibuat algoritma dan bagan alir program disain elemen balok sebagai berikut:

1. Algoritma program disain elemen balok.

Algoritma atau langkah penyelesain perencanaan elemen struktur balok dengan program komputer adalah sebagai berikut:

1. data:

   a. data bahan:

     1) kuat desak beton (fc'),

     2) tegangan tarik baja (fy),

     3) modulus elastisitas baja (Es),

     4) diameter tulangan baja yang digunakan (Dp, Ds),

   b. data dimensi balok:

     1) panjang bentang balok (L),

     2) lebar penampang balok (b),

     3) tinggi penampang balok (h),

   c. data gaya yang bekerja pada balok:

     1) gaya geser/"shear force" (Vu),

2) gaya aksial/"axial force" (Pu),

3) momen tumpuan dan lapangan maksimal atau M^-_{maks} dan M^+_{maks} (Mu),

4) momen torsi (Tu),

2. menghitung MR_{maks}:

$$d = h - Pb - Ds - \tfrac{1}{2} Dp$$

$$\rho_b = \frac{(0,85.fc'.\beta_1)}{fy} \frac{600}{(600+fy)}$$

$$\rho_{maks} = 0,75.\rho_b$$

$$\omega = \frac{\rho_{maks}.fy}{fc'}$$

$$k_{maks} = fc'.\omega.(1-0,59.\omega)$$

$$MR_{maks} = \Phi.b.d^2.k_{maks}$$

3. memeriksa MR_{maks} terhadap Mu:

a. jika $MR_{maks} \geq Mu$ maka merencanakan balok sebagai balok bertulangan tarik saja:

$$d = h - Pb - Ds - \tfrac{1}{2} Dp$$

$$k = \frac{Mu}{\Phi.b.d^2}$$

$$\rho = \frac{fc' - \sqrt{fc'^2 - 2,36.k.fc'}}{1,18.fy}$$

$$As = \rho.b.d$$

b. jika $MR_{maks} < Mu$ maka merencanakan balok sebagai balok bertulangan rangkap (bertulangan tarik dan desak):

$$\rho = 0,90.\rho_{maks}$$

$$\omega = \frac{\rho.fy}{fc'}$$

$$k = fc'.\omega.(1-0,59.\omega)$$

$$MR_1 = \Phi. b. d^2. k$$

$$As_1 = \rho. b. d$$

$$MR_2 = Mu - MR_1$$

$$d' = 70mm$$

$$ND_2 = \frac{MR_2}{\Phi.(d-d')}$$

$$a = \frac{As_1. fy}{(0,85. fc'). b}$$

$$c = \frac{a}{\beta_1}$$

$$\varepsilon s' = \frac{c-d'}{c}(0,003)$$

$$\varepsilon y = \frac{fy}{Es}$$

memeriksa εs terhadap εy:

jika $\varepsilon s' \geq \varepsilon y \rightarrow fs' = fy$

jika $\varepsilon s' < \varepsilon y \rightarrow fs' = \varepsilon s'. Es$

$$As' = \frac{ND_2}{fs'}$$

$$As_2 = \frac{As'. fs'}{fy}$$

$$As = As_1 + As_2$$

4. memilih tulangan baja yang digunakan (As dan As'),

5. merencanakan penulangan sengkang:

   a. memeriksa Vu terhadap $\frac{1}{2}\Phi Vc$,

b. $Vc = (\frac{1}{6}\sqrt{fc'}).b.d$

c. jika $Vu < \frac{1}{2}\Phi Vc$ maka tidak diperlukan tulangan geser sengkang,

dimana $\Phi = 0,60$

d. menghitung Vs pada tempat dukungan balok:

$$Vs_{perlu} = \frac{Vu}{\Phi} - Vc$$

e. memilih diameter tulangan sengkang (Ds),

f. menghitung luas penampang tulangan (Av):

$$Av = \frac{1}{4}.\pi.Ds^2$$

g. menghitung jarak spasi sengkang pada tempat berjarak x dari dukungan:

$$S_{perlu} = \frac{Av.fy.d}{Vs_{perlu}}$$

h. memeriksa Vs pada penampang kritis dengan $V = (\frac{1}{3}\sqrt{fc'}).b.d$,

1) bila $Vs \geq V$ maka $s_{maks} = 300$ mm atau $s_{maks} = \frac{1}{4}.d$, pilih yg terkecil

2) bila $Vs < V$ maka $s_{maks} = 600$ mm atau $s_{maks} = \frac{1}{2}.d$, pilih yg terkecil

6. merencanakan penulangan torsi:

a. membandingkan Tu terhadap $\Phi[(\frac{1}{24}\sqrt{fc'})\sum x^2 y]$,

$Tu \leq \Phi[(\frac{1}{24}\sqrt{fc'})\sum x^2 y] \rightarrow$ efek torsi boleh diabaikan,

$Tu > \Phi[(\frac{1}{24}\sqrt{fc'})\sum x^2 y] \rightarrow$ diperlukan tulangan sengkang,

$$Ct = \frac{b.d}{\sum x^2 y},$$

b. $Tc = \dfrac{(\frac{1}{15}\sqrt{fc'})\sum x^2 y}{\sqrt{1+(\frac{0,4.Vu}{Ct.Tu})^2}}$, apabila komponen struktur mengalami gaya tarik cukup

besar tulangan torsi harus direncanakan untuk memikul momen torsi total dan

nilai Tc dikalikan $(1+0,30\frac{Nu}{Ag})$, dimana Nu bernilai negatif untuk tarik,

c. memeriksa Tu terhadap ΦTc,

$Tu \le \Phi Tc \rightarrow$ efek torsi boleh diabaikan,

$Tn = \dfrac{Tu}{\Phi}$,

$Ts = Tn - Tc$ atau $Ts = (\frac{1}{3}\sqrt{fy'})\sum \frac{1}{3} x^2 y$ dan pilih yang terkecil,

d. memeriksa Ts terhadap Tc,

bila $Ts > 4Tc$ maka penampang harus diperbesar,

e. menghitung tulangan torsi yang dibutuhkan:

$x_1 = b - 2(Pb + \frac{1}{2}Ds)$

$y_1 = h - 2(Pb + \frac{1}{2}Ds)$

$\alpha_t = \frac{1}{3}(2+\frac{y_1}{x_1})$

$\dfrac{At}{s} = \dfrac{Ts}{\alpha_t . x_1 . y_1}$

f. menghitung penulangan geser yang diperlukan:

$Vc = \dfrac{(\frac{1}{6}\sqrt{fc'}).b.d}{\sqrt{1+(2,5.Ct\frac{Tu}{Vu})^2}}$

$Vn = \dfrac{Vu}{\Phi}$

$Vs = Vn - Vc$

$\dfrac{Av}{s} = \dfrac{Vs}{fy.d}$

g. merencanakan sengkang tertutup gabungan untuk torsi dan geser:

$$\frac{Avt}{s} = \frac{2At}{s} + \frac{Av}{s}$$

luas dua kaki $Ast = 2.(\tfrac{1}{4}.\pi.Ds^2)$

$$S_{perlu} = \frac{Ast}{\frac{Avt}{s}}$$

$$S_{maks} = \tfrac{1}{4}(x_1 + y_1)$$

$$As_{perlu} = Av + 2At = \tfrac{1}{3}\frac{b.s}{fy} < As_{terpasang}$$

h. merencanakan tulangan torsi memanjang:

$$Al = \frac{2At}{s}(x_1 + y_1)$$

memeriksa $\tfrac{1}{3}\frac{b.s}{fy}$ terhadap At,

jika $\tfrac{1}{3}\frac{b.s}{fy} \leq At \rightarrow A = At$,

jika $\tfrac{1}{3}\frac{b.s}{fy} > At \rightarrow A = \tfrac{1}{3}\frac{b.s}{fy}$,

$$Al = \left[\frac{2,8.h.s}{fy}\left[\frac{Tu}{Tu + \frac{Vu}{3.Ct}}\right] - 2.A\right]\frac{x_1 + y_1}{s},$$

memilih Al yang terbesar dan memilih diameter tulangan torsi memanjang

(Dl) yang digunakan, jarak tulangan tidak boleh melebihi 300mm,

7. menghitung luas total tulangan memanjang yang dipasang,

8. memilih tulangan memanjang yang dipasang pada balok,

9. memeriksa jarak tulangan (s),

$$n = \frac{As}{A\phi}$$

$$s = \frac{b - 2.Pb - n.Dp - 2.Ds}{(n-1)} \geq 25mm$$

1. Bagan alir program disain elemen balok.

Berdasarkan algoritma program disain elemen balok, secara umum dibuat bagan alir program disain elemen balok sebagai berikut:
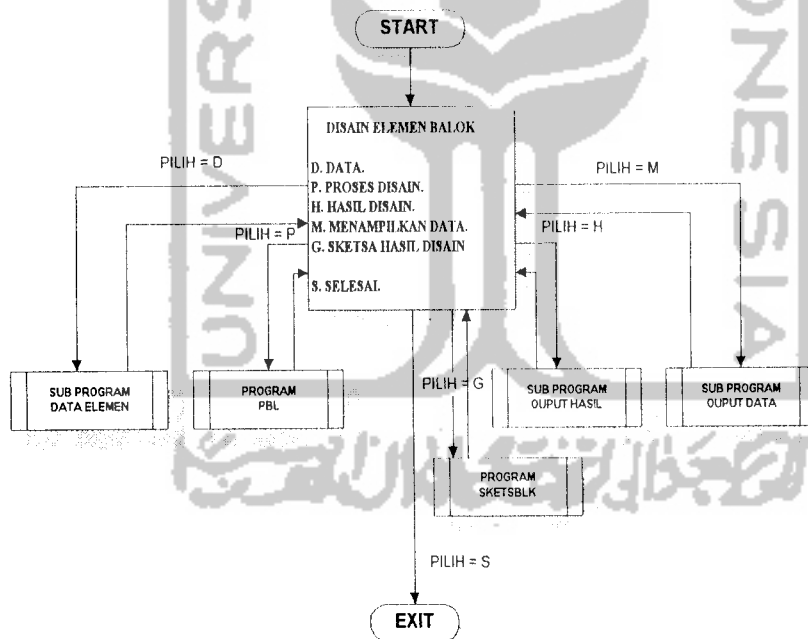
Gambar 3.6 Bagan alir subprogram disain elemen balok
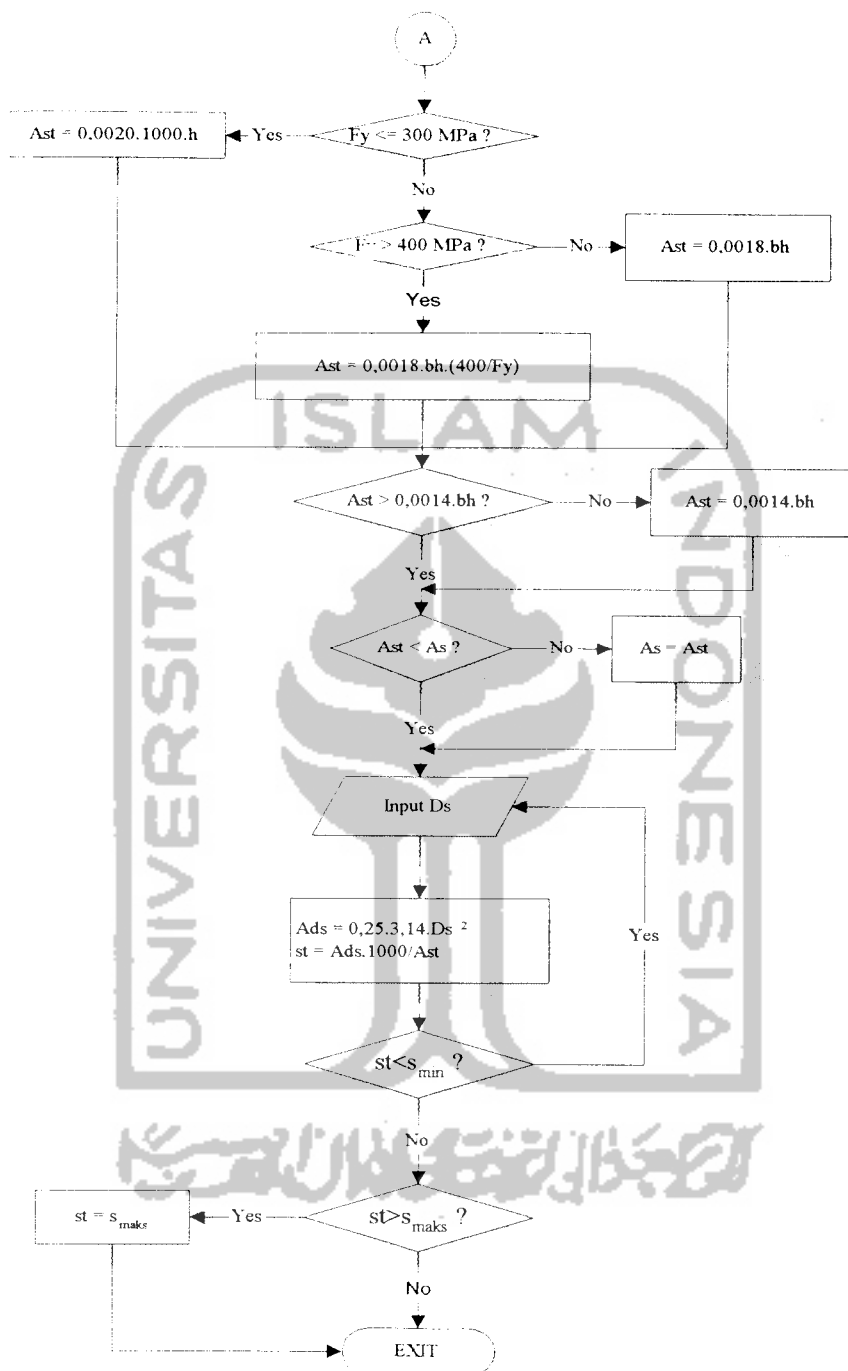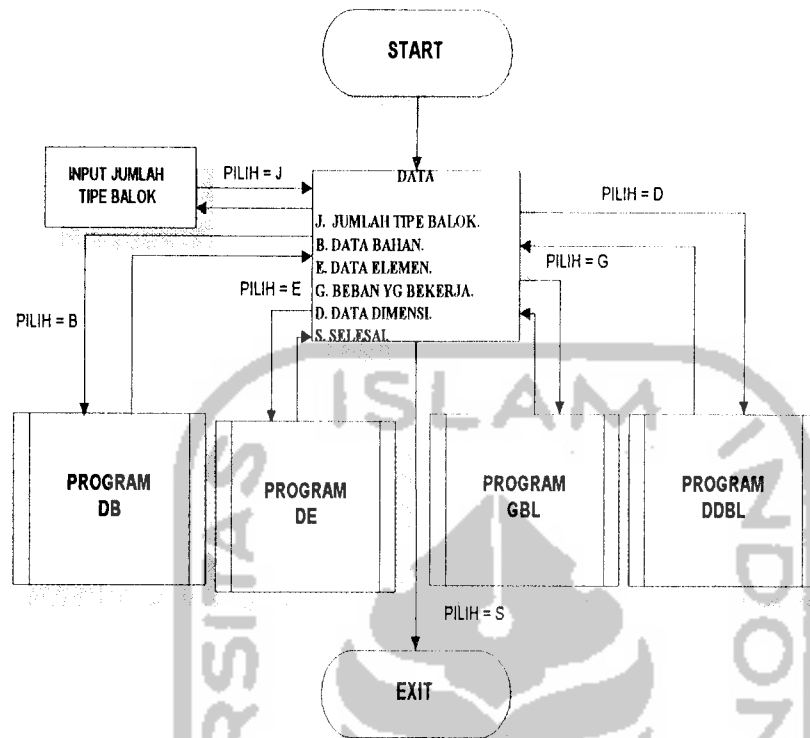
Gambar 3.7 Bagan alir subprogram data elemen
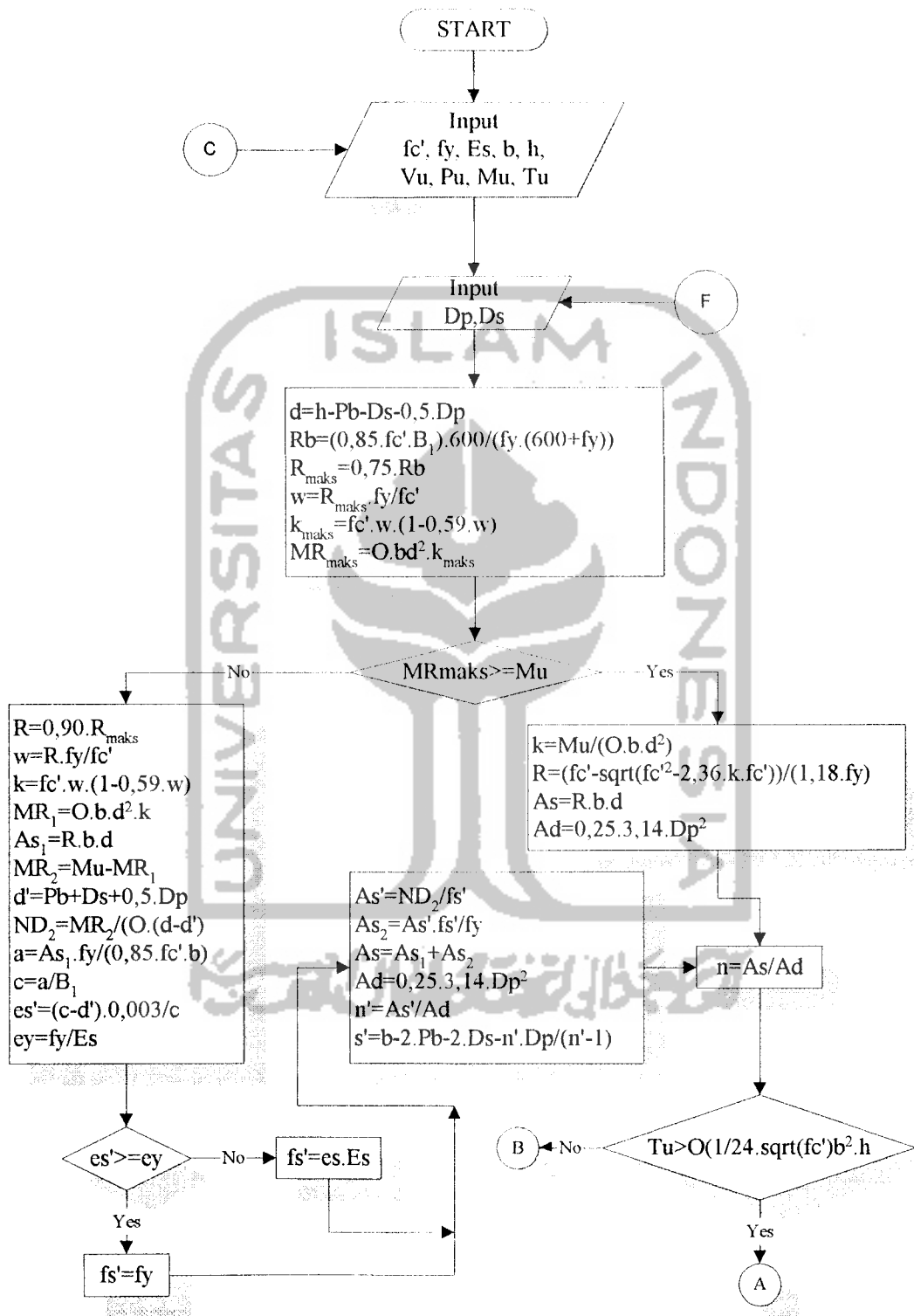
Gambar 3.8 Bagan alir proses disain balok 1
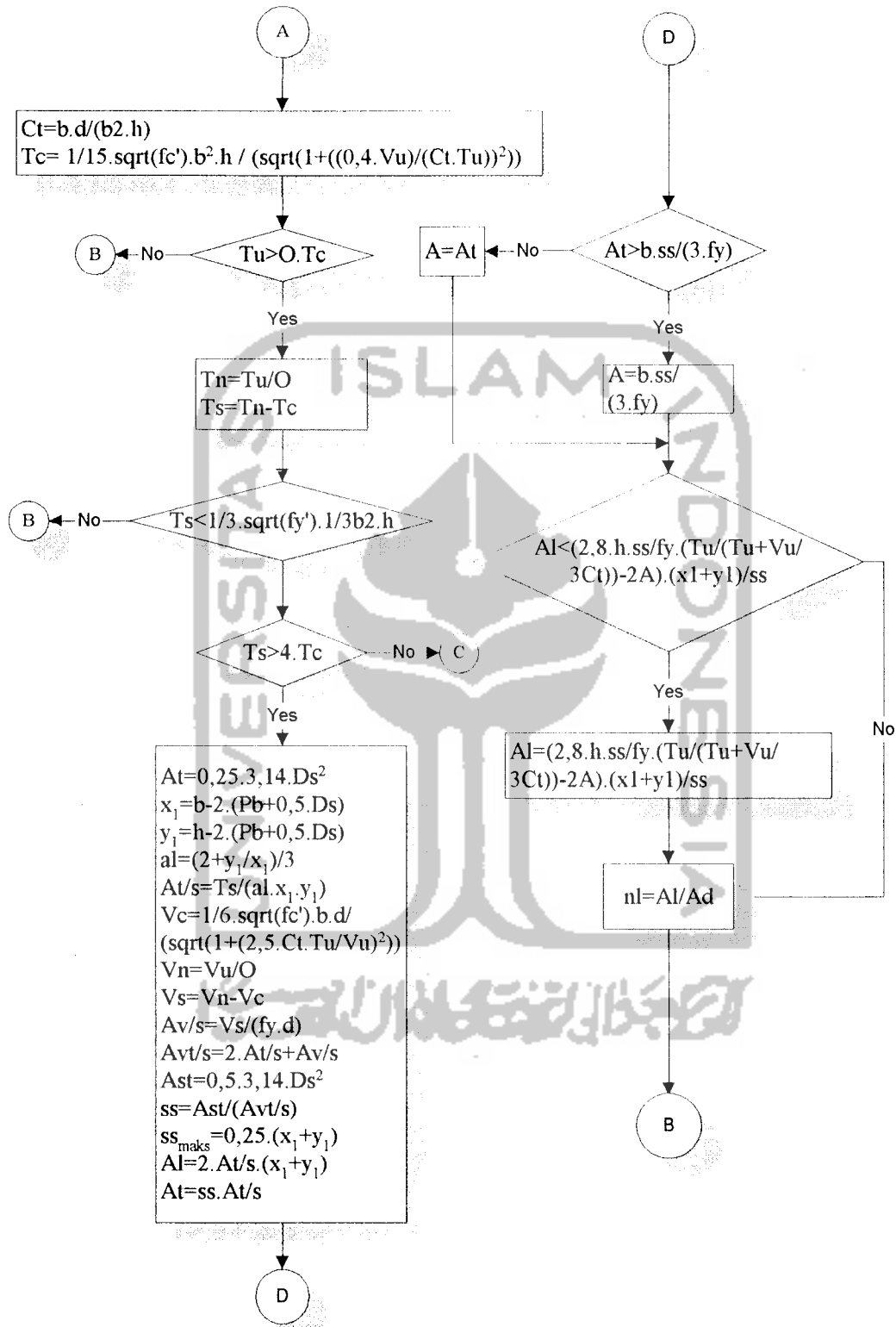
Gambar 3.9 Bagan alir proses disain balok 2 (lanjutan)
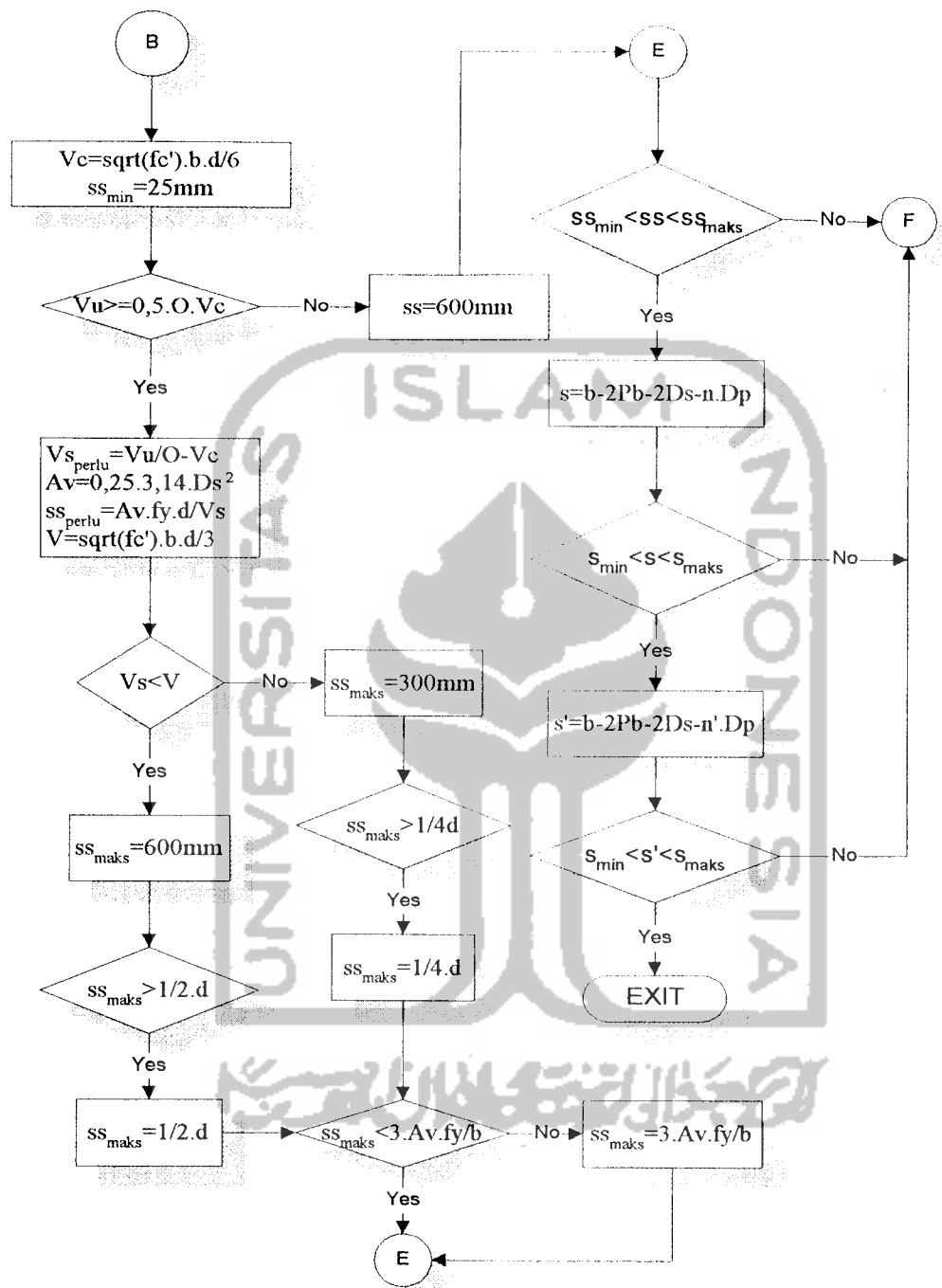
Gambar 3.10 Bagan alir proses disain balok 3 (lanjutan)

3.3.2 Listing program

Dengan berdasarkan bagan alir subprogram disain BALOK di atas dibuat program dan subprogram yang terkait dengan perencanaan disain elemen BALOK, baik dalam hal "input" data, proses disain maupun "output" hasil disain. Subprogram disain elemen BALOK tersebut berada pada program utama yang akan dieksekusi bila pilihan disain elemen BALOK diberikan.

Subprogram disain BALOK tersebut akan mengeksekusi subprogram data elemen, subprogram "output" data dan "output" hasil yang juga berada pada program utama.

Dengan subprogram data elemen tersebut dieksekusi program-program sebagai berikut: program DE ("input" data elemen), program DB ("input" data bahan BALOK), program GBL ("input" gaya maksimum yang bekerja pada BALOK), program DDBL ("input" data dimensi BALOK). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram data elemen dan bila subprogram data elemen sudah selesai dieksekusi maka program akan kembali ke subprogram disain BALOK.

Dengan subprogram "output" data dieksekusi program-program sebagai berikut: program TDBL ("output" data BALOK ke layar) dan program CDBL ("output" data BALOK ke printer). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram "output" data dan bila subprogram "output" data sudah selesai dieksekusi maka program akan kembali ke subprogram disain BALOK.

Dengan subprogram "output" hasil dieksekusi program-program sebagai berikut: program TBL ("output" hasil disain BALOK ke layar) dan program CBL ("output" hasil disain BALOK ke printer). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram "output" hasil dan bila subprogram "output" hasil sudah selesai dieksekusi maka program akan kembali ke subprogram disain BALOK.

Program-program yang langsung dapat dieksekusi (tidak melalui subprogram) oleh subprogram disain BALOK adalah program PBL (program proses disain BALOK) dan program sketsa BALOK (program sketsa hasil disain BALOK).

Dan bila subprogram disain BALOK telah selesai dieksekusi maka program kembali ke program utama (menu utama).

Listing program untuk program-program yang berada di bawah kontrol subprogram disain BALOK di atas dapat dilihat pada lampiran 2.

3.4 Program Disain Elemen Kolom

Program disain elemen kolom adalah subprogram pada program utama untuk mengontrol semua program yang berhubungan dengan perencanaan elemen kolom.

3.4.1 Algoritma dan bagan alir program

Dengan mengacu pada langkah-langkah perencanaan kolom dan rumus-rumus pada sub bab 2.1.3 dibuat algoritma dan bagan alir program disain elemen kolom sebagai berikut:

1. Algoritma program disain elemen kolom.

Algoritma atau langkah penyelesaian perencanaan elemen struktur kolom dengan program komputer adalah sebagai:

1. data:

  a. data bahan:

    1) kuat desak beton (fc'),

    2) kuat tarik baja tulangan (fy),

    3) modulus elastisitas baja tulangan (Es),

    4) diameter tulangan baja yang digunakan (Dp dan Ds),

  b. data gaya yang bekerja pada kolom:

    1) gaya aksial/"axial force" (Pu),

    2) gaya geser/"shear force" (Vu),

    3) momen (Mu),

  c. data dimensi kolom:

    1) lebar penampang kolom (b),

    2) tinggi penampang kolom (h),

3) diameter penampang kolom (D) untuk kolom berpenampang lingkaran,

4) tinggi elemen kolom (l),

5) penutup beton (Pb),

2. memilih bentuk tulangan pengikat dan bentuk penampang kolom,

   a. jika tulangan pengikat menggunakan pengikat sengkang, $\Phi = 0,65$,

   b. jika tulangan pengikat menggunakan pengikat spiral, $\Phi = 0,70$,

3. memeriksa kelangsingan kolom:

$$K = \frac{kl}{r}$$

jika $K \leq 34 - 12.(\frac{M1}{M2})$ maka efek kelangsingan dapat diabaikan ,

4. bila efek kelangsingan diperhitungkan :

$$Cm = 0,60 + 0,40(\tfrac{M1}{M2})$$

bila $Cm < 0,40 \rightarrow Cm = 0,40$

$Ig = \frac{1}{12}.b.h^3 \rightarrow$ untuk kolom penampang persegi,

$Ig = \frac{1}{64}.D^4 \rightarrow$ untuk kolom penampang lingkaran ,

$\beta d = 0,25$

$$EI = \frac{Ec.Ig}{2,50.(1+\beta d)}$$

$$Pc = \frac{\pi^2.EI}{(kl)^2}$$

$$\delta_b = \frac{Cm}{1 - \frac{Pu}{\Phi Pc}}$$

$Mc = \delta_b.Mu$

$Mu = Mc$

5. memperkirakan rasio penulangan ρ_g,

6. $e = \dfrac{Mu}{Pu}$,

7. $As_{perlu} = As'_{perlu} = \dfrac{\rho_g . b . d}{2}$,

8. memilih tulangan yang digunakan dan menghitung As_{aktual},

9. untuk kolom berpenampang persegi:

   a. $Ag = b . h$

   b. $\rho = \dfrac{As}{b . d}$,

   c. $c_b = \dfrac{600}{600 + fy} . d$

   $a_b = \beta_1 . c_b$

   $\varepsilon s' = \dfrac{c_b - d'}{c_b} . (0,003)$

   $\varepsilon y = \dfrac{fy}{Es}$

   jika $\varepsilon s' < \varepsilon y \rightarrow fs' = \varepsilon s' . Es$,

   jika $\varepsilon s' \geq \varepsilon y \rightarrow fs' = fy$,

   d. $\Phi P_{nb} = \Phi[0,85 . fc' . a_b . b + As' . fs' - As . fy]$

   e. memeriksa ΦP_{nb} terhadap Pu,

   1) jika $\Phi P_{nb} > Pu$,

   $m = \dfrac{fy}{0,85 . fc'}$

   $Pn = 0,85 . fc' . b . d \left[\dfrac{h-2.e}{2d} + \sqrt{(\dfrac{h-2.e}{2d})^2 + 2 . m . \rho . (1 - \dfrac{d'}{d})} \right]$

2) jika $\Phi P_{nb} \leq Pu$,

$$Pn = \frac{As'.fy}{\frac{e}{(d-d')}+0,50} + \frac{b.h.fc'}{\frac{3.h.e}{d^2}+1,18}$$

f. memeriksa ΦPn terhadap Pu,

jika $\Phi Pn < Pu \rightarrow$ mengulang perencanaan

10. untuk kolom berpenampang lingkaran:

$Ag = \frac{1}{4}.\pi.D^2$

$h_{ek} = 0,80.D$

$b_{ek} = \frac{Ag}{h_{ek}}$

memilih tulangan yang digunakan ,

$Pb_{eff} = Pb + Dp$

$Ds = D - 2.Pb_{eff}$

$d' = Pb_{eff} + \frac{1}{2}.Dp$

a. $c_b = \frac{600}{600+fy}.d$

$a_b = \beta_1.c_b$

$\varepsilon s' = \frac{c_b - d'}{c_b}.(0,003)$

$\varepsilon y = \frac{fy}{Es}$

jika $\varepsilon s' < \varepsilon y \rightarrow fs' = \varepsilon s'.Es$,

jika $\varepsilon s' \geq \varepsilon y \rightarrow fs' = fy$,

b. $\Phi P_{nb} = \Phi[0,85.fc'.a_b.b_{ek} + As'.fs'-As.fy]$

c. memeriksa ΦP_{nb} terhadap Pu,

1) jika $\Phi P_{nb} > Pu$,

$$m = \frac{fy}{0,85.fc'}$$

$$\rho s = \frac{2.As}{Ag}$$

$$Pn = 0,85.fc'.D^2.\left[\sqrt{(\tfrac{0,85.e}{D} - 0,38)^2 + \tfrac{\rho s.m.Ds}{2,50.D}} - (\tfrac{0,85.e}{D} - 0,38)\right]$$

2) jika $\Phi P_{nb} \leq Pu$,

$$Pn = \frac{As.fy}{\frac{3.e}{Ds} + 1,0} + \frac{Ag.fc'}{\frac{9,6.D.e}{(0,8.D + 0,67.Ds)^2} + 1,18}$$

d. memeriksa ΦPn terhadap Pu,

jika $\Phi Pn < Pu \rightarrow$ mengulang perencanaan

2. merencanakan tulangan pengikat:

a. memilih diameter tulangan pengikat (ds),

$$As = \tfrac{1}{4}.\pi.ds^2$$

1) bila tulangan pengikat berupa pengikat spiral:

untuk penampang lingkaran:

$$Dc = D - 2.Pb$$

$$Ac = \tfrac{1}{4}.\pi.Dc^2$$

$$\rho_s = 0,45.\left[\tfrac{Ag}{Ac} - 1\right].\frac{fc'}{fy}$$

$$s = \frac{4.As.(Dc - ds)}{Dc^2(\rho_s)}$$

untuk penampang persegi:

$$Ac = (b - 2.Pb).(h - 2.Pb),$$

$$\rho_s = 0,45.\left[\frac{Ag}{Ac} - 1\right].\frac{fc'}{fy},$$

$$s = \frac{As.2.((b - 2.Pb - ds) + (h - 2.Pb - ds))}{Ac.(\rho_s)}$$

2) bila berupa pengikat sengkang:

$s = 16.Dp,$

$s = 48.ds,$

untuk penampang lingkaran:

bila $h_{ck} \geq b_{ck} \rightarrow s = b_{ck}$,

bila $h_{ck} < b_{ck} \rightarrow s = h_{ck}$,

untuk penampang persegi:

bila $h \geq b \rightarrow s = b,$

bila $h < b \rightarrow s = h,$

memilih nilai s yang terkecil sebagai jarak spasi sengkang,

2. Bagan alir program disain elemen kolom.

Berdasarkan algoritma program disain elemen kolom, secara umum dibuat bagan alir program disain elemen kolom sebagai berikut:
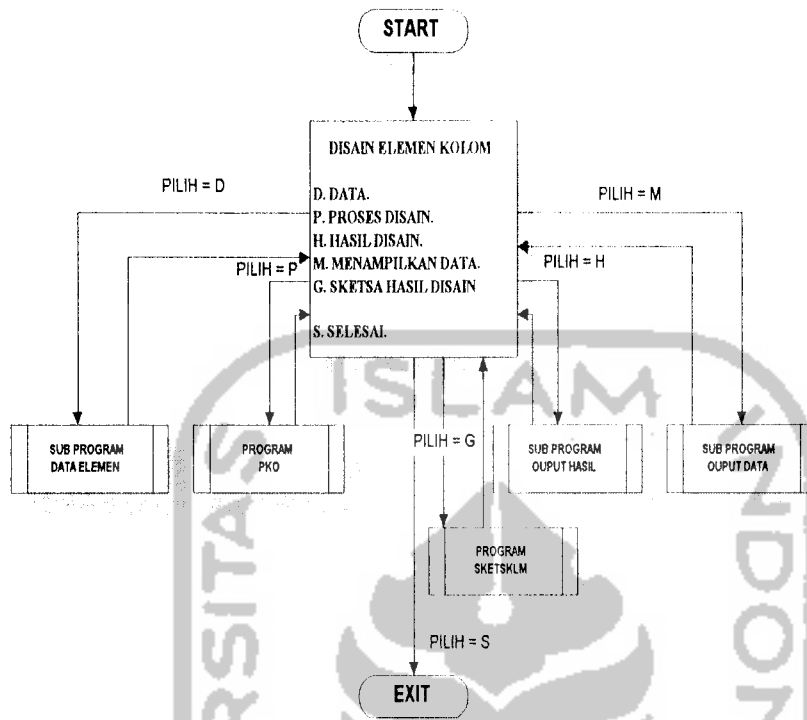
Gambar 3.11 Bagan alir subprogram disain elemen kolom
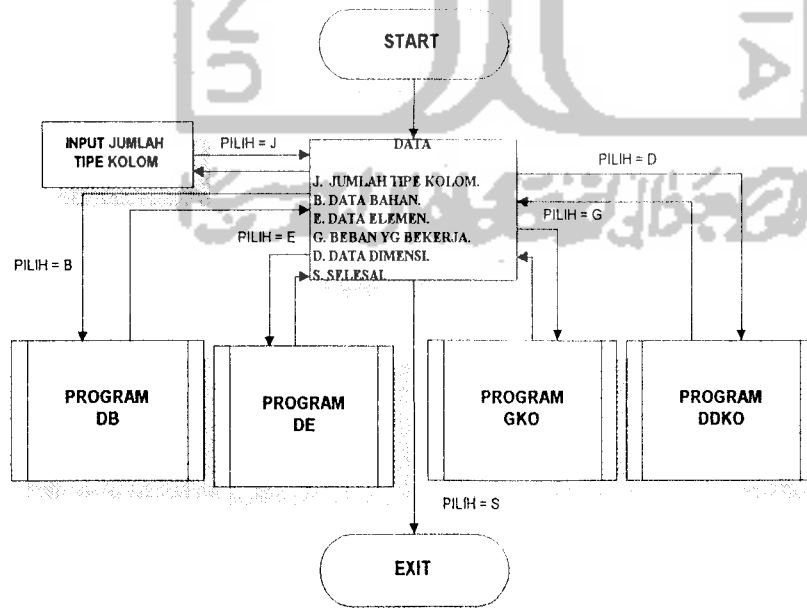
Gambar 3.12 Bagan alir subprogram data elemen

3.4.2 Listing program

Dengan berdasarkan bagan alir subprogram disain kolom di atas dibuat program dan subprogram yang terkait dengan perencanaan disain elemen kolom, baik dalam hal "input" data, proses disain maupun "output" hasil disain. Subprogram disain elemen kolom tersebut berada pada program utama yang akan dieksekusi bila pilihan disain elemen kolom diberikan.

Subprogram disain kolom tersebut akan mengeksekusi subprogram data elemen, subprogram "output" data dan "output" hasil yang juga berada pada program utama.

Dengan subprogram data elemen tersebut dieksekusi program-program sebagai berikut: program DE ("input" data elemen), program DB ("input" data bahan kolom), program GKO ("input" gaya maksimum yang bekerja pada kolom), program DDKO ("input" data dimensi kolom). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram data elemen dan bila subprogram data elemen sudah selesai dieksekusi maka program akan kembali ke subprogram disain kolom.

Dengan subprogram "output" data dieksekusi program-program sebagai berikut: program TDKO ("output" data kolom ke layar) dan program CDKO ("output" data kolom ke printer). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram "output" data dan bila subprogram "output" data sudah selesai dieksekusi maka program akan kembali ke subprogram disain kolom.

Dengan subprogram "output" hasil dieksekusi program-program sebagai berikut: program TKO ("output" hasil disain kolom ke layar) dan program CKO ("output" hasil disain kolom ke printer). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram "output" hasil dan bila subprogram "output" hasil sudah selesai dieksekusi maka program akan kembali ke subprogram disain kolom.

Program-program yang langsung dapat dieksekusi (tidak melalui subprogram) oleh subprogram disain kolom adalah program PKO (program proses disain kolom) dan program sketsa kolom (program sketsa hasil disain kolom).

Dan bila subprogram disain kolom telah selesai dieksekusi maka program kembali ke program utama (menu utama).

Listing program untuk program-program yang berada di bawah kontrol subprogram disain kolom di atas dapat dilihat pada lampiran 3.

3.5 Program Disain Elemen Fondasi

Program disain elemen fondasi adalah subprogram pada program utama untuk mengontrol semua program yang berhubungan dengan perencanaan elemen fondasi.

3.5.1 Algoritma dan bagan alir program

Dengan mengacu pada langkah-langkah perencanaan fondasi dan rumus-rumus pada sub bab 2.1.3 dibuat algoritma dan bagan alir program disain elemen fondasi sebagai berikut:

1. Algoritma program disain elemen fondasi.

Algoritma atau langkah penyelesain perencanaan elemen struktur fondasi dengan program komputer adalah sebagai berikut:

1. data:

   a. data bahan:

      1) kuat desak beton fondasi (fc'_p),

      2) kuat desak beton kolom (fc'_k),

      3) tegangan izin tanah $(\bar{q})$,

      4) perkiraan tegangan rata-rata tanah dan beton (q_r),

   b. data beban yang bekerja pada fondasi:

      1) reaksi tumpuan vertikal (Pu),

   c. data dimensi fondasi dan kolom di atasnya:

      1) kedalaman fondasi (df),

      2) lebar fondasi (b),

      3) tebal plat kaki (t),

4) selimut beton fondasi (Pb),

5) diameter tulangan pokok fondasi (Dp),

6) lebar penampang kolom (b_k),

7) tinggi penampang kolom (h_k),

8) diameter tulangan pokok kolom (Dpk),

$$Ad = \frac{1}{4} . \pi . Dp^2$$

$$Ak = b_k . h_k$$

$$q_1 = q_r . df$$

$$q_t = \overline{q} - q_1$$

$$A_{perlu} = \frac{Pu}{q_t}$$

$$l_{perlu} = \frac{A_{perlu}}{b}, \text{ tentukan } l \text{ yang digunakan},$$

$$A_p = b.l$$

$$pu = \frac{Pu}{A_p}$$

$$d = t - Pb - Dp$$

$$\Phi = 0,60$$

2. menentukan arah kerja,

a. arah kerja dua arah:

$$B = b_k + 2.(\tfrac{1}{2}.d)$$

$$Vu = pu.(A_p - B^2)$$

$$\beta_c = \frac{l_k}{b_k}$$

$$b_0 = 4.B$$

$$Vc_1 = (1 + \tfrac{2}{\beta_c})(2\sqrt{fc'_p})b_0.d$$

$$Vc_2 = (4\sqrt{fc'_p})b_0.d$$

bila $Vc_1 > Vc_2 \rightarrow Vc = Vc_2$,

bila $Vc_1 \leq Vc_2 \rightarrow Vc = Vc_1$,

$$\Phi Vn = \Phi Vc$$

memeriksa ΦVn terhadap Vu,

bila $\Phi Vn < Vu \rightarrow$ mengulang perencanaan,

b. arah kerja satu arah:

$$G = \frac{(1 - b_k)}{2} - d$$

$$Vu = pu.b.G$$

$$Vc = (\tfrac{1}{6}\sqrt{fc'_p})b.d$$

$$\Phi Vn = \Phi Vc$$

memeriksa ΦVn terhadap Vu,

bila $\Phi Vn < Vu \rightarrow$ mengulang perencanaan,

$$q = 2,3.t + 15,7.(df - t)$$

memeriksa q terhadap q_1,

bila $q > q_1 \rightarrow$ mengulang perhitungan,

3. arah memanjang:

$$F = \frac{(b - b_k)}{2}$$

$$Mu = pu.F.(\tfrac{1}{2}F).1$$

$$k = \frac{Mu}{\Phi l d^2}$$

$$\rho = \frac{fc'_p - \sqrt{fc'^2_p - 2,36.k.fc'_p}}{1,18.fy}$$

memeriksa ρ terhadap ρ_{min} dan ρ_{maks},

$$\rho_b = \frac{(0,85.fc'_p.\beta_1)}{fy} \frac{600}{600 + fy}$$

$$\rho_{maks} = 0,75.\rho_b$$

$$\rho_{min} = \frac{1,4}{fy}$$

bila $\rho > \rho_{maks} \rightarrow$ tebal plat kaki (t) diperbesar,

bila $\rho < \rho_{min} \rightarrow \rho = \rho_{min}$,

$$As = \rho l d$$

menentukan As_{aktual},

$$s = \frac{Ad.1}{As_{aktual}}$$

$$jb_1 = \frac{1}{s}$$

$$\beta = \frac{1}{b}$$

$$z = \frac{2}{\beta + 1}$$

$$jb = z.jb_1$$

jb buah tulangan dipasang merata dalam rentang b, sisanya dipasang di bagian luar dari rentang,

4. arah lebar:

$$F = \frac{(l-h_k)}{2}$$

$$Mu = pu.F.(\tfrac{1}{2}F).b$$

$$k = \frac{Mu}{\Phi bd^2}$$

$$\rho = \frac{fc'_p - \sqrt{fc'^2_p - 2,36.k.fc'_p}}{1,18.fy}$$

memeriksa ρ terhadap ρ_{min} dan ρ_{maks},

$$\rho_b = \frac{(0,85.fc'_p.\beta_1)}{fy}\frac{600}{600+fy}$$

$$\rho_{maks} = 0,75.\rho_b$$

$$\rho_{min} = \frac{1,4}{fy}$$

bila $\rho > \rho_{maks} \rightarrow$ tebal plat kaki (t) diperbesar,

bila $\rho < \rho_{min} \rightarrow \rho = \rho_{min}$,

$$As = \rho bd$$

menentukan As_{aktual},

$$s = \frac{Ad.b}{As_{aktual}}$$

tulangan dipasang merata pada arah lebar,

$$j = \sqrt{\frac{A_p}{A_k}}, \text{ jika } j > 2 \text{ maka } j = 2,$$

$$\Phi = 0,70$$

$$\text{Pt}_p = \Phi(0,85.\text{fc}'_p.A_k).(j)$$

$$\text{Pt}_k = \Phi(0,85.\text{fc}'_k.A_k)$$

memeriksa Pt_k terhadap Pt_p dan Pu,

bila $\text{Pt}_k > \text{Pt}_p$ maka perhitungan diulang,

bila $\text{Pt}_k < \text{Pu}$ maka perhitungan diulang,

5. menghitung penulangan pasak ("dowel"):

$$\text{Asd}_{\text{perlu}} = 0,005.A_k$$

memilih diameter batang tulangan pasak $(Dd) = Dp_k$,

$$As = \tfrac{1}{4}.\pi.Dd^2$$

$$jn = \frac{\text{Asd}_{\text{perlu}}}{As}, \text{ tentukan jumlah tulangan pasak } (jn) \text{ yang digunakan},$$

$$\text{Asd}_{\text{tersedia}} = jn.As$$

$$ldb = \frac{Dd.fy}{4\sqrt{\text{fc}'}}$$

$$ldb_{\text{min}} = 0,004.Dd.fy$$

$$ld_{\text{min}} = 200 \text{ mm}$$

bila $ld < ld_{\text{min}} \rightarrow ld = ld_{\text{min}}$,

$$n = \frac{\text{Asd}_{\text{perlu}}}{\text{Asd}_{\text{tersedia}}}$$

$$ld = ldb.n$$

2. Bagan alir program disain elemen fondasi.

Berdasarkan algoritma program disain elemen fondasi, secara umum dibuat bagan alir program disain elemen fondasi sebagai berikut:
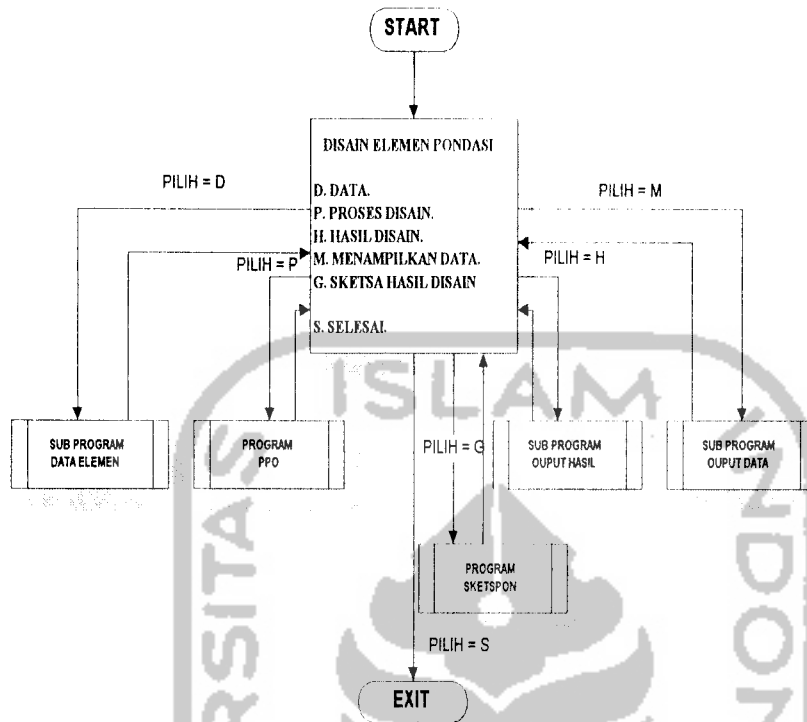
Gambar 3.13 Bagan alir subprogram disain elemen fondasi
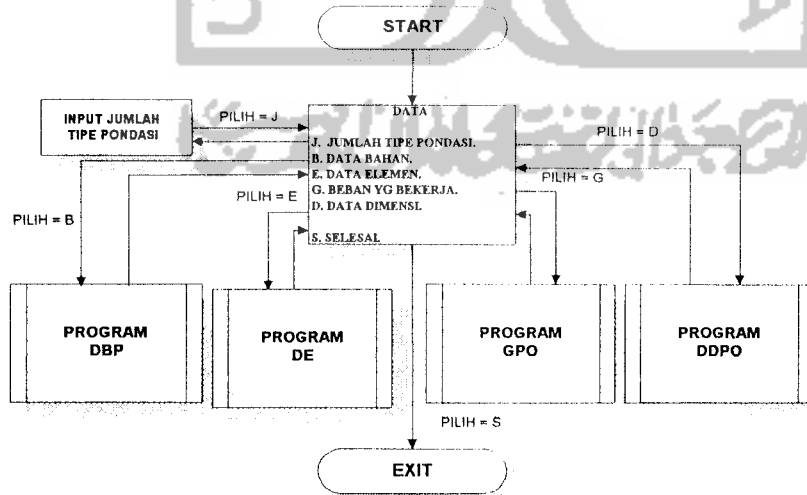
Gambar 3.14 Bagan alir subprogram data elemen

3.5.2 Listing Program

Dengan berdasarkan bagan alir subprogram disain fondasi di atas dibuat program dan subprogram yang terkait dengan perencanaan disain elemen fondasi, baik dalam hal "input" data, proses disain maupun "output" hasil disain. Subprogram disain elemen fondasi tersebut berada pada program utama yang akan dieksekusi bila pilihan disain elemen fondasi diberikan.

Subprogram disain fondasi tersebut akan mengeksekusi subprogram data elemen, subprogram "output" data dan "output" hasil yang juga berada pada program utama.

Dengan subprogram data elemen tersebut dieksekusi program-program sebagai berikut: program DE ("input" data elemen), program DBP ("input" data bahan fondasi), program GPO ("input" gaya maksimum yang bekerja pada fondasi), program DDPO ("input" data dimensi fondasi). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram data elemen dan bila subprogram data elemen sudah selesai dieksekusi maka program akan kembali ke subprogram disain fondasi.

Dengan subprogram "output" data dieksekusi program-program sebagai berikut: program TDPO ("output" data fondasi ke layar) dan program CDPO ("output" data fondasi ke printer). Bila program-program tersebut telah selesai dieksekusi maka akan kembali pada program utama pada subprogram "output" data dan bila subprogram "output" data sudah selesai dieksekusi maka program akan kembali ke subprogram disain fondasi.

Dengan subprogram "output" hasil dieksekusi program-program sebagai

berikut: program TPO ("output" hasil disain fondasi ke layar) dan program CPO

("output" hasil disain fondasi ke printer). Bila program-program tersebut telah selesai

dieksekusi maka akan kembali pada program utama pada subprogram "output" hasil

dan bila subprogram "output" hasil sudah selesai dieksekusi maka program akan

kembali ke subprogram disain fondasi.

Program-program yang langsung dapat dieksekusi (tidak melalui subprogram)

oleh subprogram disain fondasi adalah program PPO (program proses disain fondasi)

dan program sketsa fondasi (program sketsa hasil disain fondasi).

Dan bila subprogram disain fondasi telah selesai dieksekusi maka program

kembali ke program utama (menu utama).

Listing program untuk program-program yang berada di bawah kontrol

subprogram disain fondasi di atas dapat dilihat pada lampiran 4.
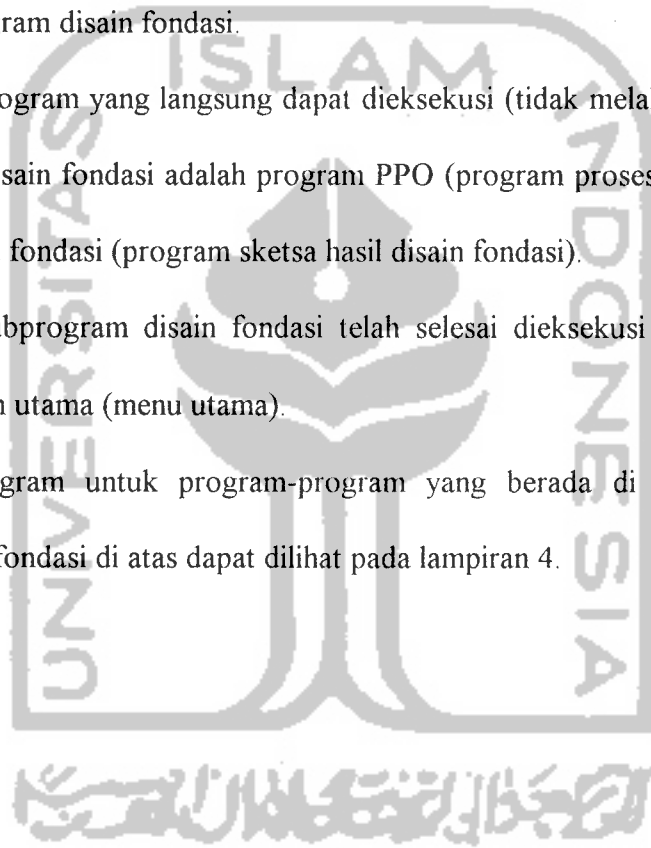
BAB IV

EKSEKUSI PROGRAM

Perencanaan elemen struktur beton menggunakan program Disain Elemen Struktur Beton dengan data "input" dari keluaran program Microfeap sebagai langkah awal adalah mendisain elemen plat dengan program UII-CDP, sehingga didapat tebal plat (h) yang akan digunakan untuk perhitungan beban merata akibat plat pada portal. Kemudian dilakukan asumsi dimensi dan material properti elemen-elemen struktur portal, identifikasi nomor titik nodal dan elemen (batang) struktur portal, dimasukkan data tersebut pada program Microfeap dan dilakukan analisa struktur dengan program Microfeap. Selanjutnya hasil program ini disimpan pada file dengan ekstensi TXT. Langkah berikutnya adalah mendisain elemen balok, kolom dan fondasi dengan program UII-CDP. Apabila saat mendisain elemen-elemen tersebut asumsi dimensi elemen struktur salah (dimensi harus diperbesar), maka perencanaan diulang kembali dimulai pada asumsi dimensi karena dengan berubahnya dimensi gaya-gaya yang bekerja pada elemen struktur juga berubah, karena itu material propertinya harus disesuaikan kembali. Apabila asumsi dimensi sudah benar, maka perencanaan tersebut telah selesai dilakukan. Untuk lebih jelasnya dapat dilihat pada skema kerja eksekusi program (gambar 4.1).
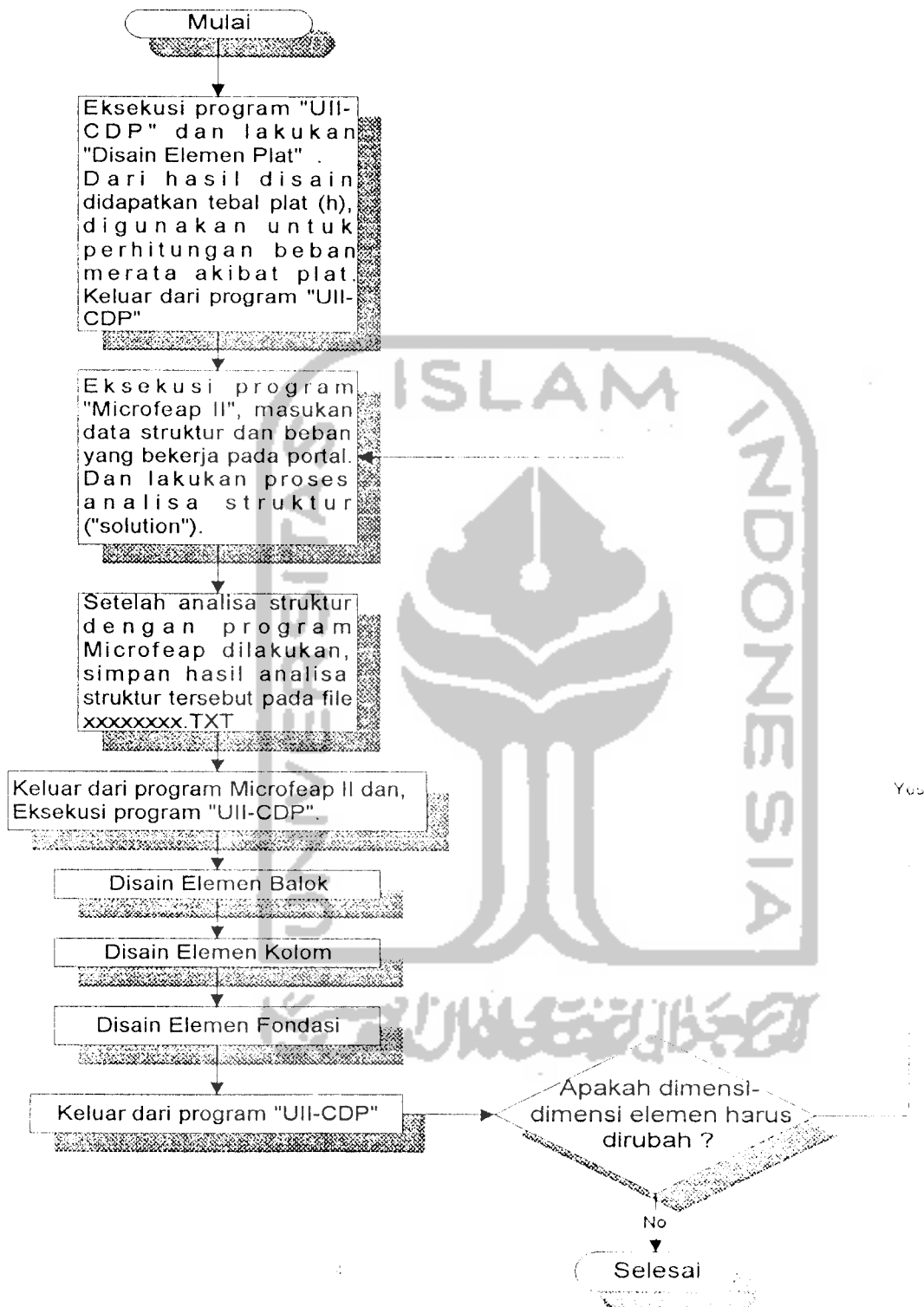
Gambar 4.1 Skema kerja eksekusi program

4.1 Penggunaan Program Microfeap II (P1-Module)

Menggunakan program Microfeap II (P1-Module) untuk analisis struktur diperlukan dimensi penampang rencana tiap elemen struktur dan beban-beban yang bekerja pada elemen ataupun titik nodal. Sebagai contoh sperti pada struktur portal gambar 4.2. Satuan gaya dan panjang harus konsisten yaitu N dan mm, karena program disain elemen struktur beton yang dibuat menggunakan satuan (SI).

4.1.1 Data Struktur

Penggunaan program Microfeap II (P1-Module) pada disain elemen struktur portal beton dengan data struktur seperti pada gambar 4.2, "Output" data strukturnya secara rinci dapat dilihat pada lampiran 5
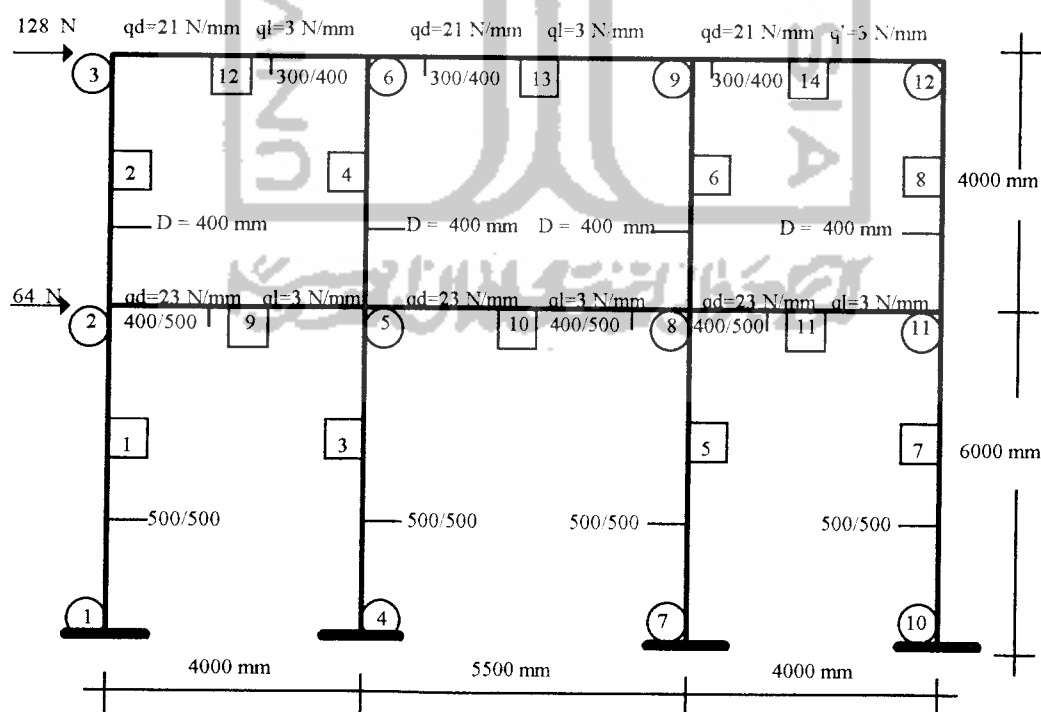
Gambar 4.2 Struktur portal beton

$$Ec = 4700\sqrt{fc'} = 4700\sqrt{30} = 25742 \text{ MPa}.$$

$$Es = 2,1x10^5 \text{ MPa}.$$

4.1.2 Keluaran/hasil program

Keluaran atau hasil program Microfeap II berupa hasil perhitungan analisis struktur yaitu seperti berikut ini:

1. Elemen balok.

Momen maksimum elemen balok lantai pada batang no.9 yaitu:

Momen tumpuan = -64924000 Nmm.

Momen lapangan = 41966000 Nmm.

Momen maksimum elemen balok atap pada batang no.12 yaitu.

Momen tumpuan = -59975000 Nmm.

Momen lapangan = 41542000 Nmm.

Gaya geser maksimum elemen balok lantai pada batang no 9 yaitu

Gaya geser (Vu) = 74674 N.

Gaya geser maksimum elemen balok atap pada batang no.12 yaitu.

Gaya geser (Vu) = 69833 N.

2. Elemen Kolom.

Momen-momen ujung maksimum elemen kolom lantai dasar pada batang no.1 yaitu:

$$M1 = 2,2 \times 10^7 \text{ Nmm}.$$

$$M2 = -1,0 \text{ Nmm}.$$

Momen-momen ujung maksimum elemen kolom lantai I pada batang no 8 yaitu

$$M1 = 3,8 \times 10^7 \text{ Nmm}.$$

$$M2 = -2,7 \times 10^7 \text{ Nmm}.$$

Gaya geser maksimum elemen kolom lantai dasar pada batang no 7 yaitu

$$Vu = 3,7 \times 10^3 \text{ Nmm}.$$

Gaya geser maksimum elemen kolom lantai I pada batang no 8 yaitu

$$Vu = 1,6 \times 10^4 \text{ Nmm}.$$

Gaya aksial maksimum elemen kolom lantai dasar pada batang no 5 yaitu

$$Pu = 2,4 \times 10^5 \text{ Nmm}.$$

Gaya aksial maksimum elemen kolom lantai I pada batang no.6 yaitu

$$Pu = 1,2 \times 10^5 \text{ Nmm}.$$

Untuk disain elemen fondasi gaya aksial elemen kolom yaitu

$$\text{batang no.7 } Pu = 1,3 \times 10^5 \text{ Nmm}.$$

$$\text{batang no.5 } Pu = 2,4 \times 10^5 \text{ Nmm}.$$

Hasil keluaran program Microfeap II berupa hasil perhitungan analisis struktur itu dengan lengkap dapat dilihat pada lampiran 6.

4.2 Penggunaan Program Disain Elemen Struktur Beton

"Output" hasil keluaran program Microfeap II pada lampiran 6 selain didokumentasikan ke printer juga didokumentasikan ke file teks dengan nama xxxxxxxx.TXT yang akan berfungsi sebagai file data "inputing" program disain elemen struktur beton. Penjelasan tentang cara penggunaan menu-menu pada program disain elemen struktur beton dengan "inputing" data Microfeap ini secara garis besar dapat dilihat pada lampiran 7.

4.2.1 Data masukan

Data masukan untuk program disain elemen struktur beton dengan "inputing" data Microfeap adalah data yang dibutuhkan untuk proses disain masing-masing elemen struktur beton yang telah di-"input"-kan. Untuk contoh struktur portal gambar 4.2 di atas "output" datanya dapat dilihat pada lampiran 8.

4.2.2 Keluaran/hasil program

Keluaran program disain elemen struktur beton adalah hasil disain penulangan elemen struktur beton untuk masing-masing tipe elemen. "Output" hasil disain untuk struktur portal gambar 4.2 di atas dapat dilihat pada lampiran 9.

4.3 Perbandingan Hasil Disain Dengan Perhitungan Manual

Sebagai perbandingan antara perhitungan manual dengan hasil program disain elemen struktur beton dengan "inputing" data Microfeap dilakukan perhitungan manual dengan mengambil gaya-gaya maksimum keluaran program Microfeap yang bekerja pada masing-masing elemen struktur beton dengan tipe yang sama

4.3.1 Disain elemen plat

Perhitungan manual disain elemen plat mengacu pada langkah-langkah dan rumus-rumus perencanaan plat pada sub bab 2.1.1 di atas, dan untuk perhitungan manual disain elemen plat ini diambil plat tipe 2.

Plat Tipe 2:

Data perencanaan:

B = 4000 mm. L = 5500 mm. Pb = 40 mm. H = 110 mm.

Mlx = $1,7.10^5$ Nmm. Mly = $1,2.10^5$ Nmm. Mtx = $-1,71.10^5$ Nmm

Mty = $-1,23.10^5$ Nmm.

Plat merupakan plat dua arah.

Φ = 0,8. β = 0,85. fc' = 30 MPa. Fy = 300 MPa.

$$\rho_b = \frac{0,85.fc'.\beta_1}{Fy} \cdot \frac{600}{600+Fy} = \frac{0,85.30.0,85}{300} \cdot \frac{600}{600+300}$$

$$= 0,048$$

$$\rho_{maks} = 0,75.\rho_b = 0,75.0,048 = 0,036$$

$$\rho_{min} = \frac{1,4}{Fy} = \frac{1,4}{400} = 0,0035$$

$$s_{maks} = 5.H = 5.110 = 550 \text{ mm.}$$

$$s_{maks} = 500 \text{ mm.}$$

digunakan $s_{maks} = 500$ mm.

$$s_{min} = 100 \text{ mm.}$$

Fy = 300 MPa ⟶ Ass = 0,0020.b.h = 0,0020.1000.110 = 220 mm²

Penulangan daerah lapangan arah(x) melebar:

Dp=16 mm. D=H-Pb-0,5.Dp=110-40-0,5.16=62 mm.

$$k = \frac{Mlx}{\Phi.1000.D^2} = \frac{1,7.10^5}{0,8.1000.62^2} = 0,055$$

$$\rho = \frac{fc' - \sqrt{fc'^2 - 2,36.k.fc'}}{1,18.Fy} = \frac{30 - \sqrt{30^2 - 2,36.0,055.30}}{1,18.300}$$

$$= 0,00018 < \rho_{min} = 0,0035$$

digunakan $\rho = 0,0035$

$$As = \rho.1000.D = 0,0035.1000.62$$

$$= 217 \text{ mm}^2 < Ass = 220 \text{ mm}^2 \rightarrow As = 220 mm^2$$

$$AD = 0,25.\pi.Dp^2 = 0,25.3,14.16^2 = 200,96 \text{ mm}^2.$$

$$s = \frac{AD.1000}{As} = \frac{200,96.1000}{220} = 913 \text{ mm} > s_{maks} = 500 \text{ mm}$$

digunakan $s = 500$ mm, dipakai sengkang $D16 - 500$ mm

Penulangan daerah lapangan arah(y) memanjang:

Dp=16 mm. D=H-Pb-Dpx-0,5.Dp=110-40-16-0,5.16=46 mm.

$$k = \frac{Mly}{\Phi.1000.D^2} = \frac{1,2.10^5}{0,8.1000.46^2} = 0,071$$

$$\rho = \frac{fc' - \sqrt{fc'^2 - 2,36.k.fc'}}{1,18.Fy} = \frac{30 - \sqrt{30^2 - 2,36.0,071.30}}{1,18.300}$$

$$= 0,00024 < \rho_{min} = 0,0035$$

digunakan $\rho = 0,0035$

$$As = \rho.1000.D = 0,0035.1000.46$$

$$= 161 \text{ mm}^2 < Ass = 220 \text{ mm}^2$$

digunakan $As = 220 \text{ mm}^2$.

$$AD = 0,25.\pi.Dp^2 = 0,25.3,14.16^2 = 200,96 \text{ mm}^2.$$

$$s = \frac{AD.1000}{As} = \frac{200,96.1000}{220} = 913 \text{ mm} > s_{maks} = 500 \text{ mm}$$

digunakan $s = 500$ mm, *dipakai sengkang D*16 − 500 mm

Penulangan daerah tumpuan arah(x) melebar:

Dp=16 mm. D=H-Pb-0,5.Dp=110-40-0,5.16=62 mm.

$$k = \frac{Mtx}{\Phi.1000.D^2} = \frac{1,71.10^5}{0,8.1000.62^2} = 0,056$$

$$\rho = \frac{fc' - \sqrt{fc'^2 - 2,36.k.fc'}}{1,18.Fy} = \frac{30 - \sqrt{30^2 - 2,36.0,056.30}}{1,18.300}$$

$$= 0,00019 < \rho_{min} = 0,0035$$

digunakan $\rho = 0,0035$

$$As = \rho.1000.D = 0,0035.1000.82$$

$$= 217 \text{ mm}^2 < Ass = 220 \text{ mm}^2 \rightarrow As = 220mm^2$$

$$AD = 0,25.\pi.Dp^2 = 0,25.3,14.16^2 = 200,96 \text{ mm}^2$$

$$s = \frac{AD.1000}{As} = \frac{200,96.1000}{220} = 913 \text{ mm} > s_{maks} = 500 \text{ mm}$$

digunakan $s = 500$ mm, *dipakai sengkang* $D16 - 500$ mm

Penulangan daerah tumpuan arah(y) memanjang:

Dp=16 mm. D=H-Pb-0,5.Dp=110-40-0,5.16=62 mm.

$$k = \frac{Mty}{\Phi.1000.D^2} = \frac{1,23.10^5}{0,8.1000.62^2} = 0,040$$

$$\rho = \frac{fc' - \sqrt{fc'^2 - 2,36.k.fc'}}{1,18.Fy} = \frac{30 - \sqrt{30^2 - 2,36.0,040.30}}{1,18.300}$$

$$= 0,00013 < \rho_{min} = 0,0035$$

digunakan $\rho = 0,0035$

$$As = \rho.1000.D = 0,0035.1000.62$$

$$= 217 \text{ mm}^2 < Ass = 220 \text{ mm}^2 \to As = 220 mm^2$$

$$AD = 0,25.\pi.Dp^2 = 0,25.3,14.16^2 = 200,96 \text{ mm}^2$$

$$s = \frac{AD.1000}{As} = \frac{200,96.1000}{220} = 913 \text{ mm} > s_{maks} = 500 \text{ mm}$$

digunakan $s = 500$ mm, *dipakai sengkang* $D16 - 500$ mm

Perhitungan tulangan susut:

$$Ds = 10 \text{ mm}. \quad AD = 0,25.\pi.Ds^2 = 0,25.3,14.10^2 = 78,5 \text{ mm}^2$$

$$s = \frac{AD.1000}{Ass} = \frac{78,5.1000}{220} = 356,8 \text{ mm} \approx 350 \text{ mm}.$$

digunakan $D10 - 350$ mm.

4.3.2 Disain elemen balok

Perhitungan manual disain elemen balok mengacu pada langkah-langkah dan rumus-rumus perencanaan balok pada sub bab 2.1.2 di atas, dan untuk perhitungan manual disain elemen balok ini diambil balok tipe 1.

Balok Tipe 1 (balok atap):

Data perencanaan:

fc' = 30 MPa. Fy = 300 MPa. Es = 200000 MPa. Dp_{maks} = 18 mm

D_{smaks} = 10 mm. L = 5500 mm. B = 300 mm. H = 400 mm

M^+ = 4,15.10^7 Nmm. M^- = 6,0.10^7 Nmm. Vu = 69830 N

Tu = 2.10^7 Nmm. Φ = 0,8. β_1 = 0,85.

$$D = H - Pb - 0,5.Dp_{maks} - Ds_{maks} = 400 - 50 - 0,5.18 - 10 = 331 \text{ mm}$$

$$\rho_b = \frac{0,85.fc'.\beta_1}{Fy} \cdot \frac{600}{600 + Fy} = \frac{0,85.30.0,85}{300} \cdot \frac{600}{600 + 300}$$

$$= 0,048$$

$$\rho_{maks} = 0,75.\rho_b = 0,75.0,048 = 0,036$$

$$\rho_{min} = \frac{1,4}{Fy} = \frac{1,4}{400} = 0,0035$$

$$\omega = \rho_{maks} \cdot \frac{Fy}{fc'} = 0,036.\frac{300}{30} = 0,36$$

$$k_{maks} = fc'.\omega.[1 - 0,59.\omega] = 30.0,36.[1 - 0,59.0,36] = 8,5$$

$$MR_{maks} = \Phi.B.D^2.k_{maks} = 0,8.300.331^2.8,5 = 223504440 \text{ Nmm}$$

Penulangan daerah lapangan:

Dp=12 mm. MR_{maks} = 223504440 Nmm> M^+ = 4,15.10^7 Nmm

Balok bertulangan tarik saja....!

$$k = \frac{M^+}{\Phi.B.D^2} = \frac{4,15.10^7}{0,8.300.331^2} = 1,56$$

$$\rho = \frac{fc' - \sqrt{fc'^2 - 2,36.k.fc'}}{1,18.Fy} = \frac{30 - \sqrt{30^2 - 2,36.1,56.30}}{1,18.300}$$

$$= 0,0054 > \rho_{min} = 0,0035 \text{ dan } < \rho_{maks} = 0,036....ok.$$

digunakan $\rho = 0,0054$

$$As = \rho.B.D = 0,0054.300.331$$

$$= 536,22 \text{ mm}^2.$$

$$AD = 0,25.\pi.Dp^2 = 0,25.3,14.12^2 = 113,04 \text{ mm}^2.$$

$$n = \frac{As}{AD} = \frac{536,22}{113,04} = 4,7 \text{ buah} \approx 5 \text{ buah}.$$

digunakan n = 5 buah, dipakai 5D12

Penulangan daerah tumpuan:

Dp=12 mm. MR_{maks} = 223504440 Nmm> M^- = 6.10^7 Nmm

Balok bertulangan tarik saja....!

$$k = \frac{M^+}{\Phi.B.D^2} = \frac{6.10^7}{0,8.300.331^2} = 2,28$$

$$\rho = \frac{fc' - \sqrt{fc'^2 - 2,36.k.fc'}}{1,18.Fy} = \frac{30 - \sqrt{30^2 - 2,36.2,28.30}}{1,18.300}$$

$$= 0,0079 > \rho_{min} = 0,0035 \text{ dan } < \rho_{maks} = 0,036....ok.$$

digunakan $\rho = 0,0079$

$$As = \rho.B.D = 0,0079.300.331$$

$$= 784,47 \text{ mm}^2.$$

$$AD = 0,25 . \pi . Dp^2 = 0,25 . 3,14 . 12^2 = 113,04 \text{ mm}^2 .$$

$$n = \frac{As}{AD} = \frac{784,47}{113,04} = 6,94 \text{ buah} \approx 7 \text{ buah}.$$

digunakan n = 7 buah, *dipakai* 7D12

Penulangan sengkang:

$$\Phi = 0,6 .$$

$$Tu = 2.10^7 \, Nmm > \Phi . (\tfrac{1}{24} . \sqrt{fc'} . B^2 . H)$$

$$= 0,6 . (\tfrac{1}{24} . \sqrt{30} . 300^2 . 400) = 49295 \, Nmm .$$

$$\rightarrow \textit{efek torsi diperhitungkan....!}$$

$$CT = \frac{B.D}{B^2 .H} = \frac{300.331}{300^2 .400} = 0,00276$$

$$Tc = \frac{\tfrac{1}{15} . \sqrt{fc'} . B^2 . H}{\sqrt{1 + (\frac{0,4.Vu}{CT.Tu})^2}} = \frac{\tfrac{1}{15} \sqrt{30} . 300^2 . 400}{\sqrt{1 + (\frac{0,4.6,983.10^4}{0,00276.2.10^7})^2}} = 11729197 \, Nmm .$$

$$Tu = 2.10^7 \, Nmm > \Phi . Tc = 0,6 . 11729197 = 7037518 \, Nmm .$$

$$\rightarrow \textit{efek torsi diperhitungkan....!}$$

$$Tn = \frac{Tu}{\Phi} = \frac{2.10^7}{0,6} = 33333333 \, Nmm .$$

$$Ts = Tn - Tc = 33333333 - 11729197 = 21604136 \, Nmm .$$

$$Ts = 21604136 \, Nmm < \tfrac{1}{3} . \sqrt{Fy} . \tfrac{1}{3} . B^2 . H - Tc$$

$$= \tfrac{1}{3} . \sqrt{300} . \tfrac{1}{3} . 300^2 . 400 - 11729197 \quad 57852835 \, Nmm$$

digunakan Ts = 21604136 Nmm .

$$Ts = 21604136 \, Nmm < 4 . Tc = 4 . 11729197 = 46916788 \, Nmm$$

$$\rightarrow \textit{penampang memadai......!}$$

$$Vc = \frac{\tfrac{1}{6} . \sqrt{fc'} . B.D}{\sqrt{1 + (2,5.CT . \tfrac{Tu}{Vu})^2}} = \frac{\tfrac{1}{6} \sqrt{30} . 300 . 331}{\sqrt{1 + (2,5 . 0,00276 \frac{2.10^7}{69830})^2}} = 41204 \, N$$

$$Vn = \frac{Vu}{\Phi} = \frac{69830}{0,6} = 116383N.$$

$$Vs = Vn - Vc = 116383 - 41204 = 75179N.$$

$$Ds = 10 \text{ mm}.$$

$$\frac{Av}{s} = \frac{Vs}{Fy.D} = \frac{75179}{300.331} = 0,76mm.$$

$$x_1 = B - 2.(Pb + 0,5.Ds) = 300 - 2.(50 + 0,5.10) = 190mm$$

$$y_1 = H - 2.(Pb + 0,5.Ds) = 400 - 2.(50 + 0,5.10) = 290mm$$

$$\alpha = \frac{(2 + \frac{y_1}{x_1})}{3} = \frac{(2 + \frac{290}{190})}{3} = 1,18$$

$$\frac{At}{s} = \frac{Ts}{\alpha.x_1.y_1.Fy} = \frac{21604136}{1,18.190.290.300} = 1,11mm.$$

$$\frac{Avt}{s} = 2.\frac{At}{s} + \frac{Av}{s} = 2.1,11 + 0,76 = 2,98mm.$$

$$Av = 2.\frac{1}{4}.\pi.Ds^2 = 2.\frac{1}{2}.3,14.10^2 = 157mm^2$$

$$s = \frac{Av}{\frac{Avt}{s}} = \frac{157}{2,98} = 52,7mm \approx 50mm.$$

$$S_{maks} = \frac{x_1 + y_1}{4} = \frac{190 + 290}{4} = 120mm.$$

$$S_{maks} = \frac{3.Av.Fy}{B} = \frac{3.157.300}{300} = 471mm.$$

$$\rightarrow dipakai \, s_{maks} = 120mm.$$

$$s = 50mm < s_{maks} = 120mm........ok$$

$$maka \quad s = 50mm \rightarrow digunakan \, D10 - 50mm.$$

Penulangan torsi memanjang:

$$Al = \frac{At}{s}.(x_1 + y_1) = 1,11.(190 + 290) = 532,8mm^2,$$

$$At = \frac{At}{s}.s = 1,11.50 = 55,5mm^2 > \frac{B.s}{3.Fy} = \frac{300.50}{3.300} = 17mm^2,$$

$$maka\ digunakan\ A_R = At = 55,5mm^2,$$

$$Al = (\frac{2,8.H.s}{Fy}.(\frac{Tu}{Tu + \frac{Tu}{3.CT}}) - 2.A_R).\frac{x_1 + y_1}{s}$$

$$= (\frac{2,8.400.50}{300}.(\frac{2.10^7}{2.10^7 + \frac{69830}{3.0,00276}}) - 2.55,5).\frac{190 + 290}{50}$$

$$= 194,88mm^2 < Al = 532,8mm^2.$$

$$\rightarrow \quad dipakai\ Al = 532,8mm^2.$$

$$As_{total} = 536,22 + 784,47 = 1320,69mm^2.$$

$$As_{total} = 1320,69mm^2 > Al = 532,8mm^2.$$

$$\rightarrow tidak\ dibutuhkan\ tulangan\ torsi\ memanjang$$

4.3.3 Disain elemen kolom

Perhitungan manual disain elemen kolom mengacu pada langkah-langkah dan rumus-rumus perencanaan kolom pada sub bab 2.1.3 di atas, dan untuk perhitungan manual disain elemen kolom ini diambil kolom tipe 2.

Kolom Tipe 2 (kolom lantai dasar):

Data perencanaan:

M1 = $2,2.10^7$ Nmm. M2 = $-1,0.10^7$ Nmm. Vu = $3,7.10^3$ N.

Pu = $2,4.10^5$ N. Lk = 6000 mm. Pb = 40 mm. B = 500 mm. H = 500 mm.

Φ = 0,65 ρ_g = 0,01. Dp$_{maks}$ = 25 mm. Ds$_{maks}$ = 10 mm. Fc'=30 MPa. Fy=300 MPa.

R = 0,30. H = 0,30.500 = 150 mm.

$$\frac{Lk}{r} = 34 - 12(\frac{M2}{M1}) = 34 - 12(\frac{1,0.10^7}{2,2.10^7}) = 28,55 \approx 29$$

$$\frac{Lk}{R} = \frac{6000}{150} = 40 > \frac{Lk}{r} = 29 \rightarrow \text{efek kelangsingan diperhitungkan.}$$

$$cm = 0,6 + 0,4(\frac{M2}{M1}) = 0,6 + 0,4(\frac{-1,0.10^7}{2,2.10^7}) = 0,42 > 0,4 \dots \dots ok$$

$$I_g = \frac{1}{12}.B.H^3 = \frac{1}{12}.500.500^3 = 5208333333 mm^4.$$

$$Ec = 4700\sqrt{fc'} = 4700\sqrt{30} = 25743 MPa.$$

$$\beta_d = 0,25$$

$$EI = \frac{Ec.I}{2,5.(1+\beta_d)} = \frac{5743.5208333333}{2,5.(1+0,25)} = 9,57.10^{12} Nmm^2$$

$$Pc = \frac{\pi^2.EI}{Lk^2} = \frac{3,14^2.9,57.10^{12}}{6000^2} = 2621010N$$

$$\delta_b = \frac{cm}{(1-\frac{Pu}{\Phi Pc})} = \frac{0,42}{(1-\frac{2,4.10^5}{0,65.2621010})} = 0,49 < 1$$

$$\rightarrow \delta_b = 1,0$$

$$Mc = \delta_b.Mu = 1.2,2.10^7 Nmm.$$

$$e\frac{Mc}{Pu} = \frac{2,2.10^7}{2,4.10^5} = 917 mm.$$

$$d' = Pb + \frac{1}{2}.Dp + Ds = 40 + \frac{1}{2}.12 + 6 = 52 mm.$$

$$d = H - d' = 500 - 52 = 448 mm.$$

$$As_{perlu} = \frac{\rho_g.B.d}{2} = \frac{0,01.500.448}{2} = 1120 mm^2.$$

$$Dp = 12 mm.$$

$$AD = \frac{1}{4}.\pi.Dp^2 = \frac{1}{4}.3,14.12^2 = 113,04 mm^2.$$

$$n = \frac{As_{perlu}}{AD} = \frac{1120}{113,04} = 9,9 \approx 10 buah.$$

$$As' = As = n.AD = 10.113,04 = 1130,4mm^2.$$

$$\rho = \frac{2.As}{B.d} = \frac{2.1130,4}{500.448} = 0,01$$

$$c_b = \frac{600.d}{600+Fy} = \frac{600.448}{600+300} = 299$$

$$\beta_1 = 0,85 - 0,008.(fc'-30) = 0,85 - 0,008.(30-30) = 0,85$$

$$a_b = \beta_1.c_b = 0,85.299 = 254$$

$$\varepsilon_s' = (\frac{c_b - d'}{c_b}).0,003 = (\frac{299-52}{299}).0,003 = 0,0025$$

$$\varepsilon_y = \frac{Fy}{Es} = \frac{300}{200000} = 0,0015 < \varepsilon_s' = 0,0025$$

$$maka \ Fs' = Fy = 300MPa.$$

$$Pn_b = \Phi.(0,85.fc'.a_b.B + As'.Fs' - As.Fy)$$

$$= 0,65.(0,85.30.254.300 + 1130,4.300 - 1130,4.300)$$

$$= 2526030N > Pu = 2,4.10^5 N.$$

maka:

$$m = \frac{Fy}{0,85.fc'} = \frac{300}{0,85.30} = 11,765$$

$$Pn = 0,85.fc'.B.d.\left[\frac{H-2.e}{2.d} + \sqrt{(\frac{H-2.e}{2.d})^2 + 2.m.\rho.(1-\frac{d'}{d})}\right]$$

$$= 0,85.30.500.448.\left[\frac{500-2.917}{2.448} + \sqrt{(\frac{500-2.917}{2.448})^2 + 2.11,765.0,01.(1-\frac{52}{448})}\right]$$

$$= 390034N.$$

$$\Phi Pn = 0,65.390034 = 253522N > Pu = 2,4.10^5 N \ldots\ldots Ok!$$

Penulangan sengkang:

$$Ds = 6mm.$$

$$s = 16.Dp = 16.12 = 192mm.$$

$$s = B = 500mm.$$

$$s = 48.Ds = 48.6 = 288mm.$$

$$dipilih\ jarak\ tulangan\ s = 192mm$$

$$\rightarrow digunakan\ D6 - 192mm.$$

4.3.4 Disain elemen fondasi

Perhitungan manual disain elemen fondasi mengacu pada langkah-langkah dan rumus-rumus perencanaan fondasi pada sub bab 2.1.4 di atas, dan untuk perhitungan manual disain elemen fondasi ini diambil fondasi tipe 1.

Fondasi Tipe 1:

Data perencanaan:

fc' = 30 MPa. Fy = 300 MPa. β_1 = 0,80. Φ = 0,60. Q = 260 kPa

Pu = 2,4.10^5 N. Lp = 1500 mm. T = 600 mm. Pb = 75 mm

Df = 2000 mm. Bk = 500 mm. Hk = 500 mm

$Dp = 18mm.$

$$AD = \frac{1}{4}.\pi.Dp^2 = \frac{1}{4}.3,14.18^2 = 254,34mm^2.$$

$$q_1 = (23.T + 15,7.(Df - T)).10^{-6} = (23.600 + 15,7.(2000 - 600)).10^{-6}$$
$$= 35,78kPa.$$

$$q_t = Q - q_1 = 260 - 35,78 = 224,22kPa = 224,22.10^{-3}\ MPa.$$

$$Ak = 2,5.10^5\ mm^2.$$

$$Ap_{perlu} = \frac{Pu}{q_t} = \frac{2,4.10^5}{224,22.10^{-3}} = 1070377mm^2.$$

$$B_{perlu} = \frac{Ap_{perlu}}{Lp} = \frac{1070377}{1500} = 714mm \approx Bp = 750mm.$$

$$Ap = Bp.Lp = 750.1500 = 1125000mm^2.$$

$$p = \frac{Pu}{Ap} = \frac{2,4.10^5}{1125000} = 0,213MPa.$$

$$d = T - Pb - Dp = 600 - 75 - 20 = 505mm.$$

Arah kerja dua arah:

$$B = Bk + d = 500 + 505 = 1005mm.$$

$$\beta_c = {}^{Hk}\!/\!_{Bk} = {}^{500}\!/\!_{500} = 1,0.$$

$$B_0 = 4.B = 4.1005 = 4020mm.$$

$$Vu = p.(Ap - B^2) = 0,213.(1125000 - 1005^2) = 24490N$$

$$Vc = (1 + \frac{2}{\beta_c}).(2\sqrt{fc'}).B_0.d = (1 + \frac{2}{1}).(2\sqrt{30}).4020.505$$
$$= 66715893N.$$

$$Vc = 4\sqrt{fc'}.B_0.d = 4\sqrt{30}.4020.505 = 44477263N.$$

$$\rightarrow digunakan\,Vc = 44477263N.$$

$$\Phi Vn = \Phi Vc = 0,60.44477263 = 26686358N.$$

$$Vu = 24490N < \Phi Vn = 2668635N......Ok!$$

Momen yang terjadi:

Arah memanjang:

$$F = \frac{Lp - Hk}{2} = \frac{1500 - 500}{2} = 500mm.$$

$$Mu_1 = p.F.\frac{1}{2}F.Bp = 0,213.500.250.750 = 19968750Nmm.$$

Arah melebar:

$$F = \frac{Bp - Bk}{2} = \frac{750 - 500}{2} = 125mm.$$

$$Mu_b = p.F.\tfrac{1}{2}F.lp = 0,213.125.62,5.1500 = 2496094 Nmm$$

Penulangan arah panjang:

$$k = \frac{Mu_l}{\Phi.Bp.d^2} = \frac{19968750}{0,80.750.505^2} = 0,13$$

$$\rho = \frac{fc' - \sqrt{fc'^2 - 2,36.k.fc'}}{1,18.Fy} = \frac{30 - \sqrt{30^2 - 2,36.0,13.30}}{1,18.300} = 0,0004$$

$$\rho_{min} = \frac{1,4}{Fy} = \frac{1,4}{300} = 0,0047 > \rho = 0,0004$$

$$\rightarrow digunakan\ \rho = 0,0047$$

$$As = \rho.Bp.d = 0,0047.750.505 = 1780,125mm^2.$$

$$s = \frac{AD.Bp}{As} = \frac{254,34.750}{1780,125} = 107,2mm \approx 100mm.$$

$$s_{maks} = 500mm.\quad s_{min} = 40mm.$$

$$s_{min} < s < s_{maks}.....Ok!$$

$$\rightarrow digunakan\ D18 - 100mm.$$

Penulangan arah lebar:

$$k = \frac{Mu_b}{\Phi.Lp.d^2} = \frac{2496094}{0,80.1500.505^2} = 0,008$$

$$\rho = \frac{fc' - \sqrt{fc'^2 - 2,36.k.fc'}}{1,18.Fy} = \frac{30 - \sqrt{30^2 - 2,36.0,008.30}}{1,18.300} = 0,00003$$

$$\rho_{min} = \frac{1,4}{Fy} = \frac{1,4}{300} = 0,0047 > \rho = 0,00003$$

$$\rightarrow digunakan\ \rho = 0,0047$$

$$As = \rho . Lp . d = 0,0047.1500.505 = 3560,25 mm^2 .$$

$$jb = \frac{As}{AD} = \frac{3560,25}{254,34} = 14 \ buah.$$

$$\beta = \frac{Lp}{Bp} = \frac{1500}{750} = 2$$

$$z = \frac{2}{\beta+1} = \frac{2}{2+1} = 0,67$$

$$jb_1 = z . jb = 0,67.14 = 9,4 \ buah \approx 10 \ buah.$$

$$Sisa = jb - jb_1 = 14 - 10 = 4 \ buah.$$

$$s = \frac{Bp}{n-1} = \frac{750}{9} = 83,3 mm \approx 80 mm.$$

$$s_{maks} = 500 mm. \quad s_{min} = 40 mm.$$

$$s_{min} < s <_{maks} \ldots \ldots Ok!$$

$$\rightarrow digunakan \, D18 - 80 mm.$$

dipasang merata dalam rentang 750 mm disepanjang sisi panjang dan 4 buah

dipasang merata di luar rentang.

$$j = \sqrt{\frac{Ap}{Ak}} = \sqrt{\frac{1125000}{250000}} = 2,12 > 2 \rightarrow j = 2$$

$$Pt_p = \Phi(0,85. fc'_p . Ak). j = 0,70(0,85.30.250000).2 = 8925000 N$$

$$Pt_k = \Phi(0,85. fc'_k . Ak) = 0,70(0,85.30.250000) = 4462500 N$$

$$Pu = 2,4.10^5 N < Pt_k = 4462500 N < Pt_p = 8925000 N \ldots \ldots Ok!$$

Penulangan "dowel" atau pasak:

$$As_{perlu} = 0,005. Ak = 0,005.250000 = 1250 mm^2 .$$

$$AD = \frac{1}{4} \pi . Dp_k^2 = \frac{1}{4} .3,14.12^2 = 113,04 mm^2 .$$

$$n = \frac{As_{perlu}}{AD} = \frac{1250}{113,04} = 11,06 \; buah \approx 12 \; buah.$$

$$As = n.AD = 12.113,04 = 1356,48mm^{2}.$$

$$x = \frac{As_{perlu}}{As} = \frac{1250}{1356,48} = 0,92$$

$$ld_{b_{min}} = 0,04.Dp_{k}.Fy = 0,04.12.300 = 144mm.$$

$$ld_{b} = \frac{Dp_{k}.Fy}{4\sqrt{fc_{p}'}} = \frac{12.300}{4\sqrt{30}} = 164,3mm.$$

$$ld_{min} = 200mm.$$

$$ld_{b} = 164,3mm > ld_{b_{min}} = 144mm.......ok!$$

$$ld = x.ld_{b} = 0,92.164,3 = 150,9mm < ld_{min} = 200mm.$$

$$\rightarrow digunakan \; tulangan \; pasak \; 12D12, \; ld = 200mm.$$

Hasil disain di atas sama dengan hasil disain dengan menggunakan program disain elemen struktur beton dengan "inputing" data dari keluaran program Microfeap II (P1-Module).

BAB V

KESIMPULAN DAN SARAN

5.1 Kesimpulan

Dari hasil studi dan pembuatan program disain elemen struktur beton dengan masukan ("inputing") data dari hasil keluaran ("outputing") program Microfeap II (P1-Module) ini dapat disimpulkan sebagai berikut ini.

1. Program disain elemen struktur beton ini cukup dapat membantu untuk mendisain elemen struktur beton yang dilakukan dengan metode coba-coba ("trial and error") yaitu memberikan asumsi-asumsi awal perencanaan, dalam usaha mendapatkan hasil disain yang efektif atau ekonomis. Perencanaan struktur beton akan lebih cepat dilakukan, sehingga memungkinkan untuk mendisain elemen struktur beton dengan tipe yang banyak atau dengan kata lain dimensi elemen-elemen struktur beton tidak harus disamakan.

2. Program disain elemen struktur beton ini terutama dimaksudkan untuk mendisain struktur beton pada perencanaan struktur bangunan (dalam bentuk portal) yang perhitungan mekanika strukturnya menggunakan program Microfeap II (P1-Module), dalam pada itu juga dapat digunakan data dari file jenis text (file tipe teks) dengan ekstension TXT yang berisi data dan urutan yang sama dengan file

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data keluaran program Microfeap II yaitu elemen, "section", "axial force", "shear", "moment".

3. Program disain elemen struktur beton ini tidak terbatas pada perencanaan struktur portal bertingkat dua saja, akan tetapi dapat digunakan untuk mendisain elemen struktur portal dengan jumlah tingkat yang tidak terbatas.

4. Program disain elemen struktur beton ini terbatas untuk mendisain elemen fondasi telapak kolom setempat.

5. Perhitungan penulangan geser/sengkang pada disain elemen balok pada program disain elemen struktur beton ini agak konservatif karena dalam perhitungan digunakan gaya geser maksimum.

6. Untuk mempermudah dan memperjelas penggunaan program disain elemen struktur beton ini dibutuhkan buku panduan/manual penggunaan program tersebut yang dibuat terpisah dari penulisan Tugas Akhir ini.

5.2 Saran-saran

1. Program disain elemen struktur beton ini dalam setiap perhitungan menggunakan satuan SI yaitu N (Newton) untuk satuan gaya, mm (milimeter) untuk satuan panjang. Dalam memasukan data-data pada program disain elemen struktur beton ini dan pada program Microfeap II juga harus menggunakan satuan-satuan tersebut.

2. Data dimensi pada program disain elemen struktur beton ini sebaiknya disesuaikan dengan "material data" (asumsi dimensi) yang digunakan pada program Microfeap II.

3. Menu-menu pada program disain elemen struktur beton ini sebaiknya digunakan urut dari atas ke bawah (sesuai skema kerja eksekusi program gambar 4.1).

4. Program disain elemen struktur beton ini masih dirasa perlu inovasi/pengembangan lebih lanjut dimasa mendatang.

5. Hendaknya mahasiswa teknik sipil (masiswa Jurusan Teknik Sipil, Univerisitas Islam Indonesia khususnya) tidak hanya mampu sebagai user/operator program aplikasi teknik sipil, akan tetapi juga mampu membuat program atau "software" program aplikasi teknik sipil.
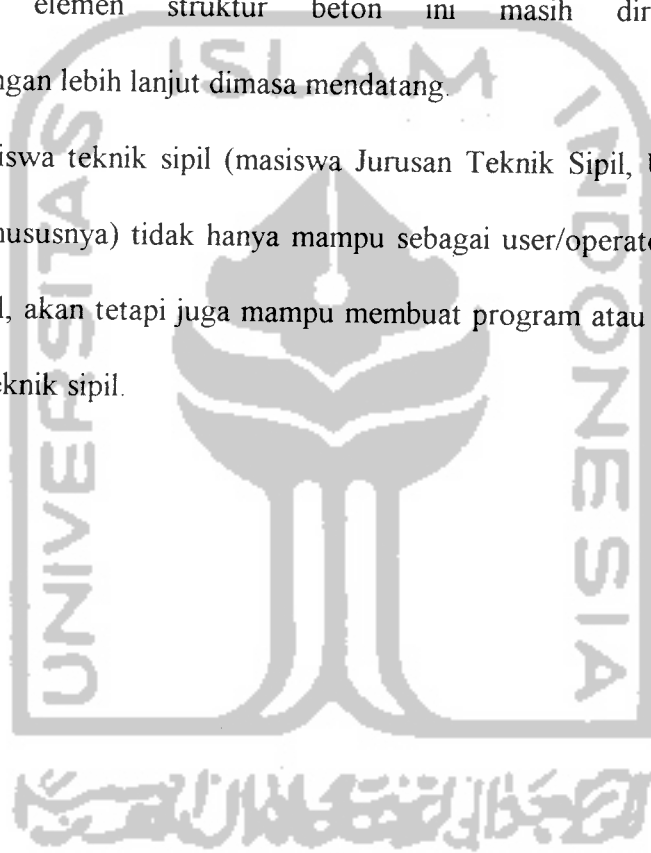
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```
PROGRAM CDPL;
USES CRT,PRINTER;
TYPE
   FDAT = RECORD
        NPROY : string[19];
        NFDAT : string[8];
        NaFil : string[12];
        ENG   : string[19];
        END;
   FDBN = RECORD
        TIPE : INTEGER;
        FC  : REAL;
        FY  : REAL;
        ES  : REAL;
        END;
   FDBT = RECORD
        TIPE : INTEGER;
        N   : INTEGER;
        DP  : INTEGER;
        DS  : INTEGER;
        END;
   FGMS = RECORD
        TIPE  : INTEGER;
        MLX   : REAL;
        MLY   : REAL;
        MTX   : REAL;
        MTY   : REAL;
        END;
   FDMN = RECORD
        TIPE : INTEGER;
        LP   : INTEGER;
        BP   : INTEGER;
        PB   : INTEGER;
        HP   : INTEGER;
        ARAH : INTEGER;
        END;

VAR
   FTIPE              : TEXT;
   FDATBAH            : FILE OF FDBN;
   FBAHTUL            : FILE OF FDBT;
   FGMAKS             : FILE OF FGMS;
   FDIM               : FILE OF FDMN;
   NFILE              : FILE OF FDAT;
   RECORDFDAT         : FDAT;
   RECORDFDBN         : FDBN;
   RECORDFDBT         : FDBT;
   RECORDFGMS         : FGMS;
   RECORDFDMN         : FDMN;
   I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
   NTUL,DPTUL,K,F,BATASKIRI,BATASATAS,
   BATASBAWAH,KERTAS,JUMLAHBARIS,BARIS,
   HAL,A,B,C,D              : Integer;
   YA                 : CHAR;
   BENAR              : BOOLEAN;
   NFDA,EL            : STRING[7];
   FDB,FDT,FGM,FTIP,FDM,FELM      : STRING[12];
   NPRO,EN            : STRING[19];
   FTP,BBN,BBT,BEL,BGM,BDD,DIRAK,DIREK   : STRING;


PROCEDURE JUDUL;
BEGIN
   ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
   WHILE NOT EOF(NFILE) DO BEGIN
   READ(NFILE,RECORDFDAT);
   IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
    NPRO:=RECORDFDAT.NPROY; EN:=RECORDFDAT.ENG; END;
   END; CLOSE(NFILE); HAL:=HAL+1; A:=LENGTH(NPRO); B:=LENGTH(NFDA);
   C:=LENGTH(EN); D:=LENGTH(EL);
```

```
      FOR J:=1 TO BATASATAS DO WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(201));
      FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(187));
      WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
      '     UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON      ',
      CHAR(186)); WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(204));
      FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(185));
      WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
      ' AUTHORITY : UII CIVIL ENGINEERING 1996    DATA    : ',
      EL:D); FOR J:=1 TO (7-D) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(186));
      WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
      ' Proyek   : ',NPRO:A); FOR J:=1 TO (19-A) DO WRITE(LST,' ');
      WRITE(LST,'      Halaman : ',HAL:3,'   ',CHAR(186)); WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
      ' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(LST,' ');
      WRITE(LST,'      File Data : ',NFDA:B);
      FOR J:=1 TO (8-B) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(186)); WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(200));
      FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(188));
      WRITELN(LST); I:=7;
END;


BEGIN
 DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);BBN:=PARAMSTR(5);
 BBT:=PARAMSTR(6); BEL:=PARAMSTR(7); BGM:=PARAMSTR(8); BDD:=PARAMSTR(9);
 GETDIR(0,DIRAK); CHDIR(DIREK); FDM:=NFDA+BDD; ASSIGN(FDIM,FDM);
 {$I-} RESET(FDIM); {$I+}
 IF IORESULT=0 THEN BEGIN
  CLOSE(FDIM); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM);
  {$I-} RESET(FGMAKS); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT);
   {$I-} RESET(FBAHTUL); {$I+}
   IF IORESULT=0 THEN BEGIN
    CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB);
    {$I-} RESET(FDATBAH); {$I+}
    IF IORESULT=0 THEN BEGIN
     CLOSE(FDATBAH); YA:='U'; HAL:=0; BATASATAS:=0; BATASBAWAH:=0;
     BATASKIRI:=0;
     WHILE UPCASE(YA)='U' DO BEGIN
     TEXTBACKGROUND(0); TEXTCOLOR(10); CLRSCR;
     GOTOXY(10,2); WRITE(CHAR(218));
     FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(191));
     GOTOXY(10,3);
     WRITE(CHAR(179),' Ukuran Kertas : '); TEXTCOLOR(11); WRITE('1');
     TEXTCOLOR(10); WRITE('. Folio '); TEXTCOLOR(11); WRITE('2');
     TEXTCOLOR(10); WRITE('. Kuarto '); TEXTCOLOR(11);
     WRITE('--> Pilih :   '); TEXTCOLOR(10); WRITE(CHAR(179));
     GOTOXY(10,4);
     WRITE(CHAR(179),' Batas Atas  :               ',
     '      ',CHAR(179));
     GOTOXY(10,5);
     WRITE(CHAR(179),' Batas Bawah :               ',
     '      ',CHAR(179));
     GOTOXY(10,6);
     WRITE(CHAR(179),' Batas Kiri  :               ',
     '      ',CHAR(179));
     GOTOXY(10,7);
     WRITE(CHAR(192)); FOR I:=1 TO 50 DO WRITE(CHAR(196));
     WRITE(CHAR(217)); TEXTCOLOR(11);
     GOTOXY(10,9); WRITE(' U : ulang   L : lanjutkan ===> ');
     GOTOXY(29,4); WRITE('Baris'); GOTOXY(29,5); WRITE('Baris');
     GOTOXY(29,6); WRITE('Spasi'); GOTOXY(59,3); READLN(KERTAS);
     GOTOXY(26,4); READLN(BATASATAS); GOTOXY(26,5); READLN(BATASBAWAH);
     GOTOXY(26,6); READLN(BATASKIRI); BENAR:=TRUE;
     WHILE BENAR DO BEGIN
```

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 GOTOXY(42,9); YA:=READKEY; WRITE(YA);
 IF UPCASE(YA)='U' THEN BENAR:=FALSE;
 IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
IF KERTAS=1 THEN JUMLAHBARIS:=71; IF KERTAS=2 THEN JUMLAHBARIS:=65;
BARIS:=JUMLAHBARIS-BATASATAS-BATASBAWAH; HAL:=0; K:=1;
F:=1; JUDUL; RESET(FDATBAH);
WHILE NOT EOF(FDATBAH) DO BEGIN
 SEEK(FDATBAH,F-1); READ(FDATBAH,RECORDFDBN); F:=F+1;
 WITH RECORDFDBN DO BEGIN
 IF (K=1) THEN BEGIN
 IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
 IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
 FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 '        >>> DATA BAHAN <<<',
 '             ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' Tipe Teg. Desak Beton  Teg. Tarik Baja  Mod. ',
 'Elastisitas Baja ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' Plat    (MPa)         (MPa)          (MPa)',
 '         ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST); END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),'  ',
 TIPE:3,'      ',TRUNC(FC):3,'           ',TRUNC(FY):3,
 '         ',TRUNC(ES):6,'       ',CHAR(179));
 WRITELN(LST); K:=K+1; I:=I+1;
 IF (I>=BARIS) OR EOF(FDATBAH) THEN BEGIN
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
 FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
 WRITELN(LST); K:=1; I:=I+1; END;
 IF I>=BARIS THEN BEGIN
 K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FDATBAH); F:=1; RESET (FBAHTUL);
WHILE NOT EOF(FBAHTUL) DO BEGIN
 SEEK(FBAHTUL,F-1); READ(FBAHTUL,RECORDFDBT); F:=F+1;
 WITH RECORDFDBT  DO BEGIN
 IF (K=1) THEN BEGIN
 IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
 IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
 FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 '      >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<<',
 '      ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' Tipe No. Diameter Tulangan Pokok   Diameter Tulangan',
 ' Sengkang ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),'              (mm)',
 ' Plat          (mm)       ',CHAR(179));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST); END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 '',TIPE:3,'   ',N:2,'         ',DP:2,
 '              ',DS:2,'          ',CHAR(179));
 WRITELN(LST); K:=K+1; I:=I+1;
 IF (I>=BARIS) OR EOF(FBAHTUL) THEN BEGIN
```

```
     FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
     FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
     WRITELN(LST); K:=1; I:=I+1; END;
   IF I>=BARIS THEN BEGIN
    K:=1;  FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
 END; CLOSE(FBAHTUL); F:=1; RESET(FDIM);
 WHILE NOT EOF(FDIM) DO BEGIN
  SEEK(FDIM,F-1); READ(FDIM,RECORDFDMN); F:=F+1;
  WITH RECORDFDMN DO BEGIN
   IF K=1 THEN BEGIN
    IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
    IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL;  END;
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
    FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
    WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
    '        >>> DATA DIMENSI <<<              ',
    CHAR(179)); WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
    FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
    WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
    ' Tipe Panjang Lebar Tebal Penutup Beton Arah ',
    CHAR(179)); WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
    ' Plat  (mm)   (mm)   (mm)    (mm)     Kerja ',
    CHAR(179)); WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
    FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
    WRITELN(LST); END;
   FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
   '',TIPE:3,' ',LP:5,' ',BP:5,' ',HP:4,'     ',PB:3,
   '     ',ARAH,' Arah ',CHAR(179)); WRITELN(LST); K:=K+1; I:=I+1;
   IF (I>=BARIS) OR EOF(FDIM) THEN BEGIN
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
    FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
    WRITELN(LST); I:=I+1; K:=1; END;
   IF I>=BARIS THEN BEGIN
    K:=1;  FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
 END; CLOSE(FDIM); F:=1; RESET(FGMAKS);
 WHILE NOT EOF(FGMAKS) DO BEGIN
  SEEK(FGMAKS,F-1); READ(FGMAKS,RECORDFGMS); F:=F+1;
  WITH RECORDFGMS DO BEGIN
   IF K=1 THEN BEGIN
    IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
    IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
    FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
    WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
    '        >>> DATA GAYA-GAYA MAKSIMUM <<<        ',
    CHAR(179)); WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
    FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
    WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
    ' Tipe  M Lap. x   M Lap. y   M Tum. x   M Tum. y ',
    CHAR(179)); WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
    ' Plat  (Nmm)    (Nmm)      (Nmm)     (Nmm) ',
    CHAR(179)); WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
    FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
    WRITELN(LST); END;
   FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
   '',TIPE:3,' ',MLX:8,' ',MLY:8,' ',MTX:9,' ',MTY:9,
   '',CHAR(179)); WRITELN(LST); K:=K+1; I:=I+1;
   IF (I>=BARIS) OR EOF(FGMAKS) THEN BEGIN
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
    FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
```

```
        WRITELN(LST); I:=I+1; K:=1; END;
      IF (I>=BARIS) THEN BEGIN
        K:=1;  FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
      END; CLOSE(FGMAKS);
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA BAHAN BELUM DIBUAT...!'); WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA GAYA YG BEKERJA PADA BALOK BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
    CLRSCR; TEXTCOLOR(11);
    GOTOXY(20,10); WRITE('DATA DIMENSI BALOK BELUM DIBUAT...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
  END.


PROGRAM CPL;
USES CRT,PRINTER;
TYPE
  FDAT = RECORD
        NPROY : string[19];
        NFDAT : string[8];
        NaFil : string[12];
        ENG   : string[19];
        END;
  FKLM = RECORD
        TIPE : INTEGER;
        SX   : INTEGER;
        DPX  : INTEGER;
        SY   : INTEGER;
        DPY  : INTEGER;
        STX  : INTEGER;
        DPTX : INTEGER;
        STY  : INTEGER;
        DPTY : INTEGER;
        S    : INTEGER;
        DSU  : INTEGER;
        END;
VAR
  FPLAT              : FILE OF FKLM;
  NFILE              : FILE OF FDAT;
  RECORDFDAT              : FDAT;
  RECORDFPLT              : FKLM;
  I,JUM,J,BATASATAS,BATASBAWAH,
  BARIS,JUMLAHBARIS,HAL,BATASKIRI,A,
  B,C,D              : INTEGER;
  BENAR              : BOOLEAN;
  KERTAS             : BYTE;
  YA                 : CHAR;
  NFDA,EL            : STRING[7];
  FBK                : STRING[12];
  NPRO,EN            : STRING[19];
  BLK,DIRAK,DIREK        : STRING;

BEGIN
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); BLK:=PARAMSTR(4);
GETDIR(0,DIRAK); CHDIR(DIREK); ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
WHILE NOT EOF(NFILE) DO BEGIN READ(NFILE,RECORDFDAT);
IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
  NPRO:=RECORDFDAT.NPROY; EN :=RECORDFDAT.ENG; END;
```

```
END; CLOSE(NFILE); FBK:=NFDA+BLK; ASSIGN(FPLAT,FBK); {$I-} RESET(FPLAT); {$I+}
IF IORESULT=0 THEN BEGIN
 YA:='U'; BATASATAS:=0; BATASBAWAH:=0; BATASKIRI:=0;
 WHILE UPCASE(YA)='U' DO BEGIN
 TEXTBACKGROUND(0); TEXTCOLOR(10); CLRSCR;
 GOTOXY(10,2);WRITE(CHAR(218)); FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(191));
 GOTOXY(10,3);WRITE(CHAR(179),' Ukuran Kertas : '); TEXTCOLOR(11); WRITE('1');
 TEXTCOLOR(10); WRITE('. Folio '); TEXTCOLOR(11); WRITE('2');
 TEXTCOLOR(10); WRITE('. Kuarto '); TEXTCOLOR(11);
 WRITE('--> Pilih :  '); TEXTCOLOR(10); WRITE(CHAR(179)); GOTOXY(10,4);
 WRITE(CHAR(179),' Batas Atas :                    ',CHAR(179));
 GOTOXY(10,5);
 WRITE(CHAR(179),' Batas Bawah :                   ',CHAR(179));
 GOTOXY(10,6);
 WRITE(CHAR(179),' Batas Kiri  :                   ',CHAR(179));
 GOTOXY(10,7);
 WRITE(CHAR(192)); FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(217));
 TEXTCOLOR(11);
 GOTOXY(10,9); WRITE(' U : ulang   L : lanjutkan ===> ');
 GOTOXY(29,4); WRITE('Baris'); GOTOXY(29,5); WRITE('Baris');
 GOTOXY(29,6); WRITE('Spasi'); GOTOXY(59,3); READLN(KERTAS);
 GOTOXY(26,4); READLN(BATASATAS); GOTOXY(26,5); READLN(BATASBAWAH);
 GOTOXY(26,6); READLN(BATASKIRI); BENAR:=TRUE;
 WHILE BENAR DO BEGIN
 GOTOXY(42,9); YA:=READKEY; WRITE(YA);IF UPCASE(YA)='U' THEN BENAR:=FALSE;
 IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
IF KERTAS=1 THEN JUMLAHBARIS:=63;IF KERTAS=2 THEN JUMLAHBARIS:=57;
BARIS:=JUMLAHBARIS-BATASATAS-BATASBAWAH; I:=1; HAL:=0;
WHILE NOT EOF(FPLAT) DO BEGIN
CLRSCR; TEXTCOLOR(11);
GOTOXY(20,10); WRITE('MENCETAK HASIL DISAIN.......'); TEXTCOLOR(11);
WRITE(I); TEXTCOLOR(10);
WITH RECORDFPLT DO BEGIN READ(FPLAT,RECORDFPLT);
IF I=1 THEN BEGIN
A:=LENGTH(NPRO); B:=LENGTH(NFDA); C:=LENGTH(EN); D:=LENGTH(EL);
 FOR J:=1 TO BATASATAS DO BEGIN WRITELN(LST); END; HAL:=HAL+1;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(218)); FOR J:=1 TO 61 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(191)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 '     UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON       ',
 CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(195)); FOR J:=1 TO 61 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(180)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' AUTHORITY : UII CIVIL ENGINEERING 1996 DISAIN   : ',
 EL:D); FOR J:=1 TO (7-D) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(179));
 WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(179),' Proyek   : ',NPRO:A);
 FOR J:=1 TO (19-A) DO WRITE(LST,' '); WRITE(LST,'     Halaman  : ',
     HAL:3,'   ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(LST,' ');
 WRITE(LST,'    File Data : ',NFDA:B); FOR J:=1 TO (8-B) DO WRITE(LST,' ');
 WRITE(LST,' ',CHAR(179)); WRITELN(LST);  FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(195)); FOR J:=1 TO 6 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 21 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 21 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(180)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(179),' TIPE ',CHAR(179),'   ARAH MELEBAR    ',
     CHAR(179),'  ARAH MEMANJANG  ',CHAR(179),' TULANGAN ',
     CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(179)); FOR J:=1 TO 6 DO WRITE(LST,' ');
 WRITE(LST,CHAR(195)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(197)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
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```pascal
WRITE(LST,CHAR(194)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(180),'  BAGI/ ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' PLAT ',CHAR(179),' LAPANGAN ',CHAR(179),
    ' TUMPUAN ',CHAR(179),' LAPANGAN ',CHAR(179),'TUMPUAN ',
    CHAR(179),'  SUSUT ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(195)); FOR J:=1 TO 6 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(180)); WRITELN(LST); END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' ',TIPE:3,' ',CHAR(179),'D',DPX:2,'-',SX:3,
    'mm ',CHAR(179),'D',DPY:2,'-',SY:3,'mm ',CHAR(179),'D',
    DPTX:2,'-',STX:3,'mm ',CHAR(179),'D',DPTY:2,'-',STY:3,'mm ',
    CHAR(179),'D',DSU:2,'-',S:3,'mm ',CHAR(179)); WRITELN(LST); I:=I+1;
IF (I=BARIS) OR EOF(FPLAT) THEN BEGIN I:=1;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(192)); FOR J:=1 TO 6 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(217)); WRITELN(LST);
IF I=BARIS THEN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); END; END;
END; CLOSE(FPLAT); END
ELSE BEGIN
    CLRSCR; TEXTCOLOR(11);GOTOXY(20,5); WRITE('    PROSES DISAIN BELUM DILAKUKAN');
    GOTOXY(15,7); WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
END.


PROGRAM DDPL;
USES CRT;

TYPE
  FDMN = RECORD
      TIPE : INTEGER;
      LP   : INTEGER;
      BP   : INTEGER;
      PB   : INTEGER;
      HP   : INTEGER;
      ARAH : INTEGER;
      END;
  FDBN = RECORD
      TIPE : INTEGER;
      FC  : REAL;
      FY  : REAL;
      ES  : REAL;
      END;
VAR
  FTIPE               : TEXT;
  FDIM                : FILE OF FDMN;
  FDATBAH             : FILE OF FDBN;
  RECORDFDBN          : FDBN;
  RECORDFDMN          : FDMN;
  I,JTIPE,JUM,NOREC,TP,DPKB,LPB,
  BPB,HB,PBB,ARAHB,ARAHS,LPS,TUMB    : INTEGER;
  FCB,FYB,ESB,HMIN,BETA       : REAL;
  BENAR               : BOOLEAN;
  YA              : CHAR;
  NFDA,EL             : STRING[7];
  FTIP,FDM,FDB            : STRING[12];
  FTP,BDD,BBN,DIRAK,DIREK         : STRING;
```

```
BEGIN
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); FTP:=PARAMSTR(4);
BBN:=PARAMSTR(5); BDD:=PARAMSTR(6); GETDIR(0,DIRAK); CHDIR(DIREK);
FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
READ(FTIPE,JTIPE); CLOSE(FTIPE); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB);
{$I-} RESET(FDATBAH); {$I+}
IF IORESULT=0 THEN BEGIN
CLOSE(FDATBAH); RESET(FDATBAH);
WHILE NOT EOF(FDATBAH) DO BEGIN
WITH RECORDFDBN DO BEGIN
READ(FDATBAH,RECORDFDBN);
IF RECORDFDBN.TIPE=TP THEN BEGIN
FCB:=RECORDFDBN.FC; FYB:=RECORDFDBN.FY; ESB:=RECORDFDBN.ES; END; END;
END; TP:=0;
REPEAT
TP:=TP+1; YA:='U';
WHILE UPCASE(YA)='U' DO BEGIN
TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(13);
WRITE('        >>> DATA DIMENSI <<<          ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
WRITE('                '); TEXTCOLOR(10);
WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' Panjang p.k.p   Lebar p.k.p   Penutup Beton ',CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),'   (L)--->mm     (B)--->mm     (Pb)--->mm ',CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); FOR I:=1 TO 47 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(217));
GOTOXY(10,13);
WRITE(' Jenis Plat : '); TEXTCOLOR(15); WRITE('1'); TEXTCOLOR(10);
WRITE('. Plat Satu Arah.'); GOTOXY(10,14);
WRITE('          '); TEXTCOLOR(15); WRITE('2'); TEXTCOLOR(10);
WRITE('. Plat Dua Arah.'); TEXTCOLOR(11);
GOTOXY(10,15); WRITE(' Pilih ? : ');
GOTOXY(10,18); WRITE(' U : ulang   L : lanjutkan ===> ');
GOTOXY(17,10); READLN(LPB); GOTOXY(33,10); READLN(BPB);
GOTOXY(49,10); READLN(PBB); ARAHB:=0; ARAHS:=0;
WHILE (ARAHB<1) OR (ARAHB>2) DO BEGIN
GOTOXY(21,15); READLN(ARAHB); END;
IF LPB<BPB THEN BEGIN
LPS:=LPB; LPB:=BPB; BPB:=LPS; END;
IF ARAHB=2 THEN BEGIN
IF LPB/BPB>2 THEN ARAHS:=1; END; BENAR:=TRUE;
WHILE BENAR DO BEGIN
IF ARAHS=1 THEN BEGIN
TEXTCOLOR(11);GOTOXY(10,17);
WRITE(' Plat Termasuk "PLAT SATU ARAH"......! ');
TEXTCOLOR(11); END;
GOTOXY(42,18); YA:=READKEY; WRITE(YA);
IF UPCASE(YA)='U' THEN BENAR:=FALSE;
IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
IF ARAHS=1 THEN ARAHB:=ARAHS;
IF ARAHB=1 THEN BEGIN
CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(11); TEXTBACKGROUND(1);
WRITE('     >>> DATA DIMENSI <<<      ');
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```
TEXTBACKGROUND(128); TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' Komponen Struktur Plat Tipe : '); TEXTCOLOR(11);
WRITE(TP:3,' '); TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7); Write(CHAR(179)); TEXTBACKGROUND(5);
Write('        '); TEXTCOLOR(15); WRITE('1'); TEXTCOLOR(10);
WRITE('. Dua Tumpuan.        '); TEXTBACKGROUND(128);
WRITE(CHAR(179)); GOTOXY(10,8); Write(CHAR(179)); TEXTBACKGROUND(5);
Write('        '); TEXTCOLOR(15); WRITE('2'); TEXTCOLOR(10);
WRITE('. Kantilever.        '); TEXTBACKGROUND(128);
WRITE(CHAR(179)); GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10); WRITE(CHAR(179)); TEXTCOLOR(15); TEXTBACKGROUND(4);
WRITE('        PILIH ?         '); TEXTCOLOR(10);
TEXTBACKGROUND(128); WRITE(CHAR(179)); GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TUMB:=0;
WHILE (TUMB<1) OR (TUMB>2) DO BEGIN
TEXTBACKGROUND(4); TEXTCOLOR(15); GOTOXY(30,10); READLN(TUMB);
TEXTBACKGROUND(128); TEXTCOLOR(10); END;
IF TUMB=1 THEN BEGIN
 IF FYB=400 THEN HMIN:=LPB/20;
 IF FYB<>400 THEN HMIN:=LPB/20*(0.4+FYB/700); END;
IF TUMB=2 THEN BEGIN
 IF FYB=400 THEN HMIN:=LPB/16;
 IF FYB<>400 THEN HMIN:=LPB/16*(0.4+FYB/700); END; END;
IF ARAHB=2 THEN BEGIN
CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(11); TEXTBACKGROUND(1);
WRITE('      >>> DATA DIMENSI <<<      ');
TEXTBACKGROUND(128); TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' Komponen Struktur Plat Tipe : '); TEXTCOLOR(11);
WRITE(TP:3,' '); TEXTCOLOR(10); WRITE(CHAR(179)); GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7); Write(CHAR(179)); TEXTBACKGROUND(5);
Write('        '); TEXTCOLOR(15); WRITE('1'); TEXTCOLOR(10);
WRITE('. Dengan Balok Tepi.      '); TEXTBACKGROUND(128);
WRITE(CHAR(179)); GOTOXY(10,8); Write(CHAR(179)); TEXTBACKGROUND(5);
Write('        '); TEXTCOLOR(15); WRITE('2'); TEXTCOLOR(10);
WRITE('. Tanpa Balok Tepi.      '); TEXTBACKGROUND(128);
WRITE(CHAR(179)); GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10); WRITE(CHAR(179)); TEXTCOLOR(15); TEXTBACKGROUND(4);
WRITE('        PILIH ?          '); TEXTCOLOR(10);
TEXTBACKGROUND(128); WRITE(CHAR(179)); GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TUMB:=0;
WHILE (TUMB<1) OR (TUMB>2) DO BEGIN
TEXTBACKGROUND(4); TEXTCOLOR(15);
GOTOXY(27,10); READLN(TUMB); TEXTBACKGROUND(128); TEXTCOLOR(10); END;
BETA:=LPB/BPB;
IF TUMB=1 THEN HMIN:=(0.8+FYB/1500)*LPB/(36+5*BETA*(1-0.12*(1+1/BETA)));
IF TUMB=2 THEN HMIN:=(0.8+FYB/1500)*LPB/36; END; YA:='U';
WHILE UPCASE(YA)='U' DO BEGIN
CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 41 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(13);
WRITE('       >>> DATA DIMENSI <<<       ');
TEXTCOLOR(10); WRITE(CHAR(179)); GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 41 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
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WRITE('              '); TEXTCOLOR(10);
WRITE(CHAR(179)); GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 41 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' Tebal Plat Minimum   Tebal Plat Rencana ',CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),'  (hmin)--->mm        (h)--->mm    ',CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 41 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); FOR I:=1 TO 41 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 41 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11); GOTOXY(10,13); WRITE(' U : ulang  L : lanjutkan ====> ');
GOTOXY(18,10); WRITE(HMIN:3:2); GOTOXY(40,10); READLN(HB); BENAR:=TRUE;
WHILE BENAR DO BEGIN
 GOTOXY(42,13); YA:=READKEY; WRITE(YA); IF UPCASE(YA)='U' THEN BENAR:=FALSE;
 IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
FDM:=NFDA+BDD; ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
IF IORESULT<>0 THEN REWRITE(FDIM); NOREC:=-1; JUM:=FILESIZE(FDIM);
WITH RECORDFDMN DO BEGIN
IF JUM<>0 THEN BEGIN
 FOR I:=1 TO JUM DO BEGIN
  SEEK(FDIM,I-1); READ(FDIM,RECORDFDMN);
  IF RECORDFDMN.TIPE=TP THEN NOREC:=I-1; END;
  IF NOREC=-1 THEN NOREC:=JUM; SEEK(FDIM,NOREC); END;
 TIPE:=TP; LP:=LPB; BP:=BPB; PB:=PBB; HP:=HB; ARAH:=ARAHB;
 WRITE(FDIM,RECORDFDMN);
 END; CLOSE(FDIM);
UNTIL TP=JTIPE;
END
ELSE BEGIN
  CLRSCR; TEXTCOLOR(11);
  GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
END; CHDIR(DIRAK);
END.


PROGRAM GPL;
USES CRT;
TYPE
  FGMS = RECORD
      TIPE : INTEGER;
      MLX  : REAL;
      MLY  : REAL;
      MTX  : REAL;
      MTY  : REAL;
    END;
  FDMN = RECORD
      TIPE : INTEGER;
      LP   : INTEGER;
      BP   : INTEGER;
      PB   : INTEGER;
      HP   : INTEGER;
      ARAH : INTEGER;
    END;
VAR
  FTIPE,BERKAS              : TEXT;
  FGMAKS                    : FILE OF FGMS;
  FDIM                      : FILE OF FDMN;
  RECORDFGMS               : FGMS;
  RECORDFDMN               : FDMN;
  Elemen,I,JTIPE,JUM,NOREC,TP,A,J,
  LPB,BPB,HPB,JEP,JEPIT,K,JEN,KO,LX,LY,
  TX,TY,CTX,CTY,CTTX,CTTY,CTX2,CTY2,
  CTTX2,CTTY2               : INTEGER;
  QB,S,MX,MY,MTUX,MTUY,CTXP,CTYP,CTTXP,
  CTTYP                    : REAL;
  YA                       : CHAR;
```

```
BENAR                    : BOOLEAN;
NFDA,EL                  : STRING[7];
FGM,FTIP,FDM             : STRING[12];
FTP,BGM,BDD,DIRAK,DIREK          : STRING;


Begin
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);
BGM:=PARAMSTR(5); BDD:=PARAMSTR(6); GETDIR(0,DIRAK); CHDIR(DIREK);
FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
READ(FTIPE,JTIPE); CLOSE(FTIPE); IF (DIRAK='A:\') OR (DIRAK='C:\') OR (DIRAK='B:\') OR (DIRAK='D:\') OR
(DIRAK='E:\') THEN  ASSIGN(BERKAS,DIRAK+'DATAPLAT.DAT') ELSE
ASSIGN(BERKAS,DIRAK+'\DATAPLAT.DAT');
{$I-} RESET(BERKAS); {$I+}
IF IORESULT=0 THEN  BEGIN
CLOSE(BERKAS); FDM:=NFDA+BDD; ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
IF IORESULT=0 THEN BEGIN
CLOSE(FDIM); TP:=0;
REPEAT
TP:=TP+1; RESET(FDIM);
WHILE NOT EOF(FDIM) DO BEGIN
WITH RECORDFDMN DO BEGIN
READ(FDIM,RECORDFDMN);
IF TIPE=TP THEN BEGIN
LPB:=RECORDFDMN.LP; BPB:=RECORDFDMN.BP; HPB:=RECORDFDMN.HP; END; END;
END; CLOSE(FDIM); YA:='U';
WHILE UPCASE(YA)='U' DO BEGIN
TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR;
GOTOXY(10,9);
WRITE('Plat Tipe : '); TEXTCOLOR(11); WRITE(TP:3); TEXTCOLOR(10);
GOTOXY(10,10);
WRITE('Beban Merata Yg Bekerja Pada Plat ? (kPa) : ');
GOTOXY(10,11);
WRITE('Plat Ditumpu Pada Keempat Sisinya : '); TEXTCOLOR(11);
WRITE('1'); TEXTCOLOR(10); WRITE('. Jepit Elastis Atau Menerus.');
GOTOXY(10,12);
WRITE('                        '); TEXTCOLOR(11);
WRITE('2'); TEXTCOLOR(10); WRITE('. Jepit Penuh.');
GOTOXY(10,13); WRITE('              ===> Pilih : ');
TEXTCOLOR(11);
GOTOXY(10,15); WRITE('U : ulang   L : lanjutkan ===> ');
GOTOXY(54,10); READLN(QB);
GOTOXY(46,13); READLN(JEP); BENAR:=TRUE;
WHILE BENAR DO BEGIN
    GOTOXY(41,15); YA:=READKEY; WRITE(YA);
    IF UPCASE(YA)='U' THEN BENAR:=FALSE;
    IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
IF JEP=2 THEN BEGIN YA:='U';
WHILE UPCASE(YA)='U' DO BEGIN
CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 65 DO WRITE(CHAR(196));
WRITE(CHAR(191));
GOTOXY(10,3);
WRITE(CHAR(179)); TEXTCOLOR(11); TEXTBACKGROUND(1);
WRITE('       >>> PERLETAKAN PADA SISI-SISI PLAT <<<
'       '); TEXTBACKGROUND(128); TEXTCOLOR(10);
WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 65 DO WRITE(CHAR(196));
WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' PLAT TIPE : '); TEXTCOLOR(11);
WRITE(TP:3,'                         ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 65 DO WRITE(CHAR(196));
WRITE(CHAR(180));
GOTOXY(10,7);
Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('1'); TEXTCOLOR(10);
```

```pascal
WRITE('. Keempat Sisi Terletak Bebas.                    ',
      '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,8);
Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('2'); TEXTCOLOR(10);
WRITE('. Keempat Sisi Terjepit Penuh.                    ',
      '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,9);
Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('3'); TEXTCOLOR(10);
WRITE('. Dua Sisi (Panjang & Pendek) Terjepit Penuh.     ',
      '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,10);
Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('4'); TEXTCOLOR(10);
WRITE('. Dua Sisi (Pendek) Terjepit Penuh.               ',
      '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,11);
Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('5'); TEXTCOLOR(10);
WRITE('. Dua Sisi (Panjang) Terjepit Penuh.              ',
      '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,12);
Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('6'); TEXTCOLOR(10);
WRITE('. Sisi Pendek Terjepit Penuh.                     ',
      '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,13);
Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('7'); TEXTCOLOR(10);
WRITE('. Sisi Panjang Terjepit Penuh.                    ',
      '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,14);
Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('8'); TEXTCOLOR(10);
WRITE('. Tiga Sisi Terjepit Penuh & Satu Sisi Pendek Terletak',
      ' Bebas. '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,15);
Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('9'); TEXTCOLOR(10);
WRITE('. Tiga Sisi Terjepit Penuh & Satu Sisi Panjang Terleta',
      'k Bebas. '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,16);
WRITE(CHAR(195)); FOR I:=1 TO 65 DO WRITE(CHAR(196));
WRITE(CHAR(180));
GOTOXY(10,17);
WRITE(CHAR(179));
TEXTCOLOR(15); TEXTBACKGROUND(4);
WRITE(' PILIH ?                                          ',
      '); TEXTCOLOR(10); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,18);
WRITE(CHAR(192)); FOR I:=1 TO 65 DO WRITE(CHAR(196));
WRITE(CHAR(217));
GOTOXY(10,20); TEXTCOLOR(11);
WRITE(' U : ulang   L : lanjutkan ===> '); TEXTCOLOR(15); TEXTBACKGROUND(4);
GOTOXY(20,17); READLN(JEPIT); TEXTCOLOR(10); TEXTBACKGROUND(128);
BENAR:=TRUE;
WHILE BENAR DO BEGIN
    TEXTCOLOR(11); GOTOXY(42,20); YA:=READKEY; WRITE(YA);
    IF UPCASE(YA)='U' THEN BENAR:=FALSE;
    IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
END;
IF JEP=1 THEN BEGIN YA:='U';
WHILE UPCASE(YA)='U' DO BEGIN
CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 67 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(11); TEXTBACKGROUND(1);
WRITE('         >>> PERLETAKAN PADA SISI-SISI PLAT <<<',
      '); TEXTBACKGROUND(128); TEXTCOLOR(10);
WRITE(CHAR(179));
```

```
GOTOXY(10,4); WRITE(CHAR(195)); FOR I:=1 TO 67 DO WRITE(CHAR(196));
WRITE(CHAR(180));
GOTOXY(10,5); WRITE(CHAR(179),' PLAT TIPE : '); TEXTCOLOR(11);
WRITE(TP:3,'                              ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,6); WRITE(CHAR(195)); FOR I:=1 TO 67 DO WRITE(CHAR(196));
WRITE(CHAR(180));
GOTOXY(10,7); Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('1'); TEXTCOLOR(10);
WRITE('. Keempat Sisi Terletak Bebas.                   '
'     '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,8);
Write(CHAR(179)); TEXTBACKGROUND(5); Write(' '); TEXTCOLOR(15);
WRITE('2'); TEXTCOLOR(10); WRITE('. Keempat Sisi Terjepit Elastis.',
'                   '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,9);
Write(CHAR(179)); TEXTBACKGROUND(5); Write(' '); TEXTCOLOR(15);
WRITE('3'); TEXTCOLOR(10); WRITE('. Dua Sisi (Panjang & Pendek)',
' Terjepit Elastis.             '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,10);
Write(CHAR(179)); TEXTBACKGROUND(5); Write(' '); TEXTCOLOR(15);
WRITE('4'); TEXTCOLOR(10); WRITE('. Dua Sisi (Pendek) Terjepit',
' Elastis.                '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,11);
Write(CHAR(179)); TEXTBACKGROUND(5); Write(' '); TEXTCOLOR(15);
WRITE('5'); TEXTCOLOR(10); WRITE('. Dua Sisi (Panjang) Terjepit',
' Elastis.               '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,12);
Write(CHAR(179)); TEXTBACKGROUND(5); Write(' '); TEXTCOLOR(15);
WRITE('6'); TEXTCOLOR(10); WRITE('. Sisi Pendek Terjepit Elastis.',
'               '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,13);
Write(CHAR(179)); TEXTBACKGROUND(5); Write(' '); TEXTCOLOR(15);
WRITE('7'); TEXTCOLOR(10); WRITE('. Sisi Panjang Terjepit Elastis.',
'              '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,14);
Write(CHAR(179)); TEXTBACKGROUND(5); Write(' '); TEXTCOLOR(15);
WRITE('8'); TEXTCOLOR(10); WRITE('. Tiga Sisi Terjepit Elastis & ',
'Satu Sisi Pendek Terletak Bebas. '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,15);
Write(CHAR(179)); TEXTBACKGROUND(5); Write(' '); TEXTCOLOR(15);
WRITE('9'); TEXTCOLOR(10); WRITE('. Tiga Sisi Terjepit Elastis & ',
'Satu Sisi Panjang Terletak Bebas. '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,16);
WRITE(CHAR(195)); FOR I:=1 TO 67 DO WRITE(CHAR(196));
WRITE(CHAR(180));
GOTOXY(10,17);
WRITE(CHAR(179));
TEXTCOLOR(15); TEXTBACKGROUND(4); WRITE(' PILIH ?          ',
'                    '); TEXTCOLOR(10);
TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,18);
WRITE(CHAR(192)); FOR I:=1 TO 67 DO WRITE(CHAR(196));
WRITE(CHAR(217));
GOTOXY(10,20); TEXTCOLOR(11); WRITE(' U : ulang   L : lanjutkan ===> ');
TEXTCOLOR(15); TEXTBACKGROUND(4);
GOTOXY(20,17); READLN(JEPIT);
TEXTCOLOR(10); TEXTBACKGROUND(128); BENAR:=TRUE;
WHILE BENAR DO BEGIN
GOTOXY(42,20); YA:=READKEY; WRITE(YA);
IF UPCASE(YA)='U' THEN BENAR:=FALSE;
IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END; END;
```

```
IF JEP=1 THEN JEPIT:=JEPIT+9; S:=LPB/BPB;
IF S>2.5 THEN A:=16;
IF S<=2.5 THEN A:=TRUNC((TRUNC(S*10)/10-1)*10);
IF (DIRAK='A:\') OR (DIRAK='C:\') OR (DIRAK='B:\') OR (DIRAK='D:\') OR
(DIRAK='E:\') THEN  ASSIGN(BERKAS,DIRAK+'DATAPLAT.DAT') ELSE
ASSIGN(BERKAS,DIRAK+'\DATAPLAT.DAT'); RESET(BERKAS);
WHILE NOT EOF(BERKAS) DO BEGIN
READLN(BERKAS,JEN,KO,LX,LY,TX,TY);
IF (JEN=JEPIT) AND (KO=A) THEN
BEGIN CTX:=LX; CTY:=LY; CTTX:=TX; CTTY:=TY; END;
IF (JEN=JEPIT) AND (KO=A+1) THEN
BEGIN CTX2:=LX; CTY2:=LY; CTTX2:=TX; CTTY2:=TY; END;
end; CLOSE(BERKAS);
IF A<15 THEN BEGIN
CTXP:=CTX+(S-((A/10)+1))*10*(CTX2-CTX);
CTYP:=CTY+(S-((A/10)+1))*10*(CTY2-CTY);
CTTXP:=CTTX+(S-((A/10)+1))*10*(CTTX2-CTTX);
CTTYP:=CTTY+(S-((A/10)+1))*10*(CTTY2-CTTY); END;
MX:=0.001*QB*SQR(BPB)*CTXP; MY:=0.001*QB*SQR(BPB)*CTYP;
MTUX:=-0.001*QB*SQR(BPB)*CTTXP; MTUY:=-0.001*QB*SQR(BPB)*CTTYP;
FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
IF IORESULT<>0 THEN REWRITE(FGMAKS); NOREC:=-1; JUM:=FILESIZE(FGMAKS);
WITH RECORDFGMS DO BEGIN
IF JUM<>0 THEN BEGIN
FOR I:=1 TO JUM DO BEGIN
  SEEK(FGMAKS,I-1); READ(FGMAKS,RECORDFGMS);
  IF RECORDFGMS.TIPE=TP THEN NOREC:=I-1; END;
  IF NOREC=-1 THEN NOREC:=JUM; SEEK(FGMAKS,NOREC); END;
TIPE:=TP; MLX:=MX; MLY:=MY; MTX:=MTUX; MTY:=MTUY;
WRITE(FGMAKS,RECORDFGMS);
END; CLOSE(FGMAKS);
UNTIL TP=JTIPE;
END
ELSE BEGIN
CLRSCR; TEXTCOLOR(11);
GOTOXY(20,10); WRITE(' Data Dimensi Belum Ada...........!');
WRITE(^G); READKEY; TEXTCOLOR(10); END;
END
ELSE BEGIN
CLRSCR; TEXTCOLOR(11);
GOTOXY(20,10); WRITE(' Data Perletakan Plat Belum Ada...........!');
WRITE(^G); READKEY; TEXTCOLOR(10); END;
END; CHDIR(DIRAK);
END.


PROGRAM PPL;
USES CRT;
TYPE

  FGMS = RECORD
        TIPE : INTEGER;
        MLX  : REAL;
        MLY  : REAL;
        MTX  : REAL;
        MTY  : REAL;
      END;
  FDMN = RECORD
        TIPE : INTEGER;
        LP  : INTEGER;
        BP  : INTEGER;
        PB  : INTEGER;
        HP  : INTEGER;
        ARAH : INTEGER;
      END;
  FDBN = RECORD
        TIPE : INTEGER;
        FC  : REAL;
        FY  : REAL;
        ES  : REAL;
```

```
        END;
    FDBT = RECORD
        TIPE : INTEGER;
        N   : INTEGER;
        DP  : INTEGER;
        DS  : INTEGER;
        END;
    FKLM = RECORD
        TIPE : INTEGER;
        SX  : INTEGER;
        DPX : INTEGER;
        SY  : INTEGER;
        DPY : INTEGER;
        STX : INTEGER;
        DPTX : INTEGER;
        STY : INTEGER;
        DPTY : INTEGER;
        S   : INTEGER;
        DSU : INTEGER;
        END;
VAR
  FTIPE                    : TEXT;
  FDI                      : FILE OF FDMN;
  FDATBAH                  : FILE OF FDBN;
  FBAHTUL                  : FILE OF FDBT;
  FGMAKS                   : FILE OF FGMS;
  FPLAT                    : FILE OF FKLM;
  RECORDFDBN               : FDBN;
  RECORDFDBT               : FDBT;
  RECORDFGMS               : FGMS;
  RECORDFDN                : FDMN;
  RECORDFPLT               : FKLM;
  I,JTIPE,JUM,NOREC,J,TP,TERUS,DPB,
  SMAKS,LPB,BPB,HPB,PBB,DPBS,DPLS,DPTBS,
  DPTLS,DSB,DSS            : INTEGER;
  FCB,FYB,ESB,DB,O,B1,KB,RHOB,RMAKS,RMIN,KL,
  RHOL,ASL,SL,AD,ASB,SB,ASTB,ASTL,STB,ASBS,
  SBS,ASLS,SLS,ASTBS,STBS,ASTLS,STLS,ASS,SS,
  SSS,MB,ML,MTB,MTL,RB,DL,DTB,DTL,KTB,KTL,
  RHOTB,RHOTL,STL  : Real;
  NFDA,EL                  : STRING[7];
  FDB,FDT,FGM,FTIP,FDM,FBK           : STRING[12];
  FTP,BBN,BBT,BGM,BDD,BLK,DIRAK,DIREK    : STRING;

BEGIN
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);BBN:=PARAMSTR(5);
BBT:=PARAMSTR(6); BGM:=PARAMSTR(7); BDD:=PARAMSTR(8); BLK:=PARAMSTR(9);
GETDIR(0,DIRAK); CHDIR(DIREK); FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
READ(FTIPE,JTIPE); CLOSE(FTIPE); FDM:=NFDA+BDD; ASSIGN(FDI,FDM); {$I-} RESET(FDI); {$I+}
IF IORESULT=0 THEN BEGIN
CLOSE(FDI); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
IF IORESULT=0 THEN BEGIN
CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT); {$I-} RESET(FBAHTUL); {$I+}
IF IORESULT=0 THEN BEGIN
CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
IF IORESULT=0 THEN BEGIN
CLOSE(FDATBAH); TP:=0;
REPEAT
SBS:=100; SLS:=100; STBS:=100; STLS:=0; SSS:=100; TEXTBACKGROUND(0); CLRSCR;
FOR I:=1 TO 1000 DO BEGIN
  TEXTCOLOR(5); GOTOXY(20,10); FOR j:=1 TO 36 DO WRITE(CHAR(176));
  GOTOXY(20,11); WRITE (CHAR(176),' '); FOR j:=1 TO 3 DO WRITE(CHAR(175));
  TEXTCOLOR(11); WRITE(' PROSES  DISAIN  PLAT '); TEXTCOLOR(5);
  FOR j:=1 TO 3 DO WRITE(CHAR(174)); WRITE(' ',CHAR(176));
  GOTOXY(20,12); FOR j:=1 TO 36 DO WRITE(CHAR(176)); TEXTCOLOR(10); END;
TP:=TP+1; RESET(FGMAKS);
WHILE NOT EOF(FGMAKS) DO BEGIN
WITH RECORDFGMS DO BEGIN READ(FGMAKS,RECORDFGMS);
IF RECORDFGMS.TIPE=TP THEN BEGIN
```

```
  MB:=MLX; ML:=MLY; MTB:=-MTX; MTL:=-MTY; END; END;
END; CLOSE(FGMAKS); RESET(FDATBAH);
WHILE NOT EOF(FDATBAH) DO BEGIN
WITH RECORDFDBN DO BEGIN READ(FDATBAH,RECORDFDBN);
 IF RECORDFDBN.TIPE=TP THEN BEGIN
   FCB:=FC; FYB:=FY; ESB:=ES; END; END;
END; CLOSE(FDATBAH); RESET(FDI);
WHILE NOT EOF(FDI) DO BEGIN
WITH RECORDFDN DO BEGIN READ(FDI,RECORDFDN);
 IF RECORDFDN.TIPE=TP THEN BEGIN
   LPB:=LP; BPB:=BP; PBB:=PB; HPB:=HP; END; END;
END; CLOSE(FDI); RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL);
FOR I:=1 TO JUM DO BEGIN TERUS:=0;
WITH RECORDFDBT DO BEGIN
SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
IF (RECORDFDBT.TIPE=TP) AND (RECORDFDBT.DP<>0) THEN BEGIN
  DPB:=RECORDFDBT.DP; AD:=0.25*3.14*SQR(DPB); O:=0.8; B1:=0.85;
  RB:=(0.85*FCB*B1)*600/(FYB*(600+FYB)); RMAKS:=0.75*RB;
  RMIN:=1.4/FYB; SMAKS:=5*HPB; IF SMAKS>500 THEN SMAKS:=500;
  IF FYB=300 THEN ASS:=0.0020*1000*HPB; IF FYB=400 THEN ASS:=0.0018*1000*HPB;
  IF FYB>400 THEN BEGIN ASS:=0.0018*1000*HPB*(400/FYB);
   IF ASS>0.0014*1000*HPB THEN ASS:=0.0014*1000*HPB; END;
  DB:=HPB-PBB-0.5*DPB; KB:=MB/(O*1000*SQR(DB));
  RHOB:=(FCB-SQRT(SQR(FCB)-2.36*KB*FCB))/(1.18*FYB);
  IF RHOB>RMAKS THEN TERUS:=1;
  IF RHOB<RMIN THEN RHOB:=RMIN; ASB:=RHOB*1000*DB;
  IF ASB<ASS THEN ASB:=ASS; SB:=TRUNC(AD*1000/ASB/10)*10;
  IF SB>SMAKS THEN SB:=SMAKS;
  IF (TERUS<>1) THEN BEGIN
   IF (SB>SBS) AND (SB>=100) THEN BEGIN
    SBS:=SB; ASBS:=ASB; DPBS:=DPB; END; END;
  DL:=HPB-PBB-DPBS-0.5*DPB; KL:=ML/(O*1000*SQR(DL));
  RHOL:=(FCB-SQRT(SQR(FCB)-2.36*KL*FCB))/(1.18*FYB);
  IF RHOL>RMAKS THEN TERUS:=1; IF RHOL<RMIN THEN RHOL:=RMIN;
  ASL:=RHOL*1000*DL; IF ASL<ASS THEN ASL:=ASS;
  SL:=TRUNC(AD*1000/ASL/10)*10; IF SL>SMAKS THEN SL:=SMAKS;
  IF (TERUS<>1) THEN BEGIN
   IF (SL>SLS) AND (SL>=100) THEN BEGIN
    SLS:=SL; ASLS:=ASL; DPLS:=DPB; END; END;
  DTB:=HPB-PBB-0.5*DPB; KTB:=MTB/(O*1000*SQR(DTB));
  RHOTB:=(FCB-SQRT(SQR(FCB)-2.36*KTB*FCB))/(1.18*FYB);
  IF RHOTB>RMAKS THEN TERUS:=1; IF RHOTB<RMIN THEN RHOTB:=RMIN;
  ASTB:=RHOTB*1000*DTB; IF ASTB<ASS THEN ASTB:=ASS;
  STB:=TRUNC(AD*1000/ASTB/10)*10; IF STB>SMAKS THEN STB:=SMAKS;
  IF (TERUS<>1) THEN BEGIN
   IF (STB>STBS) AND (STB>=100) THEN BEGIN
    STBS:=STB; ASTBS:=ASTB; DPTBS:=DPB; END; END;
  DTL:=HPB-PBB-0.5*DPB; KTL:=MTL/(O*1000*SQR(DTL));
  RHOTL:=(FCB-SQRT(SQR(FCB)-2.36*KTL*FCB))/(1.18*FYB);
  IF RHOTL>RMAKS THEN TERUS:=1; IF RHOTL<RMIN THEN RHOTL:=RMIN;
  ASTL:=RHOTL*1000*DTL; IF ASTL<ASS THEN ASTL:=ASS;
  STL:=TRUNC(AD*1000/ASTL/10)*10; IF STL>SMAKS THEN STL:=SMAKS;
  IF (TERUS<>1) THEN BEGIN
   IF (STL>STLS) AND (STL>=100) THEN BEGIN
    STLS:=STL; ASTLS:=ASTL; DPTLS:=DPB; END; END; END; END;
END; CLOSE(FBAHTUL); RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL);
FOR I:=1 TO JUM DO BEGIN
WITH RECORDFDBT DO BEGIN
SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
IF (RECORDFDBT.TIPE=TP) AND (RECORDFDBT.DS<>0) THEN BEGIN
  DSB:=RECORDFDBT.DS; AD:=0.25*3.14*SQR(DSB); SS:=TRUNC(AD*1000/ASS/10)*10;
  IF SS>SMAKS THEN SS:=SMAKS;
  IF SS>SSS THEN BEGIN
   DSS:=DSB; SSS:=SS; END; END; END;
END; CLOSE(FBAHTUL);
IF TERUS=1 THEN BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('Tebal Plat "DIPERBESAR".......!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
IF (TERUS<>1) THEN BEGIN
FBK:=NFDA+BLK; ASSIGN(FPLAT,FBK); {$I-} RESET(FPLAT); {$I+}
```

```
IF IORESULT<>0 THEN REWRITE(FPLAT);
NOREC:=-1; JUM:=FILESIZE(FPLAT);
WITH RECORDFPLT DO BEGIN
 IF JUM<>0 THEN BEGIN
  FOR J:=1 TO JUM DO BEGIN
   SEEK(FPLAT,J-1); READ(FPLAT,RECORDFPLT);
   IF TP=RECORDFPLT.TIPE THEN NOREC:=J-1; END;
   IF NOREC=-1 THEN NOREC:=JUM; SEEK(FPLAT,NOREC); END;
   TIPE:=TP; SX:=TRUNC(SBS); DPX:=TRUNC(DPBS); SY:=TRUNC(SLS);
   DPY:=TRUNC(DPLS); STX:=TRUNC(STBS); DPTX:=TRUNC(DPTBS); STY:=TRUNC(STLS);
   DPTY:=TRUNC(DPTLS); S:=TRUNC(SSS); DSU:=TRUNC(DSS); WRITE(FPLAT,RECORDFPLT);
   END; CLOSE(FPLAT); END;
  UNTIL TP=JTIPE;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
  WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
  WRITE('DATA GAYA YG BEKERJA PADA ',EL,' BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA DIMENSI ',EL,
  ' BELUM DIBUAT...!'); WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('JUMLAH TIPE ',EL,
  ' BELUM ADA....!'); WRITE(^G); READKEY; TEXTCOLOR(10); END;
  CLRSCR; TEXTCOLOR(5); GOTOXY(20,10); FOR J:=1 TO 35 DO WRITE(CHAR(176));
  GOTOXY(20,11); WRITE (CHAR(176),' '); FOR J:=1 TO 3 DO WRITE(CHAR(175));
  TEXTCOLOR(4); WRITE(' DISAIN PLAT SELESAI '); TEXTCOLOR(5);
  FOR J:=1 TO 3 DO WRITE(CHAR(174)); WRITE(' ',CHAR(176));
  GOTOXY(20,12); FOR J:=1 TO 35 DO WRITE(CHAR(176));
  GOTOXY(26,13); FOR J:=1 TO 5 DO WRITE(CHAR(3)); TEXTCOLOR(11);
  WRITE(' TEKAN ENTER '); TEXTCOLOR(5); FOR J:=1 TO 5 DO WRITE(CHAR(3));
  TEXTCOLOR(10); WRITE(^G); READLN; CHDIR(DIRAK);
END.


PROGRAM SKETSAPLAT;
uses crt,graph,printer;
TYPE
  FDMN = RECORD
          TIPE : INTEGER;
          LP   : INTEGER;
          BP   : INTEGER;
          PB   : INTEGER;
          HP   : INTEGER;
          ARAH : INTEGER;
        END;
  FBLK = RECORD
          TIPE : INTEGER;
          SX   : INTEGER;
          DPX  : INTEGER;
          SY   : INTEGER;
          DPY  : INTEGER;
          STX  : INTEGER;
          DPTX : INTEGER;
          STY  : INTEGER;
          DPTY : INTEGER;
          S    : INTEGER;
          DSU  : INTEGER;
        END;
```

```
Var
    FTIPE                          : TEXT;
    FDIM                           : FILE OF FDMN;
    FBALOK                         : FILE OF FBLK;
    RECORDFDMN                     : FDMN;
    RECORDFBLK                     : FBLK;
    NFDA,EL                        : STRING[7];
    FTIP,FDM,FBK                   : STRING[12];
    FTP,BDD,BLK,DIRAK,DIREK,S1,D1,S3,D3,S4,D4,S5,D5,TB,O,P  : STRING;
    JTIPE,tp,i,J,a,b,c,drivergrafik,
    modegrafik,Z,X,Y,NTTA,DPTTA,DSB,PBB,BB,
    HB,SS,NTTB,DPTTB,NMAKS,D,DPTLA,DPTLB,ARAHB,
    NTLA,NTLB,DL,NL,E,BARA,BARB,T,L,S,SBTX,SBTY,SBX,SBY    : INTEGER;
    TULIS                          : STRING[9];

begin
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); FTP:=PARAMSTR(3); BDD:=PARAMSTR(4);
BLK:=PARAMSTR(5); GETDIR(0,DIRAK); CHDIR(DIREK); drivergrafik := detect;
IF (DIRAK='A:\') OR (DIRAK='C:\') OR (DIRAK='B:\') OR (DIRAK='D:\') OR
(DIRAK='E:\') THEN initgraph(drivergrafik, modegrafik,DIRAK+'LOGO') ELSE
initgraph(drivergrafik, modegrafik,DIRAK+'\LOGO');
FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN READ(FTIPE,JTIPE); CLOSE(FTIPE);
FBK:=NFDA+BLK; ASSIGN(FBALOK,FBK); {$I-} RESET(FBALOK); {$I+}
IF IORESULT=0 THEN BEGIN CLOSE(FBALOK);
FDM:=NFDA+BDD; ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
IF IORESULT=0 THEN BEGIN CLOSE(FDIM); TP:=0;
REPEAT
TP:=TP+1; RESET(FDIM); cleardevice; setfillstyle(1,15); Y:=0; S:=0;
floodfill(300,200,14); setteXTstyle(SMALLfont,horizdir,4); Z:=0;
WHILE NOT EOF(FDIM) DO BEGIN
WITH RECORDFDMN DO BEGIN READ(FDIM,RECORDFDMN);
IF RECORDFDMN.TIPE=TP THEN BEGIN BB:=TRUNC(BP); HB:=TRUNC(LP); T:=TRUNC(HP);
PBB:=TRUNC(PB); ARAHB:=ARAH; END; END; END; CLOSE(FDIM); RESET(FBALOK);
WHILE NOT EOF(FBALOK) DO BEGIN WITH RECORDFBLK DO BEGIN READ(FBALOK,RECORDFBLK);
IF RECORDFBLK.TIPE=TP THEN BEGIN SBTX:=STX; DPTTA:=DPTX; SBTY:=STY;
DPTTB:=DPTY; SBX:=SX; DPTLA:=DPX; SBY:=SY; DPTLB:=DPY;
DSB:=DSU; SS:=S; END; END; END; CLOSE(FBALOK);
FOR I:=0 TO 1 DO BEGIN
IF I=0 THEN BEGIN L:=HB; S:=SBX; STR(SBTY,S5); STR(DPTTB,D5); END
ELSE BEGIN L:=BB; S:=SBY; STR(SBTX,S5); STR(DPTTA,D5); END;
STR((I+1)*SBX,S1); STR(DPTLA,D1); STR(TRUNC(2/(I+1))*SBY,S3); STR(DPTLB,D3); STR(SS,S4); STR(DSB,D4);
STR(T,TB); STR(TP,O); STR(L,P);
Z:=0; IF (I=0) THEN Z:=1;
SETLINESTYLE(0,0,1); setteXTstyle(SMALLfont,horizdir,4); SETCOLOR(0);
MOVETO(30+I*25,50+I*180); LINEREL(550-I*50,0);
MOVETO(30+I*25,110+I*180); LINEREL(550-I*50,0);
MOVETO(25+I*25,150+I*180); LINEREL(560-I*50,0);
MOVETO(30+I*25,148+I*180); LINEREL(0,5);
MOVETO(580-I*25,148+I*180); LINEREL(0,5);
OUTTEXTXY(285,I*180+138,P+' mm');
MOVETO(590-I*25,45+I*180); LINEREL(0,70);
MOVETO(588-I*25,50+I*180); LINEREL(5,0);
MOVETO(588-I*25,110+I*180); LINEREL(5,0);
OUTTEXTXY(592-I*25,I*180+70,TB+' mm');
SETLINESTYLE(1,0,1);
MOVETO(30+I*25,45+I*180); LINEREL(0,70);
MOVETO(580-I*25,45+I*180); LINEREL(0,70);
SETLINESTYLE(0,0,3);
MOVETO(30+I*25,60+I*180); LINEREL(171-I*25,0);
MOVETO(201,60+I*180); LINEREL(-3,3);
MOVETO(580-I*25,60+I*180); LINEREL(-172+I*25,0);
MOVETO(408,60+I*180); LINEREL(3,3);
MOVETO(30+I*25,100+I*180-Z*4); LINEREL(550-I*50,0);
MOVETO(422,100+I*180-Z*4); LINEREL(-3,-3);
MOVETO(187,100+I*180-Z*4); LINEREL(3,-3);
IF FRAC(L/S)=0 THEN NTLA:=TRUNC(L/S)+1 ELSE NTLA:=TRUNC(L/S)+2;
A:=0; C:=1; D:=1;
IF NTLA>2 THEN BEGIN
```

```
 IF NTLA-2>1 THEN BEGIN
  B:=TRUNC((220)/(NTLA-1));
  FOR J:=1 TO NTLA-2 DO
  BEGIN
   IF A=0 THEN BEGIN
   CIRCLE(195+B*C,96+I*180+Z*4,2);
    A:=1; C:=C+1;
   END
   ELSE BEGIN
    CIRCLE(415-B*D,96+I*180+Z*4,2);
    A:=0; D:=D+1;
   END;
  END;
 END
 ELSE CIRCLE(305,96+I*180+Z*4,2);
 END;
 CIRCLE(195,96+I*180+Z*4,2);
 CIRCLE(415,96+I*180+Z*4,2);
 FOR E:=0 TO 1 DO
 BEGIN
 NTLA:=TRUNC(0.3*L/SS)+1; IF (E=1) AND (I=0) THEN Z:=1 ELSE Z:=0;
 IF NTLA>1 THEN BEGIN
  B:=TRUNC((165-I*25-E*11-NTLA*2)/(NTLA-1));
  FOR J:=1 TO NTLA-1 DO
  BEGIN
   CIRCLE(195-B*J-E*11,64+I*180+E*32+Z*4,2);
   CIRCLE(415+B*J+E*11,64+I*180+E*32+Z*4,2);
  END;
 END;
 CIRCLE(195-E*11,64+I*180+E*32+Z*4,2);
 CIRCLE(415+E*11,64+I*180+E*32+Z*4,2);
 END;
 setteXTstyle(SMALLfont,horizdir,4);
 SETLINESTYLE(0,0,1); MOVETO(305+110*Z,I*180+100); LINEREL(-13,13);
 OUTTEXTXY(275+85*Z,I*180+115,'D'+D1+'-'+S1); MOVETO(415-Z*110,I*180+96); LINEREL(-8,-8);
 OUTTEXTXY(360-Z*110,I*180+80,'D'+D3+'-'+S3); MOVETO(415,I*180+64); LINEREL(-8,8);
 OUTTEXTXY(360,I*180+65,'D'+D4+'-'+S4); MOVETO(195,I*180+64); LINEREL(8,8);
 OUTTEXTXY(212,I*180+65,'D'+D4+'-'+S4); MOVETO(410,I*180+58); LINEREL(13,-13);
 OUTTEXTXY(405,I*180+29,'D'+D5+'-'+S5); MOVETO(200,I*180+58); LINEREL(-13,-13);
 OUTTEXTXY(160,I*180+29,'D'+D5+'-'+S5); MOVETO(185,I*180+100); LINEREL(-13,13-I*26);
 OUTTEXTXY(155,I*140+115,'D'+D4+'-'+S4); setteXTstyle(tripleXfont,horizdir,1);
 outteXTXy(145,380,'SKETSA PENULANGAN PLAT TIPE '+O);
 setteXTstyle(SMALLfont,horizdir,6); IF I=0 THEN
 OUTTEXTXY(150,170,'PENULANGAN PLAT ARAH MEMANJANG') ELSE
 OUTTEXTXY(170,350,'PENULANGAN PLAT ARAH LEBAR');
 setteXTstyle(SMALLfont,horizdir,4);
 SETLINESTYLE(0,0,1); SETCOLOR(1); setteXTstyle(tripleXfont,horizdir,1);
 outteXTXy(516,440,'UII-CDP'); setteXTstyle(SMALLfont,horizdir,4);
 setcolor(4); rectangle(500,440,600,465); setcolor(0);
 END; READKEY; UNTIL TP=JTIPE; END; END;
 END; closegraph; restorecrtmode; CHDIR(DIRAK);
end.


PROGRAM TDPL;
USES CRT;
TYPE
  FDBN = RECORD
      TIPE : INTEGER;
      FC : REAL;
      FY : REAL;
      ES : REAL;
      END;
  FDBT = RECORD
      TIPE : INTEGER;
      N   : INTEGER;
      DP  : INTEGER;
      DS  : INTEGER;
      END;
  FGMS = RECORD
      TIPE : INTEGER;
```

```pascal
        MLX  : REAL;
        MLY  : REAL;
        MTX  : REAL;
        MTY  : REAL;
      END;
    FDMN = RECORD
        TIPE : INTEGER;
        LP   : INTEGER;
        BP   : INTEGER;
        PB   : INTEGER;
        HP   : INTEGER;
        ARAH : INTEGER;
      END;

VAR
  FTIPE                   : TEXT;
  FDATBAH                 : FILE OF FDBN;
  FBAHTUL                 : FILE OF FDBT;
  FGMAKS                  : FILE OF FGMS;
  FDIM                    : FILE OF FDMN;
  RECORDFDBN              : FDBN;
  RECORDFDBT              : FDBT;
  RECORDFGMS              : FGMS;
  RECORDFDMN              : FDMN;
  I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
  NTUL,DPTUL,K,F,A        : Integer;
  NFDA,EL                 : STRING[7];
  FDB,FDT,FGM,FTIP,FDM,FELM          : STRING[12];
  FTP,BBN,BBT,BEL,BGM,BDD,DIRAK,DIREK  : STRING;

BEGIN
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); FTP:=PARAMSTR(4);
BBN:=PARAMSTR(5); BBT:=PARAMSTR(6); BEL:=PARAMSTR(7); BGM:=PARAMSTR(8);
BDD:=PARAMSTR(9); GETDIR(0,DIRAK); CHDIR(DIREK); FDM:=NFDA+BDD;
ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
IF IORESULT=0 THEN BEGIN
 CLOSE(FDIM); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
 IF IORESULT=0 THEN BEGIN
  CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT); {$I-} RESET(FBAHTUL); {$I+}
 IF IORESULT=0 THEN BEGIN
  CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FDATBAH); TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR;
   I:=1; K:=1; F:=1; RESET(FDATBAH);
   WHILE NOT EOF(FDATBAH) DO BEGIN
   SEEK(FDATBAH,F-1); READ(FDATBAH,RECORDFDBN); F:=F+1;
   WITH RECORDFDBN DO BEGIN
   IF (K=1) THEN BEGIN I:=I+6;
    IF I>=22 THEN BEGIN CLRSCR; I:=7; END;
    WRITE('      ',CHAR(218));
    FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(191));
    WRITELN; WRITE('      ',CHAR(179)); TEXTCOLOR(11);
    WRITE('              >>> DATA BAHAN <<<',
    '                '); TEXTCOLOR(10); WRITE(CHAR(179));
    WRITELN; WRITE('      ',CHAR(195));
    FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(180));
    WRITELN; WRITE('      ',CHAR(179),
    ' Tipe Teg. Desak Beton  Teg. Tarik Baja  Mod. ',
    'Elastisitas Baja ',CHAR(179)); WRITELN;
    WRITE('      ',CHAR(179),
    ' Plat    (MPa)         (MPa)          (MPa)',
    '        ',CHAR(179)); WRITELN; WRITE('      ',CHAR(195));
    FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(180));
    WRITELN; END;
    WRITE('      ',CHAR(179),'  ',TIPE:3,'      ',TRUNC(FC):3,
    '         ',TRUNC(FY):3,'            ',TRUNC(ES):6,
    '       ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
   IF (I>=22) OR EOF(FDATBAH) THEN BEGIN
    WRITE('      ',CHAR(192));
    FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(217));
```

```
   READKEY; WRITELN; K:=1; I:=I+1; END;
  IF I>=22 THEN BEGIN I:=1; K:=1; CLRSCR; END; END;
END; CLOSE(FDATBAH); F:=1; RESET (FBAHTUL);
WHILE NOT EOF(FBAHTUL) DO BEGIN
 SEEK(FBAHTUL,F-1); READ(FBAHTUL,RECORDFDBT); F:=F+1;
WITH RECORDFDBT DO BEGIN
 IF (K=1) THEN BEGIN I:=I+6;
  IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
  WRITE('     ',CHAR(218));
  FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(191));
  WRITELN; WRITE('     ',CHAR(179)); TEXTCOLOR(11);
  WRITE('      >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN',
  ' <<<      '); TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
  WRITE('     ',CHAR(195));
  FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; WRITE('     ',CHAR(179),' Tipe No.  Diameter Tulangan',
  ' Pokok  Diameter Tulangan Sengkang ',CHAR(179)); WRITELN;
  WRITE('     ',CHAR(179),' Plat           (mm)',
  '       (mm)        ',CHAR(179));
  WRITELN; WRITE('     ',CHAR(195));
  FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; END;
  WRITE('     ',CHAR(179),' ',TIPE:3,'  ',N:2,
  '       ',DP:2,'         ',DS:2,
  '       ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
 IF (I>=22) OR EOF(FBAHTUL) THEN BEGIN
  WRITE('     ',CHAR(192)); FOR J:=1 TO 65 DO WRITE(CHAR(196));
  WRITE(CHAR(217)); READKEY; WRITELN; K:=1; I:=I+1; END;
 IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
END; CLOSE(FBAHTUL); F:=1; RESET(FDIM);
WHILE NOT EOF(FDIM) DO BEGIN
SEEK(FDIM,F-1); READ(FDIM,RECORDFDMN); F:=F+1;
WITH RECORDFDMN DO BEGIN
 IF K=1 THEN BEGIN I:=I+6;
  IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
  WRITE('     ',CHAR(218));
  FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(191));
  WRITELN; WRITE('     ',CHAR(179)); TEXTCOLOR(11);
  WRITE('        >>> DATA DIMENSI <<<             ');
  TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
  WRITE('     ',CHAR(195));
  FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; WRITE('     ',CHAR(179),
  ' Tipe Panjang Lebar Tebal Penutup Beton Arah ',
  CHAR(179)); WRITELN; WRITE('     ',CHAR(179),
  ' Plat (mm)  (mm)  (mm)    (mm)      Kerja ',
  CHAR(179)); WRITELN; WRITE('     ',CHAR(195));
  FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; END;
  WRITE('     ',CHAR(179),' ',TIPE:3,'  ',LP:5,'  ',BP:5,
  '  ',HP:4,'   ',PB:3,'    ',ARAH,' Arah ',CHAR(179));
  WRITELN; K:=K+1; I:=I+1;
 IF (I>=22) OR EOF(FDIM) THEN BEGIN
  WRITE('     ',CHAR(192)); FOR J:=1 TO 51 DO WRITE(CHAR(196));
  WRITE(CHAR(217)); READKEY; WRITELN; K:=1; I:=I+1; END;
  IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
END; CLOSE(FDIM); F:=1; A:=11; RESET(FGMAKS);
WHILE NOT EOF(FGMAKS) DO BEGIN
SEEK(FGMAKS,F-1); READ(FGMAKS,RECORDFGMS); F:=F+1;
WITH RECORDFGMS DO BEGIN
 IF K=1 THEN BEGIN I:=I+6;
  IF I>=22 THEN BEGIN I:=22; CLRSCR; END;
  WRITE('     ',CHAR(218));
  FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(191));
  WRITELN; WRITE('     ',CHAR(179)); TEXTCOLOR(11);
  WRITE('     >>> DATA GAYA-GAYA MAKSIMUM <<<       ');
  TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
  WRITE('     ',CHAR(195));
  FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; WRITE('     ',CHAR(179),
```

```
                ' Tipe  M Lap. x    M Lap. y    M Tum. x   M Tum. y ',
            CHAR(179)); WRITELN; WRITE('        ',CHAR(179),
            ' Plat  (Nmm)      (Nmm)       (Nmm)      (Nmm) ',
            CHAR(179)); WRITELN; WRITE('        ',CHAR(195));
            FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180)); WRITELN; END;
            WRITE('        '); WRITE(CHAR(179),' ',TIPE:3,'  ',MLX:8,'  ',MLY:8,
            '  ',MTX:9,'  ',MTY:9,' ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
            IF (I>=22) OR EOF(FGMAKS) THEN BEGIN
            WRITE('        ',CHAR(192)); FOR J:=1 TO 51 DO WRITE(CHAR(196));
            WRITE(CHAR(217)); READKEY; WRITELN; K:=1; I:=I+1; END;
            IF (I>=22) THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
          END; CLOSE(FGMAKS);
      END
      ELSE BEGIN
        CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
        WRITE(^G); READKEY; TEXTCOLOR(10); END;
      END
      ELSE BEGIN
        CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
        WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
        WRITE(^G); READKEY; TEXTCOLOR(10); END;
      END
      ELSE BEGIN
        CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
        WRITE('DATA GAYA YG BEKERJA PADA BALOK BELUM DIBUAT...!');
        WRITE(^G); READKEY; TEXTCOLOR(10); END;
      END
      ELSE BEGIN
        CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
        WRITE('DATA DIMENSI BALOK BELUM DIBUAT...!');
        WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
END.


PROGRAM TPL;
USES CRT;
TYPE
   FDAT = RECORD
           NPROY : string[19];
           NFDAT : string[8];
           NaFil : string[12];
           ENG   : string[19];
           END;
   FKLM = RECORD
           TIPE : INTEGER;
           SX   : INTEGER;
           DPX  : INTEGER;
           SY   : INTEGER;
           DPY  : INTEGER;
           STX  : INTEGER;
           DPTX : INTEGER;
           STY  : INTEGER;
           DPTY : INTEGER;
           S    : INTEGER;
           DSU  : INTEGER;
           END;
VAR
   FPLAT     : FILE OF FKLM;
   NFILE     : FILE OF FDAT;
   RECORDFDAT : FDAT;
   RECORDFPLT : FKLM;
   I,J,A,B,C : INTEGER;
   NFDA,EL   : STRING[7];
   FBK       : STRING[12];
   NPRO,EN   : STRING[19];
   BLK,DIRAK,
   DIREK     : STRING;

BEGIN
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); BLK:=PARAMSTR(4);
```

```
GETDIR(0,DIRAK); CHDIR(DIREK); ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
WHILE NOT EOF(NFILE) DO BEGIN READ(NFILE,RECORDFDAT);
 IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
 NPRO:=RECORDFDAT.NPROY; EN :=RECORDFDAT.ENG; END; END;
CLOSE(NFILE); FBK:=NFDA+BLK; ASSIGN(FPLAT,FBK); {$I-} RESET(FPLAT); {$I+}
IF IORESULT=0 THEN BEGIN I:=1;
 WHILE NOT EOF(FPLAT) DO BEGIN
 WITH RECORDFPLT DO BEGIN READ(FPLAT,RECORDFPLT);
 IF I=1 THEN BEGIN
 A:=LENGTH(NPRO); B:=LENGTH(NFDA); C:=LENGTH(EN);
 TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR; GOTOXY(10,1);
 WRITE(CHAR(218)); FOR J:=1 TO 61 DO WRITE(CHAR(196)); WRITE(CHAR(191));
 GOTOXY(10,2); WRITE(CHAR(179)); TEXTCOLOR(11);
 WRITE('            PENULANGAN PLAT                ');
 TEXTCOLOR(10); WRITE(CHAR(179)); GOTOXY(10,3);
 WRITE(CHAR(195)); FOR J:=1 TO 61 DO WRITE(CHAR(196)); WRITE(CHAR(180));
 GOTOXY(10,4); WRITE(CHAR(179),' Proyek   : ',NPRO:A);
 FOR J:=1 TO (19-A) DO WRITE(' '); WRITE('  Nama File Data : ',NFDA:B);
 FOR J:=1 TO (8-B) DO WRITE(' '); WRITE(' ',CHAR(179)); GOTOXY(10,5);
 WRITE(CHAR(179),' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(' ');
 WRITE('                            ',CHAR(179)); GOTOXY(10,6);
 WRITE(CHAR(195)); FOR J:=1 TO 6 DO WRITE(CHAR(196)); WRITE(CHAR(194));
 FOR J:=1 TO 21 DO WRITE(CHAR(196)); WRITE(CHAR(194));
 FOR J:=1 TO 21 DO WRITE(CHAR(196)); WRITE(CHAR(194));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(180));
 GOTOXY(10,7);
 WRITE(CHAR(179),' TIPE ',CHAR(179),'   ARAH MELEBAR   ',CHAR(179),
 '  ARAH MEMANJANG  ',CHAR(179),' TULANGAN ',CHAR(179)); GOTOXY(10,8);
 WRITE(CHAR(179)); FOR J:=1 TO 6 DO WRITE(CHAR(0)); WRITE(CHAR(195));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(194));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(197));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(194));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(180),'  BAGI  ',CHAR(179));
 GOTOXY(10,9); WRITE(CHAR(179),' PLAT ',CHAR(179),' LAPANGAN ',CHAR(179),
 ' TUMPUAN ',CHAR(179),' LAPANGAN ',CHAR(179),' TUMPUAN ',CHAR(179),
 '  SUSUT ',CHAR(179)); GOTOXY(10,10);
 WRITE(CHAR(195)); FOR J:=1 TO 6 DO WRITE(CHAR(196)); WRITE(CHAR(197));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(197));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(197));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(197));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(197));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(180)); END;
 GOTOXY(10,I+10); WRITE(CHAR(179),' ',TIPE:3,' ',CHAR(179),'D',DPX:2,'-',
 SX:3,'mm ',CHAR(179),'D',DPTX:2,'-',STX:3,'mm ',CHAR(179),'D',DPY:2,'-',
 SY:3,'mm ',CHAR(179),'D',DPTY:2,'-',STY:3,'mm ',CHAR(179),'D',DSU:2,
 '-',S:3,'mm ',CHAR(179)); I:=I+1;
 IF (I=15) OR (EOF(FPLAT)) THEN BEGIN
 GOTOXY(10,I+10);
 WRITE(CHAR(192)); FOR J:=1 TO 6 DO WRITE(CHAR(196)); WRITE(CHAR(193));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(193));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(193));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(193));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(193));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(217));
 GOTOXY(10,I+11); TEXTCOLOR(11); WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
 WRITE(^G); READKEY; TEXTCOLOR(10); I:=1; END; END;
 END; CLOSE(FPLAT);
END
ELSE BEGIN
 CLRSCR; TEXTCOLOR(11); GOTOXY(20,5);
 WRITE('    PROSES DISAIN BELUM DILAKUKAN'); GOTOXY(15,7);
 WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
 WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
END.


PROGRAM CBL;
USES CRT,PRINTER;
TYPE
 FDAT = RECORD
```

```pascal
            NPROY : string[19];
            NFDAT : string[8];
            NaFil : string[12];
            ENG   : string[19];
         END;
   FBLK = RECORD
            TIPE   : INTEGER;
            FNTLB  : INTEGER;
            FDPTLB : INTEGER;
            FNTLA  : INTEGER;
            FDPTLA : INTEGER;
            FNTTB  : INTEGER;
            FDPTTB : INTEGER;
            FNTTA  : INTEGER;
            FDPTTA : INTEGER;
            FNTLB1  : INTEGER;
            FDPTLB1 : INTEGER;
            FNTLA1  : INTEGER;
            FDPTLA1 : INTEGER;
            FNTTB1  : INTEGER;
            FDPTTB1 : INTEGER;
            FNTTA1  : INTEGER;
            FDPTTA1 : INTEGER;
            FDSS   : INTEGER;
            FS     : INTEGER;
            FNL    : INTEGER;
            FDL    : INTEGER;
         END;
   VAR
     FBALOK               : FILE OF FBLK;
     NFILE                : FILE OF FDAT;
     RECORDFDAT           : FDAT;
     RECORDFBLK           : FBLK;
     I,JUM,J,BATASATAS,BATASBAWAH,
     BARIS,JUMLAHBARIS,HAL,BATASKIRI,A,
     B,C,D,E              : INTEGER;
     BENAR                : BOOLEAN;
     KERTAS               : BYTE;
     YA                   : CHAR;
     EL                   : STRING[7];
     NFDA                 : STRING[8];
     FBK                  : STRING[12];
     NPRO,EN              : STRING[19];
     BLK,DIRAK,DIREK      : STRING;

BEGIN
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);BLK:=PARAMSTR(4);E:=0;
GETDIR(0,DIRAK); CHDIR(DIREK);
REPEAT
ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
WHILE NOT EOF(NFILE) DO BEGIN READ(NFILE,RECORDFDAT);
IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
NPRO:=RECORDFDAT.NPROY; EN :=RECORDFDAT.ENG; END;
END; CLOSE(NFILE); FBK:=NFDA+BLK; ASSIGN(FBALOK,FBK); {$I-} RESET(FBALOK); {$I+}
IF IORESULT=0 THEN BEGIN
YA:='U'; BATASATAS:=0; BATASBAWAH:=0; BATASKIRI:=0;
WHILE UPCASE(YA)='U' DO BEGIN
TEXTBACKGROUND(0); TEXTCOLOR(10); CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179),' Ukuran Kertas : '); TEXTCOLOR(11); WRITE('1');
TEXTCOLOR(10); WRITE('. Folio '); TEXTCOLOR(11); WRITE('2');
TEXTCOLOR(10); WRITE('. Kuarto '); TEXTCOLOR(11);
WRITE('--> Pilih :  '); TEXTCOLOR(10); WRITE(CHAR(179)); GOTOXY(10,4);
WRITE(CHAR(179),' Batas Atas  :                   ',CHAR(179));
GOTOXY(10,5);
WRITE(CHAR(179),' Batas Bawah :                   ',CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(179),' Batas Kiri  :                 ',CHAR(179));
GOTOXY(10,7); WRITE(CHAR(192)); FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11); GOTOXY(10,9); WRITE(' U : ulang   L : lanjutkan ===> ');
```

```pascal
GOTOXY(29,4); WRITE('Baris'); GOTOXY(29,5); WRITE('Baris');
GOTOXY(29,6); WRITE('Spasi'); GOTOXY(59,3); READLN(KERTAS);
GOTOXY(26,4); READLN(BATASATAS); GOTOXY(26,5); READLN(BATASBAWAH);
GOTOXY(26,6); READLN(BATASKIRI); BENAR:=TRUE;
WHILE BENAR DO BEGIN
 GOTOXY(42,9); YA:=READKEY; WRITE(YA);IF UPCASE(YA)='U' THEN BENAR:=FALSE;
 IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
IF KERTAS=1 THEN JUMLAHBARIS:=63;IF KERTAS=2 THEN JUMLAHBARIS:=57;
BARIS:=JUMLAHBARIS-BATASATAS-BATASBAWAH; I:=1; HAL:=0;
 WHILE NOT EOF(FBALOK) DO BEGIN
 CLRSCR; TEXTCOLOR(11);
 GOTOXY(20,10); WRITE('MENCETAK HASIL DISAIN.......'); TEXTCOLOR(11);
 WRITE(I); TEXTCOLOR(10);
 WITH RECORDFBLK DO BEGIN READ(FBALOK,RECORDFBLK);
 IF E=1 THEN BEGIN
 FNTLB:=FNTLB1; FDPTLB:=FDPTLB1; FNTLA:=FNTLA1; FDPTLA:=FDPTLA1;
 FNTTB:=FNTTB1; FDPTTB:=FDPTTB1; FNTTA:=FNTTA1; FDPTTA:=FDPTTA1;
 END;
 IF I=1 THEN BEGIN
 A:=LENGTH(NPRO); B:=LENGTH(NFDA); C:=LENGTH(EN); D:=LENGTH(EL);
 FOR J:=1 TO BATASATAS DO BEGIN WRITELN(LST); END; HAL:=HAL+1;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(218)); FOR J:=1 TO 59 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(191)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); IF E=0 THEN WRITE(LST,CHAR(179),
 '    UII-CDP PENULANGAN BALOK YG MENDEKATI KEBUTUHAN    ',
 CHAR(179)) ELSE WRITE(LST,CHAR(179),
 '       UII-CDP PENULANGAN BALOK YANG DIGUNAKAN        ',
 CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(195)); FOR J:=1 TO 59 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(180)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' AUTHORITY : UII CIVIL ENGINEERING 1996 DISAIN  : ',
 EL:D); FOR J:=1 TO (7-D) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(179));
 WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(179),' Proyek   : ',NPRO:A);
 FOR J:=1 TO (19-A) DO WRITE(LST,' '); WRITE(LST,'    Halaman   : ',
 HAL:3,'    ',CHAR(179));WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(179),' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(LST,' ');
 WRITE(LST,'    File Data : ',NFDA:B); FOR J:=1 TO (8-B) DO WRITE(LST,' ');
 WRITE(LST,' ',CHAR(179)); WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(195)); FOR J:=1 TO 5 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 8 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 8 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(194)); FOR J:=1 TO 8 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(180)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(179),'TIPE ',CHAR(179),'TUL.LAP',CHAR(179),
     'TUL.LAP ',CHAR(179),'TUL.TUM',CHAR(179),'TUL.TUM ',
     CHAR(179),' TULANGAN ',CHAR(179),'TULANGAN',CHAR(179));
     WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(179),'BALOK',CHAR(179),' BAWAH ',CHAR(179),
     ' ATAS ',CHAR(179),' BAWAH ',CHAR(179),' ATAS ',
     CHAR(179),' SENGKANG ',CHAR(179),' TORSI ',CHAR(179));
     WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(195)); FOR J:=1 TO 5 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(197)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(197)); FOR J:=1 TO 8 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(197)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(197)); FOR J:=1 TO 8 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(197)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(197)); FOR J:=1 TO 8 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(180)); WRITELN(LST);
 IF I=BARIS THEN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); END;
```

```
IF FNL<>0 THEN BEGIN FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' ',TIPE:3,' ',CHAR(179),' ',FNTLB:2,'D',
    FDPTLB:2,' ',CHAR(179),' ',FNTLA:2,'D',FDPTLA:2,' ',
    CHAR(179),' ',FNTTB:2,'D',FDPTTB:2,' ',CHAR(179),' ',
    FNTTA:2,'D',FDPTTA:2,' ',CHAR(179),'D',FDSS:2,'-',FS:3,
    'mm ',CHAR(179),' ',FNL:2,'D',FDL:2,' ',CHAR(179));
    WRITELN(LST); END ELSE BEGIN
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' ',TIPE:3,' ',CHAR(179),' ',FNTLB:2,'D',
    FDPTLB:2,' ',CHAR(179),' ',FNTLA:2,'D',FDPTLA:2,' ',
    CHAR(179),' ',FNTTB:2,'D',FDPTTB:2,' ',CHAR(179),' ',
    FNTTA:2,'D',FDPTTA:2,' ',CHAR(179),'D',FDSS:2,'-',FS:3,
    'mm ',CHAR(179),' ',' - ',' ',CHAR(179));
    WRITELN(LST); END; I:=I+1;
IF (I=BARIS) OR EOF(FBALOK) THEN BEGIN I:=1;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(192)); FOR J:=1 TO 5 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 8 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 8 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 8 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(217)); WRITELN(LST); END; END;
END; CLOSE(FBALOK);
IF E=0 THEN BEGIN CLRSCR; TEXTCOLOR(11); GOTOXY(20,5);
WRITE('   GANTI KERTAS BARU PADA PRINTER'); GOTOXY(15,7);
WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
WRITE(^G); READKEY; TEXTCOLOR(10); END;
END
ELSE BEGIN
    CLRSCR; TEXTCOLOR(11);
    GOTOXY(20,5); WRITE('    PROSES DISAIN BELUM DILAKUKAN');
    GOTOXY(15,7); WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END; E:=E+1;
UNTIL E=2;
CHDIR(DIRAK);
END.


PROGRAM CDBL;
USES CRT,PRINTER;
TYPE
  FDAT = RECORD
        NPROY : string[19];
        NFDAT : string[8];
        NaFil : string[12];
        ENG   : string[19];
        END;
  FDBN = RECORD
        TIPE : INTEGER;
        FC : REAL;
        FY : REAL;
        ES : REAL;
        END;
  FDBT = RECORD
        TIPE : INTEGER;
        N    : INTEGER;
        DP   : INTEGER;
        DS   : INTEGER;
        END;
  FGMS = RECORD
        TIPE  : INTEGER;
        MUlap : REAL;
        MUtum : REAL;
        VU    : REAL;
        TU    : REAL;
        END;
  FDMN = RECORD
        TIPE : INTEGER;
```
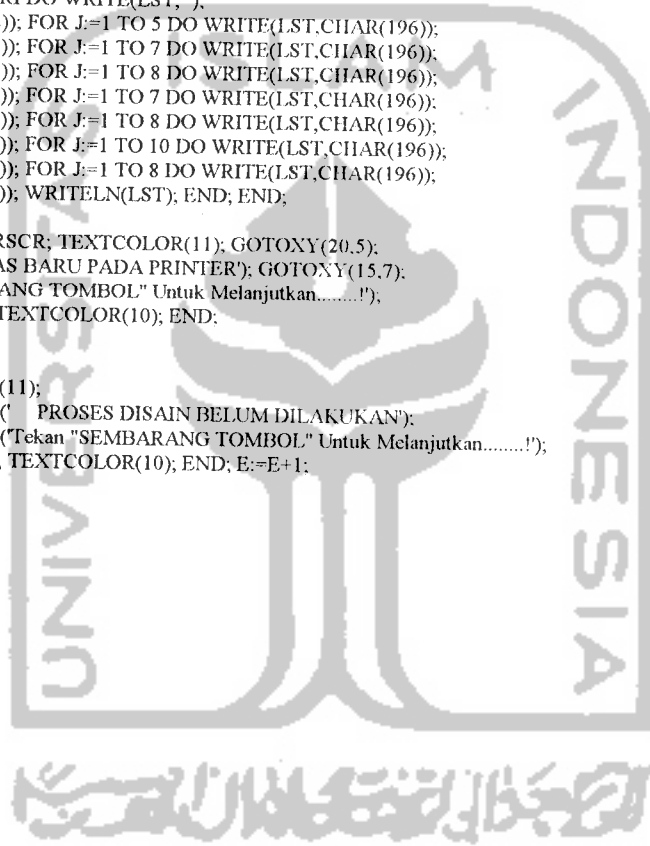
```pascal
            L   : REAL;
            B   : REAL;
            H   : REAL;
            PB  : REAL;
          END;
      FELN = RECORD
            TIPE : INTEGER;
            NO  : INTEGER;
            ELE : INTEGER;
          END;

   VAR
      FTIPE                    : TEXT;
      FDATBAH                  : FILE OF FDBN;
      FBAHTUL                  : FILE OF FDBT;
      FGMAKS                   : FILE OF FGMS;
      FDIM                     : FILE OF FDMN;
      FELE                     : FILE OF FELN;
      NFILE                    : FILE OF FDAT;
      RECORDFDAT               : FDAT;
      RECORDFELN               : FELN;
      RECORDFDBN               : FDBN;
      RECORDFDBT               : FDBT;
      RECORDFGMS               : FGMS;
      RECORDFDMN               : FDMN;
      I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
      NTUL,DPTUL,K,F,HAL,BATASATAS,
      BATASBAWAH,BATASKIRI,JUMLAHBARIS,BARIS,
      KERTAS,A,B,C,D            : Integer;
      YA                       : CHAR;
      BENAR                    : BOOLEAN;
      EL                       : STRING[7];
      NFDA                     : STRING[8];
      FDB,FDT,FGM,FTIP,FDM,FELM : STRING[12];
      NPRO,EN                  : STRING[19];
      FTP,BBN,BBT,BEL,BGM,BDD,DIRAK,DIREK : STRING;

   PROCEDURE JUDUL;
   BEGIN
      ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
      WHILE NOT EOF(NFILE) DO BEGIN
      READ(NFILE,RECORDFDAT);
      IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
       NPRO:=RECORDFDAT.NPROY; EN:=RECORDFDAT.ENG; END;
      END; CLOSE(NFILE); HAL:=HAL+1; A:=LENGTH(NPRO); B:=LENGTH(NFDA);
      C:=LENGTH(EN); D:=LENGTH(EL);
      FOR J:=1 TO BATASATAS DO WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(201));
      FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(187));
      WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
      '      UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON          ',
      CHAR(186)); WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(204));
      FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(185));
      WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
      ' AUTHORITY : UII CIVIL ENGINEERING 1996    DATA    : ',
      EL:D); FOR J:=1 TO (7-D) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(186));
      WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
      ' Proyek   : ',NPRO:A); FOR J:=1 TO (19-A) DO WRITE(LST,' ');
      WRITE(LST,'        Halaman   : ',HAL:3,
      '    ',CHAR(186)); WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
      ' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(LST,' ');
      WRITE(LST,'      File Data : ',NFDA:B);
      FOR J:=1 TO (8-B) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(186)); WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(200));
      FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(188));
      WRITELN(LST); I:=7;
```

```
END;

BEGIN
 DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);BBN:=PARAMSTR(5);
 BBT:=PARAMSTR(6); BEL:=PARAMSTR(7); BGM:=PARAMSTR(8); BDD:=PARAMSTR(9);
 GETDIR(0,DIRAK); CHDIR(DIREK); FDM:=NFDA+BDD; ASSIGN(FDIM,FDM);
 {$I-} RESET(FDIM); {$I+}
 IF IORESULT=0 THEN BEGIN
  CLOSE(FDIM); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM);
  {$I-} RESET(FGMAKS); {$I+}
  IF IORESULT=0 THEN BEGIN
  CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT);
  {$I-} RESET(FBAHTUL); {$I+}
  IF IORESULT=0 THEN BEGIN
  CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB);
  {$I-} RESET(FDATBAH); {$I+}
  IF IORESULT=0 THEN BEGIN
  CLOSE(FDATBAH); FELM:=NFDA+BEL; ASSIGN(FELE,FELM);
  {$I-} RESET(FELE); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FELE); YA:='U'; HAL:=0; BATASATAS:=0; BATASBAWAH:=0;
   BATASKIRI:=0;
   WHILE UPCASE(YA)='U' DO BEGIN
   TEXTBACKGROUND(0); TEXTCOLOR(10); CLRSCR;
   GOTOXY(10,2); WRITE(CHAR(218));
   FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(191));
   GOTOXY(10,3);
   WRITE(CHAR(179),' Ukuran Kertas : '); TEXTCOLOR(11); WRITE('1');
   TEXTCOLOR(10); WRITE('. Folio '); TEXTCOLOR(11); WRITE('2');
   TEXTCOLOR(10); WRITE('. Kuarto '); TEXTCOLOR(11);
   WRITE('--> Pilih :   '); TEXTCOLOR(10); WRITE(CHAR(179));
   GOTOXY(10,4);
   WRITE(CHAR(179),' Batas Atas  :               ',
   '      ',CHAR(179));
   GOTOXY(10,5);
   WRITE(CHAR(179),' Batas Bawah :               ',
   '      ',CHAR(179));
   GOTOXY(10,6);
   WRITE(CHAR(179),' Batas Kiri  :               ',
   '      ',CHAR(179));
   GOTOXY(10,7);
   WRITE(CHAR(192)); FOR I:=1 TO 50 DO WRITE(CHAR(196));
   WRITE(CHAR(217)); TEXTCOLOR(11);
   GOTOXY(10,9); WRITE(' U : ulang   L : lanjutkan ===> ');
   GOTOXY(29,4); WRITE('Baris'); GOTOXY(29,5); WRITE('Baris');
   GOTOXY(29,6); WRITE('Spasi'); GOTOXY(59,3); READLN(KERTAS);
   GOTOXY(26,4); READLN(BATASATAS); GOTOXY(26,5); READLN(BATASBAWAH);
   GOTOXY(26,6); READLN(BATASKIRI); BENAR:=TRUE;
   WHILE BENAR DO BEGIN
   GOTOXY(42,9); YA:=READKEY; WRITE(YA);
   IF UPCASE(YA)='U' THEN BENAR:=FALSE;
   IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
   IF KERTAS=1 THEN JUMLAHBARIS:=71; IF KERTAS=2 THEN JUMLAHBARIS:=65;
   BARIS:=JUMLAHBARIS-BATASATAS-BATASBAWAH; HAL:=0; K:=1;
   F:=1; JUDUL; RESET(FDATBAH);
   WHILE NOT EOF(FDATBAH) DO BEGIN
   SEEK(FDATBAH,F-1); READ(FDATBAH,RECORDFDBN); F:=F+1;
   WITH RECORDFDBN DO BEGIN
   IF (K=1) THEN BEGIN
   IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
   IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
   FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
   FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
   WRITELN(LST);
   FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
   '             >>> DATA BAHAN <<<                ',CHAR(179));
   WRITELN(LST);
   FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
   FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
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 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' Tipe Teg. Desak Beton  Teg. Tarik Baja Mod. ',
 'Elastisitas Baja ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' Balok    (MPa)        (MPa)         (MPa)',
 '         ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST); END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 '',TIPE:3,'      ',TRUNC(FC):3,'            ',
 TRUNC(FY):3,'           ', TRUNC(ES):6,'     ',
 CHAR(179)); WRITELN(LST); K:=K+1; I:=I+1;
 IF (I>=BARIS) OR EOF(FDATBAH) THEN BEGIN
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
  FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
  WRITELN(LST); K:=1; I:=I+1; END;
 IF I>=BARIS THEN BEGIN
  K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FDATBAH); F:=1; RESET (FBAHTUL);
WHILE NOT EOF(FBAHTUL) DO BEGIN
SEEK(FBAHTUL,F-1); READ(FBAHTUL,RECORDFDBT); F:=F+1;
WITH RECORDFDBT DO BEGIN
IF (K=1) THEN BEGIN
 IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
 IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
 FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),'      >>> DIAMETER',
 ' TULANGAN YANG AKAN DIGUNAKAN <<<        ',CHAR(179));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' Tipe No. Diameter Tulangan Pokok  Diameter Tulangan',
 ' Sengkang ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' Balok          (mm)              (mm)',
 '         ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST); END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 '',TIPE:3,'   ',N:2,'          ',DP:2,
 '              ',DS:2,'            ',CHAR(179));
 WRITELN(LST); K:=K+1; I:=I+1;
 IF (I>=BARIS) OR EOF(FBAHTUL) THEN BEGIN
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
  FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
  WRITELN(LST); K:=1; I:=I+1; END;
 IF I>=BARIS THEN BEGIN
  K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FBAHTUL); F:=1; RESET(FELE);
WHILE NOT EOF(FELE) DO BEGIN
SEEK(FELE,F-1); READ(FELE,RECORDFELN); F:=F+1;
WITH RECORDFELN DO BEGIN
IF K=1 THEN BEGIN
 IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+5;
 IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
 FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' >>> DATA ELEMEN ',EL:7,' <<< ',CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST);
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FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Tipe    No.    Elemen ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST); END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),' ',
TIPE:3,'    ',NO:2,'    ',ELE:3,' ',CHAR(179));
WRITELN(LST); K:=K+1; I:=I+1;
IF (I>=BARIS) OR EOF(FELE) THEN BEGIN
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
WRITELN(LST); K:=1; I:=I+1; END;
IF I>=BARIS THEN BEGIN
K:=1;  FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FELE); F:=1; RESET(FDIM);
WHILE NOT EOF(FDIM) DO BEGIN
SEEK(FDIM,F-1); READ(FDIM,RECORDFDMN); F:=F+1;
WITH RECORDFDMN DO BEGIN
IF K=1 THEN BEGIN
IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),'          >>> DATA',
'DIMENSI <<<          ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Tipe  Bentang Balok  Lebar  Tinggi  Penutup Beton ',
CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Balok    (mm)    (mm)    (mm)     (mm)   ',
CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST); END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' ',TIPE:3,'    ',TRUNC(L):5,'   ',TRUNC(B):4,'   ',
TRUNC(H):4,'     ',TRUNC(PB):3,'    ',CHAR(179));
WRITELN(LST); K:=K+1; I:=I+1;
IF (I>=BARIS) OR EOF(FDIM) THEN BEGIN
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
WRITELN(LST); K:=1; I:=I+1; END;
IF I>=BARIS THEN BEGIN
K:=1;  FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FDIM); F:=1; RESET(FGMAKS);
WHILE NOT EOF(FGMAKS) DO BEGIN
SEEK(FGMAKS,F-1); READ(FGMAKS,RECORDFGMS); F:=F+1;
WITH RECORDFGMS DO BEGIN
IF K=1 THEN BEGIN
IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
'         >>> DATA GAYA-',
'GAYA MAKSIMUM <<<          ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Tipe  M Lapangan   M Tumpuan   Gaya Geser   M Torsi  ',
CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Balok    (Nmm)      (Nmm)       (N)      (Nmm)   ',
CHAR(179)); WRITELN(LST);
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        FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
        FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
        WRITELN(LST); END;
        FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
        WRITE(LST,CHAR(179),' ',TIPE:3,'  ',MUlap:12,'  ',-MUtum:13,
        '  ',VU:10,'  ',TU:12,' ',CHAR(179)); WRITELN(LST); K:=K+1; I:=I+1;
        IF (I>=BARIS) OR EOF(FGMAKS) THEN BEGIN
        FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
        FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
        WRITELN(LST); K:=1; I:=I+1; END;
        IF (I>=BARIS) THEN BEGIN
        K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
        END; CLOSE(FGMAKS);
      END
      ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA ELEMEN BELUM DIBUAT...!'); WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA BAHAN BELUM DIBUAT...!'); WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA GAYA YG BEKERJA PADA BALOK BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11);
      GOTOXY(20,10); WRITE('DATA DIMENSI BALOK BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
    END.


PROGRAM DDBL;
USES CRT;
TYPE
   FELN = RECORD
        TIPE : INTEGER;
        NO   : INTEGER;
        ELE  : INTEGER;
        END;
   FDMN = RECORD
        TIPE : INTEGER;
        L    : REAL;
        B    : REAL;
        H    : REAL;
        PB   : REAL;
        END;
   FDMC = RECORD
        ELEM : INTEGER;
        SEC  : REAL;
        AX   : REAL;
        SHE  : REAL;
        MOM  : REAL;
        END;
VAR
   FTIPE                : TEXT;
   FELE                 : FILE OF FELN;
   FDIM                 : FILE OF FDMN;
   FMICRO               : FILE OF FDMC;
   RECORDFELN           : FELN;
   RECORDFDMN           : FDMN;
   RECORDFDMC           : FDMC;
   Elemen,I,JTIPE,JUM,NOREC,TP   : INTEGER;
```

```
 x,LB,BB,HB,PBB          : REAL;
 YA               : CHAR;
 BENAR            : BOOLEAN;
 NFDA,EL          : STRING[7];
 FBC,FELM,FTIP,FDM        : STRING[12];
 FTP,BEL,BDD,DIRAK,DIREK      : STRING;

BEGIN
 DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);
 BEL:=PARAMSTR(5); BDD:=PARAMSTR(6); GETDIR(0,DIRAK); CHDIR(DIREK);
 FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
 IF IORESULT=0 THEN BEGIN
  READ(FTIPE,JTIPE); CLOSE(FTIPE); FELM:=NFDA+BEL; ASSIGN(FELE,FELM);
  {$I-} RESET(FELE); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FELE); TP:=0;
   REPEAT
    TP:=TP+1; X:=0; LB:=0; PBB:=0; BB:=0; HB:=0; ASSIGN(FELE,FELM);
    RESET(FELE);
    WITH RECORDFELN DO BEGIN
     WHILE NOT EOF(FELE) DO BEGIN
      READ(FELE,RECORDFELN); ELEMEN:=RECORDFELN.ELE;
      IF RECORDFELN.TIPE=TP THEN Begin
       FBC:=NFDA+'.DMC'; Assign(FMICRO,FBC); Reset(FMICRO);
       While Not Eof(FMICRO) Do Begin
        WITH RECORDFDMC DO BEGIN
         Read(FMICRO,RECORDFDMC);
         if ELEMEN=Elem Then X:=Sec; END; End;
        if X>LB Then LB:=X; Close(FMICRO); End; END; END;
    CLOSE(FELE); YA:='U';
    WHILE UPCASE(YA)='U' DO BEGIN
     TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR; GOTOXY(10,2);
     WRITE(CHAR(218)); FOR I:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(191));
     GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(13);
     WRITE('         >>> DATA DIMENSI <<<            ');
     TEXTCOLOR(10); WRITE(CHAR(179));
     GOTOXY(10,4); WRITE(CHAR(195)); FOR I:=1 TO 54 DO WRITE(CHAR(196));
     WRITE(CHAR(180));
     GOTOXY(10,5); WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11);
     WRITE(TP:3); WRITE('                  ');
     TEXTCOLOR(10); WRITE(CHAR(179));
     GOTOXY(10,6); WRITE(CHAR(195)); FOR I:=1 TO 54 DO WRITE(CHAR(196));
     WRITE(CHAR(180));
     GOTOXY(10,7);
     WRITE(CHAR(179),' Bentang Balok   Lebar    Tinggi   Penutup ',
     'Beton ',CHAR(179));
     GOTOXY(10,8);
     WRITE(CHAR(179),' (L)--->mm   (b)--->mm  (h)--->mm  (Pb)--->mm',
     ' ',CHAR(179));
     GOTOXY(10,9);
     WRITE(CHAR(195)); FOR I:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(180));
     GOTOXY(10,10);
     WRITE(CHAR(179)); FOR I:=1 TO 54 DO WRITE(CHAR(0)); WRITE(CHAR(179));
     GOTOXY(10,11);
     WRITE(CHAR(192)); FOR I:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(217));
     TEXTCOLOR(11);
     GOTOXY(10,13); WRITE(' U : ulang  L : lanjutkan ===> ');
     GOTOXY(17,10); WRITE(LB:5:2); GOTOXY(31,10); READLN(BB);
     GOTOXY(43,10); READLN(HB); GOTOXY(56,10); READLN(PBB); BENAR:=TRUE;
     WHILE BENAR DO BEGIN
      GOTOXY(42,13); YA:=READKEY;
      WRITE(YA);IF UPCASE(YA)='U' THEN BENAR:=FALSE;
      IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
     FDM:=NFDA+BDD; ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
     IF IORESULT<>0 THEN REWRITE(FDIM); NOREC:=-1; JUM:=FILESIZE(FDIM);
     WITH RECORDFDMN DO BEGIN
      IF JUM<>0 THEN BEGIN
       FOR I:=1 TO JUM DO BEGIN
        SEEK(FDIM,I-1); READ(FDIM,RECORDFDMN);
        IF RECORDFDMN.TIPE=TP THEN NOREC:=I-1; END;
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    IF NOREC=-1 THEN NOREC:=JUM; SEEK(FDIM,NOREC); END;
    TIPE:=TP; L:=LB; B:=BB; H:=HB; PB:=PBB; WRITE(FDIM,RECORDFDMN); END;
    CLOSE(FDIM);
    UNTIL TP=JTIPE;
  END
  ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE(' Data Elemen Belum Ada...........!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END; CHDIR(DIRAK);
END.


PROGRAM GBL;
USES CRT;

TYPE
  FELN = RECORD
          TIPE : INTEGER;
          NO   : INTEGER;
          ELE  : INTEGER;
          END;
  FGMS = RECORD
          TIPE  : INTEGER;
          MUlap : REAL;
          MUtum : REAL;
          VU    : REAL;
          TU    : REAL;
          END;
  FDMC = RECORD
          ELEM : INTEGER;
          SEC  : REAL;
          AX   : REAL;
          SHE  : REAL;
          MOM  : REAL;
          END;

VAR
  FTIPE                : TEXT;
  FELE                 : FILE OF FELN;
  FGMAKS               : FILE OF FGMS;
  FMICRO               : FILE OF FDMC;
  RECORDFELN           : FELN;
  RECORDFGMS           : FGMS;
  RECORDFDMC           : FDMC;
  Elemen,I,JTIPE,JUM,NOREC,TP    : INTEGER;
  MUl,MUt,TUB,VUS,MUla,MUtu,VUB  : REAL;
  YA                   : CHAR;
  BENAR                : BOOLEAN;
  NFDA,EL              : STRING[7];
  FBC,FELM,FGM,FTIP         : STRING[12];
  FTP,BEL,BGM,DIRAK,DIREK       : STRING;

Begin
  DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); FTP:=PARAMSTR(4);
  BEL:=PARAMSTR(5); BGM:=PARAMSTR(6); GETDIR(0,DIRAK); CHDIR(DIREK);
  FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
  IF IORESULT=0 THEN BEGIN
  READ(FTIPE,JTIPE); CLOSE(FTIPE); TP:=0;
  REPEAT
  TP:=TP+1; VUB:=0; VUS:=0; MUl:=0; MUla:=0; MUt:=0; MUtu:=0; YA:='U';
  WHILE UPCASE(YA)='U' DO BEGIN
  TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR;
  GOTOXY(10,9);
  WRITE('Balok Tipe : '); TEXTCOLOR(11); WRITE(TP:3); TEXTCOLOR(10);
  GOTOXY(10,10);
  WRITE('Momen Torsi Yang Terjadi Pada ',EL:7,' ?  (Nmm) : ');
  GOTOXY(10,12); TEXTCOLOR(11); WRITE('U : ulang   L : lanjutkan ===>');
  GOTOXY(59,10); READLN(TUB); BENAR:=TRUE;
  WHILE BENAR DO BEGIN
```

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   GOTOXY(41,12); YA:=READKEY; WRITE(YA);
   IF UPCASE(YA)='U' THEN BENAR:=FALSE;
   IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
 FELM:=NFDA+BEL; ASSIGN(FELE,FELM); {$I-} RESET(FELE); {$I+}
 IF IORESULT=0 THEN BEGIN
  WHILE NOT EOF(FELE) DO Begin
   WITH RECORDFELN DO BEGIN
    READ(FELE,RECORDFELN); ELEMEN:=RECORDFELN.ELE;
    IF TIPE = TP THEN BEGIN
     FBC:=NFDA+'.DMC'; ASSIGN(FMICRO,FBC); Reset(FMICRO);
     While Not Eof(FMICRO) Do Begin
      WITH RECORDFDMC DO BEGIN
       Read(FMICRO,RECORDFDMC);
       IF ELEMEN=Elem THEN BEGIN
        if Mom<0 Then BEGIN if -MOM>MUt Then MUt:=-MOM; END;
        if MOM>MUl Then MUl:=MOM;
        IF ABS(SHE)>VUS THEN VUS:=ABS(SHE); END; END; END;
      IF MUl>MUla THEN MUla:=MUl;
      IF MUt>MUtu THEN MUtu:=MUt;
      IF VUS>VUB THEN VUB:=VUS;
      Close(FMICRO); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
      IF IORESULT<>0 THEN REWRITE(FGMAKS);
      NOREC:=-1; JUM:=FILESIZE(FGMAKS);
      WITH RECORDFGMS DO BEGIN
       IF JUM<>0 THEN BEGIN
       FOR I:=1 TO JUM DO BEGIN
        SEEK(FGMAKS,I-1); READ(FGMAKS,RECORDFGMS);
        IF RECORDFGMS.TIPE=TP THEN NOREC:=I-1; END;
        IF NOREC=-1 THEN NOREC:=JUM; SEEK(FGMAKS,NOREC); END;
        TIPE:=TP; MUlap:=MUla; MUtum:=MUtu; VU:=VUB; TU:=TUB;
        WRITE(FGMAKS,RECORDFGMS);
       END; CLOSE(FGMAKS);
      End; END;
    END; CLOSE(FELE);
   END
  ELSE BEGIN
    CLRSCR; TEXTCOLOR(11);
    GOTOXY(20,10); WRITE(' Data Elemen Balok Belum Ada...........!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
  UNTIL TP=JTIPE;
 END; CHDIR(DIRAK);
END.


PROGRAM PBL;
USES CRT;
TYPE
  FDBN = RECORD
        TIPE : INTEGER;
        FC  : REAL;
        FY  : REAL;
        ES  : REAL;
       END;
  FDBT = RECORD
        TIPE : INTEGER;
        N   : INTEGER;
        DP  : INTEGER;
        DS  : INTEGER;
       END;
  FGMS = RECORD
        TIPE : INTEGER;
        MUlap : REAL;
        MUtum : REAL;
        VU   : REAL;
        TU   : REAL;
       END;
  FDMN = RECORD
        TIPE : INTEGER;
        L   : REAL;
        B   : REAL;
```

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        H    : REAL;
        PB   : REAL;
      END;
   FBLK = RECORD
        TIPE   : INTEGER;
        FNTLB  : INTEGER;
        FDPTLB : INTEGER;
        FNTLA  : INTEGER;
        FDPTLA : INTEGER;
        FNTTB  : INTEGER;
        FDPTTB : INTEGER;
        FNTTA  : INTEGER;
        FDPTTA : INTEGER;
        FNTLB1 : INTEGER;
        FDPTLB1 : INTEGER;
        FNTLA1 : INTEGER;
        FDPTLA1 : INTEGER;
        FNTTB1 : INTEGER;
        FDPTTB1 : INTEGER;
        FNTTA1 : INTEGER;
        FDPTTA1 : INTEGER;
        FDSS   : INTEGER;
        FS     : INTEGER;
        FNL    : INTEGER;
        FDL    : INTEGER;
      END;
VAR
  FTIPE                  : TEXT;
  FDATBAH                : FILE OF FDBN;
  FBAHTUL                : FILE OF FDBT;
  FGMAKS                 : FILE OF FGMS;
  FDIM                   : FILE OF FDMN;
  FBALOK                 : FILE OF FBLK;
  RECORDFDBN             : FDBN;
  RECORDFDBT             : FDBT;
  RECORDFGMS             : FGMS;
  RECORDFDMN             : FDMN;
  RECORDFBLK             : FBLK;
  I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
  NTUL,DPTUL,X,H                : Integer;
  MUl,MUt,TUB,LB,FCB,FYB,ESB,BB,HB,
  PBB,O,OS,B1,D,RB,RMAKS,W,KMAKS,MRMAKS,
  R,K,MR1,AS1,MR2,DA,ND2,A,C,ESA,EY,FSA,
  ASAL,AS2,ASL,ASAT,AST,DPTLB,NTLB,
  DPTLA,NTLA,DPTTA,NTTA,DPTTB,NTTB,
  VC,VSP,M,VS,V,SMAKS,AV,SS,S,DSS,
  CT,TC,TN,TS,VN,AVS,X1,Y1,ALPA,ATS,
  AVT,PENAM,ABAI,AL,AT,AR,AD,PEM,
  NL,DL,VUB,ATUL,ADP,ATULS,ATULR,NTULS,
  ALX,NLX,ALY,DLX           : REAL;
  NFDA,EL                : STRING[7];
  FDB,FDT,FGM,FTIP,FDM,FBK        : STRING[12];
  FTP,BBN,BBT,BGM,BDD,BLK,DIRAK,DIREK  : STRING;

PROCEDURE PILIHTULANGAN;
BEGIN
  FDT:=NFDA+BBT; ASSIGN(FBAHTUL,FDT); RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL);
  FOR I:=1 TO JUM DO BEGIN SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
    IF (RECORDFDBT.TIPE=TP) AND (RECORDFDBT.DP<>0) THEN BEGIN
      ADP:=0.25*3.14*SQR(RECORDFDBT.DP);
      IF ATULR<>0 THEN BEGIN
        NTULS:=ATULR/ADP; IF (FRAC(NTULS)>0) THEN NTULS:=TRUNC(NTULS)+1;
        IF (FRAC(NTULS)=0) THEN NTULS:=TRUNC(NTULS); ATULS:=ADP*NTULS;
        IF I=1 THEN BEGIN ATUL:=ATULS; DPTUL:=RECORDFDBT.DP; NTUL:=TRUNC(NTULS); END;
        IF (ATULS<ATUL) AND (ATULS>=ATULR) THEN BEGIN
           ATUL:=ATULS; DPTUL:=RECORDFDBT.DP; NTUL:=TRUNC(NTULS); END;
        IF (ATULS=ATUL) AND (ATULS>=ATULR) THEN BEGIN
          IF RECORDFDBT.DP<DPTUL THEN BEGIN
          DPTUL:=RECORDFDBT.DP; NTUL:=TRUNC(NTULS); END; END; END
      ELSE BEGIN
```

```
            IF I=1 THEN DPTUL:=RECORDFDBT.DP;
            IF RECORDFDBT.DP<DPTUL THEN DPTUL:=RECORDFDBT.DP;
            NTUL:=2; ATUL:=NTUL*ADP; END; END;
     END; CLOSE(FBAHTUL);
END;


BEGIN
  DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);BBN:=PARAMSTR(5);
  BBT:=PARAMSTR(6); BGM:=PARAMSTR(7); BDD:=PARAMSTR(8); BLK:=PARAMSTR(9);
  GETDIR(0,DIRAK); CHDIR(DIREK); FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
  IF IORESULT=0 THEN BEGIN
  READ(FTIPE,JTIPE); CLOSE(FTIPE); FDM:=NFDA+BDD; ASSIGN(FDIM,FDM);
  {$I-} RESET(FDIM); {$I+}
  IF IORESULT=0 THEN BEGIN
  CLOSE(FDIM); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
  IF IORESULT=0 THEN BEGIN
  CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT); {$I-} RESET(FBAHTUL); {$I+}
  IF IORESULT=0 THEN BEGIN
  CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
  IF IORESULT=0 THEN BEGIN CLOSE(FDATBAH); TP:=0;
  REPEAT
  TEXTBACKGROUND(0); CLRSCR; ABAI:=0; PENAM:=0; NTLB:=0; DPTLB:=0;
  NTLA:=0; DPTLA:=0; NTTB:=0; DPTTB:=0; NTTA:=0; DPTTA:=0; NL:=0;
  DL:=0; PEM:=0; ASL:=0; AST:=0; ASAL:=0; ASAT:=0; NLX:=0;
  DSS:=0; S:=0; SS:=0; DPMAKS:=0; DSMAKS:=0;
  FOR I:=1 TO 1000 DO BEGIN
    TEXTCOLOR(5); GOTOXY(20,10); FOR J:=1 TO 35 DO WRITE(CHAR(176));
    GOTOXY(20,11); WRITE (CHAR(176),' '); FOR J:=1 TO 3 DO WRITE(CHAR(175));
    TEXTCOLOR(11); WRITE(' PROSES  DISAIN  BALOK '); TEXTCOLOR(5);
    FOR J:=1 TO 3 DO WRITE(CHAR(174)); WRITE(' ',CHAR(176));
    GOTOXY(20,12); FOR J:=1 TO 35 DO WRITE(CHAR(176)); TEXTCOLOR(10); END;
  TP:=TP+1; RESET(FGMAKS);
  WHILE NOT EOF(FGMAKS) DO BEGIN
   WITH RECORDFGMS DO BEGIN READ(FGMAKS,RECORDFGMS);
   IF RECORDFGMS.TIPE=TP THEN BEGIN
    MUI:=RECORDFGMS.MUlap; MUt:=RECORDFGMS.MUtum; VUB:=RECORDFGMS.VU;
    TUB:=RECORDFGMS.TU; END; END; END; CLOSE(FGMAKS); RESET(FDATBAH);
  WHILE NOT EOF(FDATBAH) DO BEGIN
   WITH RECORDFDBN DO BEGIN READ(FDATBAH,RECORDFDBN);
   IF RECORDFDBN.TIPE=TP THEN BEGIN
    FCB:=RECORDFDBN.FC; FYB:=RECORDFDBN.FY; ESB:=RECORDFDBN.ES; END; END;
  END; CLOSE(FDATBAH); RESET(FDIM);
  WHILE NOT EOF(FDIM) DO BEGIN
   WITH RECORDFDMN DO BEGIN READ(FDIM,RECORDFDMN);
   IF RECORDFDMN.TIPE=TP THEN BEGIN
    LB:=RECORDFDMN.L; BB:=RECORDFDMN.B; HB:=RECORDFDMN.H;
    PBB:=RECORDFDMN.PB; END; END; END;
  CLOSE(FDIM); O:=0.8; B1:=0.85; RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL);
  FOR I:=1 TO JUM DO BEGIN
   WITH RECORDFDBT DO BEGIN SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
   IF TIPE=TP THEN BEGIN
    IF (DP>DPMAKS) AND (DP<>0) THEN DPMAKS:=DP;
    IF (DS>DSMAKS) AND (DS<>0) THEN DSMAKS:=DS; END; END;
  END; CLOSE(FBAHTUL);
  D:=HB-PBB-0.5*DPMAKS-DSMAKS; RB:=(0.85*FCB*B1)*600/(FYB*(600+FYB));
  RMAKS:=0.75*RB; W:=RMAKS*FYB/FCB; KMAKS:=FCB*W*(1-0.59*W);
  MRMAKS:=O*BB*SQR(D)*KMAKS;
  IF MRMAKS<MUI THEN BEGIN
  CLRSCR; GOTOXY(20,10);
  WRITELN('PERENCANAAN BALOK BERTULANGAN RANGKAP.....OK !'); READKEY;
  R:=0.90*RMAKS; W:=R*FYB/FCB; K:=FCB*W*(1-0.59*W); MR1:=O*BB*SQR(D)*K;
  AS1:=R*BB*D; MR2:=MUI-MR1; DA:=PBB+0.5*DPMAKS+DSMAKS;
  ND2:=MR2/(O*(D-DA)); A:=AS1*FYB/((0.85*FCB)*BB); C:=A/B1;
  ESA:=(C-DA)*0.003/C; EY:=FYB/ESB;
  IF ESA>=EY THEN FSA:=FYB; IF ESA<EY THEN FSA:=ESA*ESB;
  ASAL:=ND2/FSA; AS2:=ASAL*FSA; ASL:=AS1+AS2; END;
  IF MRMAKS>=MUI THEN BEGIN
  CLRSCR; GOTOXY(20,10);
  WRITELN('PERENCANAAN BALOK BERTULANGAN SEBELAH.....OK !'); READKEY;
  K:=MUI/(O*BB*SQR(D)); R:=(FCB-(SQRT(SQR(FCB)-2.36*K*FCB)))/(1.18*FYB);
```

```
 IF R<1.4/FYB THEN R:=1.4/FYB; ASL:=R*BB*D; END;
IF MRMAKS<MUt THEN BEGIN
 R:=0.90*RMAKS; W:=R*FYB/FCB; K:=FCB*W*(1-0.59*W); MR1:=O*BB*SQR(D)*K;
 AS1:=R*BB*D; MR2:=MUt-MR1; DA:=PBB+0.5*DPMAKS+DSMAKS; ND2:=MR2/(O*(D-DA));
 A:=AS1*FYB/(0.85*FCB*BB); C:=A/B1; ESA:=(C-DA)*0.003/C; EY:=FYB/ESB;
 IF ESA>=EY THEN FSA:=FYB; IF ESA<EY THEN FSA:=ESA*ESB;
 ASAT:=ND2/FSA; AS2:=ASAT*FSA; AST:=AS1+AS2; END;
IF MRMAKS>=MUt THEN BEGIN K:=MUt/(O*BB*SQR(D));
 R:=(FCB-(SQRT(SQR(FCB)-2.36*K*FCB)))/(1.18*FYB);
 IF R<1.4/FYB THEN R:=1.4/FYB; AST:=R*BB*D; END;
ATULR:=ASL; PILIHTULANGAN; DPTLB:=DPTUL; IF NTUL=1 THEN NTUL:=2; NTLB:=NTUL;
ATULR:=ASAL; PILIHTULANGAN; DPTLA:=DPTUL; IF NTUL=1 THEN NTUL:=2; NTLA:=NTUL;
ATULR:=AST; PILIHTULANGAN; DPTTA:=DPTUL; IF NTUL=1 THEN NTUL:=2; NTTA:=NTUL;
ATULR:=ASAT; PILIHTULANGAN; DPTTB:=DPTUL; IF NTUL=1 THEN NTUL:=2; NTTB:=NTUL;
OS:=0.6; IF TUB>OS*(SQRT(FCB)*SQR(BB)*HB)/24 THEN BEGIN
CT:=BB*D/(SQR(BB)*HB);
TC:=(SQRT(FCB)*SQR(BB)*HB/15)/(SQRT(1+SQR((0.4*VUB)/(CT*TUB))));
IF TUB>OS*TC THEN
BEGIN
 TN:=TUB/OS; TS:=TN-TC;
 IF (TS>SQRT(FYB)/3*SQR(BB)*HB/3-TC) THEN TS:=SQRT(FYB)/3*SQR(BB)*HB/3-TC;
 IF TS<=4*TC THEN
BEGIN
 RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL);
 WHILE NOT EOF(FBAHTUL) DO
 BEGIN
 WITH RECORDFDBT DO
 BEGIN
  READ(FBAHTUL,RECORDFDBT);
  IF (TIPE=TP) AND (DS<>0) THEN
  BEGIN
  VC:=(SQRT(FCB)*BB*D/6)/(SQRT(1+SQR(2.5*CT*TUB/VUB)));
  VN:=VUB/OS; VS:=VN-VC; AVS:=VS/(FYB*D); X1:=BB-2*(PBB+0.5*DS);
  Y1:=HB-2*(PBB+0.5*DS); ALPA:=(2+Y1/X1)/3;
  ATS:=TS/(ALPA*X1*Y1*FYB); AVT:=2*ATS+AVS;
  AST:=2*0.25*3.14*SQR(DS); SS:=AST/AVT;
  SMAKS:=(X1+Y1)/4; IF SMAKS>3*AST*FYB/BB THEN SMAKS:=3*AST*FYB/BB;
  IF SS>SMAKS THEN SS:=SMAKS;
  IF (SS>S) AND (SS>=25) THEN
  BEGIN
   S:=SS; DSS:=RECORDFDBT.DS;
  END;
  END;
  END;
  END;
 CLOSE(FBAHTUL);
 IF S=0 THEN PEM:=1;
END
 ELSE PENAM:=1;
END
 ELSE ABAI:=1;
END
ELSE ABAI:=1;
IF ABAI=1 THEN
BEGIN
VC:=SQRT(FCB)*BB*D/6;
IF (VUB>OS*VC/2) THEN
BEGIN
VSP:=(VUB/OS)-VC; VS:=VSP; V:=SQRT(FCB)*BB*D/3;
IF VS>=V THEN
BEGIN
SMAKS:=D/4;
IF SMAKS>300 THEN SMAKS:=300;
END
ELSE
BEGIN
SMAKS:=D/2;
IF SMAKS>600 THEN SMAKS:=600;
END;
RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL);
```

```
FOR I:=1 TO JUM DO
BEGIN
 WITH RECORDFDBT DO
 BEGIN
  SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
  IF (TIPE=TP) AND (DS<>0) THEN
  BEGIN
   AV:=2*0.25*3.14*SQR(DS); SS:=AV*FYB*D/VS;
   IF SMAKS>3*AV*FYB/BB THEN SMAKS:=3*AV*FYB/BB;
   IF SS>SMAKS THEN SS:=SMAKS;
   IF (SS>S) and (SS>=25) THEN
   BEGIN
    S:=SS; DSS:=RECORDFDBT.DS;
   END;
   END;
   END;
 END; CLOSE(FBAHTUL);
END
ELSE
BEGIN
 RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL); X:=1;
 FOR I:=1 TO JUM DO
 BEGIN
  WITH RECORDFDBT DO
  BEGIN
   SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
   IF (RECORDFDBT.TIPE=TP) AND (RECORDFDBT.DS<>0) THEN
   BEGIN
    IF X=1 THEN DSS:=RECORDFDBT.DS;
    IF RECORDFDBT.DS<DSS THEN DSS:=RECORDFDBT.DS; X:=X+1;
   END;
   END;
  END; CLOSE(FBAHTUL); S:=300;
 END;
END;
IF (ABAI<>1) AND (PEM<>1) THEN
BEGIN
X1:=BB-2*(PBB+0.5*DSS); Y1:=HB-2*(PBB+0.5*DSS); ALPA:=(2+Y1/X1)/3;
ATS:=TS/(ALPA*X1*Y1*FYB); AL:=ATS*(X1+Y1); AT:=ATS*S;
IF (AT>=BB*S/(3*FYB)) THEN AR:=AT;
IF (AT<BB*S/(3*FYB)) THEN AR:=BB*S/(3*FYB);
IF AL<(2.8*HB*S*TUB/(FYB*(TUB+VUB/(3*CT)))-2*AR)*(X1+Y1)/S THEN
 AL:=(2.8*HB*S*TUB/(FYB*(TUB+VUB/(3*CT)))-2*AR)*(X1+Y1)/S;
ALX:=0; ALY:=NTTA*(0.25*3.14*SQR(DPTTA))+NTTB*(0.25*3.14*SQR(DPTTB));
IF ALY<NTLA*(0.25*3.14*SQR(DPTLA))+NTLB*(0.25*3.14*SQR(DPTLB)) THEN
ALY:=NTLA*(0.25*3.14*SQR(DPTLA))+NTLB*(0.25*3.14*SQR(DPTLB));
IF AL>ALY THEN ALX:=AL-ALY;
ATULR:=ALX; PILIHTULANGAN; DL:=DPTUL; IF ALX=0 THEN NLX:=0 ELSE NLX:=NTUL;
IF NLX=0 THEN BEGIN
 IF HB-DPTTA-DPTTB-2*PBB-2*DSS>=300 THEN NLX:=1;
END;
END;
IF ABAI=1 THEN BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE('Efek Torsi Balok ',TP,' Boleh "DIABAIKAN"...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
IF PENAM=1 THEN BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE('Ukuran Penampang Balok ',TP,' Harus "DIPERBESAR"...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
IF PEM=1 THEN BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE('Sengkang Tipe ',TP,' Tidak Ada Yg "MEMADAI"...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
FBK:=NFDA+BLK; ASSIGN(FBALOK,FBK); {$I-} RESET(FBALOK); {$I+}
IF IORESULT<>0 THEN REWRITE(FBALOK); NOREC:=-1; JUM:=FILESIZE(FBALOK);
WITH RECORDFBLK DO BEGIN
IF JUM<>0 THEN BEGIN
FOR J:=1 TO JUM DO BEGIN SEEK(FBALOK,J-1); READ(FBALOK,RECORDFBLK);
 IF TP=RECORDFBLK.TIPE THEN NOREC:=J-1; END;
```

```
     IF NOREC=-1 THEN NOREC:=JUM; SEEK(FBALOK,NOREC); END;
     S:=TRUNC(S/10)*10;
     TIPE:=TP; FNTLB:=TRUNC(NTLB); FDPTLB:=TRUNC(DPTLB); FNTLA:=TRUNC(NTLA);
     FDPTLA:=TRUNC(DPTLA); FNTTB:=TRUNC(NTTB); FDPTTB:=TRUNC(DPTTB);
     FNTTA:=TRUNC(NTTA); FDPTTA:=TRUNC(DPTTA); FDSS:=TRUNC(DSS);
     FS:=TRUNC(S); FNL:=TRUNC(NLX); FDL:=TRUNC(DL); H:=0;
     IF DPTTA<DPTLB THEN BEGIN DLX:=DPTTA; H:=1; END ELSE DLX:=DPTLB;
     IF (H<>1) AND (DPTTA<>DPTLB) THEN NTTA:=TRUNC(SQR(DPTTA/DLX)*NTTA)+1;
     IF NTTA<2 THEN NTTA:=2; IF (H=1) AND (DPTTA<>DPTLB) THEN
     NTLB:=TRUNC(SQR(DPTLB/DLX)*NTLB)+1;
     IF NTLB<2 THEN NTLB:=2; IF DPTTB<>DLX THEN NTTB:=TRUNC(SQR(DPTTB/DLX)*NTTB)+1;
     IF NTTB<2 THEN NTTB:=2; IF DPTLA<>DLX THEN NTLA:=TRUNC(SQR(DPTLA/DLX)*NTLA)+1;
     IF NTLA<2 THEN NTLA:=2; DPTTB:=DLX; DPTLA:=DLX;
     IF (H=1) AND (DPTTA<>DPTLB) THEN DPTLB:=DLX ELSE DPTTA:=DLX;
     FNTLB1:=TRUNC(NTLB); FDPTLB1:=TRUNC(DPTLB); FNTLA1:=TRUNC(NTLA);
     FDPTLA1:=TRUNC(DPTLA); FNTTB1:=TRUNC(NTTB); FDPTTB1:=TRUNC(DPTTB);
     FNTTA1:=TRUNC(NTTA); FDPTTA1:=TRUNC(DPTTA); WRITE(FBALOK,RECORDFBLK);
     END; CLOSE(FBALOK);
    UNTIL TP=JTIPE;
  END
  ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE('DATA GAYA YG BEKERJA PADA BALOK BELUM DIBUAT...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE('DATA DIMENSI BALOK BELUM DIBUAT...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE('JUMLAH TIPE BALOK BELUM ADA....!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
  CLRSCR; TEXTCOLOR(5); GOTOXY(20,10); FOR J:=1 TO 36 DO WRITE(CHAR(176));
  GOTOXY(20,11); WRITE (CHAR(176),' '); FOR J:=1 TO 3 DO WRITE(CHAR(175));
  TEXTCOLOR(4); WRITE(' DISAIN BALOK SELESAI '); TEXTCOLOR(5);
  FOR J:=1 TO 3 DO WRITE(CHAR(174)); WRITE(' ',CHAR(176));
  GOTOXY(20,12); FOR J:=1 TO 36 DO WRITE(CHAR(176));
  GOTOXY(26,13); FOR J:=1 TO 5 DO WRITE(CHAR(3)); TEXTCOLOR(11);
  WRITE(' TEKAN ENTER '); TEXTCOLOR(5); FOR J:=1 TO 5 DO WRITE(CHAR(3));
  TEXTCOLOR(10); WRITE(^G); READLN; CHDIR(DIRAK);
END.
PROGRAM SKETSABALOK;
uses CRT,DOS,PRINTER,graph;
TYPE
  FDMN = RECORD
      TIPE : INTEGER; L : REAL; B : REAL; H : REAL; PB : REAL; END;
  FBLK = RECORD
      TIPE  : INTEGER;FNTLB : INTEGER;FDPTLB : INTEGER;FNTLA : INTEGER;
      FDPTLA : INTEGER;FNTTB : INTEGER;FDPTTB : INTEGER;FNTTA : INTEGER;
      FDPTTA : INTEGER;FNTLB1 : INTEGER;FDPTLB1 : INTEGER;FNTLA1 : INTEGER;
      FDPTLA1 : INTEGER;FNTTB1 : INTEGER;FDPTTB1 : INTEGER;FNTTA1 : INTEGER;
      FDPTTA1 : INTEGER;FDSS : INTEGER;FS : INTEGER;FNL : INTEGER;FDL : INTEGER; END;
Var
  FTIPE : TEXT; FDIM  : FILE OF FDMN; FBALOK : FILE OF FBLK;
  RECORDFDMN : FDMN; RECORDFBLK : FBLK; NFDA,EL : STRING[7]; FTIP,FDM,FBK : STRING[12];
  FTP,BDD,BLK,DIRAK,DIREK,F,G,H,K,L,M,N,O : STRING;
  JTIPE,tp,i,J,a,b,c,drivergrafik,modegrafik,Z,X,Y,NTTA,DPTTA,DSB,PBB,BB,
  HB,SS,NTTB,DPTTB,NMAKS,D,DPTLA,DPTLB,NTLA,NTLB,DL,NLX,E,BARA,BARB,S : INTEGER;
  TULIS : STRING[9];
```

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begin DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); FTP:=PARAMSTR(3); BDD:=PARAMSTR(4);
BLK:=PARAMSTR(5); DIRAK:=PARAMSTR(6); drivergrafik := detect; IF (DIRAK='A:\') OR (DIRAK='C:\') OR
(DIRAK='B:\') OR
(DIRAK='D:\') OR (DIRAK='E:\') THEN initgraph(drivergrafik,modegrafik,DIRAK+'LOGO')ELSE initgraph(drivergrafik,
modegrafik,DIRAK+'\LOGO');CHDIR(DIREK); FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-}
RESET(FTIPE); {$I+}IF IORESULT=0 THEN BEGIN READ(FTIPE,JTIPE); CLOSE(FTIPE);FBK:=NFDA+BLK;
ASSIGN(FBALOK,FBK); {$I-}
RESET(FBALOK); {$I+}IF IORESULT=0 THEN BEGIN CLOSE(FBALOK);FDM:=NFDA+BDD; ASSIGN(FDIM,FDM);
{$I-} RESET(FDIM); {$I+}
IF IORESULT=0 THEN BEGIN CLOSE(FDIM);TP:=0;REPEAT TP:=TP+1; RESET(FDIM); cleardevice; setfillstyle(1,15);
Y:=0; S:=0;
floodfill(300,200,14); setteXTstyle(SMALLfont,horizdir,4); Z:=0;
WHILE NOT EOF(FDIM) DO BEGIN  WITH RECORDFDMN DO BEGIN READ(FDIM,RECORDFDMN);
IF RECORDFDMN.TIPE=TP THEN BEGIN BB:=TRUNC(B); HB:=TRUNC(H);PBB:=TRUNC(PB); END; END; END;
CLOSE(FDIM); RESET(FBALOK);
WHILE NOT EOF(FBALOK) DO BEGIN WITH RECORDFBLK DO BEGIN READ(FBALOK,RECORDFBLK);
IF RECORDFBLK.TIPE=TP THEN BEGIN NTTA:=FNTTA1; DPTTA:=FDPTTA1; NTTB:=FNTTB1;
DPTTB:=FDPTTB1; NTLA:=FNTLA1; DPTLA:=FDPTLA1; NTLB:=FNTLB1; DPTLB:=FDPTLB1;
DSB:=FDSS; SS:=FS; DL:=FDL; NL:=FNL; END; END; END; CLOSE(FBALOK);FOR I:=0 TO 1 DO BEGIN IF I=1 THEN
BEGIN
DPTTA:=DPTLA; NTTA:=NTLA; DPTTB:=DPTLB; NTTB:=NTLB; END; BARA:=1; BARB:=1;STR(HB,F); F:=F+' mm';
STR(BB,G); G:=G+' mm';
STR(PBB,H); H:=H+' mm';STR(DSB,K); K:='D'+K+'-'; STR(SS,L); K:=K+L;STR(DPTTA,L); L:='D'+L;STR(NTTA,M);
L:=M+L; STR(DPTTB,M);
M:='D'+M; STR(NTTB,N); M:=N+M;STR(DL,N);N:='D'+N;
STR(2*NL,O);N:=O+N;STR(TP,O);SETCOLOR(0);SETLINESTYLE(0,0,1);

rectangle(110+I*280,30,190+I*280,130);MOVETO(60+I*280,20);LINEREL(0,120);MOVETO(55+I*280,30);LINEREL(10,0);

MOVETO(55+I*280,130);LINEREL(10,0);OUTTEXTXY(15+I*280,76,F);MOVETO(100+I*280,165);LINEREL(100,0);MO
VETO(110+I*280,160);

LINEREL(0,10);MOVETO(190+I*280,160);LINEREL(0,10);OUTTEXTXY(135+I*280,151,G);MOVETO(195+I*280,150);LI
NEREL(-20,0);
MOVETO(190+I*280,148); LINEREL(0,5); MOVETO(180+I*280,148);LINEREL(0,5);OUTTEXTXY(175+I*280,135,H);
MOVETO(200+I*280,135);
LINEREL(0,-20);MOVETO(197+I*280,130); LINEREL(5,0);
MOVETO(197+I*280,120);LINEREL(5,0);OUTTEXTXY(205+I*280,120,H);
SETLINESTYLE(0,0,3);MOVETO(122+I*280,40); LINEREL(56,0); MOVETO(180+I*280,42);
LINEREL(0,76);MOVETO(122+I*280,120); LINEREL(56,0); MOVETO(120+I*280,42);LINEREL(0,76);
SETLINESTYLE(0,0,3);
ELLIPSE(122+I*280,42,90,180,2,2);ELLIPSE(178+I*280,42,0,90,2,2); ELLIPSE(122+I*280,118,180,270,2,2);

ELLIPSE(178+I*280,118,270,0,2,2);ELLIPSE(176+I*280,44,0,360,2,2);ELLIPSE(176+I*280,116,0,360,2,2);SETLINESTYL
E(0,0,1);
MOVETO(176+I*280,44);LINEREL(10,10); MOVETO(176+I*280,116);LINEREL(10,-10); NMAKS:=TRUNC((BB-2*PBB-
2*DSB+25)/(25+DPTTA));
IF (NTTA>2) THEN BEGIN IF NMAKS>1 THEN BEGIN IF NTTA<=NMAKS THEN BEGIN B:=TRUNC((80-20-
2*NTTA)/(NTTA-1));
IF FRAC(NTTA/2)>0 THEN BEGIN A:=0; C:=1; D:=1; FOR J:=1 TO NTTA-3 DO BEGIN IF A=0 THEN BEGIN
SETLINESTYLE(0,0,3); ELLIPSE(124+I*280+B*C,44,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,44);
LINEREL(10,10);
A:=1; C:=C+1; END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-B*D+I*280,44,0,360,2,2);
SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,44); LINEREL(10,10);A:=0; D:=D+1; END; END;
SETLINESTYLE(0,0,3);
ELLIPSE(150+I*280,44,0,360,2,2);ELLIPSE(176+I*280,44,0,360,2,2); ELLIPSE(124+I*280,44,0,360,2,2);
SETLINESTYLE(0,0,1);
MOVETO(124+I*280,44); LINEREL(10,10); LINEREL(130,0); OUTTEXTXY(234+I*280,42,L);
MOVETO(176+I*280,44); LINEREL(10,10); MOVETO(150+I*280,44); LINEREL(10,10);
END ELSE BEGIN A:=0; C:=1; D:=1; FOR J:=1 TO NTTA-2 DO BEGIN IF A=0 THEN BEGIN
SETLINESTYLE(0,0,3); ELLIPSE(124+I*280+B*C,44,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,44);
LINEREL(10,10);
A:=1; C:=C+1; END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-B*D+I*280,44,0,360,2,2);
SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,44); LINEREL(10,10);A:=0; D:=D+1; END; END;
SETLINESTYLE(0,0,3);
ELLIPSE(176+I*280,44,0,360,2,2); ELLIPSE(124+I*280,44,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(124+I*280,44);LINEREL(10,10);
LINEREL(130,0);OUTTEXTXY(234+I*280,42,L); MOVETO(176+I*280,44); LINEREL(10,10); END; END
ELSE BEGIN IF NTTA-NMAKS<=NMAKS THEN BEGIN B:=TRUNC((80-20-2*NMAKS)/(NMAKS-1)); BARA:=2;
IF FRAC(NMAKS/2)>0 THEN BEGIN A:=0; C:=1; D:=1; FOR J:=1 TO NMAKS-3 DO BEGIN IF A=0 THEN BEGIN
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 SETLINESTYLE(0,0,3); ELLIPSE(124+I*280+B*C,44,0,360,2,2); SETLINESTYLE(0,0,1);MOVETO(124+I*280+B*C,44);
LINEREL(17,17);
 A:=1; C:=C+1; END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-
B*D+I*280,44,0,360,2,2);SETLINESTYLE(0,0,1);
 MOVETO(176-B*D+I*280,44); LINEREL(17,17);A:=0; D:=D+1; END; END; SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,44,0,360,2,2);
 ELLIPSE(176+I*280,44,0,360,2,2);ELLIPSE(150+I*280,44,0,360,2,2); SETLINESTYLE(0,0,1); MOVETO(124+I*280,44);
LINEREL(17,17);
 MOVETO(176+I*280,44); LINEREL(17,17); SETLINESTYLE(0,0,1); MOVETO(150+I*280,44);LINEREL(17,17); END
ELSE BEGIN A:=0; C:=1;
 D:=1;FOR J:=1 TO NMAKS-2 DO BEGIN IF A=0 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280+B*C,44,0,360,2,2);
 SETLINESTYLE(0,0,1);MOVETO(124+I*280+B*C,44); LINEREL(17,17);A:=1; C:=C+1; END ELSE BEGIN
SETLINESTYLE(0,0,3);
 ELLIPSE(176-B*D+I*280,44,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,44); LINEREL(17,17);A:=0;
D:=D+1; END; END;
 SETLINESTYLE(0,0,3);ELLIPSE(124+I*280,44,0,360,2,2);ELLIPSE(176+I*280,44,0,360,2,2);
 SETLINESTYLE(0,0,1);MOVETO(124+I*280,44);
 LINEREL(17,17);MOVETO(176+I*280,44); LINEREL(17,17); END; IF FRAC((NTTA-NMAKS)/2)>0 THEN BEGIN  A:=0;
C:=1; D:=1;
 IF NTTA-NMAKS=1 THEN BEGIN SETLINESTYLE(0,0,3); ELLIPSE(150+I*280,51,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(150+I*280,51);
 LINEREL(10,10);MOVETO(141+I*280,61); LINEREL(130,0);OUTTEXTXY(234+I*280,49,L); END ELSE BEGIN FOR
J:=1 TO (NTTA-NMAKS-3) DO
 BEGIN IF A=0 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280+B*C,51,0,360,2,2);SETLINESTYLE(0,0,1);MOVETO(124+I*280+B*C,51);
 LINEREL(10,10);A:=1; C:=C+1; END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-B*D+I*280,51,0,360,2,2);
 SETLINESTYLE(0,0,1);MOVETO(176-B*D+I*280,51);LINEREL(10,10);A:=0; D:=D+1; END;
END;SETLINESTYLE(0,0,3);

ELLIPSE(124+I*280,51,0,360,2,2);ELLIPSE(176+I*280,51,0,360,2,2);ELLIPSE(150+I*280,51,0,360,2,2);SETLINESTYLE(0
,0,1);
 MOVETO(124+I*280,51); LINEREL(10,10);LINEREL(130,0); OUTTEXTXY(234+I*280,49,L); MOVETO(176+I*280,51);
LINEREL(10,10);
 MOVETO(150+I*280,51); LINEREL(10,10); END; END ELSE BEGIN A:=0; C:=1; D:=1;
 FOR J:=1 TO (NTTA-NMAKS-2) DO BEGIN IF A=0 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280+B*C,51,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,51); LINEREL(10,10);A:=1; C:=C+1; END ELSE BEGIN
SETLINESTYLE(0,0,3);
 ELLIPSE(176-B*D+I*280,51,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,51); LINEREL(10,10);
 A:=0; D:=D+1; END; END;SETLINESTYLE(0,0,3); ELLIPSE(124+I*280,51,0,360,2,2);ELLIPSE(176+I*280,51,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(124+I*280,51); LINEREL(10,10);LINEREL(130,0); OUTTEXTXY(234+I*280,49,L);
MOVETO(176+I*280,51);
 LINEREL(10,10); END; END ELSE BEGIN IF NTTA-2*NMAKS<=NMAKS THEN BEGIN B:=TRUNC((80-20-
2*NMAKS)/(NMAKS-1)); BARA:=3;
 IF FRAC(NMAKS/2)>0 THEN BEGIN A:=0; C:=1; D:=1;FOR J:=1 TO NMAKS-3 DO BEGIN IF A=0 THEN BEGIN
SETLINESTYLE(0,0,3);
 ELLIPSE(124+I*280+B*C,44,0,360,2,2);ELLIPSE(124+I*280+B*C,51,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(124+I*280+B*C,44);
 LINEREL(24,24);MOVETO(124+I*280+B*C,51);LINEREL(17,17);A:=1;C:=C+1;END ELSE BEGIN
SETLINESTYLE(0,0,3);
 ELLIPSE(176-B*D+I*280,44,0,360,2,2);ELLIPSE(176-B*D+I*280,51,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(176-
B*D+I*280,44);
 LINEREL(24,24);MOVETO(176-B*D+I*280,51); LINEREL(17,17);A:=0; D:=D+1; END; END;SETLINESTYLE(0,0,3);
 ELLIPSE(124+I*280,44,0,360,2,2);ELLIPSE(124+I*280,51,0,360,2,2);ELLIPSE(176+I*280,44,0,360,2,2);

ELLIPSE(176+I*280,51,0,360,2,2);ELLIPSE(150+I*280,44,0,360,2,2);ELLIPSE(150+I*280,51,0,360,2,2);SETLINESTYLE(0
,0,1);
 MOVETO(124+I*280,44);
 LINEREL(24,24);MOVETO(124+I*280,51);LINEREL(17,17);MOVETO(176+I*280,44);LINEREL(24,24);
 MOVETO(176+I*280,51); LINEREL(17,17);MOVETO(150+I*280,44); LINEREL(24,24);MOVETO(150+I*280,51);
LINEREL(17,17);
 END ELSE BEGIN  A:=0; C:=1; D:=1;FOR J:=1 TO NMAKS-2 DO BEGIN IF A=0 THEN BEGIN
 SETLINESTYLE(0,0,3); ELLIPSE(124+I*280+B*C,44,0,360,2,2);ELLIPSE(124+I*280+B*C,51,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,44); LINEREL(24,24);MOVETO(124+I*280+B*C,51);
 LINEREL(17,17);A:=1; C:=C+1;
 END ELSE BEGIN SETLINESTYLE(0,0,3);ELLIPSE(176-B*D+I*280,44,0,360,2,2);ELLIPSE(176-
B*D+I*280,51,0,360,2,2);
 SETLINESTYLE(0,0,1);MOVETO(176-B*D+I*280,44); LINEREL(24,24);MOVETO(176-B*D+I*280,51); LINEREL(17,17);
 A:=0; D:=D+1; END; END;
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SETLINESTYLE(0,0,3); ELLIPSE(124+I*280,44,0,360,2,2);ELLIPSE(124+I*280,51,0,360,2,2);
ELLIPSE(176+I*280,44,0,360,2,2);ELLIPSE(176+I*280,51,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280,44);
LINEREL(24,24);
MOVETO(124+I*280,51); LINEREL(17,17);MOVETO(176+I*280,44); LINEREL(24,24);MOVETO(176+I*280,51);
LINEREL(17,17); END;
IF FRAC((NTTA-2*NMAKS)/2)>0 THEN BEGIN A:=0; C:=1; D:=1;IF NTTA-2*NMAKS=1 THEN BEGIN BARA:=2;
SETLINESTYLE(0,0,3);
ELLIPSE(150+I*280,58,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(150+I*280,58); LINEREL(10,10);
MOVETO(141+I*280,68); LINEREL(130,0);OUTTEXTXY(234+I*280,56,L); END ELSE BEGIN
FOR J:=1 TO (NTTA-2*NMAKS-3) DO BEGIN IF A=0 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280+B*C,58,0,360,2,2);
SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,58); LINEREL(10,10);A:=1; C:=C+1; END ELSE BEGIN
SETLINESTYLE(0,0,3);
ELLIPSE(176-B*D+I*280,58,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,58); LINEREL(10,10);
A:=0; D:=D+1; END; END;SETLINESTYLE(0,0,3); ELLIPSE(124+I*280,58,0,360,2,2);ELLIPSE(176+I*280,58,0,360,2,2);
ELLIPSE(150+I*280,58,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280,58); LINEREL(10,10);LINEREL(130,0);
OUTTEXTXY(234+I*280,56,L);MOVETO(176+I*280,58); LINEREL(10,10);MOVETO(150+I*280,58); LINEREL(10,10);
END; END ELSE BEGIN A:=0;
C:=1; D:=1;FOR J:=1 TO (NTTA-2*NMAKS-2) DO BEGIN IF A=0 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280+B*C,58,0,360,2,2);
SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,58); LINEREL(10,10);A:=1; C:=C+1; END ELSE BEGIN
SETLINESTYLE(0,0,3);
ELLIPSE(176-B*D+I*280,58,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,58); LINEREL(10,10);

A:=0;D:=D+1;END;END;SETLINESTYLE(0,0,3);ELLIPSE(124+I*280,58,0,360,2,2);ELLIPSE(176+I*280,58,0,360,2,2);SET
LINESTYLE(0,0,1);
MOVETO(124+I*280,58); LINEREL(10,10);LINEREL(130,0);OUTTEXTXY(234+I*280,56,L);MOVETO(176+I*280,58);
LINEREL(10,10); END; END
ELSE Y:=1; END; END; END ELSE Z:=1; END ELSE BEGIN IF NMAKS>1 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,44,0,360,2,2);
SETLINESTYLE(0,0,1); MOVETO(124+I*280,44); LINEREL(10,10);LINEREL(130,0);OUTTEXTXY(234+I*280,42,L);
END ELSE Z:=1; END;
NMAKS:=TRUNC((BB-2*PBB-2*DSB+25)/(25+DPTTB));IF NTTB>2 THEN BEGIN IF NMAKS>1 THEN BEGIN IF
NTTB<=NMAKS THEN BEGIN
B:=TRUNC((80-20-2*NTTB)/(NTTB-1)); IF FRAC(NTTB/2)=0 THEN BEGIN A:=0; C:=1; D:=1;FOR J:=1 TO NTTB-3 DO
BEGIN IF A=0 THEN BEGIN
SETLINESTYLE(0,0,3); ELLIPSE(124+I*280+B*C,116,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(124+I*280+B*C,116); LINEREL(10,-10);
A:=1; C:=C+1; END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-
B*D+I*280,116,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(176-B*D+I*280,116); LINEREL(10,-10);A:=0; D:=D+1; END; END;SETLINESTYLE(0,0,3);
ELLIPSE(150+I*280,116,0,360,2,2);
ELLIPSE(124+I*280,116,0,360,2,2);ELLIPSE(176+I*280,116,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(124+I*280,116); LINEREL(10,-10);
LINEREL(130,0); OUTTEXTXY(234+I*280,94,M);MOVETO(176+I*280,116); LINEREL(10,-
10);MOVETO(150+I*280,116); LINEREL(10,-10); END
ELSE BEGIN A:=0; C:=1; D:=1;FOR J:=1 TO NTTB-2 DO BEGIN IF A=0 THEN BEGIN
SETLINESTYLE(0,0,3);ELLIPSE(124+I*280+B*C,116,0,360,
2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,116); LINEREL(10,-10);A:=1; C:=C+1; END ELSE BEGIN
SETLINESTYLE(0,0,3);
ELLIPSE(176-B*D+I*280,116,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,116); LINEREL(10,-10);
A:=0; D:=D+1; END; END;SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,116,0,360,2,2);ELLIPSE(176+I*280,116,0,360,2,2);
SETLINESTYLE(0,0,1); MOVETO(124+I*280,116); LINEREL(10,-10);
LINEREL(130,0);OUTTEXTXY(234+I*280,94,M);MOVETO(176+I*280,116);
LINEREL(10,-10); END; END ELSE BEGIN IF NTTB-NMAKS<=NMAKS THEN BEGIN B:=TRUNC((80-20-
2*NMAKS)/(NMAKS-1)); BARB:=2;
IF FRAC(NMAKS/2)>0 THEN BEGIN A:=0; C:=1; D:=1; FOR J:=1 TO NMAKS-3 DO BEGIN IF A=0 THEN BEGIN
SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280+B*C,116,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,116); LINEREL(17,-17);
A:=1; C:=C+1; END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-B*D+I*280,116,0,360,2,2);
SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,116); LINEREL(17,-17);A:=0; D:=D+1; END;
END;SETLINESTYLE(0,0,3);

ELLIPSE(124+I*280,116,0,360,2,2);ELLIPSE(176+I*280,116,0,360,2,2);ELLIPSE(150+I*280,116,0,360,2,2);SETLINESTYL
E(0,0,1);
MOVETO(124+I*280,116); LINEREL(17,-17);MOVETO(176+I*280,116); LINEREL(17,-17);MOVETO(150+I*280,116);
LINEREL(17,-17); END
ELSE BEGIN A:=0; C:=1; D:=1;FOR J:=1 TO NMAKS-2 DO BEGIN IF A=0 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280+B*C,116,0,
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360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,116); LINEREL(17,-17);A:=1; C:=C+1; END ELSE BEGIN
SETLINESTYLE(0,0,3);
 ELLIPSE(176-B*D+I*280,116,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,116); LINEREL(17,-17);
 A:=0; D:=D+1; END; END;SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,116,0,360,2,2);ELLIPSE(176+I*280,116,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(124+I*280,116); LINEREL(17,-17);MOVETO(176+I*280,116); LINEREL(17,-17);
END;IF FRAC((NTTB-NMAKS)
 /2)>0 THEN BEGIN A:=0; C:=1; D:=1;IF NTTB-NMAKS=1 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(150+I*280,109,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(150+I*280,109); LINEREL(10,-10);MOVETO(141+I*280,99);
LINEREL(130,0);OUTTEXTXY(234+I*280,87,M);END
 ELSE BEGIN FOR J:=1 TO (NTTB-NMAKS-3) DO BEGIN IF A=0 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280+B*C,109,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,109); LINEREL(10,-10);A:=1; C:=C+1; END ELSE BEGIN
SETLINESTYLE(0,0,3);
 ELLIPSE(176-B*D+I*280,109,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,109); LINEREL(10,-10);
 A:=0; D:=D+1; END; END;SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,109,0,360,2,2);ELLIPSE(176+I*280,109,0,360,2,2);
 ELLIPSE(150+I*280,109,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280,109);
LINEREL(10,-10);LINEREL(130,0);OUTTEXTXY(234+I*280,87,M);MOVETO(176+I*280,109);LINEREL(10,-
10);MOVETO(150+I*280,109);LINEREL
 (10,-10);END; END ELSE BEGIN A:=0; C:=1; D:=1;FOR J:=1 TO (NTTB-NMAKS-2) DO BEGIN IF A=0 THEN BEGIN
SETLINESTYLE(0,0,3); ELLIPSE(124+I*280+B*C,109,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(124+I*280+B*C,109); LINEREL(10,-10);
 A:=1; C:=C+1; END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-
B*D+I*280,109,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*
 280,109);LINEREL(10,-10);A:=0; D:=D+1; END; END;SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,109,0,360,2,2);ELLIPSE(176+I*280,109,0,
 360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280,109); LINEREL(10,-10); LINEREL(130,0);
OUTTEXTXY(234+I*280,87,M);MOVETO(176+I*280,109); LINEREL(10,-10); END; END ELSE BEGIN
IF NTTB-2*NMAKS<=NMAKS THEN BEGIN B:=TRUNC((80-20-2*NMAKS)/(NMAKS-1)); BARB:=3;
IF FRAC(NMAKS/2)>0 THEN BEGIN A:=0; C:=1; D:=1;FOR J:=1 TO NMAKS-3 DO BEGIN IF A=0 THEN BEGIN
SETLINESTYLE(0,0,3); ELLIPSE(124+I*280+B*C,116,0,360,2,2);ELLIPSE(124+I*280+B*C,109,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,116); LINEREL(24,-24);MOVETO(124+I*280+B*C,109);
LINEREL(17,-17);A:=1; C:=C+1;
 END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-B*D+I*280,116,0,360,2,2);ELLIPSE(176-
B*D+I*280,109,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,116); LINEREL(24,-24);MOVETO(176-B*D+I*280,109);
LINEREL(17,-17);A:=0; D:=D+1;
 END; END;SETLINESTYLE(0,0,3); ELLIPSE(124+I*280,116,0,360,2,2);ELLIPSE(124+I*280,109,0,360,2,2);
 ELLIPSE(176+I*280,116,0,360,2,2);ELLIPSE(176+I*280,109,0,360,2,2);ELLIPSE(150+I*280,116,0,360,2,2);
 ELLIPSE(150+I*280,109,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280,116); LINEREL(24,-
24);MOVETO(124+I*280,109);
 LINEREL(17,-17);MOVETO(176+I*280,116);LINEREL(24,-24);MOVETO(176+I*280,109); LINEREL(17,-
17);MOVETO(150+I*280,116);
 LINEREL(24,-24);MOVETO(150+I*280,109); LINEREL(17,-17);END ELSE BEGIN A:=0; C:=1; D:=1;FOR J:=1 TO
NMAKS-2 DO BEGIN
 IF A=0 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280+B*C,116,0,360,2,2);ELLIPSE(124+I*280+B*C,109,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(124+I*280+B*C,116); LINEREL(24,-24);MOVETO(124+I*280+B*C,109);
LINEREL(17,-17);A:=1; C:=C+1;
 END ELSE BEGIN SETLINESTYLE(0,0,3);ELLIPSE(176-B*D+I*280,116,0,360,2,2);ELLIPSE(176-
B*D+I*280,109,0,360,2,2);
 SETLINESTYLE(0,0,1); MOVETO(176-B*D+I*280,116); LINEREL(24,-24); MOVETO(176-B*D+I*280,109);
LINEREL(17,-17);
 A:=0; D:=D+1; END; END; SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,116,0,360,2,2);ELLIPSE(124+I*280,109,0,360,2,2);
 ELLIPSE(176+I*280,116,0,360,2,2);ELLIPSE(176+I*280,109,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(124+I*280,116);LINEREL(24,-24);
 MOVETO(124+I*280,109); LINEREL(17,-17);MOVETO(176+I*280,116); LINEREL(24,-24);MOVETO(176+I*280,109);
LINEREL(17,-17); END;
 IF FRAC((NTTB-2*NMAKS)/2)>0 THEN BEGIN A:=0; C:=1; D:=1;IF NTTB-2*NMAKS=1 THEN BEGIN
SETLINESTYLE(0,0,3); BARB:=2;
 ELLIPSE(150+I*280,102,0,360,2,2); SETLINESTYLE(0,0,1);MOVETO(150+I*280,102); LINEREL(10,-10);
MOVETO(141+I*280,92);
 LINEREL(130,0); OUTTEXTXY(234+I*280,80,M); END ELSE BEGIN FOR J:=1 TO (NTTB-2*NMAKS-3) DO BEGIN IF
A=0 THEN BEGIN
 SETLINESTYLE(0,0,3); ELLIPSE(124+I*280+B*C,102,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(124+I*280+B*C,102); LINEREL(10,-10);

A:=1; C:=C+1; END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-
B*D+I*280,102,0,360,2,2);SETLINESTYLE(0,0,1);MOVETO(176-B*D+I*
280,102);LINEREL(10,-10);A:=0; D:=D+1; END; END; SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,102,0,360,2,2);ELLIPSE(176+I*280,
102,0,360,2,2);ELLIPSE(150+I*280,102,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(124+I*280,102); LINEREL(10,-10);
LINEREL(130,0); OUTTEXTXY(234+I*280,80,M);MOVETO(176+I*280,102); LINEREL(10,-
10);MOVETO(150+I*280,102); LINEREL(10,-10);END;
END ELSE BEGIN A:=0; C:=1; D:=1;FOR J:=1 TO (NTTB-2*NMAKS-2) DO BEGIN IF A=0 THEN BEGIN
SETLINESTYLE(0,0,3); ELLIPSE(124+I*280+B*C,102,0,360,2,2);SETLINESTYLE(0,0,1);
MOVETO(124+I*280+B*C,102); LINEREL(10,-10);
A:=1; C:=C+1; END ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(176-
B*D+I*280,102,0,360,2,2);SETLINESTYLE(0,0,1);MOVETO(176-B*D+I*
280,102); LINEREL(10,-10);A:=0; D:=D+1; END; END; SETLINESTYLE(0,0,3); ELLIPSE(124+I*280,102,0,360,2,2);
ELLIPSE(176+I*280,102,0,360,2,2);SETLINESTYLE(0,0,1);MOVETO(124+I*280,102);LINEREL(10,-
10);LINEREL(130,0);OUTTEXTXY(234+I*
280,80,M);MOVETO(176+I*280,102); LINEREL(10,-10); END; END ELSE Y:=1; END; END; END ELSE Z:=1; END
ELSE BEGIN IF NMAKS>1 THEN BEGIN SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,116,0,360,2,2);SETLINESTYLE(0,0,1);MOVETO(124+I*280,
116); LINEREL(10,-10);LINEREL(130,0); OUTTEXTXY(234+I*280,94,M);END ELSE Z:=1;END;IF NL<>0 THEN BEGIN
IF NL=1 THEN BEGIN
SETLINESTYLE(0,0,3);
ELLIPSE(124+I*280,80,0,360,2,2);ELLIPSE(176+I*280,80,0,360,2,2);SETLINESTYLE(0,0,1);MOVETO(124+I*280,
80); LINEREL(-5,-5);MOVETO(176+I*280,80);LINEREL(-5,-5);LINEREL(-95,0); OUTTEXTXY(78+I*280,63,N);END
ELSE BEGIN
NMAKS:=TRUNC((HB-2*PBB-2*DSB-BARA*DPTTA-BARB*DPTTB-25)/(25+DL));E:=TRUNC((100-20-2*NL-
12)/(NL+1));IF (NMAKS>=1) AND
(NL<=NMAKS) THEN BEGIN IF FRAC(NL/2)>0 THEN BEGIN FOR J:=1 TO TRUNC((NL-1)/2) DO BEGIN
SETLINESTYLE(0,0,3); ELLIPSE(124+I*
280,116-J*E,0,360,2,2);ELLIPSE(124+I*280,44+J*E,0,360,2,2);ELLIPSE(176+I*280,116-J*E,0,360,2,2);
ELLIPSE(176+I*280,44+J*E,
0,360,2,2);SETLINESTYLE(0,0,1);MOVETO(124+I*280,116-J*E); LINEREL(-(80-J*E-44),-(80-J*E-
44));MOVETO(176+I*280,116-J*E);
LINEREL(-(80-J*E-44),-(80-J*E-44));MOVETO(124+I*280,44+J*E);LINEREL(-(80-J*E-44),(80-J*E-
44));MOVETO(176+I*280,44+J*E);
LINEREL(-(80-J*E-44),(80-J*E-
44));END;SETLINESTYLE(0,0,3);ELLIPSE(124+I*280,80,0,360,2,2);ELLIPSE(176+I*280,80,0,360,2,2);
SETLINESTYLE(0,0,1);MOVETO(124+I*280,80);LINEREL(-J*E,0);MOVETO(176+280*I,80); LINEREL(-80-
J*E,0);OUTTEXTXY(88+I*280-J*E,
68,N);END ELSE BEGIN FOR J:=1 TO TRUNC(NL/2) DO BEGIN SETLINESTYLE(0,0,3); ELLIPSE(124+I*280,116-
J*E,0,360,2,2);
ELLIPSE(124+I*280,44+J*E,0,360,2,2);ELLIPSE(176+I*280,116-J*E,0,360,2,2); ELLIPSE(176+I*280,44+J*E,0,360,2,2);
SETLINESTYLE(0,0,1);MOVETO(124+I*280,116-J*E); LINEREL(-(80-J*E-44),-(80-J*E-44));MOVETO(176+I*280,116-
J*E);
LINEREL(-(80-J*E-44),-(80-J*E-44));MOVETO(124+I*280,44+J*E);LINEREL(-(80-J*E-44),(80-J*E-
44));MOVETO(176+I*280,44+J*E);
LINEREL(-(80-J*E-44),(80-J*E-44));END;MOVETO(176+280*I-(80-TRUNC(NL/2)*E-44),80); LINEREL(-77-J*E,0);
OUTTEXTXY(88+I*280-J*E,68,N);END;END ELSE S:=1; END; END;IF Y=0 THEN BEGIN IF NMAKS>1 THEN BEGIN
SETLINESTYLE(0,0,1);
MOVETO(120+I*280,110); LINEREL(-23,23);OUTTEXTXY(80+I*280,135,K);setteXTstyle(tripleXfont,horizdir,1);
outteXTXy(160,310,'SKETSA PENULANGAN BALOK TIPE '+O); IF I=0 THEN BEGIN setteXTstyle(SMALLfont,horizdir,6);
OUTTEXTXY(37,
210,'PENULANGAN DAERAH TUMPUAN');setteXTstyle(SMALLfont,horizdir,4); END ELSE BEGIN
setteXTstyle(SMALLfont,horizdir,6);
OUTTEXTXY(337,210,'PENULANGAN DAERAH LAPANGAN');setteXTstyle(SMALLfont,horizdir,4); END; END; END
ELSE BEGIN

setfillstyle(1,15);bar(111+I*280,31,189+I*280,129);bar(191+I*280,31,291+I*280,115);SETLINESTYLE(0,0,3);MOVETO(122
+I*280,

40);LINEREL(56,0);MOVETO(180+I*280,42);LINEREL(0,76);MOVETO(122+I*280,120);LINEREL(56,0);MOVETO(120+I
*280,42);LINEREL(0,76);

ELLIPSE(122+I*280,42,90,180,2,2);ELLIPSE(178+I*280,42,0,90,2,2);ELLIPSE(122+I*280,118,180,270,2,2);ELLIPSE(178+I
*280,118,
270,0,2,2); setteXTstyle(tripleXfont,horizdir,1);outteXTXy(160,310,'SKETSA PENULANGAN BALOK TIPE '+O); IF I=0
THEN BEGIN
setteXTstyle(SMALLfont,horizdir,4);OUTTEXTXY(46,190,'TULANGAN LEBIH DARI TIGA BARIS
TULANGAN');setteXTstyle(SMALLfont,
horizdir,6);OUTTEXTXY(37,210,'PENULANGAN DAERAH TUMPUAN');setteXTstyle(SMALLfont,horizdir,4); END ELSE
BEGIN

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setteXTstyle(SMALLfont,horizdir,4);OUTTEXTXY(350,190,'TULANGAN LEBIH DARI TIGA BARIS TULANGAN');
setteXTstyle(SMALLfont,horizdir,6);OUTTEXTXY(337,210,'PENULANGAN DAERAH LAPANGAN');
SetteXTstyle(SMALLfont,horizdir,4); END; END; IF (Z=1) OR (S=1) THEN BEGIN
setfillstyle(1,15); bar(111+I*280,31,189+I*280,129);bar(191+I*280,31,291+I*280,115);
SETLINESTYLE(0,0,3);MOVETO(122+I*280,40);LINEREL(56,0);MOVETO(180+I*280,42);
LINEREL(0,76);MOVETO(122+I*280,120);LINEREL(56,0);MOVETO(120+I*280,42);LINEREL(0,76);
ELLIPSE(122+I*280,42,90,180,2,2);ELLIPSE(178+I*280,42,0,90,2,2);ELLIPSE(122+I*280,118,180,270,2,2);
ELLIPSE(178+I*280,118,270,0,2,2); setteXTstyle(tripleXfont,horizdir,1);
outteXTXy(160,310,'SKETSA PENULANGAN BALOK TIPE '+O); IF I=0 THEN BEGIN
setteXTstyle(SMALLfont,horizdir,4); IF Z=1 THEN OUTTEXTXY(55,190,'LEBAR PENAMPANG TIDAK MENCUKUPI ...
!') ELSE
OUTTEXTXY(52,190,'TINGGI PENAMPANG TIDAK MENCUKUPI ... !');setteXTstyle(SMALLfont,horizdir,6);
OUTTEXTXY(37,210,'PENULANGAN DAERAH TUMPUAN');setteXTstyle(SMALLfont,horizdir,4); END ELSE BEGIN
setteXTstyle(SMALLfont,horizdir,4); IF Z=1 THEN OUTTEXTXY(362,190,'LEBAR PENAMPANG TIDAK MENCUKUPI ...
!') ELSE
OUTTEXTXY(359,190,'TINGGI PENAMPANG TIDAK MENCUKUPI ...
!');setteXTstyle(SMALLfont,horizdir,6);OUTTEXTXY(337,210,
'PENULANGAN DAERAH LAPANGAN');SetteXTstyle(SMALLfont,horizdir,4); END; END;SETLINESTYLE(0,0,1);
SETCOLOR(1);
setteXTstyle(tripleXfont,horizdir,1);outteXTXy(516,440,'UII-CDP'); setteXTstyle(SMALLfont,horizdir,4);setcolor(4);
rectangle(500,440,600,465);setcolor(0);END; READKEY; UNTIL
TP=JTIPE;END;END;END;closegraph;restorecrtmode;CHDIR(DIRAK);end.


PROGRAM TBL;
USES CRT,DOS;
TYPE
   FDAT = RECORD
         NPROY : string[19];
         NFDAT : string[8];
         NaFil : string[12];
         ENG   : string[19];
         END;
   FBLK = RECORD
         TIPE  : INTEGER;
         FNTLB : INTEGER;
         FDPTLB : INTEGER;
         FNTLA : INTEGER;
         FDPTLA : INTEGER;
         FNTTB : INTEGER;
         FDPTTB : INTEGER;
         FNTTA : INTEGER;
         FDPTTA : INTEGER;
         FNTLB1 : INTEGER;
         FDPTLB1 : INTEGER;
         FNTLA1 : INTEGER;
         FDPTLA1 : INTEGER;
         FNTTB1 : INTEGER;
         FDPTTB1 : INTEGER;
         FNTTA1 : INTEGER;
         FDPTTA1 : INTEGER;
         FDSS  : INTEGER;
         FS    : INTEGER;
         FNL   : INTEGER;
         FDL   : INTEGER;
         END;
VAR
   FBALOK    : FILE OF FBLK;
   NFILE     : FILE OF FDAT;
   RECORDFDAT : FDAT;
   RECORDFBLK : FBLK;
   I,J,A,B,C,D : INTEGER;
   NFDA,EL    : STRING[7];
   FBK       : STRING[12];
   NPRO,EN    : STRING[19];
   BLK,DIRAK,
   DIREK     : STRING;

BEGIN
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); BLK:=PARAMSTR(4);
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DIRAK:=PARAMSTR(5);  D:=0; CHDIR(DIREK);
REPEAT
  ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
 WHILE NOT EOF(NFILE) DO BEGIN READ(NFILE,RECORDFDAT);
  IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
  NPRO:=RECORDFDAT.NPROY; EN :=RECORDFDAT.ENG; END;
 END; CLOSE(NFILE); FBK:=NFDA+BLK; ASSIGN(FBALOK,FBK); {$I-} RESET(FBALOK); {$I+}
 IF IORESULT=0 THEN BEGIN I:=1;
  WHILE NOT EOF(FBALOK) DO BEGIN
  WITH RECORDFBLK DO BEGIN READ(FBALOK,RECORDFBLK);
   IF D=1 THEN BEGIN
   FNTLB:=FNTLB1; FDPTLB:=FDPTLB1; FNTLA:=FNTLA1; FDPTLA:=FDPTLA1;
   FNTTB:=FNTTB1; FDPTTB:=FDPTTB1; FNTTA:=FNTTA1; FDPTTA:=FDPTTA1;
   END;
   IF I=1 THEN BEGIN
   A:=LENGTH(NPRO); B:=LENGTH(NFDA); C:=LENGTH(EN);
   TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR; GOTOXY(10,1);
   WRITE(CHAR(218)); FOR J:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(191));
   GOTOXY(10,2); WRITE(CHAR(179)); TEXTCOLOR(11); IF D=0 THEN
   WRITE('      PENULANGAN BALOK YANG MENDEKATI KEPERLUAN      ') ELSE
   WRITE('          PENULANGAN BALOK YANG DIGUNAKAN          ');
   TEXTCOLOR(10); WRITE(CHAR(179)); GOTOXY(10,3);
   WRITE(CHAR(195)); FOR J:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
   GOTOXY(10,4);
   WRITE(CHAR(179),' Proyek   : ',NPRO:A); FOR J:=1 TO (19-A) DO WRITE(' ');
   WRITE(' Nama File Data : ',NFDA:B); FOR J:=1 TO (8-B) DO WRITE(' ');
   WRITE(' ',CHAR(179)); GOTOXY(10,5);
   WRITE(CHAR(179),' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(' ');
   WRITE('                 ',CHAR(179)); GOTOXY(10,6);
   WRITE(CHAR(195)); FOR J:=1 TO 5 DO WRITE(CHAR(196)); WRITE(CHAR(194));
   FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(194));
   FOR J:=1 TO 8 DO WRITE(CHAR(196)); WRITE(CHAR(194));
   FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(194));
   FOR J:=1 TO 8 DO WRITE(CHAR(196)); WRITE(CHAR(194));
   FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(194));
   FOR J:=1 TO 8 DO WRITE(CHAR(196)); WRITE(CHAR(180));
   GOTOXY(10,7); WRITE(CHAR(179),'TIPE ',CHAR(179),'TUL.LAP',CHAR(179),'TUL.LAP ',
   CHAR(179),'TUL.TUM',CHAR(179),'TUL.TUM ',CHAR(179),' TULANGAN ',
   CHAR(179),'TULANGAN',CHAR(179)); GOTOXY(10,8);
   WRITE(CHAR(179),'BALOK',CHAR(179),' BAWAH ',CHAR(179),' ATAS ',
   CHAR(179),' BAWAH ',CHAR(179),' ATAS ',CHAR(179),' SENGKANG ',
   CHAR(179),' TORSI ',CHAR(179)); GOTOXY(10,9);
   WRITE(CHAR(195)); FOR J:=1 TO 5 DO WRITE(CHAR(196)); WRITE(CHAR(197));
   FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(197));
   FOR J:=1 TO 8 DO WRITE(CHAR(196)); WRITE(CHAR(197));
   FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(197));
   FOR J:=1 TO 8 DO WRITE(CHAR(196)); WRITE(CHAR(197));
   FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(197));
   FOR J:=1 TO 8 DO WRITE(CHAR(196)); WRITE(CHAR(180)); END;
   IF FNL<>0 THEN BEGIN
   GOTOXY(10,I+9); WRITE(CHAR(179),' ',TIPE:3,' ',CHAR(179),' ',FNTLB:2,'D',
   FDPTLB:2,' ',CHAR(179),' ',FNTLA:2,'D',FDPTLA:2,' ',CHAR(179),' ',FNTTB:2,
   'D',FDPTTB:2,' ',CHAR(179),' ',FNTTA:2,'D',FDPTTA:2,' ',CHAR(179),'D',FDSS:2,
   '-',FS:3,'mm ',CHAR(179),' ',FNL:2,'D',FDL:2,' ',CHAR(179)); END
   ELSE BEGIN GOTOXY(10,I+9); WRITE(CHAR(179),' ',TIPE:3,' ',CHAR(179),' ',FNTLB:2,'D',
   FDPTLB:2,' ',CHAR(179),' ',FNTLA:2,'D',FDPTLA:2,' ',CHAR(179),' ',FNTTB:2,
   'D',FDPTTB:2,' ',CHAR(179),' ',FNTTA:2,'D',FDPTTA:2,' ',CHAR(179),'D',FDSS:2,
   '-',FS:3,'mm ',CHAR(179),' ',' - ',' ',CHAR(179)); END; I:=I+1;
   IF (I=15) OR (EOF(FBALOK)) THEN BEGIN
   GOTOXY(10,I+9);
   WRITE(CHAR(192)); FOR J:=1 TO 5 DO WRITE(CHAR(196)); WRITE(CHAR(193));
   FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(193));
   FOR J:=1 TO 8 DO WRITE(CHAR(196)); WRITE(CHAR(193));
   FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(193));
   FOR J:=1 TO 8 DO WRITE(CHAR(196)); WRITE(CHAR(193));
   FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(193));
   FOR J:=1 TO 8 DO WRITE(CHAR(196)); WRITE(CHAR(217)); TEXTCOLOR(11);
   GOTOXY(10,I+10); WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
   WRITE(^G); READKEY; TEXTCOLOR(10); I:=1; END; END;
  END; CLOSE(FBALOK);
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    END
   ELSE BEGIN
    CLRSCR; TEXTCOLOR(11);
    GOTOXY(20,5); WRITE('    PROSES DISAIN BELUM DILAKUKAN'); GOTOXY(15,7);
    WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
    WRITE(^G); READKEY; TEXTCOLOR(10);
   END;
   D:=D+1;
  UNTIL D=2;
  CHDIR(DIRAK);
END.


PROGRAM TDBL;
USES CRT;
TYPE
  FDBN = RECORD
        TIPE : INTEGER;
        FC  : REAL;
        FY  : REAL;
        ES  : REAL;
        END;
  FDBT = RECORD
        TIPE : INTEGER;
        N    : INTEGER;
        DP   : INTEGER;
        DS   : INTEGER;
        END;
  FGMS = RECORD
        TIPE  : INTEGER;
        MUlap : REAL;
        MUtum : REAL;
        VU    : REAL;
        TU    : REAL;
        END;
  FDMN = RECORD
        TIPE : INTEGER;
        L    : REAL;
        B    : REAL;
        H    : REAL;
        PB   : REAL;
        END;
  FELN = RECORD
        TIPE : INTEGER;
        NO   : INTEGER;
        ELE  : INTEGER;
        END;

VAR
  FTIPE                    : TEXT;
  FDATBAH                  : FILE OF FDBN;
  FBAHTUL                  : FILE OF FDBT;
  FGMAKS                   : FILE OF FGMS;
  FDIM                     : FILE OF FDMN;
  FELE                     : FILE OF FELN;
  RECORDFELN               : FELN;
  RECORDFDBN               : FDBN;
  RECORDFDBT               : FDBT;
  RECORDFGMS               : FGMS;
  RECORDFDMN               : FDMN;
  I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
  NTUL,DPTUL,K,F           : Integer;
  NFDA,EL                  : STRING[7];
  FDB,FDT,FGM,FTIP,FDM,FELM        : STRING[12];
  FTP,BBN,BBT,BEL,BGM,BDD,DIRAK,DIREK   : STRING;

BEGIN
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);
BBN:=PARAMSTR(5); BBT:=PARAMSTR(6); BEL:=PARAMSTR(7); BGM:=PARAMSTR(8);
BDD:=PARAMSTR(9); DIRAK:=PARAMSTR(10); CHDIR(DIREK); FDM:=NFDA+BDD;
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ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
IF IORESULT=0 THEN BEGIN
 CLOSE(FDIM); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
 IF IORESULT=0 THEN BEGIN
  CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT); {$I-} RESET(FBAHTUL); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
   IF IORESULT=0 THEN BEGIN
    CLOSE(FDATBAH); FELM:=NFDA+BEL; ASSIGN(FELE,FELM); {$I-} RESET(FELE); {$I+}
    IF IORESULT=0 THEN BEGIN
     CLOSE(FELE); TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR;
     I:=1; K:=1; F:=1; RESET(FDATBAH);
     WHILE NOT EOF(FDATBAH) DO BEGIN
     SEEK(FDATBAH,F-1); READ(FDATBAH,RECORDFDBN); F:=F+1;
     WITH RECORDFDBN DO BEGIN
     IF (K=1) THEN BEGIN I:=I+6;
      IF I>=22 THEN BEGIN CLRSCR; I:=7; END;
      WRITE('      ',CHAR(218));
      FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(191));
      WRITELN; WRITE('      ',CHAR(179)); TEXTCOLOR(11);
      WRITE('              >>> DATA BAHAN <<<',
      '              '); TEXTCOLOR(10); WRITE(CHAR(179));
      WRITELN; WRITE('      ',CHAR(195));
      FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(180));
      WRITELN; WRITE('      ',CHAR(179),
      ' Tipe Teg. Desak Beton Teg. Tarik Baja  Mod. ',
      'Elastisitas Baja ',CHAR(179)); WRITELN;
      WRITE('      ',CHAR(179),
      ' Balok   (MPa)          (MPa)           (MPa)',
      '      ',CHAR(179)); WRITELN;
      WRITE('      ',CHAR(195));
      FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(180));
      WRITELN; END;
      WRITE('      ',CHAR(179),'',TIPE:3,'      ',TRUNC(FC):3,
      '      ',TRUNC(FY):3,'         ',TRUNC(ES):6,
      '      ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
     IF (I>=22) OR EOF(FDATBAH) THEN BEGIN
      WRITE('      ',CHAR(192));
      FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(217));
      READKEY; WRITELN; K:=1; I:=I+1; END;
      IF I>=22 THEN BEGIN I:=1; K:=1; CLRSCR; END; END;
     END; CLOSE(FDATBAH); F:=1; RESET (FBAHTUL);
     WHILE NOT EOF(FBAHTUL) DO BEGIN
     SEEK(FBAHTUL,F-1); READ(FBAHTUL,RECORDFDBT); F:=F+1;
     WITH RECORDFDBT DO BEGIN
     IF (K=1) THEN BEGIN I:=I+6;
      IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
      WRITE('      ',CHAR(218));
      FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(191));
      WRITELN; WRITE('      ',CHAR(179)); TEXTCOLOR(11);
      WRITE('      >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN',
      ' <<<      '); TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
      WRITE('      ',CHAR(195));
      FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(180));
      WRITELN; WRITE('      ',CHAR(179),' Tipe No.  Diameter Tulangan',
      ' Pokok   Diameter Tulangan Sengkang ',CHAR(179)); WRITELN;
      WRITE('      ',CHAR(179),' Balok          (mm)',
      '          (mm)           ',CHAR(179));
      WRITELN; WRITE('      ',CHAR(195));
      FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(180));
      WRITELN; END;
      WRITE('      ',CHAR(179),'',TIPE:3,'    ',N:2,
      '          ',DP:2,'                ',DS:2,
      '          ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
     IF (I>=22) OR EOF(FBAHTUL) THEN BEGIN
      WRITE('      ',CHAR(192)); FOR J:=1 TO 65 DO WRITE(CHAR(196));
      WRITE(CHAR(217)); READKEY; WRITELN; K:=1; I:=I+1; END;
      IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
     END; CLOSE(FBAHTUL); F:=1; RESET(FELE);
     WHILE NOT EOF(FELE) DO BEGIN
```

```pascal
SEEK(FELE,F-1); READ(FELE,RECORDFELN); F:=F+1;
WITH RECORDFELN DO BEGIN
 IF K=1 THEN BEGIN I:=I+5;
  IF I>=22 THEN BEGIN I:=6; CLRSCR; END;
  WRITE('      ',CHAR(218));
  FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(191));
  WRITELN; WRITE('      ',CHAR(179)); TEXTCOLOR(11);
  WRITE(' >>> DATA ELEMEN ',EL:7,' <<< '); TEXTCOLOR(10);
  WRITE(CHAR(179)); WRITELN; WRITE('      ',CHAR(195));
  FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; WRITE('      ',CHAR(179),' Tipe    No.    Elemen ',
  CHAR(179)); WRITELN; WRITE('      ',CHAR(195));
  FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; END;
  WRITE('      ',CHAR(179),' ',TIPE:3,'    ',NO:2,
   '      ',ELE:3,' ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
  IF (I>=22) OR EOF(FELE) THEN BEGIN
  WRITE('      ',CHAR(192)); FOR J:=1 TO 29 DO WRITE(CHAR(196));
  WRITE(CHAR(217)); READKEY; WRITELN; K:=1; I:=I+1; END;
  IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
END; CLOSE(FELE); F:=1; RESET(FDIM);
WHILE NOT EOF(FDIM) DO BEGIN
 SEEK(FDIM,F-1); READ(FDIM,RECORDFDMN); F:=F+1;
 WITH RECORDFDMN DO BEGIN
 IF K=1 THEN BEGIN I:=I+6;
  IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
  WRITE('      ',CHAR(218));
  FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(191));
  WRITELN; WRITE('      ',CHAR(179)); TEXTCOLOR(11);
  WRITE('            >>> DATA DIMENSI <<<          '),
  TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
  WRITE('      ',CHAR(195));
  FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; WRITE('      ',CHAR(179),
  ' Tipe Bentang Balok  Lebar  Tinggi Penutup Beton ',
  CHAR(179)); WRITELN; WRITE('      ',CHAR(179),
  ' Balok   (mm)   (mm)   (mm)    (mm)    ',
  CHAR(179)); WRITELN;
  WRITE('      ',CHAR(195));
  FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; END;
  WRITE('      ',CHAR(179),' ',TIPE:3,'    ',TRUNC(L):5,
   '    ',TRUNC(B):4,'    ',TRUNC(H):4,'     ',TRUNC(PB):3,
   '     ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
  IF (I>=22) OR EOF(FDIM) THEN BEGIN
  WRITE('      ',CHAR(192)); FOR J:=1 TO 51 DO WRITE(CHAR(196));
  WRITE(CHAR(217));  READKEY; WRITELN; K:=1; I:=I+1; END;
  IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
END; CLOSE(FDIM); F:=1; RESET(FGMAKS);
WHILE NOT EOF(FGMAKS) DO BEGIN
 SEEK(FGMAKS,F-1); READ(FGMAKS,RECORDFGMS); F:=F+1;
 WITH RECORDFGMS DO BEGIN
 IF K=1 THEN BEGIN I:=I+6;
  IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
  WRITE('      ',CHAR(218));
  FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(191));
  WRITELN; WRITE('      ',CHAR(179)); TEXTCOLOR(11);
  WRITE('          >>> DATA GAYA-GAYA MAKSIMUM <<<          '),
  TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
  WRITE('      ',CHAR(195));
  FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; WRITE('      ',CHAR(179),
  ' Tipe  M Lapangan   M Tumpuan   Gaya Geser   M Torsi ',
  CHAR(179)); WRITELN; WRITE('      ',CHAR(179),
  ' Balok   (Nmm)      (Nmm)        (N)       (Nmm)  ',
  CHAR(179)); WRITELN; WRITE('      ',CHAR(195));
  FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(180));
  WRITELN; END;
  WRITE('      ');WRITE(CHAR(179),' ',TIPE:3,'   ',MUlap:12,'  ',
  -MUtum:13,'  ',VU:10,'  ',TU:12,' ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
```

```
   IF (I>=22) OR EOF(FGMAKS) THEN BEGIN
    WRITE('      ',CHAR(192)); FOR J:=1 TO 65 DO WRITE(CHAR(196));
    WRITE(CHAR(217)); READKEY; WRITELN; K:=1; I:=I+1; END;
    IF (I>=22) THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
  END; CLOSE(FGMAKS);
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA ELEMEN BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
  WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
  WRITE('DATA GAYA YG BEKERJA PADA BALOK BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
  WRITE('DATA DIMENSI BALOK BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
END.


PROGRAM CDKO;
USES CRT,PRINTER;
TYPE
  FDAT = RECORD
        NPROY : string[19];
        NFDAT : string[8];
        NaFil : string[12];
        ENG   : string[19];
        END;
  FDBN = RECORD
        TIPE : INTEGER;
        FC  : REAL;
        FY  : REAL;
        ES  : REAL;
        END;
  FDBT = RECORD
        TIPE : INTEGER;
        N    : INTEGER;
        DP   : INTEGER;
        DS   : INTEGER;
        END;
  FGMS = RECORD
        TIPE  : INTEGER;
        MUlap : REAL;
        MUtum : REAL;
        VU   : REAL;
        TU   : REAL;
        END;
  FDMN = RECORD
        TIPE  : INTEGER;
        LK   : REAL;
        BK   : REAL;
        HK   : REAL;
        PBK  : REAL;
        KK   : REAL;
        RG   : REAL;
        PEN  : INTEGER;
        PENG : INTEGER;
        END;
```

```
FELN = RECORD
     TIPE : INTEGER;
     NO   : INTEGER;
     ELE  : INTEGER;
     END;

VAR
  FTIPE                    : TEXT;
  FDATBAH                     : FILE OF FDBN;
  FBAHTUL                     : FILE OF FDBT;
  FGMAKS                      : FILE OF FGMS;
  FDIM                     : FILE OF FDMN;
  FELE                     : FILE OF FELN;
  NFILE                    : FILE OF FDAT;
  RECORDFDAT                  : FDAT;
  RECORDFELN                  : FELN;
  RECORDFDBN                  : FDBN;
  RECORDFDBT                  : FDBT;
  RECORDFGMS                  : FGMS;
  RECORDFDMN                  : FDMN;
  I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
  NTUL,DPTUL,K,F,BATASATAS,BATASBAWAH,
  BATASKIRI,JUMLAHBARIS,BARIS,KERTAS,HAL,
  A,B,C,D                  : INTEGER;
  YA                    : CHAR;
  BENAR                     : BOOLEAN;
  NFDA,EL                   : STRING[7];
  FDB,FDT,FGM,FTIP,FDM,FELM          : STRING[12];
  NPRO,EN                   : STRING[19];
  FTP,BBN,BBT,BEL,BGM,BDD,DIRAK,DIREK   : STRING;

PROCEDURE JUDUL;
BEGIN
   ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
   WHILE NOT EOF(NFILE) DO BEGIN
    READ(NFILE,RECORDFDAT);
    IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
     NPRO:=RECORDFDAT.NPROY; EN:=RECORDFDAT.ENG; END;
    END; CLOSE(NFILE); HAL:=HAL+1; A:=LENGTH(NPRO); B:=LENGTH(NFDA);
    C:=LENGTH(EN); D:=LENGTH(EL);
    FOR J:=1 TO BATASATAS DO WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(201));
    FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(187));
    WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
    '     UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON          ',
    CHAR(186)); WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(204));
    FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(185));
    WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
    ' AUTHORITY : UII CIVIL ENGINEERING 1996     DATA    : ',
    EL:D); FOR J:=1 TO (7-D) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(186));
    WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
    ' Proyek   : ',NPRO:A); FOR J:=1 TO (19-A) DO WRITE(LST,' ');
    WRITE(LST,'        Halaman  : ',HAL:3,'     ',CHAR(186)); WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
    ' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(LST,' ');
    WRITE(LST,'        File Data : ',NFDA:B); FOR J:=1 TO (8-B) DO WRITE(LST,' ');
    WRITE(LST,' ',CHAR(186)); WRITELN(LST);
    FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(200));
    FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(188));
    WRITELN(LST); I:=7;
END;


BEGIN
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);BBN:=PARAMSTR(5);
BBT:=PARAMSTR(6); BEL:=PARAMSTR(7); BGM:=PARAMSTR(8); BDD:=PARAMSTR(9);
GETDIR(0,DIRAK); CHDIR(DIREK); FDM:=NFDA+BDD; ASSIGN(FDIM,FDM);
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```
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
  FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
  WRITELN(LST); END;
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
  ' ',TIPE:3,'      ',TRUNC(FC):3,'           ',
  TRUNC(FY):3,'           ',TRUNC(ES):6,'     ',
  CHAR(179)); WRITELN(LST); K:=K+1; I:=I+1;
  IF (I>=BARIS) OR EOF(FDATBAH) THEN BEGIN
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
  FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
  WRITELN(LST); K:=1; I:=I+1; END;
  IF I>=BARIS THEN BEGIN
  K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FDATBAH); F:=1; RESET (FBAHTUL);
WHILE NOT EOF(FBAHTUL) DO BEGIN
SEEK(FBAHTUL,F-1); READ(FBAHTUL,RECORDFDBT); F:=F+1;
WITH RECORDFDBT DO BEGIN
IF (K=1) THEN BEGIN
  IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
  IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
  FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
  WRITELN(LST);
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
  '       >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN',
  ' <<<      '); WRITE(LST,CHAR(179)); WRITELN(LST);
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
  FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
  WRITELN(LST);
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
  ' Tipe No.  Diameter Tulangan Pokok   Diameter Tulangan',
  ' Sengkang ',CHAR(179)); WRITELN(LST);
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
  ' Kolom          (mm)              (mm)',
  '         ',CHAR(179)); WRITELN(LST);
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
  FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
  WRITELN(LST); END;
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
  ' ',TIPE:3,'   ',N:2,'          ',DP:2,
  '              ',DS:2,'           ',CHAR(179));
  WRITELN(LST); K:=K+1; I:=I+1;
  IF (I>=BARIS) OR EOF(FBAHTUL) THEN BEGIN
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
  FOR J:=1 TO 65 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
  WRITELN(LST); K:=1; I:=I+1; END;
  IF I>=BARIS THEN BEGIN
  K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FBAHTUL); F:=1; RESET(FELE);
WHILE NOT EOF(FELE) DO BEGIN
SEEK(FELE,F-1); READ(FELE,RECORDFELN); F:=F+1;
WITH RECORDFELN DO BEGIN
IF K=1 THEN BEGIN
  IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+5;
  IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
  FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
  WRITELN(LST);
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
  ' >>> DATA ELEMEN ',EL:7,' <<< ',CHAR(179)); WRITELN(LST);
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
  FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
  WRITELN(LST);
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
  ' Tipe    No.     Elemen ',CHAR(179)); WRITELN(LST);
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
  FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
  WRITELN(LST); END;
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
  ' ',TIPE:3,'      ',NO:2,'      ',ELE:3,'  ',CHAR(179));
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```
 WRITELN(LST); K:=K+1; I:=I+1;
 IF (I>=BARIS) OR EOF(FELE) THEN BEGIN
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
  FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
  WRITELN(LST); K:=1; I:=I+1; END;
 IF I>=BARIS THEN BEGIN
  K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FELE); F:=1; RESET(FDIM);
WHILE NOT EOF(FDIM) DO BEGIN
 SEEK(FDIM,F-1); READ(FDIM,RECORDFDMN); F:=F+1;
 WITH RECORDFDMN DO BEGIN
 IF K=1 THEN BEGIN
 IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
 IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
 FOR J:=1 TO 54 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 '       >>> DATA DIMENSI <<<          ',
 CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 54 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 'Tipe  Panjang  Lebar/Diameter  Tinggi  Penutup Beton ',
 CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 'Kolom   (mm)       (mm)        (mm)      (mm)   ',
 CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 54 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST); END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' ',TIPE:3,'  ',TRUNC(LK):5,'     ',TRUNC(BK):4,'     ',
 TRUNC(HK):4,'    ',TRUNC(PBK):3,'     ',CHAR(179));
 WRITELN(LST); K:=K+1; I:=I+1;
 IF (I>=BARIS) OR EOF(FDIM) THEN BEGIN
  FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
  FOR J:=1 TO 54 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
  WRITELN(LST); K:=1; I:=I+1; END;
 IF I>=BARIS THEN BEGIN
  K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FDIM); F:=1; RESET(FGMAKS);
WHILE NOT EOF(FGMAKS) DO BEGIN
 SEEK(FGMAKS,F-1); READ(FGMAKS,RECORDFGMS); F:=F+1;
 WITH RECORDFGMS DO BEGIN
 IF K=1 THEN BEGIN
 IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
 IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
 FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 '     >>> DATA GAYA-GAYA MAKSIMUM <<<        ',
 CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 'Tipe    M 1     M 2   Gaya Geser  Gaya Aksial ',
 CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 'Kolom  (Nmm)   (Nmm)     (N)       (N)   ',
 CHAR(179)); WRITELN(LST);
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
 FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
 WRITELN(LST); END;
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
 ' ',TIPE:3,'   ',MUlap:8,' ',MUtum:8,' ',VU:8,
 '  ',TU:8,'   ',CHAR(179)); WRITELN(LST); K:=K+1; I:=I+1;
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```
    IF (I>=BARIS) OR EOF(FGMAKS) THEN BEGIN
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
      FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
      WRITELN(LST); K:=1; I:=I+1; END;
      IF (I>=BARIS) THEN BEGIN
        K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END; END;
      END; CLOSE(FGMAKS);
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11);
      GOTOXY(20,10); WRITE('DATA ELEMEN BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11);
      GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
    ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA GAYA YG BEKERJA PADA BALOK BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
    CLRSCR; TEXTCOLOR(11);
    GOTOXY(20,10); WRITE('DATA DIMENSI BALOK BELUM DIBUAT...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
END.


PROGRAM CKO;
USES CRT,PRINTER;
TYPE
  FDAT = RECORD
        NPROY : string[19];
        NFDAT : string[8];
        NaFil : string[12];
        ENG   : string[19];
        END;
  FKLM = RECORD
        TIPE  : INTEGER;
        FNTLB : INTEGER;
        FDPTLB : INTEGER;
        FNTLA : INTEGER;
        FDPTLA : INTEGER;
        FDSS  : INTEGER;
        FS    : INTEGER;
        END;
  FDN = RECORD
        TIPE  : INTEGER;
        LK   : REAL;
        BK   : REAL;
        HK   : REAL;
        PBK  : REAL;
        KK   : REAL;
        RG   : REAL;
        PEN  : INTEGER;
        PENG : INTEGER;
        END;

VAR
  FKOLOM              : FILE OF FKLM;
  NFILE               : FILE OF FDAT;
  FDI                 : FILE OF FDN;
  RECORDFDAT          : FDAT;
```
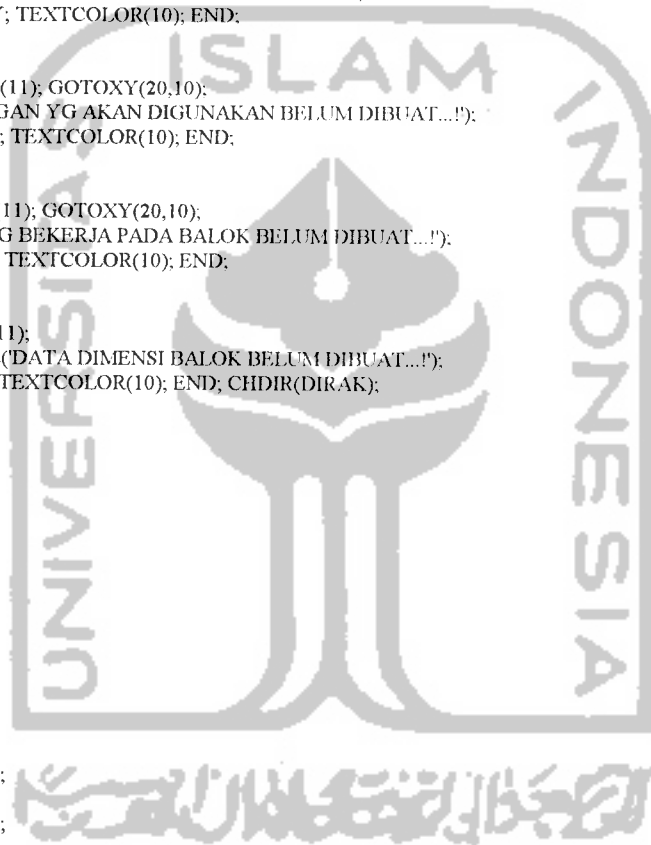
```
RECORDFKLM                : FKLM;
RECORDFDN                 : FDN;
I,JUM,J,TP,BATASATAS,BATASBAWAH,
BARIS,JUMLAHBARIS,HAL,X,BATASKIRI,A,
B,C,D                : INTEGER;
BENAR                    : BOOLEAN;
KERTAS,Z                 : BYTE;
YA                : CHAR;
NFDA,EL                 : STRING[7];
FBK,FDM                 : STRING[12];
NPRO,EN                 : STRING[19];
BLK,BDD,DIRAK,DIREK          : STRING;

BEGIN
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);BDD:=PARAMSTR(4);
BLK:=PARAMSTR(5);GETDIR(0,DIRAK);CHDIR(DIREK);ASSIGN(NFILE,'FILEDATA.DAT');
RESET(NFILE);
WHILE NOT EOF(NFILE) DO BEGIN  READ(NFILE,RECORDFDAT);
IF RECORDFDAT.NFDAT=NFDA THEN  BEGIN
NPRO:=RECORDFDAT.NPROY;  EN :=RECORDFDAT.ENG;  END;
END; CLOSE(NFILE); FBK:=NFDA+BLK; ASSIGN(FKOLOM,FBK); {$I-} RESET(FKOLOM); {$I+}
IF IORESULT=0 THEN BEGIN
YA:='U';  BATASATAS:=0;  BATASBAWAH:=0;  BATASKIRI: 0;
WHILE UPCASE(YA)='U' DO  BEGIN
TEXTBACKGROUND(0); TEXTCOLOR(10); CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179),' Ukuran Kertas : '); TEXTCOLOR(11); WRITE('1');
TEXTCOLOR(10); WRITE('. Folio '); TEXTCOLOR(11); WRITE('2');
TEXTCOLOR(10); WRITE('. Kuarto '); TEXTCOLOR(11);
WRITE('--> Pilih :   '); TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(179),' Batas Atas  :                      ',CHAR(179));
GOTOXY(10,5);
WRITE(CHAR(179),' Batas Bawah :                   ',CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(179),' Batas Kiri  :                     ',CHAR(179));
GOTOXY(10,7); WRITE(CHAR(192)); FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11); GOTOXY(10,9); WRITE(' U : ulang   L : lanjutkan =====> ');
GOTOXY(29,4); WRITE('Baris'); GOTOXY(29,5); WRITE('Baris');
GOTOXY(29,6); WRITE('Spasi'); GOTOXY(59,3); READLN(KERTAS);
GOTOXY(26,4); READLN(BATASATAS); GOTOXY(26,5); READLN(BATASBAWAH);
GOTOXY(26,6); READLN(BATASKIRI); BENAR:=TRUE;
WHILE BENAR DO BEGIN
GOTOXY(42,9); YA:=READKEY; WRITE(YA);IF UPCASE(YA)='U' THEN BENAR:=FALSE;
IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
IF KERTAS=1 THEN JUMLAHBARIS:=63;IF KERTAS=2 THEN JUMLAHBARIS:=57;
BARIS:=JUMLAHBARIS-BATASATAS-BATASBAWAH; I:=1; TP:=1; HAL:=0;
WHILE NOT EOF(FKOLOM) DO BEGIN
CLRSCR; TEXTCOLOR(11);GOTOXY(20,10); WRITE('MENCETAK HASIL DISAIN......');
TEXTCOLOR(11); WRITE(I); TEXTCOLOR(10);
WITH RECORDFKLM DO BEGIN READ(FKOLOM,RECORDFKLM);
IF I=1 THEN BEGIN
A:=LENGTH(NPRO); B:=LENGTH(NFDA); C:=LENGTH(EN); D:=LENGTH(EL);
FOR J:=1 TO BATASATAS DO BEGIN WRITELN(LST); END; HAL:=HAL+1;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(218)); FOR J:=1 TO 57 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(191)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
'    UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON      ',
CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(195)); FOR J:=1 TO 57 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(180)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' AUTHORITY : UII CIVIL ENGINEERING 1996 DISAIN : ',EL:D);
FOR J:=1 TO (7-D) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' Proyek   : ',NPRO:A);
FOR J:=1 TO (19-A) DO WRITE(LST,' '); WRITE(LST,'  Halaman  : ',HAL:3,'   ',
CHAR(179)); WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
```

```pascal
WRITE(LST,CHAR(179),' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(LST,' ');
WRITE(LST,'   File Data : ',NFDA:B); FOR J:=1 TO (8-B) DO WRITE(LST,' ');
WRITE(LST,' ',CHAR(179)); WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(195)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(194)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(194)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(194)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(194)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(180)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' TIPE ',CHAR(179),' TULANGAN ',CHAR(179),
      ' TULANGAN ',CHAR(179),' TULANGAN ',CHAR(179),
      ' TULANGAN ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' KOLOM ',CHAR(179),'   TARIK   ',CHAR(179),
      ' DESAK ',CHAR(179),' SPIRAL ',CHAR(179),
      ' SENGKANG ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(195)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(180)); WRITELN(LST); END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' ',TIPE:3,' ',CHAR(179),'  ',FNTLB:2,'D',
      FDPTLB:2,' ',CHAR(179),'  ',FNTLA:2,'D',FDPTLA:2);
FDM:=NFDA+BDD; ASSIGN(FDI,FDM); RESET(FDI); JUM:=FILESIZE(FDI); Z:=0;
WITH RECORDFDN DO BEGIN
IF JUM<>0 THEN BEGIN
FOR J:=1 TO JUM DO BEGIN
 SEEK(FDI,J-1); READ(FDI,RECORDFDN);
 IF RECORDFDN.TIPE=TP THEN Z:=RECORDFDN.PENG; END; END; END;
IF Z=2 THEN BEGIN
 WRITE(LST,' ',CHAR(179),' D',FDSS:2,'-',FS:3,' mm ',CHAR(179),
 '   -    ',CHAR(179)); END;
IF Z=1 THEN BEGIN
 WRITE(LST,' ',CHAR(179),'    -    ',CHAR(179),' D',FDSS:2,
 '-',FS:3,' mm ',CHAR(179)); END;
WRITELN(LST); TP:=TP+1; I:=I+1;
IF (I=BARIS) OR EOF(FKOLOM) THEN BEGIN
 FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
 WRITE(LST,CHAR(192)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(193)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(193)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(193)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(193)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
 WRITE(LST,CHAR(217)); WRITELN(LST); I:=1;
 IF I=BARIS THEN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); END; END;
END; CLOSE(FKOLOM); END
ELSE BEGIN
 CLRSCR; TEXTCOLOR(11);
 GOTOXY(20,5); WRITE('    PROSES DISAIN BELUM DILAKUKAN');
 GOTOXY(15,7); WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
 WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
END.


PROGRAM DDKO;
USES CRT;
TYPE
  FELN = RECORD
      TIPE : INTEGER;
      NO   : INTEGER;
      ELE  : INTEGER;
     END;
  FDMC = RECORD
      ELEM : INTEGER;
      SEC  : REAL;
      AX   : REAL;
```

```pascal
      SHE  : REAL;
      MOM  : REAL;
      END;
  FDN = RECORD
      TIPE : INTEGER;
      LK   : REAL;
      BK   : REAL;
      HK   : REAL;
      PBK  : REAL;
      KK   : REAL;
      RG   : REAL;
      PEN  : INTEGER;
      PENG : INTEGER;
      END;
VAR
  FTIPE                          : TEXT;
  FDI                            : FILE OF FDN;
  FELE                           : FILE OF FELN;
  FMICRO                         : FILE OF FDMC;
  RECORDFELN                     : FELN;
  RECORDFDN                      : FDN;
  RECORDFDMC                     : FDMC;
  Elemen,I,JTIPE,JUM,NOREC,TP,PENAMPANG,PENGIKAT  : INTEGER;
  x,LB,BB,HB,PBB,KB,RGB          : Real;
  YA                             : Char;
  PK                             : Byte;
  BENAR                          : BOOLEAN;
  NFDA,EL                        : STRING[7];
  FBC,FELM,FTIP,FDM              : STRING[12];
  FTP,BEL,BDD,DIRAK,DIREK        : STRING;

BEGIN
  DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); FTP:=PARAMSTR(4);
  BEL:=PARAMSTR(5); BDD:=PARAMSTR(6); GETDIR(0,DIRAK); CHDIR(DIREK);
  FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
  IF IORESULT=0 THEN BEGIN
  READ(FTIPE,JTIPE); CLOSE(FTIPE); FELM:=NFDA+BEL; ASSIGN(FELE,FELM);
  {$I-} RESET(FELE); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FELE); TP:=0;
   REPEAT
   TP:=TP+1; X:=0; LB:=0; PBB:=0; BB:=0; HB:=0;
    ASSIGN(FELE,FELM); RESET(FELE);
    WITH RECORDFELN DO BEGIN
    WHILE NOT EOF(FELE) DO BEGIN
    READ(FELE,RECORDFELN); ELEMEN:=RECORDFELN.ELE;
    IF RECORDFELN.TIPE=TP THEN Begin
    FBC:=NFDA+'.DMC'; Assign(FMICRO,FBC); Reset(FMICRO);
    While Not Eof(FMICRO) Do Begin
     WITH RECORDFDMC DO BEGIN
     Read(FMICRO,RECORDFDMC);
     if ELEMEN=Elem Then X:=Sec; END; End;
    if X>LB Then LB:=X; Close(FMICRO); End; END;
   END; CLOSE(FELE); TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR;
   GOTOXY(10,2);
   WRITE(CHAR(218)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(191));
   GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(11); TEXTBACKGROUND(1);
   WRITE('         >>> DATA DIMENSI <<<         ');
   TEXTBACKGROUND(128); TEXTCOLOR(10); WRITE(CHAR(179));
   GOTOXY(10,4);
   WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
   GOTOXY(10,5);
   WRITE(CHAR(179),' KONDISI TAHANAN UJUNG KOLOM TIPE : '); TEXTCOLOR(11);
   WRITE(TP:3,'    '); TEXTCOLOR(10); WRITE(CHAR(179));
   GOTOXY(10,6);
   WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
   GOTOXY(10,7); Write(CHAR(179)); TEXTBACKGROUND(5);
   Write(' '); TEXTCOLOR(15); WRITE('1'); TEXTCOLOR(10);
   WRITE('. Kedua ujung sendi, tidak tergerak lateral. ');
   TEXTBACKGROUND(128); WRITE(CHAR(179));
```

```
GOTOXY(10,8); Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('2'); TEXTCOLOR(10);
WRITE('. Kedua ujung jepit.              ');
TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,9); Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('3'); TEXTCOLOR(10);
WRITE('. Satu ujung jepit, ujung lain bebas.      ');
TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,10); Write(CHAR(179)); TEXTBACKGROUND(5);
Write(' '); TEXTCOLOR(15); WRITE('4'); TEXTCOLOR(10);
WRITE('. Kedua ujung jepit, ada gerak lateral.    ');
TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,12); WRITE(CHAR(179));
TEXTCOLOR(15); TEXTBACKGROUND(4);
WRITE(' PILIH ?                  ');
TEXTCOLOR(10); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,13);
WRITE(CHAR(192)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(217));
PK:=0;
WHILE (PK<1) OR (PK>4) DO BEGIN
    WRITE(^G); TEXTCOLOR(15); TEXTBACKGROUND(4); GOTOXY(20,12);
    READLN(PK); TEXTCOLOR(10); TEXTBACKGROUND(128); END;
CASE PK OF
 1: KB:=1;
 2: KB:=0.5;
 3: KB:=2;
 4: KB:=1;
END; CLRSCR;
GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(11); TEXTBACKGROUND(1);
WRITE('     >>> DATA DIMENSI <<<     ');
TEXTBACKGROUND(128); TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' BENTUK PENAMPANG KOLOM TIPE : '); TEXTCOLOR(11);
WRITE(TP:3,' '); TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7); Write(CHAR(179)); TEXTBACKGROUND(5);
Write('     '); TEXTCOLOR(15); WRITE('1'); TEXTCOLOR(10);
WRITE('. PERSEGI.         '); TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,8); Write(CHAR(179)); TEXTBACKGROUND(5);
Write('     '); TEXTCOLOR(15); WRITE('2'); TEXTCOLOR(10);
WRITE('. LINGKARAN.        '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10); WRITE(CHAR(179));
TEXTCOLOR(15); TEXTBACKGROUND(4);
WRITE('     PILIH ?          '); TEXTCOLOR(10);
TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 35 DO WRITE(CHAR(196)); WRITE(CHAR(217));
PENAMPANG:=0;
WHILE (PENAMPANG<1) OR (PENAMPANG>2) DO BEGIN
    TEXTCOLOR(15); TEXTBACKGROUND(4); WRITE(^G); GOTOXY(30,10);
    READLN(PENAMPANG); TEXTCOLOR(10); TEXTBACKGROUND(128); END;
CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 43 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(11); TEXTBACKGROUND(1);
WRITE('       >>> DATA DIMENSI <<<        ');
TEXTBACKGROUND(128); TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 43 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' BENTUK TULANGAN PENGIKAT KOLOM TIPE : ');
```

```
TEXTCOLOR(11); WRITE(TP:3,' ');TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 43 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7); Write(CHAR(179)); TEXTBACKGROUND(5);
Write('        '); TEXTCOLOR(15); WRITE('1'); TEXTCOLOR(10);
WRITE('. PENGIKAT SENGKANG.        '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,8); Write(CHAR(179)); TEXTBACKGROUND(5);
Write('        '); TEXTCOLOR(15); WRITE('2'); TEXTCOLOR(10);
WRITE('. PENGIKAT SPIRAL.        '); TEXTBACKGROUND(128);
WRITE(CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 43 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); TEXTCOLOR(15); TEXTBACKGROUND(4);
WRITE('       PILIH ?              '); TEXTCOLOR(10);
TEXTBACKGROUND(128); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 43 DO WRITE(CHAR(196)); WRITE(CHAR(217));
PENGIKAT:=0;
WHILE (PENGIKAT<1) OR (PENGIKAT>2) DO BEGIN
    TEXTCOLOR(15); TEXTBACKGROUND(4); WRITE(^G); GOTOXY(30,10);
    READLN(PENGIKAT); TEXTCOLOR(10); TEXTBACKGROUND(128); END;
CLRSCR; GOTOXY(10,6);
WRITE('PERKIRAAN RASIO PENULANGAN KOLOM TIPE : '); TEXTCOLOR(11);
WRITE(TP:3); TEXTCOLOR(10); WRITE(' (1%-3%) ? '); RGB:=0;
WHILE (RGB<0.01) OR (RGB>0.03) DO BEGIN
    WRITE(^G); GOTOXY(65,6); READLN(RGB); RGB:=RGB/100; END;
YA:='U';
WHILE UPCASE(YA)='U' DO BEGIN CLRSCR;
IF PENAMPANG=1 THEN BEGIN
 GOTOXY(10,2); WRITE(CHAR(218)); FOR I:=1 TO 54 DO WRITE(CHAR(196));
 WRITE(CHAR(191));
 GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(13);
 WRITE('        >>> DATA DIMENSI <<<          ');
 TEXTCOLOR(10); WRITE(CHAR(179));
 GOTOXY(10,4); WRITE(CHAR(195)); FOR I:=1 TO 54 DO WRITE(CHAR(196));
 WRITE(CHAR(180));
 GOTOXY(10,5);
 WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
 WRITE('                 '); TEXTCOLOR(10);
 WRITE(CHAR(179));
 GOTOXY(10,6); WRITE(CHAR(195)); FOR I:=1 TO 54 DO WRITE(CHAR(196));
 WRITE(CHAR(180));
 GOTOXY(10,7);
 WRITE(CHAR(179),' Panjang Kolom   Lebar    Tinggi   Penutup',
 ' Beton ',CHAR(179));
 GOTOXY(10,8);
 WRITE(CHAR(179),'  (L)--->mm    (b)--->mm  (h)--->mm  (Pb)-',
 '-->mm ',CHAR(179));
 GOTOXY(10,9); WRITE(CHAR(195)); FOR I:=1 TO 54 DO WRITE(CHAR(196));
 WRITE(CHAR(180));
 GOTOXY(10,10); WRITE(CHAR(179)); FOR I:=1 TO 54 DO WRITE(CHAR(0));
 WRITE(CHAR(179));
 GOTOXY(10,11); WRITE(CHAR(192)); FOR I:=1 TO 54 DO WRITE(CHAR(196));
 WRITE(CHAR(217)); TEXTCOLOR(11);
 GOTOXY(10,13); WRITE(' U : ulang   L : lanjutkan ====> ');
 GOTOXY(17,10); WRITE(LB:5:2); GOTOXY(31,10); READLN(BB); GOTOXY(43,10);
 READLN(HB); GOTOXY(56,10); READLN(PBB); END;
IF PENAMPANG=2 THEN BEGIN
 GOTOXY(10,2); WRITE(CHAR(218)); FOR I:=1 TO 47 DO WRITE(CHAR(196));
 WRITE(CHAR(191));
 GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(13);
 WRITE('        >>> DATA DIMENSI <<<        ');
 TEXTCOLOR(10); WRITE(CHAR(179));
 GOTOXY(10,4); WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196));
 WRITE(CHAR(180));
 GOTOXY(10,5); WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
 WRITE('                '); TEXTCOLOR(10);
 WRITE(CHAR(179));
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GOTOXY(10,6); WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196));
WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' Tinggi Kolom   Diameter Kolom   Penutup Beton ',
CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),' (L)--->mm        (D)--->mm     (Pb)--- mm ',
CHAR(179));
GOTOXY(10,9); WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196));
WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); FOR I:=1 TO 47 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 47 DO WRITE(CHAR(196));
WRITE(CHAR(217)); TEXTCOLOR(11);
GOTOXY(10,13); WRITE(' U : ulang   L : lanjutkan ===> ');
GOTOXY(16,10); WRITE(LB:5:2); GOTOXY(33,10); READLN(BB);
GOTOXY(49,10); READLN(PBB); END; BENAR:=TRUE;
WHILE BENAR DO BEGIN
GOTOXY(42,13); YA:=READKEY; WRITE(YA);
IF UPCASE(YA)='U' THEN BENAR:=FALSE;
IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10);
END; FDM:=NFDA+BDD; ASSIGN(FDI,FDM); {$I-} RESET(FDI); {$I+}
IF IORESULT<>0 THEN REWRITE(FDI); NOREC:=-1; JUM:=FILESIZE(FDI);
WITH RECORDFDN DO BEGIN
IF JUM<>0 THEN BEGIN
FOR I:=1 TO JUM DO BEGIN
 SEEK(FDI,I-1); READ(FDI,RECORDFDN);
 IF RECORDFDN.TIPE=TP THEN NOREC:=I-1; END;
 IF NOREC=-1 THEN NOREC:=JUM; SEEK(FDI,NOREC); END;
TIPE:=TP; LK:=LB; BK:=BB; HK:=HB; PBK:=PBB; KK:=KB; RG:=RGB;
PEN:=PENAMPANG; PENG:=PENGIKAT; WRITE(FDI,RECORDFDN);
END; CLOSE(FDI);
UNTIL TP=JTIPE;
END
ELSE BEGIN
 CLRSCR; TEXTCOLOR(11);
 GOTOXY(20,10); WRITE(' Data Elemen Belum Ada...........!');
 WRITE(^G); READKEY; TEXTCOLOR(10); END;
END; CHDIR(DIRAK);
END.


PROGRAM GKO;
USES CRT;
TYPE
  FELN = RECORD
      TIPE : INTEGER;
      NO   : INTEGER;
      ELE  : INTEGER;
      END;
  FGMS = RECORD
      TIPE  : INTEGER;
      MUlap : REAL;
      MUtum : REAL;
      VU    : REAL;
      TU    : REAL;
      END;
  FDMC = RECORD
      ELEM : INTEGER;
      SEC  : REAL;
      AX   : REAL;
      SHE  : REAL;
      MOM  : REAL;
      END;
VAR
  FTIPE              : TEXT;
  FELE               : FILE OF FELN;
  FGMAKS             : FILE OF FGMS;
  FMICRO             : FILE OF FDMC;
```
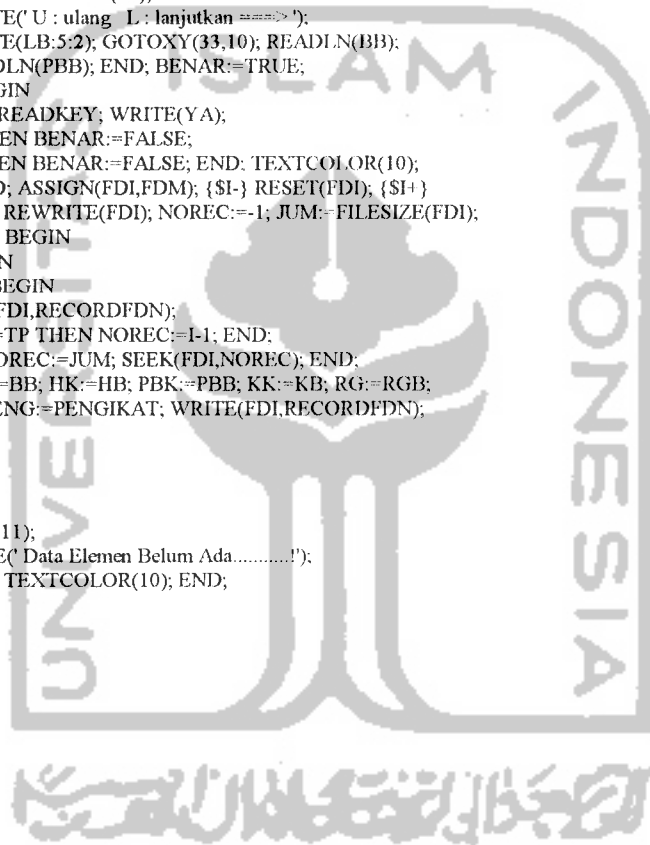
```
  RECORDFELN              : FELN;
  RECORDFGMS             : FGMS;
  RECORDFDMC            : FDMC;
  Elemen,I,JTIPE,JUM,NOREC,TP     : INTEGER;
  MUl,MUt,TUS,TUB,VUS,MUla,MUtu,VUB : REAL;
  NFDA,EL                : STRING[7];
  FBC,FELM,FGM,FTIP          : STRING[12];
  FTP,BEL,BGM,DIRAK,DIREK      : STRING;

Begin
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);
BEL:=PARAMSTR(5); BGM:=PARAMSTR(6); GETDIR(0,DIRAK); CHDIR(DIREK);
FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
 READ(FTIPE,JTIPE); CLOSE(FTIPE); TP:=0;
 REPEAT
  TP:=TP+1; VUB:=0; VUS:=0; MUl:=0; MUla:=0; MUt:=0; MUtu:=0; TUB:=0; TUS:=0;
  FELM:=NFDA+BEL; ASSIGN(FELE,FELM); {$I-} RESET(FELE); {$I+}
  IF IORESULT=0 THEN BEGIN
   WHILE NOT EOF(FELE) DO Begin
    WITH RECORDFELN DO BEGIN
     READ(FELE,RECORDFELN); ELEMEN:=RECORDFELN.ELE;
     IF TIPE = TP THEN BEGIN
      FBC:=NFDA+'.DMC'; ASSIGN(FMICRO,FBC); Reset(FMICRO);
      While Not Eof(FMICRO) Do Begin
       WITH RECORDFDMC DO BEGIN
        Read(FMICRO,RECORDFDMC);
        IF ELEMEN=Elem THEN BEGIN
         if SEC=0 Then MUt:=MOM;
         IF ABS(SHE)>VUS THEN VUS:=ABS(SHE);
         IF ABS(AX)>TUS THEN TUS:=ABS(AX);
         MUl:=MOM; END; END; End;
      IF ABS(MUl)>ABS(MUla) THEN MUla:=MUl;
      IF ABS(MUt)>ABS(MUtu) THEN MUtu:=MUt;
      IF VUS>VUB THEN VUB:=VUS;
      IF TUS>TUB THEN TUB:=TUS;
      Close(FMICRO); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
      IF IORESULT<>0 THEN REWRITE(FGMAKS);
      NOREC:=-1; JUM:=FILESIZE(FGMAKS);
      WITH RECORDFGMS DO BEGIN
       IF JUM<>0 THEN BEGIN
        FOR I:=1 TO JUM DO BEGIN
         SEEK(FGMAKS,I-1); READ(FGMAKS,RECORDFGMS);
         IF RECORDFGMS.TIPE=TP THEN NOREC:=I-1; END;
         IF NOREC=-1 THEN NOREC:=JUM; SEEK(FGMAKS,NOREC); END;
         TIPE:=TP; MUlap:=MUla; MUtum:=MUtu; VU:=VUB; TU:=TUB; WRITE(FGMAKS,RECORDFGMS);
        END; CLOSE(FGMAKS);
      End;
     END;
    END; CLOSE(FELE);
   END
   ELSE BEGIN
    TEXTBACKGROUND(0); CLRSCR; TEXTCOLOR(11);
    GOTOXY(20,10); WRITE(' Data Elemen Belum Ada...........!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
  UNTIL TP=JTIPE; END; CHDIR(DIRAK);
END.


PROGRAM PKO;
USES CRT;
TYPE
  FDBN = RECORD
      TIPE : INTEGER;
      FC  : REAL;
      FY  : REAL;
      ES  : REAL;
     END;
  FDBT = RECORD
      TIPE : INTEGER;
```

```pascal
          N   : INTEGER;
          DP  : INTEGER;
          DS  : INTEGER;
        END;
    FGMS = RECORD
          TIPE : INTEGER;
          MUlap : REAL;
          MUtum : REAL;
          VU   : REAL;
          TU   : REAL;
        END;
    FDN = RECORD
          TIPE : INTEGER;
          LK   : REAL;
          BK   : REAL;
          HK   : REAL;
          PBK  : REAL;
          KK   : REAL;
          RG   : REAL;
          PEN  : INTEGER;
          PENG : INTEGER;
        END;
    FKLM = RECORD
          TIPE  : INTEGER;
          FNTLB : INTEGER;
          FDPTLB : INTEGER;
          FNTLA : INTEGER;
          FDPTLA : INTEGER;
          FDSS  : INTEGER;
          FS   : INTEGER;
        END;
VAR
   FTIPE                    : TEXT;
   FDI                      : FILE OF FDN;
   FDATBAH                  : FILE OF FDBN;
   FBAHTUL                  : FILE OF FDBT;
   FGMAKS                   : FILE OF FGMS;
   FKOLOM                   : FILE OF FKLM;
   RECORDFDBN               : FDBN;
   RECORDFDBT               : FDBT;
   RECORDFGMS               : FGMS;
   RECORDFDN                : FDN;
   RECORDFKLM               : FKLM;
   I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
   PENAMPANG,PENGIKAT,PENAM,NTUL,DPTUL      : INTEGER;
   MUI,MUt,TUB,VUB,LB,FCB,FYB,ESB,BB,HB,MUS,
   PBB,O,OS,B1,D,DA,ESA,EY,FSA,DPTLB,NTLB,
   DPTLA,NTLA,S,SS,DSS,M,KB,RGB,KK,MUK,KL,
   CM,IG,EC,BD,EI,DB,PC,MC,E,ASPER,R,RO,CB,
   AB,PNB,PN,HEK,BEK,AG,AS,ASA,PBEFF,DC,AC,
   ROS,DSK,ASS,ATUL,ADP,ATULS,ATULR,NTULS   : REAL;
   NFDA,EL                  : STRING[7];
   FDB,FDT,FGM,FTIP,FDM,FBK        : STRING[12];
   FTP,BBN,BBT,BGM,BDD,BLK,DIREK,DIRAK    : STRING;

PROCEDURE PILIHTULANGAN;
BEGIN
    FDT:=NFDA+BBT; ASSIGN(FBAHTUL,FDT); RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL);
    FOR I:=1 TO JUM DO BEGIN SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
       IF (RECORDFDBT.TIPE=TP) AND (RECORDFDBT.DP<>0) THEN BEGIN
         ADP:=0.25*3.14*SQR(RECORDFDBT.DP);
         IF ATULR<>0 THEN BEGIN
            NTULS:=ATULR/ADP; IF (FRAC(NTULS)>0) THEN NTULS:=TRUNC(NTULS)+1;
            IF (FRAC(NTULS)=0) THEN NTULS:=TRUNC(NTULS); ATULS:=ADP*NTULS;
            IF I=1 THEN BEGIN ATUL:=ATULS; DPTUL:=RECORDFDBT.DP; NTUL:=TRUNC(NTULS); END;
            IF (ATULS<ATUL) AND (ATULS>=ATULR) THEN BEGIN
               ATUL:=ATULS; DPTUL:=RECORDFDBT.DP; NTUL:=TRUNC(NTULS); END;
            IF (ATULS=ATUL) AND (ATULS>=ATULR) THEN BEGIN
             IF RECORDFDBT.DP<DPTUL THEN BEGIN
             DPTUL:=RECORDFDBT.DP; NTUL:=TRUNC(NTULS); END; END; END
```

```
        ELSE BEGIN
            IF I=1 THEN DPTUL:=RECORDFDBT.DP;
            IF RECORDFDBT.DP<DPTUL THEN DPTUL:=RECORDFDBT.DP;
            NTUL:=2; ATUL:=NTUL*ADP; END; END;
    END; CLOSE(FBAHTUL);
END;


BEGIN
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);BBN:=PARAMSTR(5);
BBT:=PARAMSTR(6);BGM:=PARAMSTR(7);BDD:=PARAMSTR(8);BLK:=PARAMSTR(9);
GETDIR(0,DIRAK);CHDIR(DIREK);FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
 READ(FTIPE,JTIPE); CLOSE(FTIPE); FDM:=NFDA+BDD; ASSIGN(FDI,FDM);
 {$I-} RESET(FDI); {$I+}
 IF IORESULT=0 THEN BEGIN
  CLOSE(FDI); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT); {$I-} RESET(FBAHTUL); {$I+}
   IF IORESULT=0 THEN BEGIN
    CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
    IF IORESULT=0 THEN BEGIN
     CLOSE(FDATBAH); TP:=0;
     REPEAT
      PENAM:=0; TEXTBACKGROUND(0); CLRSCR;
      FOR I:=1 TO 1000 DO BEGIN
        TEXTCOLOR(5); GOTOXY(20,10); FOR J:=1 TO 35 DO WRITE(CHAR(176));
        GOTOXY(20,11); WRITE (CHAR(176),' '); FOR J:=1 TO 3 DO WRITE(CHAR(175));
        TEXTCOLOR(11); WRITE(' PROSES  DISAIN  KOLOM '); TEXTCOLOR(5);
        FOR J:=1 TO 3 DO WRITE(CHAR(174)); WRITE(' ',CHAR(176));
        GOTOXY(20,12); FOR J:=1 TO 35 DO WRITE(CHAR(176)); TEXTCOLOR(10); END;
      TP:=TP+1; RESET(FGMAKS);
      WHILE NOT EOF(FGMAKS) DO BEGIN
       WITH RECORDFGMS DO BEGIN READ(FGMAKS,RECORDFGMS);
        IF RECORDFGMS.TIPE=TP THEN BEGIN
         MUl:=RECORDFGMS.MUlap; MUt:=RECORDFGMS.MUtum; VUB:=RECORDFGMS.VU;
         TUB:=RECORDFGMS.TU; IF (MUL>MUK) OR (-MUL>MUK) THEN MUK:=MUL;
         IF (MUT>MUK) OR (-MUT>MUK) THEN MUK:=MUT;
         IF MUK<0 THEN MUK:=-MUK; END; END;
      END; CLOSE(FGMAKS); RESET(FDATBAH);
      WHILE NOT EOF(FDATBAH) DO BEGIN
       WITH RECORDFDBN DO BEGIN READ(FDATBAH,RECORDFDBN);
        IF RECORDFDBN.TIPE=TP THEN BEGIN
         FCB:=RECORDFDBN.FC; FYB:=RECORDFDBN.FY; ESB:=RECORDFDBN.ES; END; END;
      END; CLOSE(FDATBAH); RESET(FDI);
      WHILE NOT EOF(FDI) DO BEGIN
       WITH RECORDFDN DO BEGIN READ(FDI,RECORDFDN);
        IF RECORDFDN.TIPE=TP THEN BEGIN
         LB:=RECORDFDN.LK; BB:=RECORDFDN.BK; HB:=RECORDFDN.HK; PBB:=RECORDFDN.PBK;
         KB:=RECORDFDN.KK; RGB:=RECORDFDN.RG; PENAMPANG:=RECORDFDN.PEN;
         PENGIKAT:=RECORDFDN.PENG; END; END;
      END; CLOSE(FDI); RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL);
      DPMAKS:=0; DSMAKS:=0;
      FOR I:=1 TO JUM DO BEGIN
       WITH RECORDFDBT DO BEGIN SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
        IF TIPE=TP THEN BEGIN
         IF (DP>DPMAKS) AND (DP<>0) THEN DPMAKS:=DP;
         IF (DS>DSMAKS) AND (DS<>0) THEN DSMAKS:=DS; END; END;
      END; CLOSE(FBAHTUL);
      IF PENGIKAT=1 THEN O:=0.65;
      IF PENGIKAT=2 THEN O:=0.70;
      IF PENAMPANG=2 THEN HB:=0.8*BB; R:=0.30*HB;
      IF MUL<0 THEN BEGIN MUS:=MUL; MUL:=MUT; MUT:=MUS; END;
      IF ABS(MUT)>ABS(MUL) THEN BEGIN MUS:=MUL; MUL:=MUT; MUT:=MUS; END;
      IF (MUl<>0) AND (MUt<>0) THEN KL:=34-12*(ABS(MUT)/ABS(MUL));
      IF (MUl=0) OR (MUt=0) THEN KL:=22;
      IF (KB*LB/R)>KL THEN BEGIN
       IF (MUL=0) OR (MUT=0) THEN CM:=1 ELSE CM:=0.60+0.40*(ABS(MUT)/ABS(MUL));
       IF CM<0.40 THEN CM:=0.40; IF PENAMPANG=1 THEN IG:=(BB*SQR(HB)*HB)/12;
       IF PENAMPANG=2 THEN IG:=SQR(BB)*SQR(BB)/64; EC:=4700*SQRT(FCB);
       BD:=0.25; EI:=EC*IG/(2.5*(1+BD)); PC:=SQR(3.14)*EI/(SQR(KB*LB));
```

```
 DB:=CM/(1-TUB/(O*PC)); IF DB<1 THEN DB:=1; MC:=DB*MUK; MUK:=MC; END;
E:=MUK/TUB; DA:=PBB+0.5*DPMAKS+DSMAKS;
IF PENAMPANG=1 THEN D:=HB-DA;
IF PENAMPANG=2 THEN BEGIN
 HEK:=0.8*BB; BEK:=0.25*3.14*SQR(BB)/HEK; D:=HEK-DA; END;
ASPER:=RGB*BB*D/2; ATULR:=ASPER; PILIHTULANGAN; DPTLB:=DPTUL;
IF NTUL=1 THEN NTUL:=2; NTLB:=NTUL; AS:=NTLB*0.25*3.14*SQR(DPTLB);
ASA:=AS; DA:=PBB+0.5*DPTLB+DSMAKS;
IF PENAMPANG=1 THEN D:=HB-DA;
IF PENAMPANG=2 THEN BEGIN
 HEK:=0.8*BB; BEK:=0.25*3.14*SQR(BB)/HEK; D:=HEK-DA; END;
IF PENAMPANG=1 THEN BEGIN
RO:=2*AS/(BB*D); CB:=600*D/(600+FYB); B1:=0.85-0.008*(FCB-30);
AB:=B1*CB; ESA:=(CB-DA)*0.003/CB; EY:=FYB/ESB;
IF ESA>=EY THEN FSA:=FYB; IF ESA<EY THEN FSA:=ESA*ESB;
PNB:=O*(0.85*FCB*AB*BB+ASA*FSA-AS*FYB);
IF PNB>TUB THEN BEGIN
 M:=FYB/(0.85*FCB);
 PN:=0.85*FCB*BB*D*((HB-2*E)/(2*D)+SQRT(SQR((HB-2*E)/(2*D))+2*M*RO*(1-DA/D)));
END
ELSE PN:=ASA*FYB/(E/(D-DA)+0.5)+BB*HB*FCB/(3*HB*E/SQR(D)+1.18); END;
IF PENAMPANG=2 THEN BEGIN
PBEFF:=PBB+DPTLB; AG:=0.25*3.14*SQR(BB); RO:=2*AS/AG; DSK:=BB-2*PBEFF;
CB:=600*D/(600+FYB); B1:=0.85-0.008*(FCB-30); AB:=B1*CB;
ESA:=(CB-DA)*0.003/CB; EY:=FYB/ESB;
IF ESA>=EY THEN FSA:=FYB; IF ESA<EY THEN FSA:=ESA*ESB;
PNB:=O*(0.85*FCB*AB*BEK+ASA*FSA-AS*FYB);
IF PNB>TUB THEN BEGIN
 M:=FYB/(0.85*FCB);
 PN:=0.85*FCB*SQR(BB)*(SQRT(SQR(0.85*E/BB-0.38)+RO*M*DSK/
 (2.5*BB))-(0.85*E/BB-0.38)); END;
 IF PNB<=TUB THEN PN:=AS*FYB/(3*E/DSK+1)+AG*FCB/(9.6*BB*E/
 SQR(0.8*BB+0.67*DSK)+1.18); END;
IF O*PN<TUB THEN PENAM:=1;
IF PENAM<>1 THEN BEGIN
 IF PENGIKAT=1 THEN BEGIN S:=16*DPTLB;
  IF PENAMPANG=1 THEN BEGIN
   IF S>BB THEN S:=BB; IF S>HB THEN S:=HB; END
  ELSE BEGIN
   IF S>BEK THEN S:=BEK; IF S>HEK THEN S:=HEK; END; END;
 RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL); DSS:=0; SS:=0;
 FOR I:=1 TO JUM DO BEGIN
  WITH RECORDFDBT DO BEGIN
   SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
   IF (TIPE=TP) AND (DS<>0) THEN BEGIN
    IF PENGIKAT=1 THEN BEGIN
     IF S>48*DS THEN S:=48*DS; END
    ELSE BEGIN ASS:=0.25*3.14*SQR(DS);
     IF PENAMPANG=1 THEN BEGIN
      AG:=BB*HB; AC:=(BB-2*PBB)*(HB-2*PBB);
      ROS:=0.45*(AG/AC-1)*FCB/FYB;
      S:=ASS*2*((BB-2*PBB)+(HB-2*PBB))/(AC*ROS);
      IF S<25 THEN S:=25; IF S>80 THEN S:=80; END
     ELSE BEGIN
      DC:=BB-2*PBB; AC:=0.25*3.14*SQR(DC);
      ROS:=0.45*(AG/AC-1)*FCB/FYB;
      S:=4*ASS*(DC-DS)/(SQR(DC)*ROS);
      IF S<25 THEN S:=25; IF S>80 THEN S:=80; END; END; END;
    IF (S>SS) AND (DS<>0) THEN BEGIN
     SS:=S; DSS:=DS; END; END; END; CLOSE(FBAHTUL); END;
IF PENAM=1 THEN BEGIN
 CLRSCR; TEXTCOLOR(11);
 GOTOXY(20,10); WRITE('Perencanaan Kolom "DIULANG".......!');
 WRITE(^G); READKEY; TEXTCOLOR(10); END;
IF PENAM<>1 THEN BEGIN
 FBK:=NFDA+BLK; ASSIGN(FKOLOM,FBK); {$I-} RESET(FKOLOM); {$I+}
 IF IORESULT<>0 THEN REWRITE(FKOLOM);
 NOREC:=-1; JUM:=FILESIZE(FKOLOM);
 WITH RECORDFKLM DO BEGIN
  IF JUM<>0 THEN BEGIN
```

```pascal
     FOR J:=1 TO JUM DO BEGIN
       SEEK(FKOLOM,J-1); READ(FKOLOM,RECORDFKLM);
       IF TP=RECORDFKLM.TIPE THEN NOREC:=J-1; END;
       IF NOREC=-1 THEN NOREC:=JUM; SEEK(FKOLOM,NOREC); END;
       TIPE:=TP; FNTLB:=TRUNC(NTLB); FDPTLB:=TRUNC(DPTLB); FNTLA:=TRUNC(NTLB);
       FDPTLA:=TRUNC(DPTLB); FDSS:=TRUNC(DSS); FS:=TRUNC(SS);
       WRITE(FKOLOM,RECORDFKLM); END; CLOSE(FKOLOM); END;
     UNTIL TP=JTIPE;
   END
   ELSE BEGIN
     CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
     WRITE('DATA BAHAN BELUM DIBUAT...!'); WRITE(^G);
     READKEY; TEXTCOLOR(10); END;
   END
   ELSE BEGIN
     CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
     WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
     WRITE(^G); READKEY; TEXTCOLOR(10); END;
   END
   ELSE BEGIN
     CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
     WRITE('DATA GAYA YG BEKERJA PADA ',EL,' BELUM DIBUAT...!');
     WRITE(^G); READKEY; TEXTCOLOR(10); END;
   END
   ELSE BEGIN
     CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
     WRITE('DATA DIMENSI ',EL,' BELUM DIBUAT...!');
     WRITE(^G); READKEY; TEXTCOLOR(10); END;
   END
   ELSE BEGIN
     CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
     WRITE('JUMLAH TIPE ',EL,' BELUM ADA....!');
     WRITE(^G); READKEY; TEXTCOLOR(10); END;
   CLRSCR; TEXTCOLOR(5); GOTOXY(20,10); FOR J:=1 TO 36 DO WRITE(CHAR(176));
   GOTOXY(20,11); WRITE (CHAR(176),' '); FOR J:=1 TO 3 DO WRITE(CHAR(175));
   TEXTCOLOR(4); WRITE(' DISAIN KOLOM SELESAI '); TEXTCOLOR(5);
   FOR J:=1 TO 3 DO WRITE(CHAR(174)); WRITE(' ',CHAR(176));
   GOTOXY(20,12); FOR J:=1 TO 36 DO WRITE(CHAR(176));
   GOTOXY(26,13); FOR J:=1 TO 5 DO WRITE(CHAR(3)); TEXTCOLOR(11);
   WRITE(' TEKAN ENTER '); TEXTCOLOR(5); FOR J:=1 TO 5 DO WRITE(CHAR(3)); TEXTCOLOR(10);
   WRITE(^G); READLN; CHDIR(DIRAK);
   END.


PROGRAM SKETSAKOLOM;
uses crt,graph,printer;
TYPE
  FDMN = RECORD
       TIPE  : INTEGER;
       LK    : REAL;
       BK    : REAL;
       HK    : REAL;
       PBK   : REAL;
       KK    : REAL;
       RG    : REAL;
       PEN   : INTEGER;
       PENG  : INTEGER;
      END;
  FKLM = RECORD
       TIPE   : INTEGER;
       FNTLB  : INTEGER;
       FDPTLB : INTEGER;
       FNTLA  : INTEGER;
       FDPTLA : INTEGER;
       FDSS   : INTEGER;
       FS     : INTEGER;
      END;

  Var
      FTIPE                : TEXT;
```

```pascal
FDIM                    : FILE OF FDMN;
FBALOK                  : FILE OF FKLM;
RECORDFDMN              : FDMN;
RECORDFBLK              : FKLM;
NFDA,EL                 : STRING[7];
FTIP,FDM,FBK            : STRING[12];
FTP,BDD,BLK,DIRAK,DIREK,E,F,G,H,K,L   : STRING;
JTIPE,tp,i,J,a,b,c,drivergrafik,
modegrafik,Z,X,Y,DSB,PBB,BB,
HB,SS,NMAKS,D,DPTLA,
NTLA,DL,NL,S,PN,PG   : INTEGER;
TULIS                   : STRING[9];

begin
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); FTP:=PARAMSTR(3); BDD:=PARAMSTR(4);
BLK:=PARAMSTR(5); GETDIR(0,DIRAK); CHDIR(DIREK); drivergrafik := detect;
IF (DIRAK='A:\') OR (DIRAK='C:\') OR (DIRAK='B:\') OR (DIRAK='D:\') OR
(DIRAK='E:\') THEN initgraph(drivergrafik, modegrafik,DIRAK+'LOGO') ELSE
initgraph(drivergrafik, modegrafik,DIRAK+'\LOGO');
FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN READ(FTIPE,JTIPE); CLOSE(FTIPE);
FBK:=NFDA+BLK; ASSIGN(FBALOK,FBK); {$I-} RESET(FBALOK); {$I+}
IF IORESULT=0 THEN BEGIN CLOSE(FBALOK);
FDM:=NFDA+BDD; ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
IF IORESULT=0 THEN BEGIN CLOSE(FDIM); TP:=0;
REPEAT
TP:=TP+1; RESET(FDIM); cleardevice; setfillstyle(1,15); Y:=0; S:=0;
floodfill(300,200,14); setteXTstyle(SMALLfont,horizdir,4); Z:=0;
WHILE NOT EOF(FDIM) DO BEGIN  WITH RECORDFDMN DO BEGIN READ(FDIM,RECORDFDMN);
 IF RECORDFDMN.TIPE=TP THEN BEGIN BB:=TRUNC(BK); HB:=TRUNC(HK); PN:=PEN;
 PG:=PENG; PBB:=TRUNC(PBK); END; END; END; CLOSE(FDIM); RESET(FBALOK);
  WHILE NOT EOF(FBALOK) DO BEGIN WITH RECORDFBLK DO BEGIN READ(FBALOK,RECORDFBLK);
   IF RECORDFBLK.TIPE=TP THEN BEGIN NTLA:=FNTLA; DPTLA:=FDPTLA;
   DSB:=FDSS; SS:=FS; END; END; END; CLOSE(FBALOK);SETCOLOR(0);
NMAKS:=TRUNC((BB-2*PBB-2*DSB+25)/(25+DPTLA));
STR(HB,E); E:=E+' mm'; STR(BB,F); F:=F+' mm'; STR(PBB,G); G:=G+' mm';
STR(DSB,H); H:='D'+H+'-'; STR(SS,K); H:=H+K; STR(DPTLA,K); K:='D'+K;
IF PG=1 THEN STR(NTLA,L) ELSE STR(2*NTLA,L); K:=L+K; STR(TP,L);
IF PG=1 THEN BEGIN
 SETLINESTYLE(0,0,1); rectangle(250,30,330,130); MOVETO(200,20);
 LINEREL(0,120); MOVETO(195,30); LINEREL(10,0);
 MOVETO(195,130); LINEREL(10,0); OUTTEXTXY(155,76,E);
 MOVETO(240,165); LINEREL(100,0); MOVETO(250,160);
 LINEREL(0,10); MOVETO(330,160); LINEREL(0,10);
 OUTTEXTXY(275,151,F); MOVETO(335,150); LINEREL(-20,0);
 MOVETO(330,148); LINEREL(0,5); MOVETO(320,148); LINEREL(0,5);
 OUTTEXTXY(315,135,G); MOVETO(340,135); LINEREL(0,-20);
 MOVETO(337,130); LINEREL(5,0); MOVETO(337,120); LINEREL(5,0);
 OUTTEXTXY(345,120,G); SETLINESTYLE(0,0,3);
 MOVETO(262,40); LINEREL(56,0); MOVETO(320,42); LINEREL(0,76);
 MOVETO(262,120); LINEREL(56,0); MOVETO(260,42);
 LINEREL(0,76); SETLINESTYLE(0,0,3); ELLIPSE(262,42,90,180,2,2);
 ELLIPSE(318,42,0,90,2,2); ELLIPSE(262,118,180,270,2,2);
 ELLIPSE(318,118,270,0,2,2); ELLIPSE(316,44,0,360,2,2);
 ELLIPSE(316,116,0,360,2,2); SETLINESTYLE(0,0,1);
 MOVETO(316,44); LINEREL(10,10); MOVETO(316,116);
 LINEREL(10,-10);
 FOR I:=0 TO 1 DO BEGIN
 IF (NTLA>2) THEN BEGIN IF NMAKS>1 THEN BEGIN
  IF NTLA<=NMAKS THEN BEGIN B:=TRUNC((80-20-2*NTLA)/(NTLA-1));
  IF FRAC(NTLA/2)>0 THEN BEGIN A:=0; C:=1; D:=1;
  FOR J:=1 TO NTLA-3 DO BEGIN IF A=0 THEN BEGIN
   SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,44+I*72,0,360,2,2);
   SETLINESTYLE(0,0,1); MOVETO(264+B*C,44+I*72); LINEREL(10,10-I*20);
   A:=1; C:=C+1; END ELSE BEGIN
   SETLINESTYLE(0,0,3); ELLIPSE(316-B*D,44+I*72,0,360,2,2);
   SETLINESTYLE(0,0,1); MOVETO(316-B*D,44+I*72); LINEREL(10,10-I*20);
   A:=0; D:=D+1; END; END; SETLINESTYLE(0,0,3); ELLIPSE(290,44+I*72,0,360,2,2);
   ELLIPSE(316,44+I*72,0,360,2,2); ELLIPSE(264,44+I*72,0,360,2,2); SETLINESTYLE(0,0,1);
   MOVETO(264,44+I*72); LINEREL(10,10-I*20); LINEREL(130,0); OUTTEXTXY(374,42+I*52,K);
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  MOVETO(316,44+I*72); LINEREL(10,10-I*20); MOVETO(290,44+I*72); LINEREL(10,10-I*20);
  END ELSE BEGIN A:=0; C:=1; D:=1; FOR J:=1 TO NTLA-2 DO BEGIN IF A=0 THEN BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,44+I*72,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(264+B*C,44+I*72); LINEREL(10,10-I*20);
    A:=1; C:=C+1; END
  ELSE BEGIN SETLINESTYLE(0,0,3); ELLIPSE(316-B*D,44+I*72,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(316-B*D,44+I*72); LINEREL(10,10-I*20);
    A:=0; D:=D+1; END; END;
  SETLINESTYLE(0,0,3); ELLIPSE(316,44+I*72,0,360,2,2); ELLIPSE(264,44+I*72,0,360,2,2);
  SETLINESTYLE(0,0,1); MOVETO(264,44+I*72); LINEREL(10,10-I*20); LINEREL(130,0);
  OUTTEXTXY(374,42+I*52,K); MOVETO(316,44+I*72); LINEREL(10,10-I*20); END; END
ELSE BEGIN
  IF NTLA-NMAKS<=NMAKS THEN BEGIN B:=TRUNC((80-20-2*NMAKS)/(NMAKS-1));
  IF FRAC(NMAKS/2)>0 THEN BEGIN A:=0; C:=1; D:=1; FOR J:=1 TO NMAKS-3 DO BEGIN IF A=0 THEN BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,44+I*72,0,360,2,2); SETLINESTYLE(0,0,1);
    MOVETO(264+B*C,44+I*72); LINEREL(17,17-I*34); A:=1; C:=C+1; END ELSE BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(316-B*D,44+I*72,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(316-B*D,44+I*72); LINEREL(17,17-I*34);
    A:=0; D:=D+1; END; END;
  SETLINESTYLE(0,0,3); ELLIPSE(264,44+I*72,0,360,2,2); ELLIPSE(316,44+I*72,0,360,2,2);
  ELLIPSE(290,44+I*72,0,360,2,2); SETLINESTYLE(0,0,1); MOVETO(264,44+I*72); LINEREL(17,17-I*34);
  MOVETO(316,44+I*72); LINEREL(17,17-I*34); SETLINESTYLE(0,0,1); MOVETO(290,44+I*72);
  LINEREL(17,17-I*34); END ELSE BEGIN A:=0; C:=1; D:=1;
  FOR J:=1 TO NMAKS-2 DO BEGIN IF A=0 THEN BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,44+I*72,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(264+B*C,44+I*72); LINEREL(17,17-I*34);
    A:=1; C:=C+1; END ELSE BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(316-B*D,44+I*72,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(316-B*D,44+I*72); LINEREL(17,17-I*34);
    A:=0; D:=D+1; END; END; SETLINESTYLE(0,0,3); ELLIPSE(264,44+I*72,0,360,2,2);
  ELLIPSE(316,44+I*72,0,360,2,2); SETLINESTYLE(0,0,1); MOVETO(264,44+I*72); LINEREL(17,17-I*34);
  MOVETO(316,44+I*72); LINEREL(17,17-I*34); END;
  IF FRAC((NTLA-NMAKS)/2)>0 THEN BEGIN A:=0; C:=1; D:=1;
  IF NTLA-NMAKS=1 THEN BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(290,51+I*58,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(290,51+I*58); LINEREL(10,10-I*20);
    MOVETO(281,61+I*38); LINEREL(130,0);
    OUTTEXTXY(374,49+I*38,K); END ELSE BEGIN
    FOR J:=1 TO (NTLA-NMAKS-3) DO BEGIN IF A=0 THEN BEGIN
      SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,51+I*58,0,360,2,2);
      SETLINESTYLE(0,0,1); MOVETO(264+B*C,51+I*58); LINEREL(10,10-I*20);
      A:=1; C:=C+1; END ELSE BEGIN
      SETLINESTYLE(0,0,3); ELLIPSE(316-B*D,51+I*58,0,360,2,2);
      SETLINESTYLE(0,0,1); MOVETO(316-B*D,51+I*58); LINEREL(10,10-I*20);
      A:=0; D:=D+1; END; END;
    SETLINESTYLE(0,0,3); ELLIPSE(264,51+I*58,0,360,2,2);ELLIPSE(316,51+I*58,0,360,2,2);
    ELLIPSE(290,51+I*58,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(264,51+I*58); LINEREL(10,10-I*20);
    LINEREL(130,0); OUTTEXTXY(374,49+I*38,K); MOVETO(316,51+I*58); LINEREL(10,10-I*20);
    MOVETO(290,51+I*58); LINEREL(10,10-I*20); END; END
  ELSE BEGIN A:=0; C:=1; D:=1;
  FOR J:=1 TO (NTLA-NMAKS-2) DO BEGIN IF A=0 THEN BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,51+I*58,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(264+B*C,51+I*58); LINEREL(10,10-I*20);
    A:=1; C:=C+1; END ELSE BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(316-B*D,51+I*58,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(316-B*D,51+I*58); LINEREL(10,10-I*20);
    A:=0; D:=D+1; END; END;
  SETLINESTYLE(0,0,3); ELLIPSE(264,51+I*58,0,360,2,2);ELLIPSE(316,51+I*58,0,360,2,2);
  SETLINESTYLE(0,0,1); MOVETO(264,51+I*58); LINEREL(10,10-I*20);
  LINEREL(130,0); OUTTEXTXY(374,49+I*38,K); MOVETO(316,51+I*58); LINEREL(10,10-I*20); END; END
ELSE BEGIN
  IF NTLA-2*NMAKS<=NMAKS THEN BEGIN B:=TRUNC((80-20-2*NMAKS)/(NMAKS-1));
  IF FRAC(NMAKS/2)>0 THEN BEGIN A:=0; C:=1; D:=1;
  FOR J:=1 TO NMAKS-3 DO BEGIN IF A=0 THEN BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,44+I*72,0,360,2,2);ELLIPSE(264+B*C,51+I*58,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(264+B*C,44+I*72); LINEREL(24,24-I*48);
    MOVETO(264+B*C,51+I*58); LINEREL(17,17-I*34); A:=1; C:=C+1; END ELSE BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(316-B*D,44+I*72,0,360,2,2);ELLIPSE(316-B*D,51+I*58,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(316-B*D,44+I*72); LINEREL(24,24-I*48);
    MOVETO(316-B*D,51+I*58); LINEREL(17,17-I*34);A:=0; D:=D+1; END; END;
```

```
SETLINESTYLE(0,0,3); ELLIPSE(264,44+I*72,0,360,2,2);ELLIPSE(264,51+I*58,0,360,2,2);
ELLIPSE(316,44+I*72,0,360,2,2);ELLIPSE(316,51+I*58,0,360,2,2);
ELLIPSE(290,44+I*72,0,360,2,2);ELLIPSE(290,51+I*58,0,360,2,2);
SETLINESTYLE(0,0,1); MOVETO(264,44+I*72); LINEREL(24,24-I*48);
MOVETO(264,51+I*58); LINEREL(17,17-I*34);MOVETO(316,44+I*72); LINEREL(24,24-I*48);
MOVETO(316,51+I*58); LINEREL(17,17-I*34);MOVETO(290,44+I*72); LINEREL(24,24-I*48);
MOVETO(290,51+I*58); LINEREL(17,17-I*34); END ELSE BEGIN  A:=0; C:=1; D:=1;
FOR J:=1 TO NMAKS-2 DO BEGIN IF A=0 THEN BEGIN
  SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,44+I*72,0,360,2,2);ELLIPSE(264+B*C,51+I*58,0,360,2,2);
  SETLINESTYLE(0,0,1); MOVETO(264+B*C,44+I*72); LINEREL(24,24-I*48);
  MOVETO(264+B*C,51+I*58); LINEREL(17,17-I*34);A:=1; C:=C+1; END ELSE BEGIN
  SETLINESTYLE(0,0,3);ELLIPSE(316-B*D,44+I*72,0,360,2,2);ELLIPSE(316-B*D,51+I*58,0,360,2,2);
  SETLINESTYLE(0,0,1);MOVETO(316-B*D,44+I*72); LINEREL(24,24-I*48);
  MOVETO(316-B*D,51+I*58); LINEREL(17,17-I*34); A:=0; D:=D+1; END; END;
  SETLINESTYLE(0,0,3); ELLIPSE(264,44+I*72,0,360,2,2);ELLIPSE(264,51+I*58,0,360,2,2);
  ELLIPSE(316,44+I*72,0,360,2,2);ELLIPSE(316,51+I*58,0,360,2,2);
  SETLINESTYLE(0,0,1); MOVETO(264,44+I*72); LINEREL(24,24-I*48);
  MOVETO(264,51+I*58); LINEREL(17,17-I*34);MOVETO(316,44+I*72); LINEREL(24,24-I*48);
  MOVETO(316,51+I*58); LINEREL(17,17-I*34); END;
IF FRAC((NTLA-2*NMAKS)/2)>0 THEN BEGIN A:=0; C:=1; D:=1;
IF NTLA-2*NMAKS=1 THEN BEGIN
  SETLINESTYLE(0,0,3); ELLIPSE(290,58+I*44,0,360,2,2);
  SETLINESTYLE(0,0,1); MOVETO(290,58+I*44); LINEREL(10,10-I*20);
  MOVETO(281,68+I*24); LINEREL(130,0);
  OUTTEXTXY(374,56+I*24,K); END ELSE BEGIN
  FOR J:=1 TO (NTLA-2*NMAKS-3) DO BEGIN IF A=0 THEN BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,58+I*44,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(264+B*C,58+I*44); LINEREL(10,10-I*20);
    A:=1; C:=C+1; END ELSE BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(316-B*D,58+I*44,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(316-B*D,58+I*44); LINEREL(10,10-I*20);
    A:=0; D:=D+1; END; END;
  SETLINESTYLE(0,0,3); ELLIPSE(264,58+I*44,0,360,2,2);ELLIPSE(316,58+I*44,0,360,2,2);
  ELLIPSE(290,58+I*44,0,360,2,2);SETLINESTYLE(0,0,1); MOVETO(264,58+I*44); LINEREL(10,10-I*20);
  LINEREL(130,0);OUTTEXTXY(374,56+I*24,K);MOVETO(316,58+I*44); LINEREL(10,10-I*20);
  MOVETO(290,58+I*44); LINEREL(10,10-I*20); END; END ELSE BEGIN A:=0; C:=1; D:=1;
  FOR J:=1 TO (NTLA-2*NMAKS-2) DO BEGIN IF A=0 THEN BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(264+B*C,58+I*44,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(264+B*C,58+I*44); LINEREL(10,10-I*20);
    A:=1; C:=C+1; END ELSE BEGIN
    SETLINESTYLE(0,0,3); ELLIPSE(316-B*D,58+I*44,0,360,2,2);
    SETLINESTYLE(0,0,1); MOVETO(316-B*D,58+I*44); LINEREL(10,10-I*20);
    A:=0; D:=D+1; END; END;
  SETLINESTYLE(0,0,3); ELLIPSE(264,58+I*44,0,360,2,2);ELLIPSE(316,58+I*44,0,360,2,2);
  SETLINESTYLE(0,0,1); MOVETO(264,58+I*44); LINEREL(10,10-I*20);
  LINEREL(130,0);OUTTEXTXY(374,56+I*24,K);MOVETO(316,58+I*44); LINEREL(10,10-I*20); END; END
ELSE Y:=1; END; END; END ELSE Z:=1; END
ELSE BEGIN IF NMAKS>1 THEN BEGIN
  SETLINESTYLE(0,0,3); ELLIPSE(264,44+I*72,0,360,2,2);
  SETLINESTYLE(0,0,1); MOVETO(264,44+I*72); LINEREL(10,10-I*20); LINEREL(130,0);
  OUTTEXTXY(374,42+I*52,K); END ELSE Z:=1; END; END; END
ELSE BEGIN
  SETLINESTYLE(0,0,1); ELLIPSE(300,100,0,360,70,70); SETLINESTYLE(0,0,3);
  ELLIPSE(300,100,0,360,60,60); S:=0; A:=0; SETLINESTYLE(0,0,3);
IF FRAC(NTLA/2)>0 THEN BEGIN NTLA:=NTLA-1; S:=1;
  FOR I:=0 TO 1 DO BEGIN ELLIPSE(300,46+I*108,0,360,2,2); END; END;
B:=TRUNC(60/(NTLA/2+1)); FOR J:=1 TO TRUNC(NTLA/2) DO BEGIN
  IF (S=0) AND (J=1) THEN A:=A+TRUNC(B/2) ELSE A:=A+B;
  ELLIPSE(300+A,100-TRUNC(SQRT(2916-SQR(A))),0,360,2,2);
  ELLIPSE(300-A,100-TRUNC(SQRT(2916-SQR(A))),0,360,2,2);
  ELLIPSE(300+A,100+TRUNC(SQRT(2916-SQR(A))),0,360,2,2);
  ELLIPSE(300-A,100+TRUNC(SQRT(2916-SQR(A))),0,360,2,2); END;
setteXTstyle(SMALLfont,horizdir,4); SETLINESTYLE(0,0,1);
OUTTEXTXY(287,95,K);MOVETO(200,20);LINEREL(0,160);MOVETO(195,30);
LINEREL(10,0);MOVETO(195,170);LINEREL(10,0);OUTTEXTXY(155,100,F);
MOVETO(355,180);LINEREL(20,0);MOVETO(360,178);LINEREL(0,5);MOVETO(370,178);
LINEREL(0,5);OUTTEXTXY(352,165,G); MOVETO(360,100); LINEREL(20,0);
OUTTEXTXY(390,95,H); END;
IF Y=0 THEN BEGIN IF NMAKS>1 THEN BEGIN
  IF PG=1 THEN BEGIN SETLINESTYLE(0,0,1); MOVETO(260,110); LINEREL(-23,23);
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  OUTTEXTXY(220,135,H);END;setteXTstyle(tripleXfont,horizdir,1);
  outteXTXy(135,310,'SKETSA PENULANGAN KOLOM TIPE '+L);
  setteXTstyle(SMALLfont,horizdir,6); IF PG=1 THEN
   OUTTEXTXY(130,270,'PENULANGAN KOLOM PENAMPANG PERSEGI') ELSE
   OUTTEXTXY(120,270,'PENULANGAN KOLOM PENAMPANG LINGKARAN');
   setteXTstyle(SMALLfont,horizdir,4); END; END ELSE BEGIN
 setfillstyle(1,15);bar(251,31,329,129);bar(331,31,291,115);SETLINESTYLE(0,0,3);
 MOVETO(262,40); LINEREL(56,0); MOVETO(320,42);LINEREL(0,76); MOVETO(262,120);
 LINEREL(56,0);MOVETO(260,42); LINEREL(0,76); ELLIPSE(262,42,90,180,2,2);
 ELLIPSE(318,42,0,90,2,2); ELLIPSE(262,118,180,270,2,2);
 ELLIPSE(318,118,270,0,2,2);setteXTstyle(tripleXfont,horizdir,1);
 outteXTXy(135,310,'SKETSA PENULANGAN KOLOM TIPE '+L);
  setteXTstyle(SMALLfont,horizdir,4);
  OUTTEXTXY(186,190,'TULANGAN LEBIH DARI TIGA BARIS TULANGAN');
  setteXTstyle(SMALLfont,horizdir,6);
  OUTTEXTXY(177,270,'PENULANGAN KOLOM PERSEGI');
  setteXTstyle(SMALLfont,horizdir,4); END; IF (Z=1) THEN BEGIN
 setfillstyle(1,15); bar(251,31,329,129);
 bar(331,31,431,115); SETLINESTYLE(0,0,3);
 MOVETO(262,40); LINEREL(56,0); MOVETO(320,42);
 LINEREL(0,76); MOVETO(262,120); LINEREL(56,0);
 MOVETO(260,42); LINEREL(0,76); ELLIPSE(262,42,90,180,2,2);
 ELLIPSE(318,42,0,90,2,2); ELLIPSE(262,118,180,270,2,2);
 ELLIPSE(318,118,270,0,2,2); setteXTstyle(tripleXfont,horizdir,1);
 outteXTXy(135,310,'SKETSA PENULANGAN KOLOM TIPE '+L);
  setteXTstyle(SMALLfont,horizdir,4);
  OUTTEXTXY(195,190,'LEBAR PENAMPANG TIDAK MENCUKUPI ... !');
  setteXTstyle(SMALLfont,horizdir,6);
  OUTTEXTXY(177,270,'PENULANGAN KOLOM PERSEGI');
  setteXTstyle(SMALLfont,horizdir,4); END;
 SETLINESTYLE(0,0,1); SETCOLOR(1); setteXTstyle(tripleXfont,horizdir,1);
 outteXTXy(516,440,'UII-CDP'); setteXTstyle(SMALLfont,horizdir,4);
 setcolor(4); rectangle(500,440,600,465); setcolor(0);
 READKEY; UNTIL TP=JTIPE;
  END; END; END; closegraph; restorecrtmode; CHDIR(DIRAK);
end.


PROGRAM TDKO;
USES CRT;
TYPE
  FDBN = RECORD
        TIPE : INTEGER;
        FC  : REAL;
        FY  : REAL;
        ES  : REAL;
        END;
  FDBT = RECORD
        TIPE : INTEGER;
        N   : INTEGER;
        DP  : INTEGER;
        DS  : INTEGER;
        END;
  FGMS = RECORD
        TIPE : INTEGER;
        MUlap : REAL;
        MUtum : REAL;
        VU  : REAL;
        TU  : REAL;
        END;
  FDMN = RECORD
        TIPE : INTEGER;
        LK   : REAL;
        BK   : REAL;
        HK   : REAL;
        PBK  : REAL;
        KK   : REAL;
        RG   : REAL;
        PEN  : INTEGER;
        PENG : INTEGER;
```

```pascal
        END;
   FELN = RECORD
        TIPE : INTEGER;
        NO  : INTEGER;
        ELE : INTEGER;
        END;

VAR
  FTIPE                  : TEXT;
  FDATBAH                  : FILE OF FDBN;
  FBAHTUL                  : FILE OF FDBT;
  FGMAKS                   : FILE OF FGMS;
  FDIM                   : FILE OF FDMN;
  FELE                   : FILE OF FELN;
  RECORDFELN                 : FELN;
  RECORDFDBN                 : FDBN;
  RECORDFDBT               : FDBT;
  RECORDFGMS               : FGMS;
  RECORDFDMN                 : FDMN;
  I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
  NTUL,DPTUL,K,F             : INTEGER;
  NFDA,EL              : STRING[7];
  FDB,FDT,FGM,FTIP,FDM,FELM         : STRING[12];
  FTP,BBN,BBT,BEL,BGM,BDD,DIRAK,DIREK    : STRING;

BEGIN
  DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);
  BBN:=PARAMSTR(5); BBT:=PARAMSTR(6); BEL:=PARAMSTR(7); BGM:=PARAMSTR(8);
  BDD:=PARAMSTR(9); GETDIR(0,DIRAK); CHDIR(DIREK); FDM:=NFDA+BDD;
  ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FDIM); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
   IF IORESULT=0 THEN BEGIN
    CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT); {$I-} RESET(FBAHTUL); {$I+}
    IF IORESULT=0 THEN BEGIN
     CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
     IF IORESULT=0 THEN BEGIN
      CLOSE(FDATBAH); FELM:=NFDA+BEL; ASSIGN(FELE,FELM); {$I-} RESET(FELE); {$I+}
      IF IORESULT=0 THEN BEGIN
       CLOSE(FELE); TEXTCOLOR(10); TEXTBACKGROUND(0); clrscr; I:=1; K:=1; F:=1;
       RESET(FDATBAH);
       WHILE NOT EOF(FDATBAH) DO BEGIN
       SEEK(FDATBAH,F-1); READ(FDATBAH,RECORDFDBN); F:=F+1;
       WITH RECORDFDBN DO BEGIN
       IF (K=1) THEN BEGIN I:=I+6;
       IF I>=22 THEN BEGIN CLRSCR; I:=7; END;
       WRITE('      ',CHAR(218));
       FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(191));
       WRITELN; WRITE('     ',CHAR(179)); TEXTCOLOR(11);
       WRITE('         >>> DATA BAHAN <<<',
       '            '); TEXTCOLOR(10); WRITE(CHAR(179));
       WRITELN; WRITE('     ',CHAR(195));
       FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(180));
       WRITELN; WRITE('     ',CHAR(179),
       ' Tipe Teg. Desak Beton  Teg. Tarik Baja  Mod. ',
       'Elastisitas Baja ',CHAR(179)); WRITELN;
       WRITE('     ',CHAR(179),
       ' Kolom   (MPa)        (MPa)         (MPa)',
       '     ',CHAR(179)); WRITELN;
       WRITE('     ',CHAR(195));
       FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(180));
       WRITELN; END;
       WRITE('     ',CHAR(179),' ',TIPE:3,'     ',TRUNC(FC):3,
       '          ',TRUNC(FY):3,'             ',TRUNC(ES):6,
       '     ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
       IF (I>=22) OR EOF(FDATBAH) THEN BEGIN
       WRITE('     ',CHAR(192));
       FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(217)); READKEY;
       WRITELN; K:=1; I:=I+1; END;
       IF I>=22 THEN BEGIN I:=1; K:=1; CLRSCR; END; END;
```

```
END; CLOSE(FDATBAH); F:=1; RESET (FBAHTUL);
WHILE NOT EOF(FBAHTUL) DO BEGIN
SEEK(FBAHTUL,F-1); READ(FBAHTUL,RECORDFDBT); F:=F+1;
WITH RECORDFDBT DO BEGIN
IF (K=1) THEN BEGIN I:=I+6;
 IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
 WRITE('       ',CHAR(218));
 FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(191));
 WRITELN; WRITE('       ',CHAR(179)); TEXTCOLOR(11);
 WRITE('       >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN',
 ' <<<       '); TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
 WRITE('       ',CHAR(195));
 FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(180));
 WRITELN; WRITE('       ',CHAR(179),' Tipe  No.  Diameter Tulangan',
 ' Pokok   Diameter Tulangan Sengkang ',CHAR(179)); WRITELN;
 WRITE('       ',CHAR(179),' Kolom            (mm)',
 '           (mm)            ',CHAR(179));
 WRITELN; WRITE('       ',CHAR(195));
 FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(180));
 WRITELN; END;
 WRITE('       ',CHAR(179),'  ',TIPE:3,'    ',N:2,
 '          ',DP:2,'                    ',DS:2,
 '          ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
IF (I>=22) OR EOF(FBAHTUL) THEN BEGIN
 WRITE('       ',CHAR(192));
 FOR J:=1 TO 65 DO WRITE(CHAR(196)); WRITE(CHAR(217));
 READKEY; WRITELN; K:=1; I:=I+1; END;
 IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
END; CLOSE(FBAHTUL); F:=1; RESET(FELE);
WHILE NOT EOF(FELE) DO BEGIN
SEEK(FELE,F-1); READ(FELE,RECORDFELN); F:=F+1;
WITH RECORDFELN DO BEGIN
IF K=1 THEN BEGIN I:=I+5;
 IF I>=22 THEN BEGIN I:=6; CLRSCR; END;
 WRITE('       ',CHAR(218));
 FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(191));
 WRITELN; WRITE('       ',CHAR(179)); TEXTCOLOR(11);
 WRITE(' >>> DATA ELEMEN ',EL:7,' <<< '); TEXTCOLOR(10);
 WRITE(CHAR(179)); WRITELN; WRITE('       ',CHAR(195));
 FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(180));
 WRITELN; WRITE('       ',CHAR(179),' Tipe     No.    Elemen ',
 CHAR(179)); WRITELN; WRITE('       ',CHAR(195));
 FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(180));
 WRITELN; END;
 WRITE('       ',CHAR(179),'  ',TIPE:3,'    ',NO:2,
 '    ',ELE:3,'  ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
IF (I>=22) OR EOF(FELE) THEN BEGIN
 WRITE('       ',CHAR(192));
 FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(217));
 READKEY; WRITELN; K:=1; I:=I+1; END;
 IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
END; CLOSE(FELE); F:=1; RESET(FDIM);
WHILE NOT EOF(FDIM) DO BEGIN
SEEK(FDIM,F-1); READ(FDIM,RECORDFDMN); F:=F+1;
WITH RECORDFDMN DO BEGIN
IF K=1 THEN BEGIN I:=I+6;
 IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
 WRITE('       ',CHAR(218));
 FOR J:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(191));
 WRITELN; WRITE('       ',CHAR(179)); TEXTCOLOR(11);
 WRITE('            >>> DATA DIMENSI <<<    ',
 '        '); TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
 WRITE('       ',CHAR(195));
 FOR J:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(180));
 WRITELN; WRITE('       ',CHAR(179),' Tipe Panjang  Lebar',
 'Diameter Tinggi  Penutup Beton ',CHAR(179)); WRITELN;
 WRITE('       ',CHAR(179),' Kolom (mm)      (mm)',
 '   (mm)     (mm)    ',
 CHAR(179)); WRITELN; WRITE('       ',CHAR(195));
 FOR J:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(180));
```

```
    WRITELN; END;
    WRITE('      ',CHAR(179),' ',TIPE:3,'  ',TRUNC(LK):5,
    '      ',TRUNC(BK):4,'     ',TRUNC(HK):4,'    ',
    TRUNC(PBK):3,'     ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
    IF (I>=22) OR EOF(FDIM) THEN BEGIN
     WRITE('      ',CHAR(192));
     FOR J:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(217));
     READKEY; WRITELN; K:=1; I:=I+1; END;
    IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
   END; CLOSE(FDIM); F:=1; RESET(FGMAKS);
   WHILE NOT EOF(FGMAKS) DO BEGIN
    SEEK(FGMAKS,F-1); READ(FGMAKS,RECORDFGMS); F:=F+1;
    WITH RECORDFGMS DO BEGIN
     IF K=1 THEN BEGIN I:=I+6;
      IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
      WRITE('      ',CHAR(218));
      FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(191));
      WRITELN; WRITE('      ',CHAR(179)); TEXTCOLOR(11);
      WRITE('        >>> DATA GAYA-GAYA MAKSIMUM <<<    ',
      '  '); TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
      WRITE('      ',CHAR(195));
      FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180));
      WRITELN; WRITE('      ',CHAR(179),
      'Tipe    M 1     M 2  Gaya Geser  Gaya Aksial ',
      CHAR(179)); WRITELN;
      WRITE('      ',CHAR(179),
      'Kolom  (Nmm)   (Nmm)    (N)       (N)    ',
      CHAR(179)); WRITELN;
      WRITE('      ',CHAR(195));
      FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180));
      WRITELN; END;
     WRITE('      ',CHAR(179),' ',TIPE:3,'  ',MUlap:8,
     '  ',MUtum:8,'  ',VU:8,'  ',TU:8,'  ',CHAR(179));
     WRITELN; K:=K+1; I:=I+1;
     IF (I>=22) OR EOF(FGMAKS) THEN BEGIN
      WRITE('      ',CHAR(192)); FOR J:=1 TO 51 DO WRITE(CHAR(196));
      WRITE(CHAR(217)); READKEY; WRITELN; K:=1; I:=I+1; END;
     IF (I>=22) THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
    END; CLOSE(FGMAKS);
   END
   ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA ELEMEN BELUM DIBUAT...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
   CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
   WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
   CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
   WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
   WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
   CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
   WRITE('DATA GAYA YG BEKERJA PADA BALOK BELUM DIBUAT...!');
   WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
  CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
  WRITE('DATA DIMENSI BALOK BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
END.


PROGRAM TKO;
USES CRT;
TYPE
  FDAT = RECORD
         NPROY : string[19];
```

```
        NFDAT : string[8];
        NaFil : string[12];
        ENG   : string[19];
      END;
  FKLM = RECORD
        TIPE  : INTEGER;
        FNTLB : INTEGER;
        FDPTLB : INTEGER;
        FNTLA : INTEGER;
        FDPTLA : INTEGER;
        FDSS  : INTEGER;
        FS    : INTEGER;
      END;
  FDN = RECORD
        TIPE  : INTEGER;
        LK    : REAL;
        BK    : REAL;
        HK    : REAL;
        PBK   : REAL;
        KK    : REAL;
        RG    : REAL;
        PEN   : INTEGER;
        PENG  : INTEGER;
      END;
VAR
  FKOLOM       : FILE OF FKLM;
  FDI          : FILE OF FDN;
  NFILE        : FILE OF FDAT;
  RECORDFDAT   : FDAT;
  RECORDFKLM   : FKLM;
  RECORDFDN    : FDN;
  I,JUM,J,TP,Z,A,B,
  C            : INTEGER;
  NFDA,EL      : STRING[7];
  FBK,FDM      : STRING[12];
  NPRO,EN      : STRING[19];
  BLK,BDD,DIRAK,
  DIREK        : STRING;

BEGIN
  DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); BDD:=PARAMSTR(4);
  BLK:=PARAMSTR(5); GETDIR(0,DIRAK); CHDIR(DIREK); ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
  WHILE NOT EOF(NFILE) DO BEGIN READ(NFILE,RECORDFDAT);
  IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
    NPRO:=RECORDFDAT.NPROY; EN :=RECORDFDAT.ENG; END;
  END; CLOSE(NFILE); FBK:=NFDA+BLK; ASSIGN(FKOLOM,FBK); {$I-} RESET(FKOLOM); {$I+}
  IF IORESULT=0 THEN BEGIN I:=1; TP:=1;
  WHILE NOT EOF(FKOLOM) DO BEGIN
    WITH RECORDFKLM DO BEGIN READ(FKOLOM,RECORDFKLM);
    IF I=1 THEN BEGIN
    A:=LENGTH(NPRO); B:=LENGTH(NFDA); C:=LENGTH(EN);
    TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR; GOTOXY(10,1);
    WRITE(CHAR(218)); FOR J:=1 TO 57 DO WRITE(CHAR(196)); WRITE(CHAR(191));
    GOTOXY(10,2); WRITE(CHAR(179)); TEXTCOLOR(11);
    WRITE('                PENULANGAN KOLOM                ');
    TEXTCOLOR(10); WRITE(CHAR(179));
    GOTOXY(10,3);
    WRITE(CHAR(195)); FOR J:=1 TO 57 DO WRITE(CHAR(196)); WRITE(CHAR(180));
    GOTOXY(10,4);
    WRITE(CHAR(179),' Proyek   : ',NPRO:A); FOR J:=1 TO (19-A) DO WRITE(' ');
    WRITE('Nama File Data: ',NFDA:B); FOR J:=1 TO (8-B) DO WRITE(' ');
    WRITE(' ',CHAR(179)); GOTOXY(10,5);
    WRITE(CHAR(179),' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(' ');
    WRITE('                 ',CHAR(179)); GOTOXY(10,6);
    WRITE(CHAR(195)); FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(194));
    FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(194));
    FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(194));
    FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(194));
    FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(180));
    GOTOXY(10,7);
```

```pascal
WRITE(CHAR(179),' TIPE ',CHAR(179),' TULANGAN ',CHAR(179),
' TULANGAN ',CHAR(179),' TULANGAN ',CHAR(179),' TULANGAN ',
CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),' KOLOM ',CHAR(179),'  TARIK   ',CHAR(179),
' DESAK ',CHAR(179),'  SPIRAL  ',CHAR(179),' SENGKANG ',
CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(197));
FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(197));
FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(197));
FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(197));
FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(180)); END;
GOTOXY(10,I+9);
WRITE(CHAR(179),' ',TIPE:3,' ',CHAR(179),'  ',FNTLB:2,'D',FDPTLB:2.
' ',CHAR(179),' ',FNTLA:2,'D',FDPTLA:2);
FDM:=NFDA+BDD; ASSIGN(FDI,FDM); RESET(FDI); JUM:= FILESIZE(FDI); Z:=0;
WITH RECORDFDN DO BEGIN
 IF JUM<>0 THEN BEGIN
  FOR J:=1 TO JUM DO BEGIN
   SEEK(FDI,J-1); READ(FDI,RECORDFDN);
   IF RECORDFDN.TIPE=TP THEN Z:=RECORDFDN.PENG; END; END; END;
 IF Z=2 THEN BEGIN
  GOTOXY(40,I+9); WRITE(' ',CHAR(179),' D',FDSS:2,'-',FS:3,' mm ',
  CHAR(179),'   -   ',CHAR(179)); END
 ELSE BEGIN
  GOTOXY(40,I+9); WRITE(' ',CHAR(179),'   -   ',CHAR(179),' D',
  FDSS:2,'-',FS:3,' mm ',CHAR(179)); END;
 TP:=TP+1; I:=I+1;
 IF (I=15) OR (EOF(FKOLOM)) THEN BEGIN
  GOTOXY(10,I+9);
  WRITE(CHAR(192)); FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(193));
  FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(193));
  FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(193));
  FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(193));
  FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(217)); TEXTCOLOR(11);
  GOTOXY(10,I+10); WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
  WRITE(^G); READKEY; TEXTCOLOR(10); I:=1; END; END;
 END; CLOSE(FKOLOM);
END
ELSE BEGIN
 CLRSCR; TEXTCOLOR(11); GOTOXY(20,5);
 WRITE('   PROSES DISAIN BELUM DILAKUKAN');
 GOTOXY(15,7); WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
 WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
END.


PROGRAM DB;
USES CRT;
TYPE
  FDBN = RECORD
      TIPE : INTEGER;
      FC  : REAL;
      FY  : REAL;
      ES  : REAL;
     END;
  FDBT = RECORD
      TIPE : INTEGER;
      N   : INTEGER;
      DP  : INTEGER;
      DS  : INTEGER;
      END;
VAR
  FTIPE            : TEXT;
  FDATBAH           : FILE OF FDBN;
  FBAHTUL           : FILE OF FDBT;
  RECORDFDBN          : FDBN;
  RECORDFDBT          : FDBT;
  I,JTIPE,JUM,NOREC,TP,DPB,DSB,U : INTEGER;
```

```
FCB,FYB,ESB            : REAL;
YA              : CHAR;
BENAR           : BOOLEAN;
NFDA,EL         : STRING[7];
FDB,FDT,FTIP         : STRING[12];
FTP,BBN,BBT,DIRAK,DIREK     : STRING;


Begin
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP: PARAMSTR(4);
BBN:=PARAMSTR(5); BBT:=PARAMSTR(6); GETDIR(0,DIRAK); CHDIR(DIREK);
FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
READ(FTIPE,JTIPE); CLOSE(FTIPE); TP:=0;
REPEAT
TP:=TP+1; YA:='U'; FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
IF IORESULT<>0 THEN REWRITE(FDATBAH);
WHILE UPCASE(YA)='U' DO BEGIN
TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3);
WRITE(CHAR(179)); TEXTCOLOR(13);
WRITE('          >>> DATA BAHAN <<<           ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
WRITE('                 '); TEXTCOLOR(10);
WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' Teg. Desak Beton  Teg. Tarik Baja   Mod. Elastisitas',
' Baja ',CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),'  (fc )--->MPa      (fy)--->MPa        (Es)---  MPa',
'    ',CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); FOR I:=1 TO 59 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11);
GOTOXY(10,13); WRITE(' U : ulang   L : lanjutkan ===> ');
GOTOXY(19,10); READLN(FCB);
GOTOXY(37,10); READLN(FYB);
GOTOXY(57,10); READLN(ESB); BENAR:=TRUE;
WHILE BENAR DO BEGIN
GOTOXY(42,13); YA:=READKEY; WRITE(YA);
IF UPCASE(YA)='U' THEN BENAR:=FALSE;
IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; END; TEXTCOLOR(10);
NOREC:=-1; JUM:=FILESIZE(FDATBAH);
WITH RECORDFDBN DO BEGIN
IF JUM<>0 THEN BEGIN
FOR I:=1 TO JUM DO BEGIN
SEEK(FDATBAH,I-1); READ(FDATBAH,RECORDFDBN);
IF RECORDFDBN.TIPE=TP THEN NOREC:=I-1; END;
IF NOREC=-1 THEN NOREC:=JUM; SEEK(FDATBAH,NOREC);
END; TIPE:=TP; FC:=FCB; FY:=FYB; ES:=ESB; WRITE(FDATBAH,RECORDFDBN); END;
CLOSE(FDATBAH); U:=1;
Repeat
FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT); {$I-} RESET(FBAHTUL); {$I+}
IF IORESULT<>0 THEN REWRITE(FBAHTUL); CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3);
WRITE(CHAR(179)); TEXTCOLOR(13);
WRITE('    >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<<      ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
```

```
WRITE(CHAR(195)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
WRITE('                      '); TEXTCOLOR(10);
WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' No.  Diameter Tulangan Pokok   Diameter Tulangan',
' Sengkang ',CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),'      (Dp)--->mm            (Ds)--- mm',
'      ',CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); FOR I:=1 TO 59 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11);
GOTOXY(10,13); WRITE(' Isikan No. = '); TEXTCOLOR(13); WRITE('0');
TEXTCOLOR(11); WRITE(' jika sudah selesai ... !');
GOTOXY(13,10); WRITE(U);
GOTOXY(13,10); READLN(U);
IF U<>0 THEN BEGIN
 GOTOXY(26,10); READLN(DPB);
 GOTOXY(54,10); READLN(DSB); END; TEXTCOLOR(10);
IF U<>0 THEN BEGIN
 NOREC:=-1; JUM:=FILESIZE(FBAHTUL);
 WITH RECORDFDBT DO BEGIN
  IF JUM<>0 THEN BEGIN
  FOR I:=1 TO JUM DO BEGIN
   SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
   IF (RECORDFDBT.TIPE=TP) AND (RECORDFDBT.N=U) THEN NOREC:=I-1; END;
   IF NOREC=-1 THEN NOREC:=JUM; SEEK(FBAHTUL,NOREC); END;
   TIPE:=TP; N:=U; DP:=DPB; DS:=DSB; WRITE(FBAHTUL,RECORDFDBT); END;
  END; CLOSE(FBAHTUL);
 Until U=0;
 UNTIL TP=JTIPE;
 END; CHDIR(DIRAK);
END.


PROGRAM DE;
USES CRT;
TYPE
  FELN = RECORD
       TIPE : INTEGER;
       NO   : INTEGER;
       ELE  : INTEGER;
       END;
VAR
 FTIPE      : TEXT;
 FELE       : FILE OF FELN;
 RECORDFELN : FELN;
 FELM,FTIP  : STRING[12];
 Elemen,I,JTIPE,JUM,NOREC,J,TP :INTEGER;
 NFDA,EL            : STRING[7];
 FTP,BEL,DIRAK,DIREK       : STRING;


Begin
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);
BEL:=PARAMSTR(5); GETDIR(0,DIRAK); CHDIR(DIREK); FTIP:=NFDA+FTP;
ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
READ(FTIPE,JTIPE); CLOSE(FTIPE); FELM:=NFDA+BEL; ASSIGN(FELE,FELM); TP:=0;
REPEAT
 TP:=TP+1; {$I-} RESET(FELE); {$I+} IF IORESULT<>0 THEN REWRITE(FELE);
 WITH RECORDFELN DO BEGIN I:=1;
```

```
Repeat
TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR J:=1 TO 52 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179)); TEXTCOLOR(13);
WRITE('        >>> DATA ELEMEN ',EL:7,' <<<          ');
TEXTCOLOR(10); WRITE(CHAR(179)); GOTOXY(10,4);
WRITE(CHAR(195)); FOR J:=1 TO 52 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
WRITE('                       '); TEXTCOLOR(10);
WRITE(CHAR(179)); GOTOXY(10,6);
WRITE(CHAR(195)); FOR J:=1 TO 52 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' Masukan Elemen ',EL:7,' Yang Mempunyai Tipe Yg',
' Sama ',CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),'       No.        Elemen       ',
'  ',CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR J:=1 TO 52 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); FOR J:=1 TO 52 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR J:=1 TO 52 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11); GOTOXY(10,13);
WRITE(' Isikan No. = '); TEXTCOLOR(13); WRITE('0'); TEXTCOLOR(11);
WRITE(' jika sudah selesai ... !');
GOTOXY(23,10); WRITE(I);
GOTOXY(23,10); READLN(I);
IF I<>0 THEN BEGIN
GOTOXY(42,10); READLN(ELEMEN); NOREC:=-1; JUM:=FILESIZE(FELE);
IF JUM<>0 THEN BEGIN
FOR J:=1 TO JUM DO BEGIN
SEEK(FELE,J-1); READ(FELE,RECORDFELN);
IF (I=RECORDFELN.NO) AND (TP=RECORDFELN.TIPE) THEN NOREC:=J-1; END;
IF NOREC=-1 THEN NOREC:=JUM; SEEK(FELE,NOREC); END;
TIPE:=TP; NO:=I; ELE:=ELEMEN; WRITE(FELE,RECORDFELN); END; TEXTCOLOR(10);
Until I=0;
END; CLOSE(FELE);
UNTIL TP=JTIPE;
END; CHDIR(DIRAK);
END.


PROGRAM CDPO;
USES CRT,PRINTER;
TYPE
  FDAT = RECORD
      NPROY : string[19];
      NFDAT : string[8];
      NaFil : string[12];
      ENG   : string[19];
      END;
  FDBN = RECORD
      TIPE : INTEGER;
      FCK  : REAL;
      FCP  : REAL;
      FY   : REAL;
      END;
  FDBT = RECORD
      TIPE : INTEGER;
      N    : INTEGER;
      DP   : INTEGER;
      END;
  FDMN = RECORD
      TIPE : INTEGER;
      LP   : REAL;
      T    : REAL;
      PB   : REAL;
      DF   : REAL;
```

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       BK  : REAL;
       HK  : REAL;
       DPK : INTEGER;
     END;
  FGMS = RECORD
       TIPE : INTEGER;
       PU  : REAL;
       Q   : REAL;
       AKER : INTEGER;
     END;
  FELN = RECORD
       TIPE : INTEGER;
       NO  : INTEGER;
       ELE : INTEGER;
     END;

VAR
  FTIPE                    : TEXT;
  FDATBAH                  : FILE OF FDBN;
  FBAHTUL                  : FILE OF FDBT;
  FGMAKS                   : FILE OF FGMS;
  FDIM                     : FILE OF FDMN;
  FELE                     : FILE OF FELN;
  NFILE                    : FILE OF FDAT;
  RECORDFDAT               : FDAT;
  RECORDFELN               : FELN;
  RECORDFDBN               : FDBN;
  RECORDFDBT               : FDBT;
  RECORDFGMS               : FGMS;
  RECORDFDMN               : FDMN;
  I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
  NTUL,DPTUL,K,F,BATASATAS,BATASBAWAH,
  BATASKIRI,JUMLAHBARIS,BARIS,KERTAS,HAL,
  A,B,C,D                  : Integer;
  YA                       : CHAR;
  BENAR                    : BOOLEAN;
  NFDA,EL                  : STRING[7];
  FDB,FDT,FGM,FTIP,FDM,FELM    : STRING[12];
  NPRO,EN                  : STRING[19];
  FTP,BBN,BBT,BEL,BGM,BDD,DIRAK,DIREK   : STRING;

PROCEDURE JUDUL;
BEGIN
   ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
   WHILE NOT EOF(NFILE) DO BEGIN
    READ(NFILE,RECORDFDAT);
    IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
     NPRO:=RECORDFDAT.NPROY; EN:=RECORDFDAT.ENG; END;
   END;
   CLOSE(NFILE); HAL:=HAL+1; A:=LENGTH(NPRO); B:=LENGTH(NFDA);
   C:=LENGTH(EN); D:=LENGTH(EL);
   FOR J:=1 TO BATASATAS DO WRITELN(LST);
   FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(201));
   FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(187));
   WRITELN(LST);
   FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
   '      UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON       ',
   CHAR(186)); WRITELN(LST);
   FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(204));
   FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(185));
   WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
   ' AUTHORITY : UII CIVIL ENGINEERING 1996    Data      : ',EL:D);
   FOR J:=1 TO (7-D) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(186));
   WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
   ' Proyek   : ',NPRO:A); FOR J:=1 TO (19-A) DO WRITE(LST,' ');
   WRITE(LST,'        Halaman  : ',HAL:3,'   ',CHAR(186));
   WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(186),
   ' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(LST,' ');
   WRITE(LST,'        File Data : ',NFDA:B); FOR J:=1 TO (8-B) DO WRITE(LST,' ');
   WRITE(LST,' ',CHAR(186)); WRITELN(LST);
```

```pascal
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(200));
      FOR J:=1 TO 65 DO WRITE(LST,CHAR(205)); WRITE(LST,CHAR(188)); I:=7;
      WRITELN(LST);
END;


BEGIN
 DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);BBN:=PARAMSTR(5);
 BBT:=PARAMSTR(6); BEL:=PARAMSTR(7); BGM:=PARAMSTR(8); BDD:=PARAMSTR(9);
 GETDIR(0,DIRAK); CHDIR(DIREK); FDM:=NFDA+BDD; ASSIGN(FDIM,FDM);
 {$I-} RESET(FDIM); {$I+}
 IF IORESULT=0 THEN BEGIN
  CLOSE(FDIM); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM);
  {$I-} RESET(FGMAKS); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT);
   {$I-} RESET(FBAHTUL); {$I+}
   IF IORESULT=0 THEN BEGIN
    CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB);
    {$I-} RESET(FDATBAH); {$I+}
    IF IORESULT=0 THEN BEGIN
     CLOSE(FDATBAH); FELM:=NFDA+BEL; ASSIGN(FELE,FELM);
     {$I-} RESET(FELE); {$I+}
     IF IORESULT=0 THEN BEGIN
      CLOSE(FELE); YA:='U'; HAL:=0; BATASATAS:=0; BATASBAWAH:=0; BATASKIRI:=0;
      WHILE UPCASE(YA)='U' DO BEGIN
       TEXTBACKGROUND(0); TEXTCOLOR(10); CLRSCR;
       GOTOXY(10,2); WRITE(CHAR(218));
       FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(191));
       GOTOXY(10,3);
       WRITE(CHAR(179),' Ukuran Kertas : '); TEXTCOLOR(11); WRITE('1');
       TEXTCOLOR(10); WRITE('. Folio '); TEXTCOLOR(11); WRITE('2');
       TEXTCOLOR(10); WRITE('. Kuarto '); TEXTCOLOR(11);
       WRITE('--> Pilih :  '); TEXTCOLOR(10); WRITE(CHAR(179));
       GOTOXY(10,4);
       WRITE(CHAR(179),' Batas Atas  :                  ',
       '      ',CHAR(179));
       GOTOXY(10,5);
       WRITE(CHAR(179),' Batas Bawah :                  ',
       '      ',CHAR(179));
       GOTOXY(10,6);
       WRITE(CHAR(179),' Batas Kiri  :                  ',
       '      ',CHAR(179));
       GOTOXY(10,7);
       WRITE(CHAR(192)); FOR I:=1 TO 50 DO WRITE(CHAR(196));
       WRITE(CHAR(217)); TEXTCOLOR(11);
       GOTOXY(10,9); WRITE(' U : ulang  L : lanjutkan ===> ');
       GOTOXY(29,4); WRITE('Baris'); GOTOXY(29,5); WRITE('Baris');
       GOTOXY(29,6); WRITE('Spasi'); GOTOXY(59,3); READLN(KERTAS);
       GOTOXY(26,4); READLN(BATASATAS); GOTOXY(26,5); READLN(BATASBAWAH);
       GOTOXY(26,6); READLN(BATASKIRI); BENAR:=TRUE;
       WHILE BENAR DO BEGIN
        GOTOXY(42,9); YA:=READKEY; WRITE(YA);
        IF UPCASE(YA)='U' THEN BENAR:=FALSE;
        IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
       IF KERTAS=1 THEN JUMLAHBARIS:=71; IF KERTAS=2 THEN JUMLAHBARIS:=65;
       BARIS:=JUMLAHBARIS-BATASATAS-BATASBAWAH; HAL:=0; K:=1;
       F:=1; JUDUL; RESET(FDATBAH);
       WHILE NOT EOF(FDATBAH) DO BEGIN
        SEEK(FDATBAH,F-1); READ(FDATBAH,RECORDFDBN); F:=F+1;
        WITH RECORDFDBN DO BEGIN
        IF (K=1) THEN BEGIN
         IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
         IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END;
         FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
         FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
         WRITELN(LST);
         FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
         '            >>> DATA BAHAN <<<',
         '            ',CHAR(179)); WRITELN(LST);
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FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Tipe Teg. Desak Beton  Teg. Desak Beton   Tegangan Tarik',
' Baja ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Pond. Kolom (MPa)    Pond.  (MPa)        (MPa)',
'          ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST); END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
'',TIPE:3,'       ',TRUNC(FCK):3,'            ',
TRUNC(FCP):3,'            ',TRUNC(FY):6,'     ',
CHAR(179)); WRITELN(LST); K:=K+1; I:=I+1;
IF (I>=BARIS) OR EOF(FDATBAH) THEN BEGIN
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
FOR J:=1 TO 63 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
WRITELN(LST); K:=1; I:=I+1; END;
IF I>=BARIS THEN BEGIN
K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FDATBAH); F:=1; RESET (FBAHTUL);
WHILE NOT EOF(FBAHTUL) DO BEGIN
SEEK(FBAHTUL,F-1); READ(FBAHTUL,RECORDFDBT); F:=F+1;
WITH RECORDFDBT  DO BEGIN
IF (K=1) THEN BEGIN
IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
IF I>=BARIS THEN  BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL;  END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
FOR J:=1 TO 47 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<< ',CHAR(179));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 47 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Tipe    No.     Diameter Tulangan Pokok ', CHAR(179));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Pondasi          (mm)      ', CHAR(179));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 47 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST); END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
'',TIPE:3,'      ',N:2,'           ',DP:2,
'           ',CHAR(179)); WRITELN(LST); K:=K+1; I:=I+1;
IF (I>=BARIS) OR EOF(FBAHTUL) THEN
BEGIN
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
FOR J:=1 TO 47 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
WRITELN(LST); K:=1; I:=I+1; END;
IF I>=BARIS THEN BEGIN
K:=1;  FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FBAHTUL); F:=1; RESET(FELE);
WHILE NOT EOF(FELE) DO BEGIN
SEEK(FELE,F-1); READ(FELE,RECORDFELN); F:=F+1;
WITH RECORDFELN DO BEGIN
IF K=1 THEN BEGIN
IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+5;
IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL;  END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' >>> DATA ELEMEN ',EL:7,' <<< ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
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FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Tipe    No.     Elemen ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST); END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
'',TIPE:3,'     ',NO:2,'      ',ELE:3,' ',CHAR(179));
WRITELN(LST); K:=K+1; I:=I+1;
IF (I>=BARIS) OR EOF(FELE) THEN BEGIN
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
FOR J:=1 TO 29 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
WRITELN(LST); K:=1; I:=I+1; END;
IF I>=BARIS THEN BEGIN
K:=1;  FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FELE); F:=1; RESET(FDIM);
WHILE NOT EOF(FDIM) DO BEGIN
SEEK(FDIM,F-1); READ(FDIM,RECORDFDMN); F:=F+1;
WITH RECORDFDMN DO BEGIN
IF K=1 THEN BEGIN
IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL;  END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
FOR J:=1 TO 54 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
'        >>> DATA DIMENSI <<<         ',
CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 54 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Tipe  Panjang Tebal Plat  Kedalaman Penutup Beton ',
CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Pond.   (mm)     (mm)       (mm)        (mm)      ',
CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 54 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST); END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
'',TIPE:3,'   ',TRUNC(LP):5,'   ',TRUNC(T):4,'       ',
TRUNC(DF):5,'    ',TRUNC(PB):3,'     ',CHAR(179));
WRITELN(LST); K:=K+1; I:=I+1;
IF (I>=BARIS) OR EOF(FDIM) THEN BEGIN
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
FOR J:=1 TO 54 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
WRITELN(LST); K:=1; I:=I+1; END;
IF I>=BARIS THEN BEGIN
K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
END; CLOSE(FDIM); F:=1; RESET(FGMAKS);
WHILE NOT EOF(FGMAKS) DO BEGIN
SEEK(FGMAKS,F-1); READ(FGMAKS,RECORDFGMS); F:=F+1;
WITH RECORDFGMS DO BEGIN
IF K=1 THEN BEGIN
IF (BARIS-I)<=6 THEN FOR J:=1 TO (BARIS-I) DO WRITELN(LST); I:=I+6;
IF I>=BARIS THEN BEGIN FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL;  END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(218));
FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(191));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
'       >>> DATA GAYA-GAYA MAKSIMUM <<<        ',
CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Tipe Gaya Aksial Kolom  Tegangan Izin  Arah Kerja ',
CHAR(179)); WRITELN(LST);
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      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
      ' Pond.   (N)        (kPa)              ',
      CHAR(179)); WRITELN(LST);
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(195));
      FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(180));
      WRITELN(LST); END;
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
      ' ',TIPE:3,'      ',PU:8,'        ',Q:8,'     ',AKER,
      ' Arah   ',CHAR(179)); WRITELN(LST); K:=K+1; I:=I+1;
      IF (I>=BARIS) OR EOF(FGMAKS) THEN BEGIN
      FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(192));
      FOR J:=1 TO 51 DO WRITE(LST,CHAR(196)); WRITE(LST,CHAR(217));
      WRITELN(LST); I:=I+1; K:=1; END;
      IF (I>=BARIS) THEN BEGIN
      K:=1; FOR J:=1 TO BATASBAWAH DO WRITELN(LST); JUDUL; END; END;
      END; CLOSE(FGMAKS);
     END
     ELSE BEGIN
      CLRSCR; TEXTCOLOR(11);
      GOTOXY(20,10); WRITE('DATA ELEMEN BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
     END
     ELSE BEGIN
      CLRSCR; TEXTCOLOR(11);
      GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
     END
     ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
     END
     ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA GAYA YG BEKERJA PADA BALOK BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
     END
     ELSE BEGIN
      CLRSCR; TEXTCOLOR(11);
      GOTOXY(20,10); WRITE('DATA DIMENSI BALOK BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
     END.


PROGRAM CPON;
USES CRT,PRINTER;
TYPE
   FDAT = RECORD
        NPROY : string[19];
        NFDAT : string[8];
        NaFil : string[12];
        ENG   : string[19];
      END;
   FKLM = RECORD
        TIPE : INTEGER;
        FBP  : INTEGER;
        FLP  : INTEGER;
        FT   : INTEGER;
        FDP  : INTEGER;
        FSP  : INTEGER;
        FDL  : INTEGER;
        FSL  : INTEGER;
        FND  : INTEGER;
        FDD  : INTEGER;
        FLD  : INTEGER;
        FJB  : INTEGER;
        FSISA: INTEGER;
      END;
VAR
   FPONDASI              : FILE OF FKLM;
```

```
NFILE                    : FILE OF FDAT;
RECORDFDAT               : FDAT;
RECORDFPON               : FKLM;
I,JUM,J,BATASATAS,BATASBAWAH,
BARIS,JUMLAHBARIS,HAL,BATASKIRI,A,
B,C,D                    : INTEGER;
BENAR                    : BOOLEAN;
KERTAS                   : BYTE;
YA                       : CHAR;
NFDA,EL                  : STRING[7];
FBK                      : STRING[12];
NPRO,EN                  : STRING[19];
BLK,DIRAK,DIREK          : STRING;

BEGIN
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);BLK:=PARAMSTR(4);
GETDIR(0,DIRAK); CHDIR(DIREK); ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
WHILE NOT EOF(NFILE) DO BEGIN
READ(NFILE,RECORDFDAT);
IF RECORDFDAT.NFDAT=NFDA THEN  BEGIN
NPRO:=RECORDFDAT.NPROY; EN :=RECORDFDAT.ENG; END;
END; CLOSE(NFILE); FBK:=NFDA+BLK; ASSIGN(FPONDASI,FBK);
{$I-} RESET(FPONDASI); {$I+}
IF IORESULT=0 THEN BEGIN  YA:='U';
WHILE UPCASE(YA)='U' DO  BEGIN
TEXTBACKGROUND(0); TEXTCOLOR(10); CLRSCR;
GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3); WRITE(CHAR(179),' Ukuran Kertas : '); TEXTCOLOR(11); WRITE('1');
TEXTCOLOR(10); WRITE('. Folio '); TEXTCOLOR(11); WRITE('2');
TEXTCOLOR(10); WRITE('. Kuarto '); TEXTCOLOR(11);
WRITE('--> Pilih :  '); TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(179),' Batas Atas  :                    ',CHAR(179));
GOTOXY(10,5);
WRITE(CHAR(179),' Batas Bawah :                    ',CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(179),' Batas Kiri  :                    ',CHAR(179));
GOTOXY(10,7);WRITE(CHAR(192)); FOR I:=1 TO 50 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11); GOTOXY(10,9); WRITE(' U : ulang  L : lanjutkan ====> ');
GOTOXY(29,4); WRITE('Baris'); GOTOXY(29,5); WRITE('Baris');
GOTOXY(29,6); WRITE('Spasi'); GOTOXY(59,3); READLN(KERTAS);
GOTOXY(26,4); READLN(BATASATAS); GOTOXY(26,5); READLN(BATASBAWAH);
GOTOXY(26,6); READLN(BATASKIRI); BENAR:=TRUE;
WHILE BENAR DO BEGIN
GOTOXY(42,9); YA:=READKEY; WRITE(YA);IF UPCASE(YA)='U' THEN BENAR:=FALSE;
IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10);END;
IF KERTAS=1 THEN JUMLAHBARIS:=63;IF KERTAS=2 THEN JUMLAHBARIS:=57;
BARIS:=JUMLAHBARIS-BATASATAS-BATASBAWAH; I:=1; HAL:=0;
WHILE NOT EOF(FPONDASI) DO BEGIN
CLRSCR; TEXTCOLOR(11);
GOTOXY(20,10);
WRITE('MENCETAK HASIL DISAIN.......'); TEXTCOLOR(11); WRITE(I);
TEXTCOLOR(10);
WITH RECORDFPON DO BEGIN
READ(FPONDASI,RECORDFPON);
IF I=1 THEN BEGIN
A:=LENGTH(NPRO); B:=LENGTH(NFDA); C:=LENGTH(EN); D:=LENGTH(EL);
FOR J:=1 TO BATASATAS DO BEGIN WRITELN(LST); END; HAL:=HAL+1;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(218)); FOR J:=1 TO 58 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(191)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
'      UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON      ',
CHAR(179)); WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(195)); FOR J:=1 TO 58 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(180)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' AUTHORITY : UII CIVIL ENGINEERING 1996 Disain : ',EL:D);
FOR J:=1 TO (7-D) DO WRITE(LST,' '); WRITE(LST,' ',CHAR(179)); WRITELN(LST);
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FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' Proyek   : ',NPRO:A); FOR J:=1 TO (19-A) DO WRITE(LST,' ');
WRITE(LST,'  Halaman  : ',HAL:3,'  ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' '); WRITE(LST,CHAR(179),
' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(LST,' ');
WRITE(LST,'  File Data : ',NFDA:B); FOR J:=1 TO (8-B) DO WRITE(LST,' ');
WRITE(LST,' ',CHAR(179)); WRITELN(LST); FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(195)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(194)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(194)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(194)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(194)); FOR J:=1 TO 13 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(180)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' TIPE ',CHAR(179),' TULANGAN ',CHAR(179),
     ' TULANGAN ',CHAR(179),' TULANGAN ',CHAR(179),
     ' UKURAN  ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),'PONDASI',CHAR(179),' ARAH LEBAR ',CHAR(179),
     'ARAH PANJANG',CHAR(179),'  PASAK ',CHAR(179),
     ' PONDASI  ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(195)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(197)); FOR J:=1 TO 13 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(180)); WRITELN(LST); END;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),' ',TIPE:3,' ',CHAR(179),' D',FDP:2,' -',FSP:3,
     'mm ',CHAR(179),' D',FDL:2,' -',FSL:3,'mm ',CHAR(179),' '
     FND:2,'D',FDD:2,'  ',CHAR(179),FBP:4,'mmx',FLP:4,'mm',CHAR(179));
     WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),'    ',CHAR(179),'MERATA DALAM',
     CHAR(179),'     ',CHAR(179),'PANJANG ',CHAR(179),
     'TEBAL PLAT ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),'    ',CHAR(179),'RENTANG ',FBP:4,CHAR(179),
     '     ',CHAR(179),'PENYALURAN',CHAR(179),'KAKI = ',
     FT:4,'mm',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),'    ',CHAR(179),FSISA:2,' MERATA DI',CHAR(179),
     '     ',CHAR(179),'Ld =',FLD:4,'mm',CHAR(179),
     '     ',CHAR(179)); WRITELN(LST);
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(179),'    ',CHAR(179),'LUAR RENTANG',
     CHAR(179),'     ',CHAR(179),'     ',CHAR(179),
     '     ',CHAR(179)); WRITELN(LST); I:=I+5;
IF (I>=BARIS) OR EOF(FPONDASI) THEN BEGIN I:=1;
FOR J:=1 TO BATASKIRI DO WRITE(LST,' ');
WRITE(LST,CHAR(192)); FOR J:=1 TO 7 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 12 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 10 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(193)); FOR J:=1 TO 13 DO WRITE(LST,CHAR(196));
WRITE(LST,CHAR(217)); WRITELN(LST);
IF I=BARIS THEN FOR J:=1 TO BATASBAWAH DO WRITELN(LST);END;END;
END; CLOSE(FPONDASI);END)
ELSE BEGIN
   CLRSCR; TEXTCOLOR(11); GOTOXY(20,5);
   WRITE('   PROSES DISAIN BELUM DILAKUKAN');
   GOTOXY(15,7); WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
   WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
END.


PROGRAM DDPO;
USES CRT;
TYPE
```

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FDMN = RECORD
    TIPE : INTEGER;
    LP  : REAL;
    T   : REAL;
    PB  : REAL;
    DF  : REAL;
    BK  : REAL;
    HK  : REAL;
    DPK : INTEGER;
  END;
VAR
  FTIPE              : TEXT;
  FDIM               : FILE OF FDMN;
  RECORDFDMN         : FDMN;
  I,JTIPE,JUM,NOREC,TP,DPKB   : INTEGER;
  LPB,TB,HKB,BKB,PBB,DFB      : REAL;
  BENAR              : BOOLEAN;
  ya                 : CHAR;
  NFDA,EL            : STRING[7];
  FTIP,FDM           : STRING[12];
  FTP,BDD,DIRAK,DIREK       : STRING;

BEGIN
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); FTP:=PARAMSTR(4);
BDD:=PARAMSTR(5); GETDIR(0,DIRAK); CHDIR(DIREK); FTIP:=NFDA+FTP;
ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
READ(FTIPE,JTIPE); CLOSE(FTIPE); TP:=0;
REPEAT
TP:=TP+1; YA:='U';
WHILE UPCASE(YA)='U' DO BEGIN
TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR;
GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 44 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3);
WRITE(CHAR(179)); TEXTCOLOR(13);
WRITE('        >>> DATA DIMENSI <<<          ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 44 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
WRITE('            '); TEXTCOLOR(10);
WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 44 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' Panjang  Tebal Plat Kaki  Penutup Beton ',
CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),' (L)--->mm    (t)--->mm     (Pb)--->mm  ',
CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 44 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); FOR I:=1 TO 44 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 44 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11);
GOTOXY(10,13); WRITE(' U : ulang  L : lanjutkan ===> ');
GOTOXY(15,10); READLN(LPB);
GOTOXY(29,10); READLN(TB);
GOTOXY(46,10); READLN(PBB); BENAR:=TRUE;
WHILE BENAR DO BEGIN
GOTOXY(42,13); YA:=READKEY; WRITE(YA);
IF UPCASE(YA)='U' THEN BENAR:=FALSE;
IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10);
END; YA:='U';
WHILE UPCASE(YA)='U' DO BEGIN CLRSCR;
GOTOXY(10,2);
```

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WRITE(CHAR(218)); FOR I:=1 TO 61 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3);
WRITE(CHAR(179)); TEXTCOLOR(13);
WRITE('          >>> DATA DIMENSI <<<          ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 61 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
WRITE('                    '); TEXTCOLOR(10);
WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 61 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' Kedalaman  Lebar Penampang  Tinggi Penampang  Diame',
'ter Tul. ',CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),' Pondasi       Kolom         Kolom        Poko',
'k Kolom ',CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(179),' (Df)--->mm   (Bk)--->mm      (Hk)--->mm   (Dpk',
')--->mm ',CHAR(179));
GOTOXY(10,10);
WRITE(CHAR(195)); FOR I:=1 TO 61 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,11);
WRITE(CHAR(179)); FOR I:=1 TO 61 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,12);
WRITE(CHAR(192)); FOR I:=1 TO 61 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11);
GOTOXY(10,14); WRITE(' U : ulang   L : lanjutkan ===> ');
GOTOXY(16,11); READLN(DFB);
GOTOXY(30,11); READLN(BKB);
GOTOXY(48,11); READLN(HKB);
GOTOXY(64,11); READLN(DPKB); BENAR:=TRUE;
WHILE BENAR DO BEGIN
GOTOXY(42,14); YA:=READKEY; WRITE(YA);
IF UPCASE(YA)='U' THEN BENAR:=FALSE;
IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10);
END;
FDM:=NFDA+BDD; ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
IF IORESULT<>0 THEN REWRITE(FDIM); NOREC:=-1; JUM:=FILESIZE(FDIM);
WITH RECORDFDMN DO BEGIN
IF JUM<>0 THEN BEGIN
FOR I:=1 TO JUM DO BEGIN
SEEK(FDIM,I-1); READ(FDIM,RECORDFDMN);
IF RECORDFDMN.TIPE=TP THEN NOREC:=I-1; END;
IF NOREC=-1 THEN NOREC:=JUM; SEEK(FDIM,NOREC); END;
TIPE:=TP; LP:=LPB; T:=TB; DF:=DFB; BK:=BKB; HK:=HKB; DPK:=DPKB;
PB:=PBB; WRITE(FDIM,RECORDFDMN);
END; CLOSE(FDIM);
UNTIL TP=JTIPE;
END; CHDIR(DIRAK);
END.


PROGRAM DBP;
USES CRT;
TYPE
  FDBN = RECORD
      TIPE : INTEGER;
      FCK  : REAL;
      FCP  : REAL;
      FY   : REAL;
      END;
  FDBT = RECORD
      TIPE : INTEGER;
      N    : INTEGER;
      DP   : INTEGER;
      END;
VAR
```

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FTIPE              : TEXT;
FDATBAH              : FILE OF FDBN;
FBAHTUL              : FILE OF FDBT;
RECORDFDBN              : FDBN;
RECORDFDBT              : FDBT;
I,JTIPE,JUM,NOREC,TP,DPB,U : INTEGER;
FKB,FPB,FYB              : REAL;
YA              : CHAR;
BENAR              : BOOLEAN;
NFDA,EL              : STRING[7];
FDB,FDT,FTIP              : STRING[12];
FTP,BBN,BBT,DIRAK,DIREK    : STRING;

Begin
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);
BBN:=PARAMSTR(5); BBT:=PARAMSTR(6); GETDIR(0,DIRAK); CHDIR(DIREK);
FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
READ(FTIPE,JTIPE); CLOSE(FTIPE); TP:=0;
REPEAT
TP:=TP+1; YA:='U'; FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
IF IORESULT<>0 THEN REWRITE(FDATBAH);
WHILE UPCASE(YA)='U' DO BEGIN
TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR;
GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3);
WRITE(CHAR(179)); TEXTCOLOR(13);
WRITE('         >>> DATA BAHAN <<<           ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
WRITE('                  '); TEXTCOLOR(10);
WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' Teg. Desak Beton    Teg. Desak Beton    Teg. Tarik',
' Baja ',CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),'  Kolom--->MPa       Pondasi--->MPa      (Fy)--->',
'MPa  ',CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); FOR I:=1 TO 59 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 59 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11);
GOTOXY(10,13); WRITE(' U : ulang   L : lanjutkan ===> ');
GOTOXY(19,10); READLN(FKB);
GOTOXY(41,10); READLN(FPB);
GOTOXY(60,10); READLN(FYB); BENAR:=TRUE;
WHILE BENAR DO BEGIN
GOTOXY(42,13); YA:=READKEY; WRITE(YA);
IF UPCASE(YA)='U' THEN BENAR:=FALSE;
IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
NOREC:=-1; JUM:=FILESIZE(FDATBAH);
WITH RECORDFDBN DO BEGIN
IF JUM<>0 THEN BEGIN
FOR I:=1 TO JUM DO BEGIN
SEEK(FDATBAH,I-1); READ(FDATBAH,RECORDFDBN);
IF RECORDFDBN.TIPE=TP THEN NOREC:=I-1; END;
IF NOREC=-1 THEN NOREC:=JUM; SEEK(FDATBAH,NOREC); END;
TIPE:=TP; FCK:=FKB; FCP:=FPB; FY:=FYB; WRITE(FDATBAH,RECORDFDBN); END;
CLOSE(FDATBAH); U:=1;
Repeat
FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT); {$I-} RESET(FBAHTUL); {$I+}
```

```
IF IORESULT<>0 THEN REWRITE(FBAHTUL); CLRSCR; GOTOXY(10,2);
WRITE(CHAR(218)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,3);
WRITE(CHAR(179)); TEXTCOLOR(13);
WRITE(' >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<< ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,4);
WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,5);
WRITE(CHAR(179),' ',EL:7,' Tipe : '); TEXTCOLOR(11); WRITE(TP:3);
WRITE('                '); TEXTCOLOR(10);
WRITE(CHAR(179));
GOTOXY(10,6);
WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7);
WRITE(CHAR(179),' No.           Diameter Tulangan Pokok ',
CHAR(179));
GOTOXY(10,8);
WRITE(CHAR(179),'           (Dp)--->mm          ',
CHAR(179));
GOTOXY(10,9);
WRITE(CHAR(195)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,10);
WRITE(CHAR(179)); FOR I:=1 TO 47 DO WRITE(CHAR(0)); WRITE(CHAR(179));
GOTOXY(10,11);
WRITE(CHAR(192)); FOR I:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(217));
TEXTCOLOR(11);
GOTOXY(10,13); WRITE(' Isikan No. = '); TEXTCOLOR(13); WRITE('0');
TEXTCOLOR(11); WRITE(' jika sudah selesai ... !');
GOTOXY(13,10); WRITE(U);
GOTOXY(13,10); READLN(U);
IF U<>0 THEN BEGIN
GOTOXY(43,10); READLN(DPB); END; TEXTCOLOR(10);
IF U<>0 THEN BEGIN
NOREC:=-1; JUM:=FILESIZE(FBAHTUL);
WITH RECORDFDBT DO BEGIN
IF JUM<>0 THEN BEGIN
FOR I:=1 TO JUM DO BEGIN
SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
IF (RECORDFDBT.TIPE=TP) AND (RECORDFDBT.N=U) THEN NOREC:=I-1; END;
IF NOREC=-1 THEN NOREC:=JUM; SEEK(FBAHTUL,NOREC); END;
TIPE:=TP; N:=U; DP:=DPB; WRITE(FBAHTUL,RECORDFDBT); END;
END; CLOSE(FBAHTUL);
Until U=0;
UNTIL TP=JTIPE;
END; CHDIR(DIRAK);
END.


PROGRAM GPO;
USES CRT;
TYPE
  FELN = RECORD
        TIPE : INTEGER;
        NO   : INTEGER;
        ELE  : INTEGER;
        END;
  FGMS = RECORD
        TIPE : INTEGER;
        PU   : REAL;
        Q    : REAL;
        AKER : INTEGER;
        END;
  FDMC = RECORD
        ELEM : INTEGER;
        SEC  : REAL;
        AX   : REAL;
        SHE  : REAL;
        MOM  : REAL;
        END;
```

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VAR
  FTIPE                        : TEXT;
  FELE                         : FILE OF FELN;
  FGMAKS                       : FILE OF FGMS;
  FMICRO                       : FILE OF FDMC;
  RECORDFELN                   : FELN;
  RECORDFGMS                   : FGMS;
  RECORDFDMC                   : FDMC;
  Elemen,I,JTIPE,JUM,NOREC,TP,AKERB : INTEGER;
  PUS,PUB,QB                   : REAL;
  YA                           : CHAR;
  BENAR                        : BOOLEAN;
  NFDA,EL                      : STRING[7];
  FBC,FELM,FGM,FTIP            : STRING[12];
  FTP,BEL,BGM,DIRAK,DIREK      : STRING;

Begin
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);
BEL:=PARAMSTR(5); BGM:=PARAMSTR(6); GETDIR(0,DIRAK); CHDIR(DIREK);
FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
READ(FTIPE,JTIPE); CLOSE(FTIPE); TP:=0;
REPEAT
TP:=TP+1; PUB:=0; PUS:=0; FELM:=NFDA+BEL; ASSIGN(FELE,FELM);
{$I-} RESET(FELE); {$I+}
IF IORESULT=0 THEN BEGIN
 WHILE NOT EOF(FELE) DO Begin
  WITH RECORDFELN DO BEGIN
   READ(FELE,RECORDFELN); ELEMEN:=RECORDFELN.ELE;
   IF TIPE = TP THEN BEGIN
   FBC:=NFDA+'.DMC'; ASSIGN(FMICRO,FBC); Reset(FMICRO);
   While Not Eof(FMICRO) Do Begin
    WITH RECORDFDMC DO BEGIN
    Read(FMICRO,RECORDFDMC);
     IF ELEMEN=Elem THEN BEGIN
     IF ABS(AX)>PUS THEN PUS:=ABS(AX); END; END;
   END; IF PUS>PUB THEN PUB:=PUS; Close(FMICRO);
   END; END;
 END; CLOSE(FELE); YA:='U';
 WHILE UPCASE(YA)='U' DO BEGIN
 TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR;
 GOTOXY(5,9);
 WRITE('Pondasi Tipe : '); TEXTCOLOR(11); WRITE(TP:3); TEXTCOLOR(10);
 GOTOXY(5,10);
 WRITE('Tegangan Izin Tanah ? (kPa) : ');
 GOTOXY(5,11);
 WRITE('Arah Kerja Gaya Pada Pondasi : '); TEXTCOLOR(11); WRITE('1');
 TEXTCOLOR(10); WRITE('. Arah Kerja Satu Arah');
 GOTOXY(5,12);
 WRITE('                          '); TEXTCOLOR(11); WRITE('2');
 TEXTCOLOR(10); WRITE('. Arah Kerja Dua Arah');
 GOTOXY(5,13);
 WRITE('Pilih Arah Kerja Pondasi ! : ');
 GOTOXY(5,15); TEXTCOLOR(11); WRITE('U : ulang   L : lanjutkan ===>');
 GOTOXY(35,10); READLN(QB);
 GOTOXY(34,13); READLN(AKERB); BENAR:=TRUE;
 WHILE BENAR DO BEGIN
  GOTOXY(36,15); YA:=READKEY; WRITE(YA);
  IF UPCASE(YA)='U' THEN BENAR:=FALSE;
  IF UPCASE(YA)='L' THEN BENAR:=FALSE; END; TEXTCOLOR(10); END;
FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
IF IORESULT<>0 THEN REWRITE(FGMAKS); NOREC:=-1; JUM:=FILESIZE(FGMAKS);
WITH RECORDFGMS DO BEGIN
IF JUM<>0 THEN BEGIN
 FOR I:=1 TO JUM DO BEGIN
  SEEK(FGMAKS,I-1); READ(FGMAKS,RECORDFGMS);
  IF RECORDFGMS.TIPE=TP THEN NOREC:=I-1; END;
 IF NOREC=-1 THEN NOREC:=JUM; SEEK(FGMAKS,NOREC); END;
TIPE:=TP; PU:=PUB; Q:=QB; AKER:=AKERB; WRITE(FGMAKS,RECORDFGMS);
END; CLOSE(FGMAKS);
```

```
    END
    ELSE BEGIN
     CLRSCR; TEXTCOLOR(11);
     GOTOXY(20,10); WRITE(' Data Elemen Belum Ada...........!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
    UNTIL TP=JTIPE; END; CHDIR(DIRAK);
    END.


PROGRAM PPO;
USES CRT;
TYPE
  FDN = RECORD
         TIPE : INTEGER;
         LP   : REAL;
         T    : REAL;
         PB   : REAL;
         DF   : REAL;
         BK   : REAL;
         HK   : REAL;
         DPK  : INTEGER;
        END;
  FGMS = RECORD
         TIPE  : INTEGER;
         PU    : REAL;
         Q     : REAL;
         AKER  : INTEGER;
        END;
  FDBN = RECORD
         TIPE : INTEGER;
         FCK  : REAL;
         FCP  : REAL;
         FY   : REAL;
        END;
  FDBT = RECORD
         TIPE : INTEGER;
         N    : INTEGER;
         DP   : INTEGER;
        END;
  FKLM = RECORD
         TIPE : INTEGER;
         FBP  : INTEGER;
         FLP  : INTEGER;
         FT   : INTEGER;
         FDP  : INTEGER;
         FSP  : INTEGER;
         FDL  : INTEGER;
         FSL  : INTEGER;
         FND  : INTEGER;
         FDD  : INTEGER;
         FLD  : INTEGER;
         FJB  : INTEGER;
         FSISA: INTEGER;
        END;
VAR
  FTIPE                : TEXT;
  FDI                  : FILE OF FDN;
  FDATBAH              : FILE OF FDBN;
  FBAHTUL              : FILE OF FDBT;
  FGMAKS               : FILE OF FGMS;
  FPONDASI             : FILE OF FKLM;
  RECORDFDBN           : FDBN;
  RECORDFDBT           : FDBT;
  RECORDFGMS           : FGMS;
  RECORDFDN            : FDN;
  RECORDFPON           : FKLM;
I,JTIPE,JUM,NOREC,J,TP,ULANG,ULANGT,AKERB,
TERUS,TERUST,ULANG2, TERUS2,SISAS,DPB,
DD,DPKB,JBS,SISA             : INTEGER;
PUB,QB,FCKB,FCPB,FYB,LPB,TB,DFB,BKB,HKB,
```

```
PBB,AD,AK,Q1,QT,APER,BPER,BPB,LPS,
AP,P,D,O,B,VU,B1,BC,B0,VC1,VC2,VC,OVN,
G,FP,MUP,KP,ROP,ROB,ROMAKS,ROMIN,ASP,SP,
JB1,BE,Z,JB,FL,MUL,KL,ROL,ASL,SL,PTP,PTK,
ASDPER,ADS,JN,ASD,LDB,LDBMAKS,LDBMIN,N,LD,
ASPS,SPS,DPS,ASLS,SLS,DLS,JI          : Real;
NFDA,EL                          : STRING[7];
FDB,FDT,FGM,FTIP,FDM,FBK              : STRING[12];
FTP,BBN,BBT,BGM,BDD,BLK,DIRAK,DIREK      : STRING;

BEGIN
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);BBN:=PARAMSTR(5);
BBT:=PARAMSTR(6); BGM:=PARAMSTR(7); BDD:=PARAMSTR(8); BLK:=PARAMSTR(9);
GETDIR(0,DIRAK); CHDIR(DIREK); FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN
READ(FTIPE,JTIPE); CLOSE(FTIPE); FDM:=NFDA+BDD; ASSIGN(FDI,FDM);
{$I-} RESET(FDI); {$I+}
IF IORESULT=0 THEN BEGIN
CLOSE(FDI); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
IF IORESULT=0 THEN BEGIN
CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT);
{$I-} RESET(FBAHTUL); {$I+}
IF IORESULT=0 THEN BEGIN
CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
IF IORESULT=0 THEN BEGIN CLOSE(FDATBAH); TP:=0;
REPEAT
ULANG:=0; ULANGT:=0; ULANG2:=0; TEXTBACKGROUND(0); CLRSCR;
FOR I:=1 TO 1000 DO BEGIN
 TEXTCOLOR(5); GOTOXY(20,10); FOR J:=1 TO 36 DO WRITE(CHAR(176));
 GOTOXY(20,11); WRITE (CHAR(176),' '); FOR J:=1 TO 3 DO WRITE(CHAR(175));
 TEXTCOLOR(11); WRITE(' PROSES DIASIN  PONDASI'); TEXTCOLOR(5);
 FOR J:=1 TO 3 DO WRITE(CHAR(174)); WRITE(' ',CHAR(176));
 GOTOXY(20,12); FOR J:=1 TO 36 DO WRITE(CHAR(176)); TEXTCOLOR(10); END;
TP:=TP+1; RESET(FGMAKS);
WHILE NOT EOF(FGMAKS) DO BEGIN
WITH RECORDFGMS DO BEGIN READ(FGMAKS,RECORDFGMS);
IF RECORDFGMS.TIPE=TP THEN BEGIN
 PUB:=PU; QB :=Q*1E-3; AKERB:=AKER; END; END;
END; CLOSE(FGMAKS); RESET(FDATBAH);
WHILE NOT EOF(FDATBAH) DO BEGIN
WITH RECORDFDBN DO BEGIN READ(FDATBAH,RECORDFDBN);
IF RECORDFDBN.TIPE=TP THEN BEGIN
 FCKB:=FCK; FCPB:=FCP; FYB :=FY; END; END;
END; CLOSE(FDATBAH); RESET(FDI);
WHILE NOT EOF(FDI) DO BEGIN
WITH RECORDFDN DO BEGIN READ(FDI,RECORDFDN);
IF RECORDFDN.TIPE=TP THEN BEGIN
 LPS:=LP; TB:=T; PBB:=PB; DFB:=DF; BKB:=BK;
 HKB:=HK; DPKB:=DPK; END; END;
END; CLOSE(FDI); RESET(FBAHTUL); JUM:=FILESIZE(FBAHTUL); ASPS:=0;
DPS:=0; ASLS:=0; DLS:=0; JBS:=2; SISAS:=2;
FOR I:=1 TO JUM DO BEGIN TERUS:=0; TERUST:=0; TERUS2:=0;
WITH RECORDFDBT DO BEGIN SEEK(FBAHTUL,I-1); READ(FBAHTUL,RECORDFDBT);
IF (RECORDFDBT.TIPE=TP) AND (RECORDFDBT.DP<>0) THEN BEGIN
 DPB:=RECORDFDBT.DP; AD:=0.25*3.14*SQR(DPB); AK:=BKB*HKB;
 Q1:=(23*TB+15.7*(DFB-TB))*1E-6; QT:=QB-Q1; APER:=PUB/QT;
 BPER:=APER/LPS; IF FRAC(BPER/100)>0.5 THEN BEGIN BPER:=(ROUND(BPER/100))*100; END
 ELSE BPER:=(TRUNC(BPER/100)+0.5)*100;
 IF BPER>LPS THEN BEGIN
  BPB:=LPS; LPB:=BPER; END
 ELSE BEGIN
  BPB:=BPER; LPB:=LPS; END;
 AP:=BPB*LPB; P:=PUB/AP; D:=TB-PBB-DPB; O:=0.60; B1:=0.80;
 IF AKERB=2 THEN BEGIN
 B:=BKB+D; VU:=P*(AP-SQR(B)); BC:=HKB/BKB; B0:=4*B;
 VC1:=(1+2/BC)*2*SQRT(FCPB)*B0*D*1000;
 VC2:=4*SQRT(FCPB)*B0*D*1000;
 IF VC1<=VC2 THEN VC:=VC1
 ELSE VC:=VC2;
 OVN:=O*VC;
```

```
        IF OVN<VU THEN BEGIN TERUS:=1; ULANG:=ULANG+1; END; END
        ELSE BEGIN
         G:=(LPB-BKB)/2-D; VU:=P*BPB*G; VC:=SQRT(FCPB)*BPB*1000*D/6; OVN:=O*VC;
         IF OVN<VU THEN BEGIN TERUS:=1; ULANG:=ULANG+1; END; END;
        IF TERUS<>1 THEN BEGIN O:=0.8;
         FP:=(BPB-BKB)/2; MUP:=P*FP*(0.5*FP)*LPB; KP:=MUP/(O*LPB*SQR(D));
         ROP:=(FCPB-SQRT(SQR(FCPB)-2.36*KP*FCPB))/(1.18*FYB);
         ROB:=(0.85*FCPB*B1)*600/(FYB*(600+FYB)); ROMAKS:=0.75*ROB; ROMIN:=1.4/FYB;
         IF ROP<ROMIN THEN ROP:=ROMIN;
         IF ROP>ROMAKS THEN BEGIN TERUST:=1; ULANGT:=ULANGT+1; END;
         IF TERUST<>1 THEN BEGIN
          ASP:=ROP*LPB*D; JB1:=TRUNC(ASP/AD)+1; BE:=LPB/BPB; Z:=2/(BE+1);
          JB:=Z*JB1; JB:=TRUNC(JB)+1; SISA:=TRUNC(JB1-JB);
          SP:=BPB/(JB-1); SP:=TRUNC(SP/10)*10;
          IF SISA=0 THEN SISA:=2; END;
         FL:=(LPB-HKB)/2; MUL:=P*FL*(0.5*FL)*BPB; KL:=MUL/(O*BPB*SQR(D));
         ROL:=(FCPB-SQRT(SQR(FCPB)-2.36*KL*FCPB))/(1.18*FYB);
         IF ROL<ROMIN THEN ROL:=ROMIN;
         IF ROL>ROMAKS THEN BEGIN TERUST:=1; ULANGT:=ULANGT+1; END;
         IF TERUST<>1 THEN BEGIN
          ASL:=ROL*BPB*D; SL:=AD*BPB/ASL; SL:=TRUNC(SL/10)*10; JI:=SQRT(AP/AK);
          IF JI>2 THEN JI:=2;
          O:=0.70; PTP:=O*(0.85*FCPB*AK)*JI*1000; PTK:=O*(0.85*FCKB*AK)*1000;
          IF (PTK>PTP) OR (PTK<PUB) THEN BEGIN
           TERUS2:=1; ULANG2:=ULANG2+1; END;
          IF TERUS2<>1 THEN BEGIN
           IF (ASPS=0) AND (SP>=25) THEN BEGIN
            ASPS:=ASP; SPS:=SP; DPS:=DPB; JBS:=TRUNC(JB); SISAS:=SISA; END
           ELSE IF (ASP<ASPS) AND (SP>=25) THEN BEGIN
            ASPS:=ASP; SPS:=SP; DPS:=DPB; JBS:=TRUNC(JB); SISAS:=SISA; END;
           IF (ASLS=0) AND (SL>=25)THEN BEGIN
            ASLS:=ASL; SLS:=SL; DLS:=DPB; END
           ELSE IF (ASL<ASLS) AND (SL>=25) THEN BEGIN
            ASLS:=ASL; SLS:=SL; DLS:=DPB; END;
           END; END; END; END; END;
          IF (FRAC(SISAS/2)>0) THEN SISAS:=SISAS+1;
          IF SPS>=500 THEN SPS:=500; IF SLS>=500 THEN SLS:=500;
    END; CLOSE(FBAHTUL);
    IF (ULANG=JUM) OR (ULANG2=JUM) THEN BEGIN
       CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
       WRITE('Perencanaan Pondasi "DIULANG".......!');
       WRITE(^G); READKEY; TEXTCOLOR(10); END;
    IF ULANGT=JUM THEN BEGIN
       CLRSCR; TEXTCOLOR(11);
       GOTOXY(20,10); WRITE('Tebal Plat Kaki "DIPERBESAR".......!');
       WRITE(^G); READKEY; TEXTCOLOR(10); END;
    IF (ULANG<JUM) AND (ULANGT<JUM) THEN BEGIN
    IF ULANG2<JUM THEN BEGIN
     ASDPER:=0.005*AK; DD:=DPKB; ADS:=0.25*3.14*SQR(DD); JN:=ASDPER/ADS;
     JN:=TRUNC(JN)+1; ASD:=JN*ADS; LDB:=DD*FYB/(4*SQRT(FCPB));
     LDBMAKS:=0.04*DD*FYB; LDBMIN:=200;
     IF LDB<LDBMAKS THEN LDB:=LDBMAKS;
     N:=ASDPER/ASD; LD:=N*LDB; LD:=(TRUNC(LD/10)+1)*10;
     IF LD<LDBMIN THEN LD:=LDBMIN; FBK:=NFDA+BLK;
     ASSIGN(FPONDASI,FBK); {$I-} RESET(FPONDASI); {$I+}
     IF IORESULT<>0 THEN REWRITE(FPONDASI); NOREC:=-1; JUM:=FILESIZE(FPONDASI);
     WITH RECORDFPON DO BEGIN
      IF JUM<>0 THEN BEGIN
       FOR J:=1 TO JUM DO BEGIN SEEK(FPONDASI,J-1); READ(FPONDASI,RECORDFPON);
        IF TP=RECORDFPON.TIPE THEN NOREC:=J-1; END;
        IF NOREC=-1 THEN NOREC:=JUM; SEEK(FPONDASI,NOREC); END;
       TIPE:=TP; FBP:=TRUNC(BPB); FLP:=TRUNC(LPB); FT :=TRUNC(TB);
       FDP:=TRUNC(DPS); FSP:=TRUNC(SPS); FDL:=TRUNC(DLS); FSL:=TRUNC(SLS);
       FND:=TRUNC(JN); FDD:=TRUNC(DD); FLD:=TRUNC(LD); FJB:=JBS;
       FSISA:=SISAS; WRITE(FPONDASI,RECORDFPON); END; CLOSE(FPONDASI);
      END; END;
    UNTIL TP=JTIPE;
   END
   ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
```

```
       WRITE(^G); READKEY; TEXTCOLOR(10); END;
     END
     ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
       WRITE(^G); READKEY; TEXTCOLOR(10); END;
     END
     ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA GAYA YG BEKERJA PADA ',EL,' BELUM DIBUAT...!');
       WRITE(^G); READKEY; TEXTCOLOR(10); END;
     END
     ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
      WRITE('DATA DIMENSI ',EL,' BELUM DIBUAT...!');
       WRITE(^G); READKEY; TEXTCOLOR(10); END;
     END
     ELSE BEGIN
      CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('JUMLAH TIPE ',EL,' BELUM ADA...!');
       WRITE(^G); READKEY; TEXTCOLOR(10); END;
      CLRSCR; TEXTCOLOR(5); GOTOXY(20,10); FOR J:=1 TO 36 DO WRITE(CHAR(176));
      GOTOXY(20,11);
      WRITE (CHAR(176),' '); FOR J:=1 TO 3 DO WRITE(CHAR(175)); TEXTCOLOR(4);
      WRITE(' DISAIN PONDASI SELESAI '); TEXTCOLOR(5);
      FOR J:=1 TO 3 DO WRITE(CHAR(174)); WRITE(' ',CHAR(176)); GOTOXY(20,12);
      FOR J:=1 TO 36 DO WRITE(CHAR(176)); GOTOXY(26,13);
      FOR J:=1 TO 5 DO WRITE(CHAR(3)); TEXTCOLOR(11); WRITE(' TEKAN ENTER ');
      TEXTCOLOR(5); FOR J:=1 TO 5 DO WRITE(CHAR(3)); TEXTCOLOR(10);
      WRITE(^G); READLN; CHDIR(DIRAK);
     END.


PROGRAM SKETSABALOK;
uses crt,graph,printer;
TYPE
    FDMN = RECORD
         TIPE : INTEGER;
         LP  : REAL;
         T   : REAL;
         PB  : REAL;
         DF  : REAL;
         BK  : REAL;
         HK  : REAL;
         DPK : INTEGER;
        END;
    FBLK = RECORD
         TIPE : INTEGER;
         FBP : INTEGER;
         FLP : INTEGER;
         FT  : INTEGER;
         FDP : INTEGER;
         FSP : INTEGER;
         FDL : INTEGER;
         FSL : INTEGER;
         FND : INTEGER;
         FDD : INTEGER;
         FLD : INTEGER;
         FJB : INTEGER;
         FSISA: INTEGER;
        END;

Var
   FTIPE                  : TEXT;
   FDIM                   : FILE OF FDMN;
   FBALOK                  : FILE OF FBLK;
   RECORDFDMN                 : FDMN;
   RECORDFBLK                : FBLK;
   NFDA,EL                : STRING[7];
   FTIP,FDM,FBK              : STRING[12];
   FTP,BDD,BLK,DIRAK,DIREK,O,BPS,P,HBS,PBS,
```
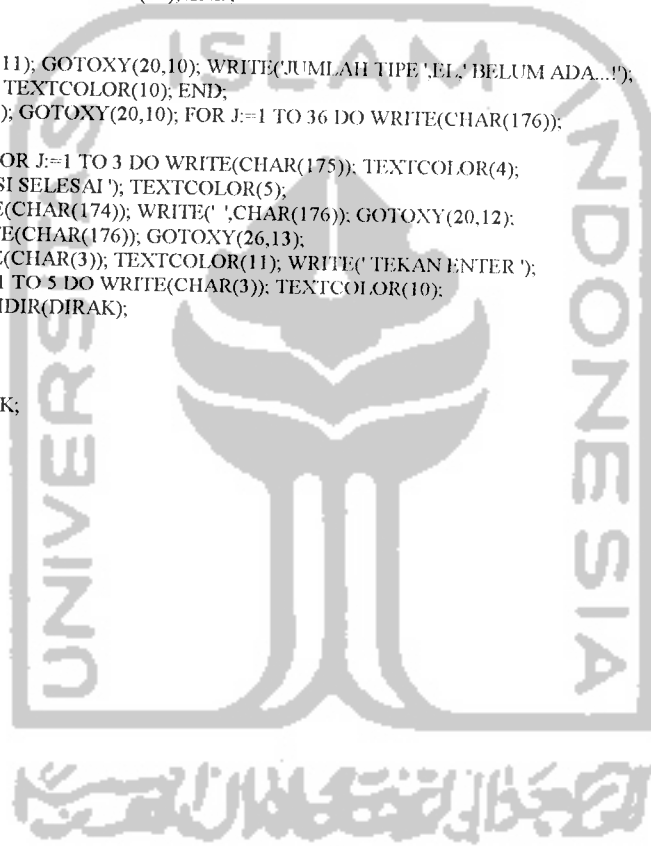
```pascal
DLS,SLS,DPS,SPS,NDS,DDS,LDS,HKS,BKS    : STRING;
JTIPE,tp,i,J,a,b,c,drivergrafik,
modegrafik,Z,X,Y,PBB,BP,LP,HB,DL,SL,DP,
SP,ND,DD,LD,D,NTLA,E,BARA,BARB,T,L,S,
SISA,HKO,BKO                : INTEGER;
TULIS                   : STRING[9];

begin
DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);FTP:=PARAMSTR(3);BDD:=PARAMSTR(4);BLK:=PARAMSTR(5);
GETDIR(0,DIRAK); CHDIR(DIREK); drivergrafik := detect;
IF (DIRAK='A:\') OR (DIRAK='C:\') OR (DIRAK='B:\') OR (DIRAK='D:\') OR
(DIRAK='E:\') THEN initgraph(drivergrafik, modegrafik,DIRAK+'LOGO') ELSE
initgraph(drivergrafik, modegrafik,DIRAK+'\LOGO');
FTIP:=NFDA+FTP; ASSIGN(FTIPE,FTIP); {$I-} RESET(FTIPE); {$I+}
IF IORESULT=0 THEN BEGIN READ(FTIPE,JTIPE); CLOSE(FTIPE);
FBK:=NFDA+BLK; ASSIGN(FBALOK,FBK); {$I-} RESET(FBALOK); {$I+}
IF IORESULT=0 THEN BEGIN CLOSE(FBALOK);
FDM:=NFDA+BDD; ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
IF IORESULT=0 THEN BEGIN CLOSE(FDIM); TP:=0;
REPEAT
TP:=TP+1; RESET(FDIM); cleardevice; setfillstyle(1,15);
floodfill(1,1,14); setteXTstyle(SMALLfont,horizdir,4); X:=0; Y:=0;
WHILE NOT EOF(FDIM) DO BEGIN
WITH RECORDFDMN DO BEGIN READ(FDIM,RECORDFDMN);
 IF RECORDFDMN.TIPE=TP THEN BEGIN PBB:=TRUNC(PB); HKO:=TRUNC(HK);
 BKO:=TRUNC(BK); END; END; END; CLOSE(FDIM); RESET(FBALOK);
WHILE NOT EOF(FBALOK) DO BEGIN WITH RECORDFBLK DO BEGIN
READ(FBALOK,RECORDFBLK);
 IF RECORDFBLK.TIPE=TP THEN BEGIN
BP:=FBP; LP:=FLP; HB:=FT; DL:=FDP; SL:=FSP; DP:=FDL; SP:=FSL; ND:=FND;
DD:=FDD; LD:=FLD; SISA:=FSISA; END; END; END; CLOSE(FBALOK);
STR(BP,BPS); STR(HB,HBS); STR(PBB,PBS); STR(DL,DLS);
STR(SL,SLS); STR(DP,DPS); STR(SP,SPS); STR(ND,NDS); STR(DD,DDS);
STR(LD,LDS); STR(HKO,HKS); STR(BKO,BKS); STR(TP,O);
FOR I:=0 TO 1 DO BEGIN
IF I=0 THEN BEGIN S:=SL; L:=LP; END ELSE BEGIN S:=SP; L:=BP; END;
STR(L,P); L:=BP; SETLINESTYLE(0,0,1);
setteXTstyle(SMALLfont,horizdir,4); SETCOLOR(0);
MOVETO(20+I*25,50+I*180); LINEREL(255-I*15,0); LINEREL(0,-30);
MOVETO(335-I*10,50+I*180); LINEREL(0,-30); LINEREL(0,30);
LINEREL(255-I*15,0); MOVETO(20+I*25,110+I*180); LINEREL(570-I*50,0);
MOVETO(15+I*25,150+I*180); LINEREL(580-I*50,0);
MOVETO(20+I*25,148+I*180); LINEREL(0,5);
MOVETO(590-I*25,148+I*180); LINEREL(0,5);
OUTTEXTXY(285,I*180+138,P+' mm');
MOVETO(600-I*25,45+I*180); LINEREL(0,70);
MOVETO(598-I*25,50+I*180); LINEREL(5,0);
MOVETO(598-I*25,110+I*180); LINEREL(5,0);
OUTTEXTXY(602-I*25,I*180+70,HBS+' mm');
MOVETO(607-I*25,95+I*180); LINEREL(0,20);
MOVETO(605-I*25,100+I*180); LINEREL(5,0);
MOVETO(605-I*25,110+I*180); LINEREL(5,0);
OUTTEXTXY(612-I*25,I*180+100,PBS+' mm');
MOVETO(20+I*25,50+I*180); LINEREL(0,60);
MOVETO(590-I*25,50+I*180); LINEREL(0,60);
MOVETO(260,15+I*180); LINEREL(0,70);
MOVETO(257,20+I*180); LINEREL(5,0);
MOVETO(257,80+I*180); LINEREL(5,0);
OUTTEXTXY(210,I*180+30,LDS+' mm');
OUTTEXTXY(210,I*180+60,LDS+' mm');
SETLINESTYLE(0,0,3);
MOVETO(30+I*25,100+I*176); LINEREL(550-I*50,0); LINEREL(-3,-3);
MOVETO(30+I*25,100+I*176); LINEREL(3,-3);
MOVETO(285+I*10,20+I*180); LINEREL(0,60); LINEREL(-20,0);
MOVETO(325-I*10,20+I*180); LINEREL(0,60); LINEREL(20,0);
SETLINESTYLE(1,0,1);
MOVETO(270+I*10,20+I*180); LINEREL(70-I*20,0);
SETLINESTYLE(0,0,3);
IF FRAC(L/S)=0 THEN NTLA:=TRUNC(L/S)+1 ELSE NTLA:=TRUNC(L/S)+2;
A:=0; C:=1; D:=1;
```

```
IF (I=0) THEN BEGIN
IF SISA>2 THEN BEGIN
 B:=TRUNC((160-SISA)/((SISA-2)/2+1));
 FOR J:=1 TO SISA-2 DO BEGIN
  IF A=0 THEN BEGIN
   CIRCLE(38+B*C,96,2);
   A:=1; C:=C+1; X:=X+1;
   END
   ELSE BEGIN
   CIRCLE(572-B*D,96,2);
   A:=0; D:=D+1; Y:=Y+1;
   END;
  END;
 END;
 CIRCLE(38,96,2);
 CIRCLE(572,96,2);
END;
A:=0; C:=1; D:=1;
IF NTLA>2 THEN BEGIN
IF NTLA-2>1 THEN BEGIN
 B:=TRUNC((220+I*280)/(NTLA-1));
 FOR J:=1 TO NTLA-2 DO
 BEGIN
  IF A=0 THEN BEGIN
   CIRCLE(195+B*C-I*157+I*25,96+I*184,2);
   A:=1; C:=C+1;
   END
   ELSE BEGIN
   CIRCLE(415-B*D+I*157-I*25,96+I*184,2);
   A:=0; D:=D+1;
   END;
  END;
 END
 ELSE CIRCLE(305,96+I*184,2);
END;
CIRCLE(195-I*157+I*25,96+I*184,2); CIRCLE(415+I*157-I*25,96+I*184,2);
SETLINESTYLE(0,0,1);
IF I=0 THEN BEGIN
 MOVETO(190,130); LINEREL(230,0);
 MOVETO(195,127); LINEREL(0,5);
 MOVETO(415,127); LINEREL(0,5);
 OUTTEXTXY(285,118,BPS+' mm');
 STR(Y+1,TULIS);
 MOVETO(572,96); LINEREL(-15,-15); OUTTEXTXY(525,73,TULIS+'D'+DLS);
 STR(X+1,TULIS);
 MOVETO(38,96); LINEREL(15,-15); OUTTEXTXY(55,73,TULIS+'D'+DLS);
END;
SetteXTstyle(SMALLfont,horizdir,4);
 MOVETO(32+I*515,I*180+100); LINEREL(-15,15); OUTTEXTXY(10+I*500,I*176+117,'D'+DPS+'-'+SPS);
 MOVETO(415-358*I,I*180+96); LINEREL(-15,-15+I*30); OUTTEXTXY(358-I*330,I*220+73,'D'+DLS+'-'+SLS);
 MOVETO(285+10*I,I*180+60); LINEREL(60-I*20,0); OUTTEXTXY(355-I*10,55+I*180,NDS+'D'+DDS);
 MOVETO(330-10*I,I*180+30); LINEREL(15,0); IF I=0 THEN OUTTEXTXY(355-I*10,I*180+25,HKS+' mm x '+BKS+'
mm')
ELSE OUTTEXTXY(355-I*10,I*180+25,BKS+' mm x '+HKS+' mm');
SetteXTstyle(tripleXfont,horizdir,1); OutteXTXy(130,380,'SKETSA PENULANGAN PONDASI TIPE '+O);
setteXTstyle(SMALLfont,horizdir,6); IF I=0 THEN
OUTTEXTXY(140,170,'PENULANGAN PONDASI ARAH MEMANJANG') ELSE
OUTTEXTXY(160,350,'PENULANGAN PONDASI ARAH LEBAR'); SetteXTstyle(SMALLfont,horizdir,4);
SETLINESTYLE(0,0,1); SETCOLOR(1); setteXTstyle(tripleXfont,horizdir,1);
outteXTXy(516,440,'UII-CDP'); setteXTstyle(SMALLfont,horizdir,4);
setcolor(4); rectangle(500,440,600,465); setcolor(0);
END; READKEY; UNTIL TP=JTIPE; END; END; END; closegraph; restorecrtmode; CHDIR(DIRAK);
end.


PROGRAM TDPO;
USES CRT;
TYPE
 FDBN = RECORD
```

```
        TIPE : INTEGER;
        FCK  : REAL;
        FCP  : REAL;
        FY   : REAL;
      END;
    FDBT = RECORD
        TIPE : INTEGER;
        N    : INTEGER;
        DP   : INTEGER;
      END;
    FDMN = RECORD
        TIPE : INTEGER;
        LP   : REAL;
        T    : REAL;
        PB   : REAL;
        DF   : REAL;
        BK   : REAL;
        HK   : REAL;
        DPK  : INTEGER;
      END;
    FGMS = RECORD
        TIPE : INTEGER;
        PU   : REAL;
        Q    : REAL;
        AKER : INTEGER;
      END;
    FELN = RECORD
        TIPE : INTEGER;
        NO   : INTEGER;
        ELE  : INTEGER;
      END;

VAR
  FTIPE                              : TEXT;
  FDATBAH                           : FILE OF FDBN;
  FBAHTUL                          : FILE OF FDBT;
  FGMAKS                          : FILE OF FGMS;
  FDIM                           : FILE OF FDMN;
  FELE                          : FILE OF FELN;
  RECORDFELN                      : FELN;
  RECORDFDBN                      : FDBN;
  RECORDFDBT                      : FDBT;
  RECORDFGMS                      : FGMS;
  RECORDFDMN                      : FDMN;
  I,JTIPE,JUM,NOREC,J,TP,DPMAKS,DSMAKS,
  NTUL,DPTUL,ISI,K,F                : Integer;
  NFDA,EL                          : STRING[7];
  FDB,FDT,FGM,FTIP,FDM,FELM         : STRING[12];
  FTP,BBN,BBT,BEL,BGM,BDD,DIRAK,DIREK   : STRING;

BEGIN
  DIREK:=PARAMSTR(1);NFDA:=PARAMSTR(2);EL:=PARAMSTR(3);FTP:=PARAMSTR(4);
  BBN:=PARAMSTR(5); BBT:=PARAMSTR(6); BEL:=PARAMSTR(7); BGM:=PARAMSTR(8);
  BDD:=PARAMSTR(9); GETDIR(0,DIRAK); CHDIR(DIREK); FDM:=NFDA+BDD;
  ASSIGN(FDIM,FDM); {$I-} RESET(FDIM); {$I+}
  IF IORESULT=0 THEN BEGIN
   CLOSE(FDIM); FGM:=NFDA+BGM; ASSIGN(FGMAKS,FGM); {$I-} RESET(FGMAKS); {$I+}
   IF IORESULT=0 THEN BEGIN
   CLOSE(FGMAKS); FDT :=NFDA+BBT; ASSIGN(FBAHTUL,FDT); {$I-} RESET(FBAHTUL); {$I+}
   IF IORESULT=0 THEN BEGIN
   CLOSE(FBAHTUL); FDB :=NFDA+BBN; ASSIGN(FDATBAH,FDB); {$I-} RESET(FDATBAH); {$I+}
   IF IORESULT=0 THEN BEGIN
   CLOSE(FDATBAH); FELM:=NFDA+BEL; ASSIGN(FELE,FELM); {$I-} RESET(FELE); {$I+}
   IF IORESULT=0 THEN BEGIN
    CLOSE(FELE); TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR; I:=1; K:=1;
    F:=1; RESET(FDATBAH);
    WHILE NOT EOF(FDATBAH) DO BEGIN
    SEEK(FDATBAH,F-1); READ(FDATBAH,RECORDFDBN); F:=F+1;
    WITH RECORDFDBN DO BEGIN
    IF (K=1) THEN BEGIN I:=I+6;
```

```
IF I>=22 THEN BEGIN CLRSCR; I:=7; END;
WRITE('       ',CHAR(218)); FOR J:=1 TO 63 DO WRITE(CHAR(196));
WRITE(CHAR(191)); WRITELN; WRITE('       ',CHAR(179));
TEXTCOLOR(11); WRITE('          >>> DATA BAHAN <<<',
'           '); TEXTCOLOR(10); WRITE(CHAR(179));
WRITELN; WRITE('       ',CHAR(195));
FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(180));
WRITELN; WRITE('       ',CHAR(179),' Tipe Teg. Desak Beton Teg.',
' Desak Beton  Tegangan Tarik Baja ',CHAR(179)); WRITELN;
WRITE('       ',CHAR(179),' Pond. Kolom (MPa)    ',
'Pond. (MPa)     (MPa)     ',CHAR(179));
WRITELN; WRITE('       ',CHAR(195));
FOR J:=1 TO 63 DO WRITE(CHAR(196)); WRITE(CHAR(180)); WRITELN; END;
WRITE('       ',CHAR(179),' ',TIPE:3,'      ',
TRUNC(FCK):3,'          ',TRUNC(FCP):3,
'          ',TRUNC(FY):6,'      ',CHAR(179)); WRITELN;
K:=K+1; I:=I+1;
IF (I>=22) OR EOF(FDATBAH) THEN BEGIN
WRITE('       ',CHAR(192)); FOR J:=1 TO 63 DO WRITE(CHAR(196));
WRITE(CHAR(217)); READKEY; WRITELN; K:=1; I:=I+1; END;
IF I>=22 THEN BEGIN I:=1; K:=1; CLRSCR; END; END;
END; CLOSE(FDATBAH); F:=1; RESET (FBAHTUL);
WHILE NOT EOF(FBAHTUL) DO BEGIN
SEEK(FBAHTUL,F-1); READ(FBAHTUL,RECORDFDBT); F:=F+1;
WITH RECORDFDBT DO BEGIN
IF (K=1) THEN BEGIN I:=I+6;
IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
WRITE('       ',CHAR(218));
FOR J:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(191));
WRITELN; WRITE('       ',CHAR(179)); TEXTCOLOR(11);
WRITE(' >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<< ');
TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
WRITE('       ',CHAR(195));
FOR J:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
WRITELN; WRITE('       ',CHAR(179),
' Tipe   No.    Diameter Tulangan Pokok ',
CHAR(179)); WRITELN; WRITE('       ',CHAR(179),
' Pondasi         (mm)        ',
CHAR(179)); WRITELN; WRITE('       ',CHAR(195));
FOR J:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(180));
WRITELN; END;
WRITE('       ',CHAR(179),' ',TIPE:3,'     ',N:2,
'        ',DP:2,'        ',CHAR(179));
WRITELN; K:=K+1; I:=I+1;
IF (I>=22) OR EOF(FBAHTUL) THEN BEGIN
WRITE('       ',CHAR(192));
FOR J:=1 TO 47 DO WRITE(CHAR(196)); WRITE(CHAR(217));
READKEY; WRITELN; K:=1; I:=I+1; END;
IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
END; CLOSE(FBAHTUL); F:=1; RESET(FELE);
WHILE NOT EOF(FELE) DO BEGIN
SEEK(FELE,F-1); READ(FELE,RECORDFELN); F:=F+1;
WITH RECORDFELN DO BEGIN
IF K=1 THEN BEGIN I:=I+5;
IF I>=22 THEN BEGIN I:=6; CLRSCR; END;
WRITE('       ',CHAR(218));
FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(191));
WRITELN; WRITE('       ',CHAR(179)); TEXTCOLOR(11);
WRITE(' >>> DATA ELEMEN ',EL:7,' <<< '); TEXTCOLOR(10);
WRITE(CHAR(179)); WRITELN; WRITE('       ',CHAR(195));
FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(180));
WRITELN; WRITE('       ',CHAR(179),' Tipe    No.   Elemen ',
CHAR(179)); WRITELN; WRITE('       ',CHAR(195));
FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(180));
WRITELN; END;
WRITE('       ',CHAR(179),' ',TIPE:3,'     ',NO:2,
'      ',ELE:3,' ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
IF (I>=22) OR EOF(FELE) THEN BEGIN
WRITE('       ',CHAR(192));
FOR J:=1 TO 29 DO WRITE(CHAR(196)); WRITE(CHAR(217));
```

```pascal
     READKEY; WRITELN; K:=1; I:=I+1; END;
    IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
   END; CLOSE(FELE); F:=1; RESET(FDIM);
  WHILE NOT EOF(FDIM) DO BEGIN
  SEEK(FDIM,F-1); READ(FDIM,RECORDFDMN); F:=F+1;
  WITH RECORDFDMN DO BEGIN
  IF K=1 THEN BEGIN I:=I+6;
   IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
   WRITE('        ',CHAR(218));
   FOR J:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(191));
   WRITELN; WRITE('        ',CHAR(179)); TEXTCOLOR(11);
   WRITE('              >>> DATA DIMENSI <<<      ',
   '        '); TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
   WRITE('        ',CHAR(195));
   FOR J:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(180));
   WRITELN; WRITE('        ',CHAR(179),
   ' Tipe  Panjang  Tebal Plat  Kedalaman  Penutup Beton ',
   CHAR(179)); WRITELN; WRITE('        ',CHAR(179),
   ' Pond.  (mm)       (mm)        (mm)        (mm)  ',
   CHAR(179)); WRITELN; WRITE('        ',CHAR(195));
   FOR J:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(180));
   WRITELN; END;
   WRITE('        ',CHAR(179),'',TIPE:3,'   ',TRUNC(LP):5,
   '     ',TRUNC(T):4,'     ',TRUNC(DF):5,'       ',
   TRUNC(PB):3,'     ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
   IF (I>=22) OR EOF(FDIM) THEN BEGIN
    WRITE('        ',CHAR(192));
    FOR J:=1 TO 54 DO WRITE(CHAR(196)); WRITE(CHAR(217));
    READKEY; WRITELN; K:=1; I:=I+1; END;
   IF I>=22 THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
  END; CLOSE(FDIM); F:=1; RESET(FGMAKS);
  WHILE NOT EOF(FGMAKS) DO BEGIN
  SEEK(FGMAKS,F-1); READ(FGMAKS,RECORDFGMS); F:=F+1;
  WITH RECORDFGMS DO BEGIN
  IF K=1 THEN BEGIN I:=I+6;
   IF I>=22 THEN BEGIN I:=7; CLRSCR; END;
   WRITE('        ',CHAR(218));
   FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(191));
   WRITELN; WRITE('        ',CHAR(179)); TEXTCOLOR(11);
   WRITE('         >>> DATA GAYA-GAYA MAKSIMUM <<<      ');
   TEXTCOLOR(10); WRITE(CHAR(179)); WRITELN;
   WRITE('        ',CHAR(195));
   FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180));
   WRITELN; WRITE('        ',CHAR(179),
   ' Tipe Gaya Aksial Kolom  Tegangan Izin  Arah Kerja ',
   CHAR(179)); WRITELN; WRITE('        ',CHAR(179),
   ' Pond.    (N)          (kPa)             ',
   CHAR(179)); WRITELN; WRITE('        ',CHAR(195));
   FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(180));
   WRITELN; END;
   WRITE('        ');
   WRITE(CHAR(179),'',TIPE:3,'     ',PU:8,'     ',Q:8,
   '      ',AKER,' Arah  ',CHAR(179)); WRITELN; K:=K+1; I:=I+1;
   IF (I>=22) OR EOF(FGMAKS) THEN BEGIN
    WRITE('        ',CHAR(192));
    FOR J:=1 TO 51 DO WRITE(CHAR(196)); WRITE(CHAR(217));
    READKEY; WRITELN; I:=I+1; K:=1; END;
   IF (I>=22) THEN BEGIN K:=1; I:=1; CLRSCR; END; END;
  END; CLOSE(FGMAKS);
 END
 ELSE BEGIN
 CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA ELEMEN BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
 CLRSCR; TEXTCOLOR(11); GOTOXY(20,10); WRITE('DATA BAHAN BELUM DIBUAT...!');
  WRITE(^G); READKEY; TEXTCOLOR(10); END;
 END
 ELSE BEGIN
 CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
```

```
      WRITE('DATA TULANGAN YG AKAN DIGUNAKAN BELUM DIBUAT...!');
      WRITE(^G); READKEY; TEXTCOLOR(10); END;
    END
   ELSE BEGIN
    CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
    WRITE('DATA GAYA YG BEKERJA PADA BALOK BELUM DIBUAT...!');
    WRITE(^G); READKEY; TEXTCOLOR(10); END;
  END
  ELSE BEGIN
   CLRSCR; TEXTCOLOR(11); GOTOXY(20,10);
   WRITE('DATA DIMENSI BALOK BELUM DIBUAT...!');
   WRITE(^G); READKEY; TEXTCOLOR(10); END; CHDIR(DIRAK);
 END.


PROGRAM TPO;
USES CRT;
TYPE
  FDAT = RECORD
       NPROY : STRING[19];
       NFDAT : STRING[8];
     . NaFil : STRING[12];
       ENG  : STRING[19];
     END;
  FKLM = RECORD
       TIPE : INTEGER;
       FBP  : INTEGER;
       FLP  : INTEGER;
       FT   : INTEGER;
       FDP  : INTEGER;
       FSP  : INTEGER;
       FDL  : INTEGER;
       FSL  : INTEGER;
       FND  : INTEGER;
       FDD  : INTEGER;
       FLD  : INTEGER;
       FJB  : INTEGER;
       FSISA: INTEGER;
     END;
VAR
  FPONDASI    : FILE OF FKLM;
  NFILE       : FILE OF FDAT;
  RECORDFDAT  : FDAT;
  RECORDFPON  : FKLM;
  I,J,A,B,C   : INTEGER;
  NFDA,EL     : STRING[7];
  FBK         : STRING[12];
  NPRO,EN     : STRING[19];
  BLK,DIRAK,DIREK: STRING;

BEGIN
DIREK:=PARAMSTR(1); NFDA:=PARAMSTR(2); EL:=PARAMSTR(3); BLK:=PARAMSTR(4);
GETDIR(0,DIRAK); CHDIR(DIREK); ASSIGN(NFILE,'FILEDATA.DAT'); RESET(NFILE);
WHILE NOT EOF(NFILE) DO BEGIN READ(NFILE,RECORDFDAT);
IF RECORDFDAT.NFDAT=NFDA THEN BEGIN
NPRO:=RECORDFDAT.NPROY; EN :=RECORDFDAT.ENG; END; END;
CLOSE(NFILE); FBK:=NFDA+BLK; ASSIGN(FPONDASI,FBK); {$I-} RESET(FPONDASI); {$I+}
IF IORESULT=0 THEN BEGIN I:=1;
WHILE NOT EOF(FPONDASI) DO BEGIN
WITH RECORDFPON DO BEGIN READ(FPONDASI,RECORDFPON);
IF I=1 THEN BEGIN
A:=LENGTH(NPRO); B:=LENGTH(NFDA); C:=LENGTH(EN);
TEXTCOLOR(10); TEXTBACKGROUND(0); CLRSCR; GOTOXY(10,1);
WRITE(CHAR(218)); FOR J:=1 TO 58 DO WRITE(CHAR(196)); WRITE(CHAR(191));
GOTOXY(10,2); WRITE(CHAR(179)); TEXTCOLOR(11);
WRITE('        HASIL PERENCANAAN PONDASI              ');
TEXTCOLOR(10); WRITE(CHAR(179));
GOTOXY(10,3);
WRITE(CHAR(195)); FOR J:=1 TO 58 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,4);
```

```pascal
WRITE(CHAR(179),' Proyek   : ',NPRO:A); FOR J:=1 TO (19-A) DO WRITE(' ');
WRITE('Nama File Data : ',NFDA:B); FOR J:=1 TO (8-B) DO WRITE(' ');
WRITE(' ',CHAR(179)); GOTOXY(10,5);
WRITE(CHAR(179),' Perencana : ',EN:C); FOR J:=1 TO (19-C) DO WRITE(' ');
WRITE('                 ', CHAR(179)); GOTOXY(10,6);
WRITE(CHAR(195)); FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(194));
FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(194));
FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(194));
FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(194));
FOR J:=1 TO 13 DO WRITE(CHAR(196)); WRITE(CHAR(180));
GOTOXY(10,7); WRITE(CHAR(179),' TIPE ',CHAR(179),' TULANGAN ',CHAR(179),
' TULANGAN ',CHAR(179),' TULANGAN ',CHAR(179),' UKURAN  ',
CHAR(179)); GOTOXY(10,8);
WRITE(CHAR(179),'PONDASI',CHAR(179),' ARAH LEBAR ',CHAR(179),
'ARAH PANJANG',CHAR(179),'  PASAK ',CHAR(179),'  PONDASI  ',
CHAR(179)); GOTOXY(10,9);
WRITE(CHAR(195)); FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(197));
FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(197));
FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(197));
FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(197));
FOR J:=1 TO 13 DO WRITE(CHAR(196)); WRITE(CHAR(180)); END;
GOTOXY(10,I+9);
WRITE(CHAR(179),' ',TIPE:3,' ',CHAR(179),'D',FDP:2,' -',FSP:3,' mm ',
   CHAR(179),'D',FDL:2,' -',FSL:3,' mm ',CHAR(179),' ',FND:2,'D',
   FDD:2,'  ',CHAR(179),FBP:4,'mmx',FLP:4,'mm',CHAR(179));
GOTOXY(10,I+10);
WRITE(CHAR(179),'      ',CHAR(179),'MERATA DALAM',CHAR(179),
   '       ',CHAR(179),'PANJANG ',CHAR(179),'TEBAL PLAT  ',
   CHAR(179));
GOTOXY(10,I+11); WRITE(CHAR(179),'      ',CHAR(179),'RENTANG ',FBP:4,CHAR(179),
   '       ',CHAR(179),'PENYALURAN',CHAR(179),'KAKI = ',FT:4,
   'mm',CHAR(179));
GOTOXY(10,I+12); WRITE(CHAR(179),'      ',CHAR(179),FSISA:2,' MERATA DI',CHAR(179),
   '       ',CHAR(179),'Ld =',FLD:4,'mm',CHAR(179),
   '       ',CHAR(179));
GOTOXY(10,I+13);
WRITE(CHAR(179),'      ',CHAR(179),'LUAR RENTANG',CHAR(179),
   '       ',CHAR(179),'     ',CHAR(179),'         ',
   CHAR(179)); I:=I+5;
IF (I>=10) OR (EOF(FPONDASI)) THEN BEGIN
 GOTOXY(10,I+9);
 WRITE(CHAR(192)); FOR J:=1 TO 7 DO WRITE(CHAR(196)); WRITE(CHAR(193));
 FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(193));
 FOR J:=1 TO 12 DO WRITE(CHAR(196)); WRITE(CHAR(193));
 FOR J:=1 TO 10 DO WRITE(CHAR(196)); WRITE(CHAR(193));
 FOR J:=1 TO 13 DO WRITE(CHAR(196)); WRITE(CHAR(217));
 GOTOXY(10,I+10); TEXTCOLOR(11); WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!');
 WRITE(^G); READKEY; TEXTCOLOR(10); I:=1; END; END;
END; CLOSE(FPONDASI);
END
ELSE BEGIN
 CLRSCR; TEXTCOLOR(11); GOTOXY(20,5);
 WRITE('  PROSES DISAIN BELUM DILAKUKAN'); GOTOXY(15,7);
 WRITE('Tekan "SEMBARANG TOMBOL" Untuk Melanjutkan........!'); WRITE(^G); READKEY;
 TEXTCOLOR(10); END; CHDIR(DIRAK);
END.
```

```
:=======================================================================
      MICROFEAP-P1          DATE: 10-25-1996        <DATA> P.1
 :OJECT    : TUGAS AKHIR                          FILENAME: TAKHIR
 ITHORITY: PETRA CIVIL ENGINEERING 1986    ENGINEER: FN ABDI
:=======================================================================
```

```
        ***********************************
        *                                 *
        *   STRUCTURE   DATA   *
        *                                 *
        ***********************************
```

COORDINATE DATA (mm)**   **BOUNDARY DATA**
DE   1-COOR   2-COOR   1-B   2-B   3-B

NODE	1-COOR	2-COOR	1-B	2-B	3-B
1	0.00	0.00	L	L	F
2	0.00	6000.00			
3	0.00	10000.00			
4	5500.00	0.00	L	L	F
5	5500.00	6000.00			
6	5500.00	10000.00			
7	9500.00	0.00	L	L	F
8	9500.00	6000.00			
9	9500.00	10000.00			
10	15000.00	0.00	L	L	F
11	15000.00	6000.00			
12	15000.00	10000.00			

ELEMENT DATA**
EM   1-NODE   2-NODE   HINGE   MATERIAL

ELEM	1-NODE	2-NODE	HINGE	MATERIAL
1	1	2		3
2	2	3		3
3	4	5		3
4	5	6		3
5	7	8		3
6	8	9		3
7	10	11		3
8	11	12		3
9	2	5		1
10	5	8		1
11	8	11		1
12	3	6		2
13	6	9		2
14	9	12		2

MATERIAL DATA**
TE   E-MODULUS AXIAL-AREA   INERTIA
       (N/mm^2)   (mm^2)   (mm^4)

MATE	E-MODULUS (N/mm^2)	AXIAL-AREA (mm^2)	INERTIA (mm^4)
1	2.574D+04	2.000D+05	4.170D+09

==

MATERIAL DATA

ATE	E-MODULUS (N/mm^2)	AXIAL-AREA (mm^2)	INERTIA (mm^4)
2	2.574D+04	1.200D+05	1.600D+09
3	2.574D+04	2.500D+05	5.210D+09
4	2.574D+04	1.256D+05	1.256D+09

JAD CASE #1 : BEBAN MATI

UNIFORM LOAD DATA

EM	1-UNIFORM (N/mm)	2-UNIFORM (N/mm)
9	0.000D+00	-2.300D+01
10	0.000D+00	-2.300D+01
11	0.000D+00	-2.300D+01
12	0.000D+00	-2.100D+01
13	0.000D+00	-2.100D+01
14	0.000D+00	-2.100D+01

JAD CASE #2 : BEBAN HIDUF

UNIFORM LOAD DATA

EM	1-UNIFORM (N/mm)	2-UNIFORM (N/mm)
9	0.000D+00	-3.000D+00
10	0.000D+00	-3.000D+00
11	0.000D+00	-3.000D+00
12	0.000D+00	-3.000D+00
13	0.000D+00	-3.000D+00
14	0.000D+00	-3.000D+00

JAD CASE #3 : GAYA GEMPA

NODAL FORCE DATA

JDE	1-FORC (N)	2-FORC (N)	3-FORC $(N-mm)$
2	6.400D+01	0.000D+00	0.000D+00
3	1.280D+02	0.000D+00	0.000D+00
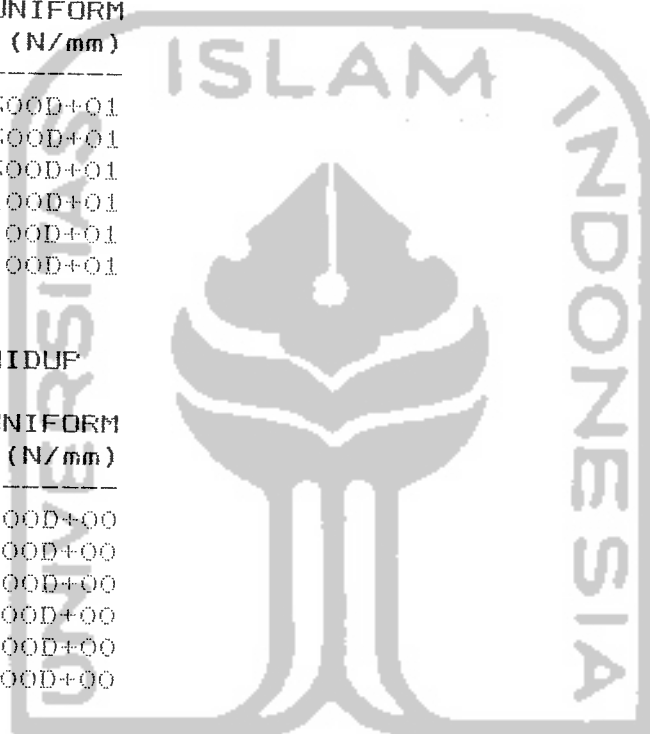
```
=================================================================
    MICROFEAP-P1          DATE: 10-25-1996        <COMB> P.1
 OJECT  : TUGAS AKHIR                          FILENAME: TAKHIR
 THORITY: PETRA CIVIL ENGINEERING 1986         ENGINEER: FN ABDI
=================================================================


        *****************************
        *                           *
        *   COMBINATION   *
        *                           *
        *****************************


SPLACEMENT COMBINATION <2D-FRAME SYSTEM>
AD FACTOR : 1.05/.63/1.05
 DE        1-DISP        2-DISP        3-DISP
           (mm)          (mm)          (Rad)
--------------------------------------------------------
   1    0.0000D+00    0.0000D+00    1.5673D-04
   2    2.4168D-02   -1.2156D-01   -3.2554D-04
   3    8.6540D-02   -1.9806D-01   -1.0355D-03
   4    0.0000D+00    0.0000D+00   -8.0872D-05
   5    3.7483D-02   -2.2779D-01    1.4300D-04
   6    5.7592D-02   -3.7338D-01    4.8241D-04
   7    0.0000D+00    0.0000D+00    6.2268D-05
   8    4.2476D-02   -2.2784D-01   -1.4577D-04
   9    4.6516D-02   -3.7345D-01   -4.8410D-04
  10    0.0000D+00    0.0000D+00   -1.7380D-04
  11    5.5818D-02   -1.2176D-01    3.1969D-04
  12    1.7733D-02   -1.9830D-01    1.0327D-03


RESS COMBINATION <2D-FRAME SYSTEM>
AD FACTOR : 1.05/.63/1.05
 EM  MA HINGE  SECTION       AXIAL F.        SHEAR         MOMENT
              (mm)           (N)            (N)          (N-mm)
--------------------------------------------------------------------
  1   3          0.00    -1.3038D+05    -3.5935D+03    -1.0000D+00
                1000.00   -1.3038D+05   -3.5935D+03    -3.5935D+06
                2000.00   -1.3038D+05   -3.5935D+03    -7.1870D+06
                3000.00   -1.3038D+05   -3.5935D+03    -1.0780D+07
                4000.00   -1.3038D+05   -3.5935D+03    -1.4374D+07
                5000.00   -1.3038D+05   -3.5935D+03    -1.7967D+07
                6000.00   -1.3038D+05   -3.5935D+03    -2.1561D+07

  2   4          0.00    -6.1837D+04    -1.6124D+04     2.6510D+07
                 666.67   -6.1837D+04   -1.6124D+04     1.5760D+07
                1333.33   -6.1837D+04   -1.6124D+04     5.0108D+06
                2000.00   -6.1837D+04   -1.6124D+04    -5.7388D+06
                2666.67   -6.1837D+04   -1.6124D+04    -1.6488D+07
                3333.33   -6.1837D+04   -1.6124D+04    -2.7238D+07
                4000.00   -6.1837D+04   -1.6124D+04    -3.7988D+07

  3   3          0.00    -2.4433D+05     1.6681D+03     0.0000D+00
```

RESS COMBINATION \<2D-FRAME SYSTEM\>
AD FACTOR : 1.05/.63/1.05

EM	MA	HINGE	SECTION (mm)	AXIAL F. (N)	SHEAR (N)	MOMENT (N-mm)
3	3		1000.00	-2.4433D+05	1.6681D+03	1.6681D+06
			2000.00	-2.4433D+05	1.6681D+03	3.3362D+06
			3000.00	-2.4433D+05	1.6681D+03	5.0044D+06
			4000.00	-2.4433D+05	1.6681D+03	6.6725D+06
			5000.00	-2.4433D+05	1.6681D+03	8.3406D+06
			6000.00	-2.4433D+05	1.6681D+03	1.0009D+07
4	4		0.00	-1.1769D+05	7.7050D+03	-1.2667D+07
			666.67	-1.1769D+05	7.7050D+03	-7.5298D+06
			1333.33	-1.1769D+05	7.7050D+03	-2.3931D+06
			2000.00	-1.1769D+05	7.7050D+03	2.7436D+06
			2666.67	-1.1769D+05	7.7050D+03	7.8802D+06
			3333.33	-1.1769D+05	7.7050D+03	1.3017D+07
			4000.00	-1.1769D+05	7.7050D+03	1.8154D+07
5	3		0.00	-2.4438D+05	-1.5502D+03	0.0000D+00
			1000.00	-2.4438D+05	-1.5502D+03	-1.5502D+06
			2000.00	-2.4438D+05	-1.5502D+03	-3.1003D+06
			3000.00	-2.4438D+05	-1.5502D+03	-4.6505D+06
			4000.00	-2.4438D+05	-1.5502D+03	-6.2006D+06
			5000.00	-2.4438D+05	-1.5502D+03	-7.7508D+06
			6000.00	-2.4438D+05	-1.5502D+03	-9.3009D+06
6	4		0.00	-1.1770D+05	-7.6127D+03	1.2491D+07
			666.67	-1.1770D+05	-7.6127D+03	7.4155D+06
			1333.33	-1.1770D+05	-7.6127D+03	2.3403D+06
			2000.00	-1.1770D+05	-7.6127D+03	-2.7348D+06
			2666.67	-1.1770D+05	-7.6127D+03	-7.8099D+06
			3333.33	-1.1770D+05	-7.6127D+03	-1.2885D+07
			4000.00	-1.1770D+05	-7.6127D+03	-1.7960D+07
7	3		0.00	-1.3060D+05	3.6771D+03	0.0000D+00
			1000.00	-1.3060D+05	3.6771D+03	3.6771D+06
			2000.00	-1.3060D+05	3.6771D+03	7.3542D+06
			3000.00	-1.3060D+05	3.6771D+03	1.1031D+07
			4000.00	-1.3060D+05	3.6771D+03	1.4708D+07
			5000.00	-1.3060D+05	3.6771D+03	1.8386D+07
			6000.00	-1.3060D+05	3.6771D+03	2.2063D+07
8	4		0.00	-6.1874D+04	1.6166D+04	-2.6570D+07
			666.67	-6.1874D+04	1.6166D+04	-1.5792D+07
			1333.33	-6.1874D+04	1.6166D+04	-5.0145D+06
			2000.00	-6.1874D+04	1.6166D+04	5.7632D+06
			2666.67	-6.1874D+04	1.6166D+04	1.6541D+07
			3333.33	-6.1874D+04	1.6166D+04	2.7319D+07
			4000.00	-6.1874D+04	1.6166D+04	3.8096D+07

STRESS COMBINATION <2D-FRAME SYSTEM>
LOAD FACTOR : 1.05/.63/1.05

ELEM	MA HINGE	SECTION (mm)	AXIAL F. (N)	SHEAR (N)	MOMENT (N-mm)
9	1	0.00	1.2464D+04	6.8546D+04	-4.8071D+07
		916.67	1.2464D+04	4.4676D+04	3.8222D+06
		1833.33	1.2464D+04	2.0806D+04	3.3835D+07
		2750.00	1.2464D+04	-3.0642D+03	4.1966D+07
		3666.67	1.2464D+04	-2.6934D+04	2.8217D+07
		4583.33	1.2464D+04	-5.0804D+04	-7.4130D+06
		5500.00	1.2464D+04	-7.4674D+04	-6.4924D+07
10	1	0.00	6.4268D+03	5.1969D+04	-4.2249D+07
		666.67	6.4268D+03	3.4609D+04	-1.3389D+07
		1333.33	6.4268D+03	1.7249D+04	3.8971D+06
		2000.00	6.4268D+03	1.1058D+02	9.6101D+06
		2666.67	6.4268D+03	-1.7471D+04	3.7497D+06
		3333.33	6.4268D+03	-3.4831D+04	-1.3684D+07
		4000.00	6.4268D+03	-5.2191D+04	-4.2691D+07
11	1	0.00	1.2489D+04	7.4492D+04	-6.4483D+07
		916.67	1.2489D+04	5.0622D+04	-7.1388D+06
		1833.33	1.2489D+04	2.6752D+04	2.8324D+07
		2750.00	1.2489D+04	2.8818D+03	4.1906D+07
		3666.67	1.2489D+04	-2.0988D+04	3.3607D+07
		4583.33	1.2489D+04	-4.4858D+04	3.4280D+06
		5500.00	1.2489D+04	-6.8728D+04	-4.8633D+07
12	2	0.00	-1.6259D+04	6.1837D+04	-3.7988D+07
		916.67	-1.6259D+04	3.9892D+04	8.6384D+06
		1833.33	-1.6259D+04	1.7947D+04	3.5148D+07
		2750.00	-1.6259D+04	-3.9977D+03	4.1542D+07
		3666.67	-1.6259D+04	-2.5943D+04	2.7819D+07
		4583.33	-1.6259D+04	-4.7888D+04	-6.0198D+06
		5500.00	-1.6259D+04	-6.9833D+04	-5.9975D+07
13	2	0.00	-8.5538D+03	4.7854D+04	-4.1821D+07
		666.67	-8.5538D+03	3.1894D+04	-1.5238D+07
		1333.33	-8.5538D+03	1.5934D+04	7.0465D+05
		2000.00	-8.5538D+03	-2.5522D+01	6.0076D+06
		2666.67	-8.5538D+03	-1.5986D+04	6.7062D+05
		3333.33	-8.5538D+03	-3.1946D+04	-1.5306D+07
		4000.00	-8.5538D+03	-4.7906D+04	-4.1923D+07
14	2	0.00	-1.6166D+04	6.9796D+04	-5.9884D+07
		916.67	-1.6166D+04	4.7851D+04	-5.9617D+06
		1833.33	-1.6166D+04	2.5906D+04	2.7844D+07
		2750.00	-1.6166D+04	3.9613D+03	4.1533D+07
		3666.67	-1.6166D+04	-1.7984D+04	3.5106D+07
		4583.33	-1.6166D+04	-3.7929D+04	8.5632D+06

STRESS COMBINATION <2D-FRAME SYSTEM>
LOAD FACTOR : 1.05/.63/1.05

ELEM	MA HINGE	SECTION (mm)	AXIAL F. (N)	SHEAR (N)	MOMENT (N-mm)
14	2	5500.00	-1.6166D+04	-6.1874D+04	-3.8096D+07

SUPPORT REACTIONS <2D-FRAME SYSTEM>
LOAD FACTOR : 1.05/.63/1.05

NODE	1-REACTION (N)	2-REACTION (N)	3-REACTION (N-mm)
1	3.5935D+03	1.3038D+05	0.0000D+00
4	-1.6681D+03	2.4433D+05	0.0000D+00
7	1.5502D+03	2.4438D+05	0.0000D+00
10	-3.6771D+03	1.3060D+05	0.0000D+00

VOLUME OF MATERIALS <2D-FRAME SYSTEM>

SETS	VOLUME (mm^3)
1	3.0000D+09
2	1.8000D+09
3	6.0000D+09
4	2.0096D+09
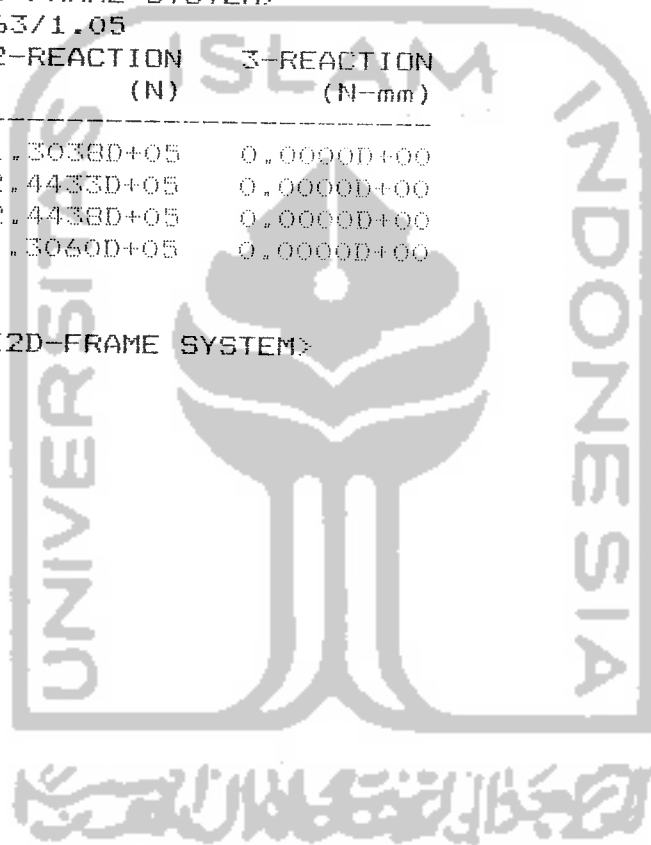
Manual Penggunaan Program Disain Elemen Struktur Beton

Dengan Inputing Data Dari Program Microfeaf II (P1-Module)

Untuk menggunakan program disain elemen struktur beton ini diperlukan file data keluaran dari program microfeap atau file data yang dibuat dengan program editor (seperti edit line dalam DOS, Sidekick, WS dan lainnya) non dokumen dengan ekstension file .TXT.

File data tersebut berisi gaya-gaya yang bekerja pada elemen portal beton yang akan didisain dengan urutan data sebagai berikut:

Elemen-Section-Gaya Aksial-Gaya Geser-Momen

Dalam pengeksekusian, program tersebut dapat langsung dipanggil dari prompt atau direktori dimana program tersebut berada, dengan nama UII-CDP.

Pada saat program dieksekusi akan tampak di layar logo program, untuk melanjutkan dapat ditekan sembarang tombol maka akan tampak di layar menu isian sebagai berikut:

```
DIREKTORI YANG SEDANG AKTIF : C:\UII-CDUI
DIREKTORI FILE DATA ANDA    : A:\

U : ulang   L : lanjutkan ===>
```

Direktori yang sedang aktif adalah drive atau direktori dimana program berada.

Direktori file data anda adalah menu isian yang harus diisikan, di direktori mana

data akan disimpan.Seperti contoh di atas DIREKTORI YANG SEDANG AKTIF

berisi C:\UII-CDUI artinya program tersimpan pada direktori C:\UII-CDUI.

DIREKTORI FILE DATA ANDA berisi A:\ artinya semua file data yang akan

dibuat akan disimpan pada direktori A:\ , dan di bawahnya tampak menu pilihan

U:Ulang L:Lanjutkan, pilih U bila ingin mengulang pengisian direktori file data

anda, pilih L untuk melanjutkan eksekusi program.

```
┌────────────────────────────────────────────────────┐
│  >>> PROGRAM DISAIN ELEMEN STRUKTUR BETON <<<       │
├────────────────────────────────────────────────────┤
│                                                    │
│                                                    │
│   **** Nama File Data :   T-AKHIR                  │
│        D   FILE DATA                               │
│        P   DISAIN ELEMEN PLAT                      │
│        B   DISAIN ELEMEN BALOK                     │
│        K   DISAIN ELEMEN KOLOM                     │
│        F   DISAIN ELEMEN PONDASI                   │
│        S   SELESAI                                 │
│                                                    │
├────────────────────────────────────────────────────┤
│        Pilih ? :                                   │
└────────────────────────────────────────────────────┘
```

Bila pilihan L, akan tampak pada layar menu pilihan PROGRAM DISAIN

ELEMEN STRUKTUR BETON seperti di atas.

```
╔══════════════════════════════════════════════════╗
║  >>> PROGRAM DISAIN ELEMEN STRUKTUR BETON <<<    ║
╠══════════════════════════════════════════════════╣
║                                                  ║
║      **** Nama File Data :  T-AKHIR              ║
║             D  FILE DATA                         ║
║             P  DISAIN ELEMEN PLAT                ║
║             B  DISAIN ELEMEN BALOK               ║
║             K  DISAIN ELEMEN KOLOM               ║
║             F  DISAIN ELEMEN PONDASI             ║
║             S  SELESAI                           ║
╠══════════════════════════════════════════════════╣
║             Pilih ? :                            ║
╚══════════════════════════════════════════════════╝
```

Nama File Data : adalah nama file data yang akan digunakan untuk diakses atau dibuat dalam pemasukan data maupun proses disain. Kalau file data belum pernah dibuat dengan program ini, maka nama file data akan kosong. Seperti contoh di atas nama file data yang sedang aktif adalah T-AKHIR.

D FILE DATA : menu pilihan untuk membuat, merubah file data yang aktif, merubah isi file data.

P DISAIN ELEMEN PLAT : menu pilihan untuk mendisain elemen plat.

B DISAIN ELEMEN BALOK : menu pilihan untuk mendisain elemen balok.

K DISAIN ELEMEN KOLOM : menu pilihan untuk mendisain elemen kolom.

F DISAIN ELEMEN PONDASI : menu pilihan untuk mendisain elemen pondasi.

S SELESAI : menu pilihan untuk keluar dari program ini.

Bila menu pilihan di isikan (**D**), akan tampak di layar menu pilihan FILE DATA sebagai berikut:

```
╔═══════════════════════════════════════════╗
║            >>> FILE DATA <<<              ║
╠═══════════════════════════════════════════╣
║  B   MEMBUAT FILE DATA BARU              ║
║  R   MERUBAH FILE DATA YANG AKTIF        ║
║  I   MERUBAH ISI FILE DATA YANG AKTIF    ║
║  S   SELESAI                             ║
╠═══════════════════════════════════════════╣
║  ===> Pilih ?                            ║
╚═══════════════════════════════════════════╝
```

Pilihan (**B**) untuk membuat file data baru.

Pilihan (**R**) untuk merubah file data yang sedang aktif. Untuk merubah file data

yang sedang aktif dengan file data yang lain, file data yang dimaksud harus sudah

pernah dibuat.

Pilihan (**I**) untuk merubah isi file data yang sedang aktif dengan isian-isian yang

baru.

Bila menu pilihan diisikan (**B**) maka akan tampak di layar menu isian seperti

sebagai berikut:

```
╔═══════════════════════════════════════════════╗
║    PROGRAM DISAIN ELEMEN STRUKTUR BETON       ║
╠═══════════════════════════════════════════════╣
║  Nama Proyek            :                     ║
║  Nama File Data         :                     ║
║  File Data Microfeap II :                     ║
║  Engineer               :                     ║
╚═══════════════════════════════════════════════╝
```

        U : ulang   L : lanjutkan ===>

File Data Microfeap II diisikan dengan nama file data keluaran Microfeap II atau file data gaya berekstension TXT. Jika semua isian sudah diisikan dan di pilih menu pilihan (**L**) akan tampak kembali menu pilihan FILE DATA sebagai berikut:

```
╔══════════════════════════════════════════╗
║            >>> FILE DATA <<<             ║
╠══════════════════════════════════════════╣
║  B   MEMBUAT FILE DATA BARU              ║
║  R   MERUBAH FILE DATA YANG AKTIF        ║
║  I   MERUBAH ISI FILE DATA YANG AKTIF    ║
║  S   SELESAI                             ║
╠══════════════════════════════════════════╣
║  ===> Pilih ?                            ║
╚══════════════════════════════════════════╝
```

Bila menu pilihan diisikan (**R**) maka akan tampak di layar menu isian sebagai berikut:

```
FILE DATA YANG SEDANG AKTIF : T-AKHIR
DIRUBAH DENGAN FILE DATA     : T-AKHIR

U : ulang    L : lanjutkan ===>
```
T-AKHIR

File data yang aktif dapat dirubah dengan file data yang lain dengan mengisikan nama file datanya. Pada contoh di atas file data yang aktif tidak dirubah. Di bawah menu isian terdapat nama-nama file yang pernah dibuat, untuk contoh di atas hanya terdapat satu file data yaitu T-AKHIR.

Bila menu pilihan diisikan (**L**) maka akan tampak kembali menu pilihan FILE DATA seperti di bawah ini:

```
┌──────────────────────────────────────────────┐
│              >>> FILE DATA <<<                 │
├──────────────────────────────────────────────┤
│  B   MEMBUAT FILE DATA BARU                    │
│  R   MERUBAH FILE DATA YANG AKTIF              │
│  I   MERUBAH ISI FILE DATA YANG AKTIF          │
│  S   SELESAI                                   │
├──────────────────────────────────────────────┤
│  ===> Pilih ?                                  │
└──────────────────────────────────────────────┘
```

Bila menu pilihan diisikan (**I**) maka akan tampak di layar menu isian sebagai

berikut:

```
┌──────────────────────────────────────────────┐
│       PROGRAM DISAIN ELEMEN STRUKTUR BETON     │
├──────────────────────────────────────────────┤
│  Nama Proyek           : GEDUNG SEKOLAH        │
│  File Data Microfeap II : TAKHIR.TXT           │
│  Engineer              : FN ABDI               │
└──────────────────────────────────────────────┘
```

       U : ulang   L : lanjutkan ===>

File Data Microfeap II pada menu isian di atas harus berekstension TXT, seperti

contoh di atas file data yang berisi data gaya-gaya yang terjadi pada struktur portal

beton adalah TAKHIR.TXT.

Bila menu pilihan diisikan (**L**) maka akan tampak kembali menu pilihan FILE

DATA sebagai berikut:

```
╔══════════════════════════════════════════╗
║           >>> FILE DATA <<<               ║
╠══════════════════════════════════════════╣
║  B   MEMBUAT FILE DATA BARU               ║
║  R   MERUBAH FILE DATA YANG AKTIF         ║
║  I   MERUBAH ISI FILE DATA YANG AKTIF     ║
║  S   SELESAI                              ║
╠══════════════════════════════════════════╣
║  ===> Pilih ?                             ║
╚══════════════════════════════════════════╝
```

Bila menu pilihan diisikan (S) maka akan tampak menu pilihan utama sebagai

berikut:

```
╔════════════════════════════════════════════════════╗
║   >>> PROGRAM DISAIN ELEMEN STRUKTUR BETON <<<     ║
╠════════════════════════════════════════════════════╣
║                                                    ║
║     ****  Nama File Data :   T-AKHIR               ║
║           D   FILE DATA                            ║
║           P   DISAIN ELEMEN PLAT                   ║
║           B   DISAIN ELEMEN BALOK                  ║
║           K   DISAIN ELEMEN KOLOM                  ║
║           F   DISAIN ELEMEN PONDASI                ║
║           S   SELESAI                              ║
╠════════════════════════════════════════════════════╣
║           Pilih ? :                                ║
╚════════════════════════════════════════════════════╝
```

Bila menu pilihan utama di atas diisikan (P) maka akan tampak di layar menu

pilihan DISAIN ELEMEN PLAT seperti di bawah ini:

```
╔═══════════════════════════════════════╗
║   >>> DISAIN ELEMEN PLAT <<<          ║
╠═══════════════════════════════════════╣
║   D   DATA                            ║
║   P   PROSES DISAIN                   ║
║   M   MENAMPILKAN DATA DISAIN         ║
║   H   HASIL DISAIN                    ║
║   G   SKETSA HASIL DISAIN             ║
║   S   SELESAI                         ║
╠═══════════════════════════════════════╣
║   ===> Pilih ?                        ║
╚═══════════════════════════════════════╝
```

Pilihan (**D**) untuk memasukan data-data elemen struktur plat.

Pilihan (**P**) untuk proses disain elemen struktur plat.

Pilihan (**M**) untuk menampilkan data-data elemen struktur plat yang sudah dimasukan.

Pilihan (**H**) untuk menampilkan hasil disain elemen plat yang diproses.

Pilihan (**G**) untuk menampilkan hasil disain elemen plat dalam bentuk gambar sketsa.

Pilihan (**S**) untuk kembali pada menu pilihan utama.

Bila menu pilihan DISAIN ELEMEN PLAT diisikan (**D**) maka akan tampak menu pilihan DATA sebagai berikut:

```
┌─────────────────────────────────────────────┐
│              >>> DATA <<<                     │
├─────────────────────────────────────────────┤
│ J   JUMLAH TIPE      PLAT :    3             │
│ B   DATA BAHAN                               │
│ D   DATA DIMENSI     PLAT                    │
│ G   DATA GAYA YANG BEKERJA PADA    PLAT      │
│ S   SELESAI                                  │
├─────────────────────────────────────────────┤
│ ===> Pilih ?                                 │
└─────────────────────────────────────────────┘
```

Pilihan (**J**) untuk memasukan jumlah tipe elemen struktur plat yang akan didisain.

Pilihan (**B**) untuk memasukan spesipikasi bahan yang digunakan untuk disain elemen struktur plat.

Pilihan (**D**) untuk memasukan data-data dimensi elemen struktur plat yang akan didisain.

Pilihan (**G**) untuk memasukan gaya yang bekerja pada elemen plat.

Pilihan (**S**) untuk untuk kembali pada menu pilihan DISAIN ELEMEN PLAT.

Bila menu pilihan DISAIN ELEMEN PLAT diisikan (**J**) maka akan tampak menu isian sebagai berikut:
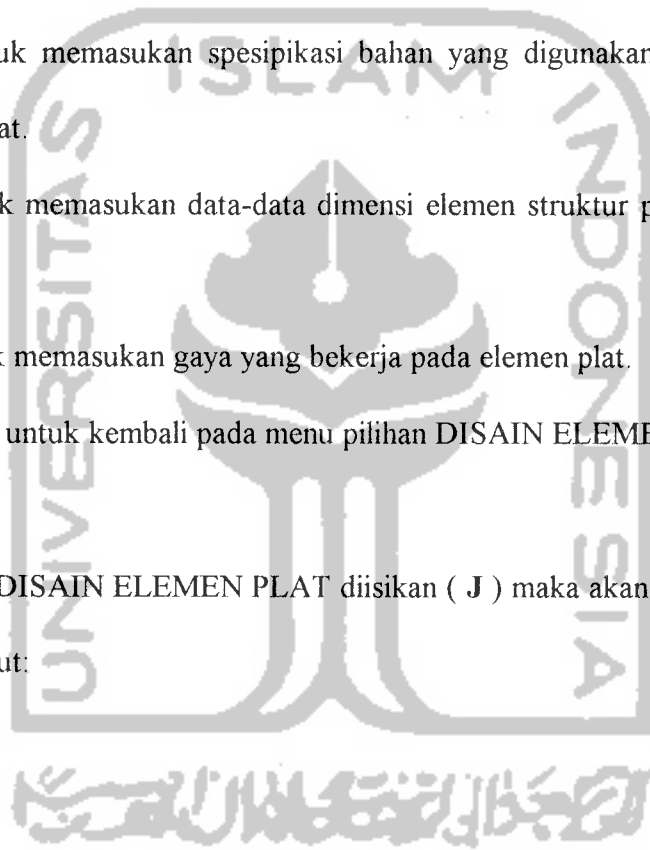
```
JUMLAH  TIPE  PLAT  DISAIN  ?  :      3


U  :  ulang    L  :  lanjutkan  ===>
```

Jumlah tipe plat disain pada contoh di atas adalah tiga tipe atau tiga macam dimensi

dan kondisi plat yang berbeda.

Bila menu pilihan diisikan (**L**) maka di layar akan tampak kembali menu pilihan

DATA sebagai berikut:

```
+----------------------------------------------------------+
|                    >>>  DATA  <<<                        |
+----------------------------------------------------------+
|  J    JUMLAH  TIPE      PLAT  :      3                   |
|  B    DATA  BAHAN                                        |
|  D    DATA  DIMENSI        PLAT                          |
|  G    DATA  GAYA  YANG  BEKERJA  PADA      PLAT          |
|  S    SELESAI                                            |
+----------------------------------------------------------+
|  ===>  Pilih  ?                                          |
+----------------------------------------------------------+
```

Bila menu pilihan tersebut diisikan (**B**) maka akan tampak menu isian DATA

BAHAN seperti di bawah:

>>> DATA BAHAN <<<		
PLAT Tipe : 2		
Teg. Desak Beton (fc)--->MPa	Teg. Tarik Baja (fy)--->MPa	Mod. Elastisitas Baja (Es)--->MPa
30	300	210000

U : ulang   L : lanjutkan ===>

Menu isian DATA BAHAN di atas untuk mengisikan data bahan masing-masing tipe plat, setelah masing-masing tipe diisikan dan menu pilihan diisikan (L) maka akan tampak di layar menu isian DIAMETER TULANGAN YANG DIGUNAKAN seperti di bawah ini:

>>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<<	
PLAT Tipe : 2	
No. Diameter Tulangan Pokok (Dp)--->mm	Diameter Tulangan Sengkang (Ds)--->mm
1	

Isikan No. = 0 jika sudah selesai ... !

Untuk mengakhiri pengisian diameter tulangan yang digunakan masing-masing tipe plat isikan 0 pada kolom No.

Setelah semua diameter tulangan yang akan digunakan untuk masing-masing tipe plat diisikan dan mengisikan No. = 0 pada tipe plat terakhir maka akan tampak kembali menu pilihan DATA sebagai berikut:

```
┌──────────────────────────────────────────────────┐
│                  >>> DATA <<<                      │
├──────────────────────────────────────────────────┤
│  J   JUMLAH TIPE      PLAT :    3                  │
│  B   DATA BAHAN                                    │
│  D   DATA DIMENSI      PLAT                        │
│  G   DATA GAYA YANG  BEKERJA  PADA      PLAT       │
│  S   SELESAI                                       │
├──────────────────────────────────────────────────┤
│  ===> Pilih ?                                      │
└──────────────────────────────────────────────────┘
```

Bila pada menu pilihan DATA di atas diisikan (**D**) maka akan tampak menu isian

seperti di bawah ini:

```
┌──────────────────────────────────────────────────┐
│              >>> DATA DIMENSI <<<                  │
├──────────────────────────────────────────────────┤
│    PLAT Tipe :    1                                │
├──────────────────┬──────────────┬─────────────────┤
│  Panjang p.k.p   │  Lebar p.k.p │  Penutup Beton  │
│  (L)--->mm       │  (B)--->mm   │  (Pb)--->mm     │
├──────────────────┼──────────────┼─────────────────┤
│     4000         │    2000      │      50         │
└──────────────────┴──────────────┴─────────────────┘
```

```
Jenis Plat : 1. Plat Satu Arah.
             2. Plat Dua Arah.
Pilih ? : 2


U : ulang    L : lanjutkan ===>
```

Bila semua isian pada menu isian DATA DIMENSI di atas sudah diisikan maka

dan jenis plat diisikan (**2**) yaitu plat dua arah serta pilihan (**L**) maka akan tampak

menu pilihan sebagai berikut ini:

```
+-----------------------------------------+
|          >>> DATA DIMENSI <<<           |
+-----------------------------------------+
| Komponen Struktur Plat Tipe :      1    |
+-----------------------------------------+
|        1. Dengan Balok Tepi.            |
|        2. Tanpa Balok Tepi.             |
+-----------------------------------------+
|             PILIH ?                     |
+-----------------------------------------+
```

Bila salah satu dari dua pilihan pada menu di atas diisikan, maka akan tampak menu isian DATA DIMENSI sebagai berikut:

```
+-----------------------------------------+
|          >>> DATA DIMENSI <<<           |
+-----------------------------------------+
|       PLAT Tipe :      1                |
+-----------------------------------------+
| Tebal Plat Minimum    Tebal Plat Rencana|
|    (hmin)--->mm          (h)--->mm      |
+-----------------------------------------+
|       88.89              100            |
+-----------------------------------------+
```

U : ulang   L : lanjutkan ===>

Bila pada pilihan Jenis Plat dipilih (1) yaitu Plat Satu Arah maka akan tampak menu pilihan sebagai berikut:

```
+-----------------------------------------------+
|            >>> DATA DIMENSI <<<               |
+-----------------------------------------------+
| Komponen Struktur Plat Tipe :      2          |
+-----------------------------------------------+
|              1. Dua Tumpuan.                  |
|              2. Kantilever.                   |
+-----------------------------------------------+
|                 PILIH ?                       |
+-----------------------------------------------+
```

Bila salah satu dari dua pilihan pada menu di atas diisikan, maka akan tampak menu

isian DATA DIMENSI sebagai berikut:

```
+---------------------------------------------------+
|              >>> DATA DIMENSI <<<                 |
+---------------------------------------------------+
|     PLAT Tipe :    2                              |
+---------------------------------------------------+
| Tebal Plat Minimum      Tebal Plat Rencana        |
|     (hmin)--->mm            (h)--->mm             |
+---------------------------------------------------+
|        125.00                  130                |
+---------------------------------------------------+
```

U : ulang   L : lanjutkan ===>

Bila isian Tebal Plat Rencana sudah diisikan dan menu pilihan diisikan (L) maka

akan tampak menu pilihan DATA kembali seperti berikut ini:

```
┌─────────────────────────────────────────────────┐
│               >>> DATA <<<                      │
├─────────────────────────────────────────────────┤
│  J   JUMLAH TIPE      PLAT :    3               │
│  B   DATA BAHAN                                 │
│  D   DATA DIMENSI     PLAT                      │
│  G   DATA GAYA YANG BEKERJA PADA      PLAT      │
│  S   SELESAI                                    │
├─────────────────────────────────────────────────┤
│  ===> Pilih ?                                   │
└─────────────────────────────────────────────────┘
```

Bila diisikan (**G**) pada menu pilihan di atas maka akan tampak di layar menu isian

seperti di bawah ini.

Dan bila semua isian pada menu tersebut sudah diisikan dan pilihan (**L**)

Lanjutkan.

```
Plat Tipe :    1
Beban Merata Yg Bekerja Pada Plat ? (kPa) : 8.24
Plat Ditumpu Pada Keempat Sisinya : 1. Jepit Elastis Atau Menerus.
                                    2. Jepit Penuh.
                   ===> Pilih : 1

U : ulang   L : lanjutkan ===>
```

```
+-------------------------------------------------------------------+
|            >>> PERLETAKAN PADA SISI-SISI PLAT <<<                  |
+-------------------------------------------------------------------+
| PLAT TIPE :    1                                                  |
+-------------------------------------------------------------------+
| 1. Keempat Sisi Terletak Bebas.                                   |
| 2. Keempat Sisi Terjepit Elastis.                                 |
| 3. Dua Sisi (Panjang & Pendek) Terjepit Elastis.                  |
| 4. Dua Sisi (Pendek) Terjepit Elastis.                            |
| 5. Dua Sisi (Panjang) Terjepit Elastis.                           |
| 6. Sisi Pendek Terjepit Elastis.                                  |
| 7. Sisi Panjang Terjepit Elastis.                                 |
| 8. Tiga Sisi Terjepit Elastis & Satu Sisi Pendek Terletak Bebas.  |
| 9. Tiga Sisi Terjepit Elastis & Satu Sisi Panjang Terletak Bebas. |
+-------------------------------------------------------------------+
| PILIH ? 2                                                         |
+-------------------------------------------------------------------+
```

U : ulang   L : lanjutkan ===>

Bila dipilih (1) Jepit Elastis Atau Menerus maka akan tampak menu pilihan seperti

di atas.

Bila dipilih (2) Jepit Penuh maka akan tampak menu pilihan seperti di bawah ini.

```
+-------------------------------------------------------------------+
|            >>> PERLETAKAN PADA SISI-SISI PLAT <<<                  |
+-------------------------------------------------------------------+
| PLAT TIPE :    2                                                  |
+-------------------------------------------------------------------+
| 1. Keempat Sisi Terletak Bebas.                                   |
| 2. Keempat Sisi Terjepit Penuh.                                   |
| 3. Dua Sisi (Panjang & Pendek) Terjepit Penuh.                    |
| 4. Dua Sisi (Pendek) Terjepit Penuh.                              |
| 5. Dua Sisi (Panjang) Terjepit Penuh.                             |
| 6. Sisi Pendek Terjepit Penuh.                                    |
| 7. Sisi Panjang Terjepit Penuh.                                   |
| 8. Tiga Sisi Terjepit Penuh & Satu Sisi Pendek Terletak Bebas.    |
| 9. Tiga Sisi Terjepit Penuh & Satu Sisi Panjang Terletak Bebas.   |
+-------------------------------------------------------------------+
| PILIH ? 5                                                         |
+-------------------------------------------------------------------+
```

U : ulang   L : lanjutkan ===>

Bila menu pilihan tersebut telah diisikan dan dipilih (**L**) maka akan tampak kembali menu pilihan DATA seperti di bawah ini:

```
+----------------------------------------------------------+
|                     >>>  DATA  <<<                        |
+----------------------------------------------------------+
| J   JUMLAH TIPE      PLAT :      3                        |
| B   DATA BAHAN                                            |
| D   DATA DIMENSI      PLAT                                |
| G   DATA GAYA YANG BEKERJA PADA      PLAT                 |
| S   SELESAI                                               |
+----------------------------------------------------------+
| ===> Pilih ?                                             |
+----------------------------------------------------------+
```

Bila pilihan diisikan (**S**) pada menu pilihan tersebut maka akan tampak kembali menu pilihan DISAIN ELEMEN PLAT seperti berikut ini:

```
╔══════════════════════════════════════╗
║  >>> DISAIN ELEMEN PLAT <<<          ║
╠══════════════════════════════════════╣
║  D   DATA                            ║
║  P   PROSES DISAIN                   ║
║  M   MENAMPILKAN DATA DISAIN         ║
║  H   HASIL DISAIN                    ║
║  G   SKETSA HASIL DISAIN             ║
║  S   SELESAI                         ║
╠══════════════════════════════════════╣
║  ===> Pilih ?                        ║
╚══════════════════════════════════════╝
```

Bila dipilih (**P**) pada menu pilihan di atas maka akan dilakukan proses disain elemen plat dengan data-data yang telah dimasukan.

Bila dipilih (**M**) pada menu pilihan di atas maka akan ditampilkan data-data yang telah diisikan.

Bila dipilih (**H**) pada menu pilihan di atas maka akan ditampilkan hasil disain elemen plat yang telah diproses tersebut.

Bila dipilih (**G**) pada menu pilihan di atas maka akan ditampilkan hasil disain elemen plat yang telah diproses tersebut dalam bentuk gambar sketsa.

Dan bila dipilih (**S**) pada menu pilihan di atas maka akan tampak kembali menu pilihan utama sebagai berikut ini:

```
+----------------------------------------------------+
|   >>>  PROGRAM  DISAIN  ELEMEN  STRUKTUR  BETON  <<<|
+----------------------------------------------------+
|                                                    |
|        ****  Nama File Data :   T-AKHIR             |
|              D   FILE DATA                          |
|              P   DISAIN  ELEMEN  PLAT               |
|              B   DISAIN  ELEMEN  BALOK              |
|              K   DISAIN  ELEMEN  KOLOM              |
|              F   DISAIN  ELEMEN  PONDASI            |
|              S   SELESAI                            |
|                                                    |
+----------------------------------------------------+
|              Pilih ? :                             |
+----------------------------------------------------+
```
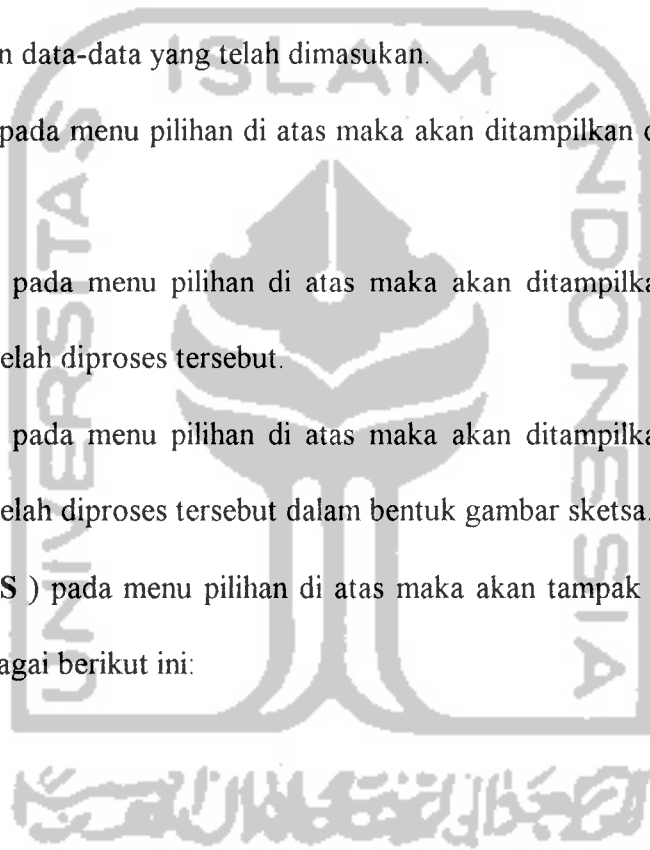
Bila dipilih (**B**) pada menu utama di atas maka akan tampak di layar menu pilihan

DISAIN ELEMEN BALOK seperti di bawah ini:

```
+----------------------------------+
|   >>>  DISAIN  ELEMEN  BALOK  <<< |
+----------------------------------+
|   D   DATA                       |
|   P   PROSES DISAIN              |
|   M   MENAMPILKAN DATA DISAIN    |
|   H   HASIL DISAIN               |
|   G   SKETSA HASIL DISAIN        |
|   S   SELESAI                    |
+----------------------------------+
|   ===> Pilih ?                   |
+----------------------------------+
```

Bila dipilih (**D**) pada menu pilihan di atas maka akan tampak di layar menu pilihan

DATA sebagai berikut:

```
╔═══════════════════════════════════════════════════╗
║              >>> DATA <<<                          ║
╠═══════════════════════════════════════════════════╣
║  J   JUMLAH TIPE    BALOK :    2                   ║
║  B   DATA BAHAN                                    ║
║  E   DATA ELEMEN    BALOK                          ║
║  G   DATA GAYA YANG BEKERJA PADA    BALOK          ║
║  D   DATA DIMENSI   BALOK                          ║
║  S   SELESAI                                       ║
╠═══════════════════════════════════════════════════╣
║  ===> Pilih ?                                      ║
╚═══════════════════════════════════════════════════╝
```

Pilihan (**J**) untuk memasukan jumlah tipe elemen struktur balok yang akan

didisain.

Pilihan (**B**) untuk memasukan spesipikasi bahan yang digunakan untuk disain

elemen struktur balok.

Pilihan (**D**) untuk memasukan data-data dimensi elemen struktur balok yang akan

didisain.

Pilihan (**G**) untuk memasukan gaya yang bekerja pada elemen balok.

Pilihan (**S**) untuk untuk kembali pada menu pilihan DISAIN ELEMEN BALOK.

Bila menu pilihan DISAIN ELEMEN BALOK diisikan (**J**) maka akan tampak

menu isian sebagai berikut:


```
JUMLAH TIPE BALOK DISAIN ? :    2


U : ulang   L : lanjutkan ===>
```

Bila menu isian telah diisikan dan dipilih (L) pada menu pilihannya maka akan tampak kembali menu pilihan DATA seperti di bawah ini:

```
┌─────────────────────────────────────────────────────┐
│                   >>> DATA <<<                        │
├─────────────────────────────────────────────────────┤
│  J   JUMLAH TIPE    BALOK :    2                      │
│  B   DATA BAHAN                                       │
│  E   DATA ELEMEN    BALOK                             │
│  G   DATA GAYA YANG BEKERJA PADA    BALOK             │
│  D   DATA DIMENSI   BALOK                             │
│  S   SELESAI                                          │
├─────────────────────────────────────────────────────┤
│  ===> Pilih ?                                         │
└─────────────────────────────────────────────────────┘
```

Bila dipilih (B) pada menu pilihan di atas maka akan tampak menu isian DATA BAHAN dan DIAMETER TULANGAN YG DIGUNAKAN (seperti pada disain elemen plat, kolom, pondasi) seperti di bawah ini:

>>> DATA BAHAN <<<		
BALOK Tipe : 2		
Teg. Desak Beton (fc)--->MPa	Teg. Tarik Baja (fy)--->MPa	Mod. Elastisitas Baja (Es)--->MPa
30	400	210000

U : ulang   L : lanjutkan ===>

Bila menu isian telah diisikan untuk masing-masing tipe balok dan menu pilihan dipilih (L) maka akan tampak kembali menu pilihan data sebagai berikut:

```
┌─────────────────────────────────────────────────┐
│              >>>  DATA  <<<                      │
├─────────────────────────────────────────────────┤
│ J   JUMLAH TIPE    BALOK :    2                  │
│ B   DATA BAHAN                                   │
│ E   DATA ELEMEN     BALOK                        │
│ G   DATA GAYA YANG BEKERJA PADA     BALOK        │
│ D   DATA DIMENSI    BALOK                        │
│ S   SELESAI                                      │
├─────────────────────────────────────────────────┤
│ ===> Pilih ?                                     │
└─────────────────────────────────────────────────┘
```

Bila dipilih (**E**) pada menu pilihan di atas maka akan tampak menu isian DATA

ELEMEN BALOK seperti di bawah ini:

>>> DATA ELEMEN BALOK <<<		
BALOK Tipe :	1	
Masukan Elemen No.	BALOK Yang Mempunyai Tipe Yg Sama Elemen	
1		

Isikan No. = 0 jika sudah selesai ... !

Menu isian DATA ELEMEN BALOK adalah untuk memasukan data elemen-

elemen balok pada portal beton atau portal dalam program Microfeap II yang

mempunyai tipe atau dimensi-dimensi yang sama.

Untuk mengakhir pemasukan elemen-elemen tiap tipe isikan 0 pada kolom No.

Dan bila semua elemen-elemen pada masing-masing tipe telah dimasukan maka

akan tampak kembali menu pilihan DATA sebagai berikut:

```
┌─────────────────────────────────────────────┐
│             >>> DATA <<<                     │
├─────────────────────────────────────────────┤
│ J   JUMLAH TIPE    BALOK :    2             │
│ B   DATA BAHAN                              │
│ E   DATA ELEMEN    BALOK                     │
│ G   DATA GAYA YANG BEKERJA PADA    BALOK     │
│ D   DATA DIMENSI   BALOK                     │
│ S   SELESAI                                 │
├─────────────────────────────────────────────┤
│ ===> Pilih ?                                │
└─────────────────────────────────────────────┘
```

Bila dipilih (G) pada menu pilihan di atas maka akan dilakukan pembacaan file
data gaya dari program Microfeap II dan tampak menu isian seperti di bawah ini:

```
Balok Tipe :    1
Momen Torsi Yang Terjadi Pada    BALOK ?  (Nmm) : 2000000

U : ulang   L : lanjutkan ===>
```

Setelah momen torsi yang bekerja pada balok untuk masing-masing tipe balok telah

diisikan maka akan tampak kembali di layar menu pilihan DATA sebagai berikut:

```
+==========================================================+
||                     >>> DATA <<<                         ||
+==========================================================+
|| J   JUMLAH TIPE    BALOK :     2                         ||
|| B   DATA BAHAN                                           ||
|| E   DATA ELEMEN    BALOK                                 ||
|| G   DATA GAYA YANG BEKERJA PADA      BALOK               ||
|| D   DATA DIMENSI   BALOK                                 ||
|| S   SELESAI                                             ||
+==========================================================+
|| ===> Pilih ?                                            ||
+==========================================================+
```

Bila dipilih (**D**) pada menu pilihan di atas maka akan tampak menu isian DATA

DIMENSI seperti di bawah ini:

>>> DATA DIMENSI <<<			
BALOK Tipe : 1			
Bentang Balok (L)--->mm	Lebar (b)--->mm	Tinggi (h)--->mm	Penutup Beton (Pb)--->mm
5500.00	300	400	50

U : ulang   L : lanjutkan ===>

Bila semua data dimensi balok untuk masing-masing tipe balok telah diisikan maka

akan tampak kembali menu pilihan DATA sebagai berikut:

```
┌─────────────────────────────────────────────────┐
│               >>> DATA <<<                      │
├─────────────────────────────────────────────────┤
│ J   JUMLAH TIPE    BALOK :    2                 │
│ B   DATA BAHAN                                  │
│ E   DATA ELEMEN    BALOK                        │
│ G   DATA GAYA YANG BEKERJA PADA    BALOK        │
│ D   DATA DIMENSI   BALOK                        │
│ S   SELESAI                                     │
├─────────────────────────────────────────────────┤
│ ===> Pilih ?                                    │
└─────────────────────────────────────────────────┘
```

Bila dipilih (**S**) pada menu pilihan di atas maka akan tampak kembali menu pilihan

DISAIN ELEMEN BALOK seperti di bawah ini:

```
┌─────────────────────────────────────────┐
│       >>> DISAIN ELEMEN BALOK <<<       │
├─────────────────────────────────────────┤
│ D   DATA                                │
│ P   PROSES DISAIN                       │
│ M   MENAMPILKAN DATA DISAIN             │
│ H   HASIL DISAIN                        │
│ G   SKETSA HASIL DISAIN                 │
│ S   SELESAI                             │
├─────────────────────────────────────────┤
│ ===> Pilih ?                            │
└─────────────────────────────────────────┘
```

Bila dipilih (**P**) maka akan dilakukan proses disain elemen balok dengan data-data

yang telah dimasukan. Bila dipilih (**M**) maka akan ditampilkan data-data yang

telah diisikan. Bila dipilih (**H**) maka akan ditampilkan hasil disain elemen balok

yang telah diproses tersebut. Bila dipilih (**G**) maka akan ditampilkan hasil disain

elemen balok yang telah diproses tersebut dalam bentuk gambar sketsa.

Dan bila dipilih (**S**) maka akan tampak kembali menu pilihan utama   sebagai

berikut ini:

```
┌─────────────────────────────────────────────────┐
│ >>> PROGRAM DISAIN ELEMEN STRUKTUR BETON <<<    │
├─────────────────────────────────────────────────┤
│                                                 │
│                                                 │
│       **** Nama File Data :  T-AKHIR            │
│            D  FILE DATA                         │
│            P  DISAIN ELEMEN PLAT                │
│            B  DISAIN ELEMEN BALOK               │
│            K  DISAIN ELEMEN KOLOM               │
│            F  DISAIN ELEMEN PONDASI             │
│            S  SELESAI                           │
│                                                 │
├─────────────────────────────────────────────────┤
│              Pilih ? :                          │
└─────────────────────────────────────────────────┘
```

Bila dipilih (**K**) pada menu pilihan di atas maka akan tampak menu pilihan

DISAIN ELEMEN KOLOM seperti di bawah ini:

```
┌──────────────────────────────────────┐
│ >>> DISAIN ELEMEN KOLOM <<<          │
├──────────────────────────────────────┤
│ D   DATA                             │
│ P   PROSES DISAIN                    │
│ M   MENAMPILKAN DATA DISAIN          │
│ H   HASIL DISAIN                     │
│ G   SKETSA HASIL DISAIN              │
│ S   SELESAI                          │
├──────────────────────────────────────┤
│ ===> Pilih ?                         │
└──────────────────────────────────────┘
```

Bila dipilih (**D**) pada menu pilihan di atas maka akan tampak menu pilihan DATA

sebagai berikut:

```
┌─────────────────────────────────────────────────┐
│              >>> DATA <<<                        │
├─────────────────────────────────────────────────┤
│ J   JUMLAH TIPE    KOLOM :    2                  │
│ B   DATA BAHAN                                   │
│ E   DATA ELEMEN    KOLOM                         │
│ G   DATA GAYA YANG BEKERJA PADA    KOLOM         │
│ D   DATA DIMENSI    KOLOM                        │
│ S   SELESAI                                      │
├─────────────────────────────────────────────────┤
│ ===> Pilih ?                                     │
└─────────────────────────────────────────────────┘
```

Pilihan (J) untuk memasukan jumlah tipe elemen struktur kolom yang akan didisain.

Pilihan (B) untuk memasukan spesipikasi bahan yang digunakan untuk disain elemen struktur kolom.

Pilihan (D) untuk memasukan data-data dimensi elemen struktur kolom yang akan didisain.

Pilihan (G) untuk memasukan gaya yang bekerja pada elemen kolom.

Pilihan (S) untuk untuk kembali pada menu pilihan DISAIN ELEMEN KOLOM.

Bila menu pilihan DISAIN ELEMEN KOLOM diisikan (J) maka akan tampak menu isian sebagai berikut:

```
        JUMLAH TIPE KOLOM DISAIN ? :    2


        U : ulang    L : lanjutkan ===>
```

Bila menu isian telah diisikan dan dipilih (L) pada menu pilihannya maka akan tampak kembali menu pilihan DATA seperti di bawah ini:

```
+-----------------------------------------------------+
|                  >>> DATA <<<                        |
+-----------------------------------------------------+
| J   JUMLAH TIPE     KOLOM :    2                     |
| B   DATA BAHAN                                       |
| E   DATA ELEMEN    KOLOM                             |
| G   DATA GAYA YANG BEKERJA PADA     KOLOM            |
| D   DATA DIMENSI   KOLOM                             |
| S   SELESAI                                          |
+-----------------------------------------------------+
| ===> Pilih ?                                        |
+-----------------------------------------------------+
```

Bila dipilih (B) pada menu pilihan di atas maka akan tampak menu isian DATA BAHAN seperti di bawah ini:

>>> DATA BAHAN <<<		
KOLOM Tipe : 2		
Teg. Desak Beton (fc)--->MPa	Teg. Tarik Baja (fy)--->MPa	Mod. Elastisitas Baja (Es)--->MPa
30	400	210000

U : ulang   L : lanjutkan ===>

Bila menu isian telah diisikan untuk masing-masing tipe kolom dan menu pilihan dipilih (L) maka akan tampak menu pilihan DIAMETER TULANGAN YANG DIGUNAKAN sebagai berikut:

```
+-----------------------------------------------------------------+
|         >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<<            |
+-----------------------------------------------------------------+
|  KOLOM Tipe :    2                                              |
+-----------------------------------------------------------------+
| No.   Diameter Tulangan Pokok    Diameter Tulangan Sengkang     |
|            (Dp)--->mm                   (Ds)--->mm              |
+-----------------------------------------------------------------+
|   1                                                             |
+-----------------------------------------------------------------+
```

Isikan No. = 0 jika sudah selesai ... !

Bila menu isian telah diisikan untuk masing-masing tipe kolom dan menu pilihan

dipilih (**L**) maka akan tampak kembali menu pilihan DATA seperti di bawah ini:

```
+-----------------------------------------------------------------+
|                       >>> DATA <<<                              |
+-----------------------------------------------------------------+
|  J   JUMLAH TIPE    KOLOM :    2                               |
|  B   DATA BAHAN                                                 |
|  E   DATA ELEMEN    KOLOM                                       |
|  G   DATA GAYA YANG BEKERJA PADA    KOLOM                       |
|  D   DATA DIMENSI    KOLOM                                      |
|  S   SELESAI                                                    |
+-----------------------------------------------------------------+
|  ===> Pilih ?                                                   |
+-----------------------------------------------------------------+
```

Bila dipilih (**E**) pada menu pilihan di atas maka akan tampak menu isian DATA

ELEMEN KOLOM seperti di bawah ini:

```
┌────────────────────────────────────────────────────┐
│            >>> DATA ELEMEN    KOLOM <<<             │
├────────────────────────────────────────────────────┤
│   KOLOM Tipe :     1                               │
├────────────────────────────────────────────────────┤
│ Masukan Elemen      KOLOM Yang Mempunyai Tipe Yg Sama │
│         No.                    Elemen              │
├────────────────────────────────────────────────────┤
│                 1                                  │
└────────────────────────────────────────────────────┘
```

Isikan No. = 0 jika sudah selesai ... !

Menu isian DATA ELEMEN KOLOM adalah untuk memasukan data elemen-elemen kolom pada portal beton dalam program Microfeap II yang mempunyai tipe atau dimensi yang sama. Dan bila semua elemen-elemen pada masing-masing tipe telah dimasukan maka akan tampak kembali menu pilihan DATA sebagai berikut:

```
┌────────────────────────────────────────────────────┐
│                 >>> DATA <<<                       │
├────────────────────────────────────────────────────┤
│  J   JUMLAH TIPE     KOLOM :     2                 │
│  B   DATA BAHAN                                    │
│  E   DATA ELEMEN     KOLOM                         │
│  G   DATA GAYA YANG  BEKERJA PADA     KOLOM        │
│  D   DATA DIMENSI    KOLOM                         │
│  S   SELESAI                                       │
├────────────────────────────────────────────────────┤
│  ===> Pilih ?                                      │
└────────────────────────────────────────────────────┘
```

Bila dipilih (**G**) pada menu pilihan di atas maka akan dilakukan pembacaan pada file data dari Microfeap II atau file data gaya-gaya yang bekerja pada kolom yang dibuat dengan program lain tapi mempunyai struktur data/isi file yang sama:

Bila dipilih (**D**) pada menu pilihan di atas maka akan tampak menu pilihan DATA DIMENSI sebagai berikut ini:

>>> DATA DIMENSI <<<
BENTUK TULANGAN PENGIKAT KOLOM TIPE :   1
1. PENGIKAT SENGKANG. 2. PENGIKAT SPIRAL.
PILIH ?

Bila menu pilihan bentuk tulangan pengikat di atas telah dipilih maka akan tampak menu isian rasio penulangan kolom seperti di bawah ini:

PERKIRAAN RASIO PENULANGAN KOLOM TIPE :   1 (1%-3%) ?   2

Bila menu isian rasio penulangan kolom di atas telah diisikan dan pilihan bentuk penampang adalah penampang kolom persegi akan tampak di layar menu isian DATA DIMENSI sebagai berikut:

>>> DATA DIMENSI <<<			
KOLOM Tipe : 1			
Panjang Kolom (L)--->mm	Lebar (b)--->mm	Tinggi (h)--->mm	Penutup Beton (Pb)--->mm
4000.00	400	400	40

U : ulang   L : lanjutkan ===>

Bila pada menu pilihan bentuk penampang kolom dipilih bentuk penampang kolom

lingkaran maka akan tampak menu isian DATA DIMENSI seperti di bawah ini:

>>> DATA DIMENSI <<<		
KOLOM Tipe : 2		
Tinggi Kolom (L)--->mm	Diameter Kolom (D)--->mm	Penutup Beton (Pb)--->mm
4000.00	600	50

U : ulang   L : lanjutkan ===> S

Bila semua menu pilihan dan menu isian DATA DIMENSI sudah diisikan maka

akan tampak kembali menu pilihan DATA sebagai berikut:

```
+==============================================+
|             >>> DATA <<<                     |
+==============================================+
| J   JUMLAH TIPE    KOLOM :    2              |
| B   DATA BAHAN                               |
| E   DATA ELEMEN    KOLOM                      |
| G   DATA GAYA YANG BEKERJA PADA    KOLOM     |
| D   DATA DIMENSI   KOLOM                      |
| S   SELESAI                                  |
+----------------------------------------------+
| ===> Pilih ?                                 |
+==============================================+
```

Bila dipilih (S) pada menu pilihan di atas maka akan tampak kembali menu pilihan

DISAIN ELEMEN KOLOM seperti di bawah ini:

```
+==============================================+
|        >>> DISAIN ELEMEN KOLOM <<<           |
+==============================================+
| D   DATA                                     |
| P   PROSES DISAIN                            |
| M   MENAMPILKAN DATA DISAIN                   |
| H   HASIL DISAIN                             |
| G   SKETSA HASIL DISAIN                       |
| S   SELESAI                                  |
+----------------------------------------------+
| ===> Pilih ?                                 |
+==============================================+
```

Bila dipilih (P) maka akan dilakukan proses disain elemen kolom dengan data-

data yang telah dimasukan. Bila dipilih (M) maka akan ditampilkan data-data

yang telah diisikan. Bila dipilih (H) maka akan ditampilkan hasil disain elemen

kolom yang telah diproses tersebut. Bila dipilih (G) maka akan ditampilkan hasil

disain elemen kolom yang telah diproses tersebut dalam bentuk gambar sketsa.

Dan bila dipilih (S) maka akan tampak kembali menu pilihan utama   sebagai

berikut ini:

```
┌──────────────────────────────────────────────────┐
│ >>> PROGRAM DISAIN ELEMEN STRUKTUR BETON <<<      │
├──────────────────────────────────────────────────┤
│                                                    │
│      **** Nama File Data :  T-AKHIR                │
│           D  FILE DATA                             │
│           P  DISAIN ELEMEN PLAT                    │
│           B  DISAIN ELEMEN BALOK                   │
│           K  DISAIN ELEMEN KOLOM                   │
│           F  DISAIN ELEMEN PONDASI                 │
│           S  SELESAI                               │
├──────────────────────────────────────────────────┤
│            Pilih ? :                               │
└──────────────────────────────────────────────────┘
```

Bila dipilih (**F**) pada menu pilihan di atas maka akan tampak menu pilihan

DISAIN ELEMEN PONDASI seperti di bawah ini:

```
┌──────────────────────────────────────────┐
│ >>> DISAIN ELEMEN PONDASI <<<            │
├──────────────────────────────────────────┤
│ D  DATA                                  │
│ P  PROSES DISAIN                         │
│ M  MENAMPILKAN DATA DISAIN               │
│ H  HASIL DISAIN                          │
│ G  SKETSA HASIL DISAIN                   │
│ S  SELESAI                               │
├──────────────────────────────────────────┤
│ ===> Pilih ?                             │
└──────────────────────────────────────────┘
```

Bila dipilih (**D**) pada menu pilihan di atas maka akan tampak menu pilihan DATA

sebagai berikut:

```
┌─────────────────────────────────────────────────┐
│                 >>> DATA <<<                     │
├─────────────────────────────────────────────────┤
│  J    JUMLAH TIPE PONDASI :    2                 │
│  B    DATA BAHAN                                 │
│  E    DATA ELEMEN PONDASI                        │
│  G    DATA GAYA YANG BEKERJA PADA PONDASI        │
│  D    DATA DIMENSI PONDASI                       │
│  S    SELESAI                                    │
├─────────────────────────────────────────────────┤
│  ===> Pilih ?                                    │
└─────────────────────────────────────────────────┘
```

Pilihan (**J**) untuk memasukan jumlah tipe elemen struktur pondasi yang akan didisain.

Pilihan (**B**) untuk memasukan spesipikasi bahan yang digunakan untuk disain elemen struktur pondasi.

Pilihan (**D**) untuk memasukan data-data dimensi elemen struktur pondasi yang akan didisain.

Pilihan (**G**) untuk memasukan gaya yang bekerja pada elemen pondasi.

Pilihan (**S**) untuk untuk kembali pada menu pilihan DISAIN ELEMEN PONDASI.

Bila menu pilihan DISAIN ELEMEN PONDASI diisikan (**J**) maka akan tampak menu isian sebagai berikut:

```
    JUMLAH TIPE PONDASI DISAIN ? : 2


    U : ulang    L : lanjutkan ===>
```

Bila menu isian telah diisikan dan dipilih (**L**) pada menu pilihannya maka akan tampak kembali menu pilihan DATA seperti di bawah ini:

```
┌─────────────────────────────────────────────────┐
│              >>> DATA <<<                        │
├─────────────────────────────────────────────────┤
│ J   JUMLAH TIPE PONDASI :    2                   │
│ B   DATA BAHAN                                   │
│ E   DATA ELEMEN PONDASI                          │
│ G   DATA GAYA YANG BEKERJA PADA PONDASI          │
│ D   DATA DIMENSI PONDASI                         │
│ S   SELESAI                                      │
├─────────────────────────────────────────────────┤
│ ===> Pilih ?                                     │
└─────────────────────────────────────────────────┘
```

Bila dipilih (**B**) pada menu pilihan di atas maka akan tampak menu isian DATA BAHAN seperti di bawah ini:

```
┌─────────────────────────────────────────────────────────────┐
│                    >>> DATA BAHAN <<<                        │
├─────────────────────────────────────────────────────────────┤
│ PONDASI Tipe :    1                                         │
├─────────────────────────────────────────────────────────────┤
│ Teg. Desak Beton      Teg. Desak Beton     Teg. Tarik Baja  │
│   Kolom--->MPa          Pondasi--->MPa       (Fy)--->MPa    │
├─────────────────────────────────────────────────────────────┤
│                                                             │
└─────────────────────────────────────────────────────────────┘
```

U : ulang   L : lanjutkan ===>

Bila menu isian telah diisikan untuk masing-masing tipe pondasi dan menu pilihan dipilih (**L**) maka akan tampak menu pilihan DIAMETER TULANGAN YANG DIGUNAKAN sebagai berikut:

>>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<<
PONDASI Tipe :   1
No.   Diameter Tulangan Pokok   (Dp)--->mm
1

Isikan No. = 0 jika sudah selesai ... !

Bila menu isian telah diisikan untuk masing-masing tipe pondasi dan menu pilihan

dipilih (**L**) maka akan tampak kembali menu pilihan DATA seperti di bawah ini:

```
                        >>> DATA <<<

    J    JUMLAH TIPE PONDASI :    2
    B    DATA BAHAN
    E    DATA ELEMEN PONDASI
    G    DATA GAYA YANG BEKERJA PADA PONDASI
    D    DATA DIMENSI PONDASI
    S    SELESAI

    ===> Pilih ?
```

Bila dipilih (**E**) pada menu pilihan di atas maka akan tampak menu isian DATA

ELEMEN PONDASI seperti di bawah ini:

```
+--------------------------------------------------------+
|              >>> DATA ELEMEN PONDASI <<<               |
+--------------------------------------------------------+
| PONDASI Tipe :    1                                    |
+--------------------------------------------------------+
| Masukan Elemen PONDASI Yang Mempunyai Tipe Yg Sama     |
|          No.                    Elemen                 |
+--------------------------------------------------------+
|              1                                         |
+--------------------------------------------------------+
```

Isikan No. = 0 jika sudah selesai ... !

Menu isian DATA ELEMEN PONDASI adalah untuk memasukan elemen kolom di atas pondasi pada portal beton dalam program Microfeap II yang mempunyai tipe yang sama. Dan bila semua elemen-elemen pada masing-masing tipe telah dimasukan maka akan tampak kembali menu pilihan DATA sebagai berikut:

```
+--------------------------------------------------------+
|                   >>> DATA <<<                         |
+--------------------------------------------------------+
| J    JUMLAH TIPE PONDASI :    2                        |
| B    DATA BAHAN                                        |
| E    DATA ELEMEN PONDASI                               |
| G    DATA GAYA YANG BEKERJA PADA PONDASI               |
| D    DATA DIMENSI PONDASI                              |
| S    SELESAI                                           |
+--------------------------------------------------------+
| ===> Pilih ?                                           |
+--------------------------------------------------------+
```

Bila dipilih (G) pada menu pilihan di atas maka akan dilakukan pembacaan pada file data dari Microfeap II atau file data gaya-gaya yang bekerja pada pondasi yang dibuat dengan program lain tapi mempunyai struktur data/isi file yang sama dan akan tampak menu isian sebagai berikut:

```
ndasi Tipe :    1
gangan Izin Tanah ? (kPa) : 260
ah Kerja Gaya Pada Pondasi : 1. Arah Kerja Satu Arah
                             2. Arah Kerja Dua Arah
lih Arah Kerja Pondasi ! : 2

: ulang   L : lanjutkan ===>
```

Setelah semua isian dan pilihan di atas untuk masing-masing tipe pondasi diisikan

maka akan tampak kembali menu pilihan DATA seperti di bawah ini:

```
┌─────────────────────────────────────────────────┐
│                 >>> DATA <<<                      │
├─────────────────────────────────────────────────┤
│  J   JUMLAH TIPE PONDASI :    2                   │
│  B   DATA BAHAN                                   │
│  E   DATA ELEMEN PONDASI                          │
│  G   DATA GAYA YANG BEKERJA PADA PONDASI          │
│  D   DATA DIMENSI PONDASI                         │
│  S   SELESAI                                      │
├─────────────────────────────────────────────────┤
│  ===> Pilih ?                                     │
└─────────────────────────────────────────────────┘
```

Bila dipilih (**D**) pada menu pilihan di atas maka akan tampak menu pilihan DATA

DIMENSI sebagai berikut ini:

```
┌─────────────────────────────────────────────────────┐
│            >>> DATA DIMENSI <<<                      │
├─────────────────────────────────────────────────────┤
│ PONDASI Tipe :    1                                 │
├─────────────────────────────────────────────────────┤
│  Panjang      Tebal Plat Kaki      Penutup Beton    │
│ (L)--->mm        (t)--->mm          (Pb)--->mm      │
├─────────────────────────────────────────────────────┤
│                                                     │
│                                                     │
└─────────────────────────────────────────────────────┘
```

U : ulang   L : lanjutkan ===>

Bila menu isian ini telah diisi maka akan tampak menu isian DATA DIMENSI
seperti di bawah ini:

```
┌──────────────────────────────────────────────────────────────────────┐
│                        >>> DATA DIMENSI <<<                           │
├──────────────────────────────────────────────────────────────────────┤
│ PONDASI Tipe :    1                                                   │
├──────────────────────────────────────────────────────────────────────┤
│ Kedalaman   Lebar Penampang   Tinggi Penampang   Diameter Tul.       │
│  Pondasi         Kolom              Kolom         Pokok Kolom         │
│ (Df)--->mm    (Bk)--->mm         (Hk)--->mm       (Dpk)--->mm         │
├──────────────────────────────────────────────────────────────────────┤
│                                                                       │
└──────────────────────────────────────────────────────────────────────┘
```

U : ulang   L : lanjutkan ===>

Bila semua menu pilihan dan menu isian DATA DIMENSI sudah diisikan maka
akan tampak kembali menu pilihan DATA sebagai berikut:

```
+==================================================+
||              >>> DATA <<<                       ||
+==================================================+
||  J   JUMLAH TIPE PONDASI  :    2                ||
||  B   DATA BAHAN                                 ||
||  E   DATA ELEMEN PONDASI                        ||
||  G   DATA GAYA YANG BEKERJA PADA PONDASI        ||
||  D   DATA DIMENSI PONDASI                       ||
||  S   SELESAI                                    ||
+==================================================+
||  ===> Pilih ?                                   ||
+==================================================+
```

Bila dipilih (**S**) pada menu pilihan di atas maka akan tampak kembali menu pilihan

DISAIN ELEMEN PONDASI seperti di bawah ini:

Bila dipilih (**P**) maka akan dilakukan proses disain elemen pondasi dengan data-

data yang telah dimasukan. Bila dipilih (**M**) maka akan ditampilkan data-data

yang telah diisikan. Bila dipilih (**H**) maka akan ditampilkan hasil disain elemen

pondasi yang telah diproses tersebut. Bila dipilih (**G**) maka akan ditampilkan hasil

disain elemen pondasi yang telah diproses tersebut dalam bentuk gambar sketsa.

Dan bila dipilih (**S**) maka akan tampak kembali menu pilihan utama.

```
+==================================================+
||       >>> DISAIN ELEMEN PONDASI <<<             ||
+==================================================+
||   D    DATA                                     ||
||   P    PROSES DISAIN                            ||
||   M    MENAMPILKAN DATA DISAIN                  ||
||   H    HASIL DISAIN                             ||
||   G    SKETSA HASIL DISAIN                      ||
||   S    SELESAI                                  ||
+==================================================+
||   ===> Pilih ?                                  ||
+==================================================+
```

```
┌─────────────────────────────────────────────────┐
│  >>> PROGRAM DISAIN ELEMEN STRUKTUR BETON <<<   │
├─────────────────────────────────────────────────┤
│                                                 │
│                                                 │
│     **** Nama File Data :   T-AKHIR             │
│          D   FILE DATA                          │
│          P   DISAIN ELEMEN PLAT                 │
│          B   DISAIN ELEMEN BALOK                │
│          K   DISAIN ELEMEN KOLOM                │
│          F   DISAIN ELEMEN PONDASI              │
│          S   SELESAI                            │
│                                                 │
├─────────────────────────────────────────────────┤
│          Pilih ? :                              │
└─────────────────────────────────────────────────┘
```

Bila dipilih (**S**) pada menu pilihan utama di atas maka akan keluar dari program

ini.
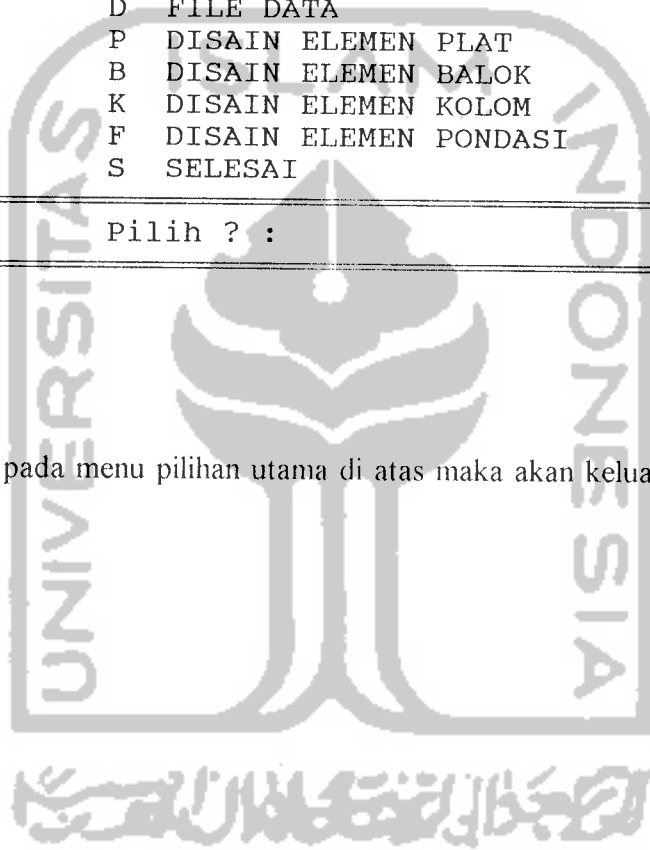
```
╔══════════════════════════════════════════════════════════════╗
║         UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON           ║
╠══════════════════════════════════════════════════════════════╣
║ AUTHORITY : UII CIVIL ENGINEERING 1996    DATA      : PLAT     ║
║ Proyek    : KAMPUS                        Halaman   : 1        ║
║ Perencana : FN ABDI                       File Data : T-AKHIR  ║
╚══════════════════════════════════════════════════════════════╝
```

>>> DATA BAHAN <<<

Tipe Plat	Teg. Desak Beton (MPa)	Teg. Tarik Baja (MPa)	Mod. Elastisitas Baja (MPa)
1	30	300	200000
2	30	300	200000

>>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<<

Tipe	No.	Diameter Tulangan Pokok (mm) Plat	Diameter Tulangan Sengkang (mm)
1	1	16	8
1	2	19	10
1	3	22	0
2	1	16	8
2	2	19	10
2	3	22	0

>>> DATA DIMENSI <<<

Tipe Plat	Panjang (mm)	Lebar (mm)	Tebal (mm)	Penutup Beton (mm)	Arah Kerja
1	4000	4000	100	40	2 Arah
2	5500	4000	110	40	2 Arah

>>> DATA GAYA-GAYA MAKSIMUM <<<

Tipe Plat	M Lap. x (Nmm)	M Lap. y (Nmm)	M Tum. x (Nmm)	M Tum. y (Nmm)
1	1.0E+05	1.0E+05	-9.95E+04	-9.95E+04
2	1.7E+05	1.2E+05	-1.71E+05	-1.23E+05

```
            UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON

 AUTHORITY : UII CIVIL ENGINEERING 1996    DATA     : BALOK
 Proyek    : KAMPUS                        Halaman  : 1
 Perencana : FN ABDI                       File Data : T-AKHIR
```

```
                        >>> DATA BAHAN <<<
```

Tipe Balok	Teg. Desak Beton (MPa)	Teg. Tarik Baja (MPa)	Mod. Elastisitas Baja (MPa)
1	30	300	200000
2	30	300	200000

```
          >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<<
```

Tipe Balok	No.	Diameter Tulangan Pokok (mm)	Diameter Tulangan Sengkang (mm)
1	1	12	6
1	2	18	8
1	3	20	10
2	1	12	6
2	2	16	8
2	3	18	10

```
          >>> DATA ELEMEN  BALOK <<<
```

Tipe	No.	Elemen
1	1	12
1	2	13
1	3	14
2	1	9
2	2	10
2	3	11

```
                    >>> DATA DIMENSI <<<
```

Tipe Balok	Bentang Balok (mm)	Lebar (mm)	Tinggi (mm)	Penutup Beton (mm)
1	5500	300	400	50
2	5500	400	500	50

```
┌─────────────────────────────────────────────────────────────────────┐
│        UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON                   │
├─────────────────────────────────────────────────────────────────────┤
│ AUTHORITY : UII CIVIL ENGINEERING 1996    DATA      : BALOK           │
│ Proyek    : KAMPUS                        Halaman   :   2             │
│ Perencana : FN ABDI                       File Data : T-AKHIR         │
└─────────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────────┐
│              >>> DATA GAYA-GAYA MAKSIMUM <<<                          │
├─────────────────────────────────────────────────────────────────────┤
│ Tipe    M Lapangan    M Tumpuan      Gaya Geser      M Torsi          │
│ Balok     (Nmm)         (Nmm)           (N)           (Nmm)           │
│                                                                       │
│   1     4.15420E+07   -5.997500E+07    6.983E+04     2.00000E+07      │
│   2     4.19660E+07   -6.492400E+07    7.467E+04     3.00000E+07      │
└─────────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────┐
│        UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON               │
├─────────────────────────────────────────────────────────────────┤
│ AUTHORITY : UII CIVIL ENGINEERING 1996    DATA      : KOLOM       │
│ Proyek    : KAMPUS                        Halaman   : 1           │
│ Perencana : FN ABDI                       File Data : T-AKHIR     │
└─────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────┐
│                    >>> DATA BAHAN <<<                             │
├─────────────────────────────────────────────────────────────────┤
│ Tipe Teg. Desak Beton   Teg. Tarik Baja   Mod. Elastisitas Baja  │
│ Kolom     (MPa)         (MPa)             (MPa)                   │
├─────────────────────────────────────────────────────────────────┤
│   1          30             300               200000             │
│   2          30             300               200000             │
└─────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────┐
│          >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<<            │
├─────────────────────────────────────────────────────────────────┤
│ Tipe  No.  Diameter Tulangan Pokok   Diameter Tulangan Sengkang  │
│ Kolom               (mm)                       (mm)              │
├─────────────────────────────────────────────────────────────────┤
│   1    1          12                                             │
│   1    2          16                            6                │
│   1    3          18                            8                │
│   2    1          12                           10               │
│   2    2          16                            6                │
│   2    3          18                            8                │
│                                                 10               │
└─────────────────────────────────────────────────────────────────┘
```

```
┌────────────────────────────────────┐
│   >>> DATA ELEMEN   KOLOM <<<       │
├────────────────────────────────────┤
│ Tipe          No.         Elemen    │
├────────────────────────────────────┤
│   1            1            2        │
│   1            2            4        │
│   1            3            6        │
│   1            4            8        │
│   2            1            1        │
│   2            2            3        │
│   2            3            5        │
│   2            4            7        │
└────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────┐
│                    >>> DATA DIMENSI <<<                          │
├─────────────────────────────────────────────────────────────────┤
│ Tipe  Panjang  Lebar/Diameter  Tinggi  Penutup Beton             │
│ Kolom (mm)     (mm)            (mm)    (mm)                       │
├─────────────────────────────────────────────────────────────────┤
│   1   4000         400            0        40                    │
│   2   6000         500          500        40                    │
└─────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────┐
│        UII-CDP  PROGRAM DISAIN ELEMEN STRUKTUR BETON              │
├─────────────────────────────────────────────────────────────────┤
│ AUTHORITY : UII CIVIL ENGINEERING 1996    DATA      : KOLOM       │
│ Proyek    : KAMPUS                        Halaman   :  2          │
│ Perencana : FN ABDI                       File Data : T-AKHIR     │
└─────────────────────────────────────────────────────────────────┘
```

```
┌──────────────────────────────────────────────────────────────┐
│              >>> DATA GAYA-GAYA MAKSIMUM <<<                   │
├──────────────────────────────────────────────────────────────┤
│ Tipe    M 1       M 2    Gaya Geser   Gaya Aksial             │
│ Kolom  (Nmm)     (Nmm)      (N)          (N)                  │
├──────────────────────────────────────────────────────────────┤
│   1    3.8E+07  -2.7E+07   1.6E+04      1.2E+05               │
│   2    2.2E+07  -1.0E+00   3.7E+03      2.4E+05               │
└──────────────────────────────────────────────────────────────┘
```
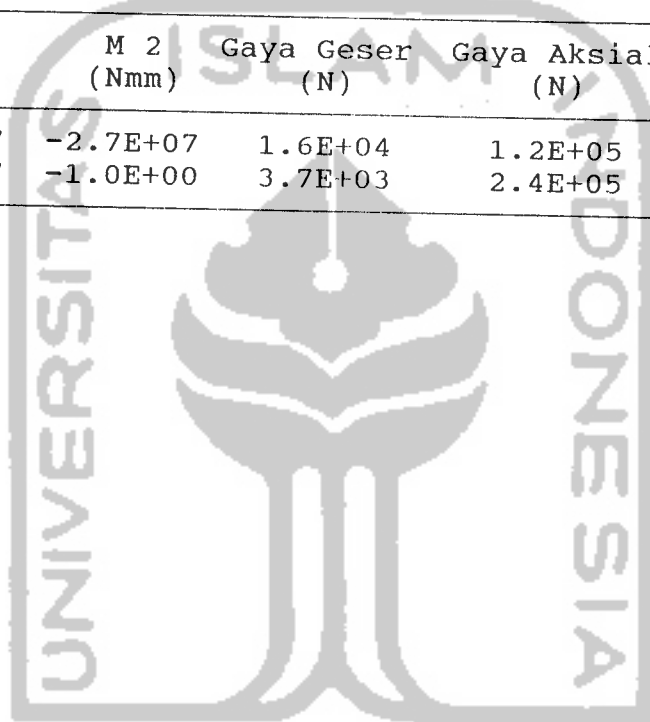
```
┌────────────────────────────────────────────────────────────────┐
│         UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON            │
├────────────────────────────────────────────────────────────────┤
│ AUTHORITY : UII CIVIL ENGINEERING 1996    Data     : PONDASI    │
│ Proyek    : KAMPUS                        Halaman  : 1          │
│ Perencana : FN ABDI                       File Data : T-AKHIR   │
└────────────────────────────────────────────────────────────────┘
```

```
┌────────────────────────────────────────────────────────────────┐
│                      >>> DATA BAHAN <<<                         │
├────────────────────────────────────────────────────────────────┤
│ Tipe Teg. Desak Beton   Teg. Desak Beton   Tegangan Tarik Baja │
│ Pond.  Kolom (MPa)      Pond.     (MPa)         (MPa)           │
├────────────────────────────────────────────────────────────────┤
│   1         30               30                 300            │
│   2         30               30                 300            │
└────────────────────────────────────────────────────────────────┘
```

Tipe Pond.	Teg. Desak Beton Kolom (MPa)	Teg. Desak Beton Pond. (MPa)	Tegangan Tarik Baja (MPa)
1	30	30	300
2	30	30	300

```
┌────────────────────────────────────────────────────────────────┐
│         >>> DIAMETER TULANGAN YANG AKAN DIGUNAKAN <<<           │
├────────────────────────────────────────────────────────────────┤
│ Tipe        No.        Diameter Tulangan Pokok                 │
│ Pondasi                       (mm)                             │
├────────────────────────────────────────────────────────────────┤
│   1          1                 12                              │
│   1          2                 16                              │
│   1          3                 18                              │
│   2          1                 12                              │
│   2          2                 16                              │
│   2          3                 18                              │
└────────────────────────────────────────────────────────────────┘
```

Tipe Pondasi	No.	Diameter Tulangan Pokok (mm)
1	1	12
1	2	16
1	3	18
2	1	12
2	2	16
2	3	18

```
┌────────────────────────────────────┐
│       >>> DATA ELEMEN PONDASI <<<   │
├────────────────────────────────────┤
│ Tipe        No.        Elemen      │
├────────────────────────────────────┤
│   1          1            3        │
│   1          2            5        │
│   2          1            1        │
│   2          2            7        │
└────────────────────────────────────┘
```

Tipe	No.	Elemen
1	1	3
1	2	5
2	1	1
2	2	7

```
┌────────────────────────────────────────────────────────────────┐
│                      >>> DATA DIMENSI <<<                       │
├────────────────────────────────────────────────────────────────┤
│ Tipe   Panjang   Tebal Plat   Kedalaman   Penutup Beton        │
│ Pond.   (mm)       (mm)          (mm)         (mm)             │
├────────────────────────────────────────────────────────────────┤
│   1     1500       600          2000          75              │
│   2     1000       500          2000          75              │
└────────────────────────────────────────────────────────────────┘
```

Tipe Pond.	Panjang (mm)	Tebal Plat (mm)	Kedalaman (mm)	Penutup Beton (mm)
1	1500	600	2000	75
2	1000	500	2000	75

```
┌────────────────────────────────────────────────────────────────┐
│                 >>> DATA GAYA-GAYA MAKSIMUM <<<                 │
├────────────────────────────────────────────────────────────────┤
│ Tipe Gaya Aksial Kolom   Tegangan Izin   Arah Kerja            │
│ Pond.       (N)             (kPa)                              │
├────────────────────────────────────────────────────────────────┤
│   1      2.4E+05           2.6E+02        2 Arah              │
│   2      1.3E+05           2.6E+02        2 Arah              │
└────────────────────────────────────────────────────────────────┘
```

Tipe Pond.	Gaya Aksial Kolom (N)	Tegangan Izin (kPa)	Arah Kerja
1	2.4E+05	2.6E+02	2 Arah
2	1.3E+05	2.6E+02	2 Arah

UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON					
AUTHORITY : UII CIVIL ENGINEERING 1996 DISAIN : PLAT Proyek : KAMPUS Halaman : 1 Perencana : FN ABDI File Data : T-AKHIR					
TIPE PLAT	ARAH MELEBAR		ARAH MEMANJANG		TULANGAN BAGI/ SUSUT
	LAPANGAN	TUMPUAN	LAPANGAN	TUMPUAN	
1 2	D16-500mm D16-500mm	D16-500mm D16-500mm	D16-500mm D16-500mm	D16-500mm D16-500mm	D10-390mm D10-350mm

TIPE BALOK	TUL.LAP BAWAH	TUL.LAP ATAS	TUL.TUM BAWAH	TUL.TUM ATAS	TULANGAN SENGKANG	TULANGAN TORSI
1	5D12	2D12	2D12	8D12	D10- 50mm	–
2	2D12	2D12	2D12	2D12	D10- 90mm	2D12

UII-CDP PENULANGAN BALOK YG MENDEKATI KEBUTUHAN

AUTHORITY : UII CIVIL ENGINEERING 1996 DISAIN : BALOK
Proyek : KAMPUS   Halaman : 1
Perencana : FN ABDI   File Data : T-AKHIR

UII-CDP PROGRAM DISAIN ELEMEN STRUKTUR BETON				
AUTHORITY : UII CIVIL ENGINEERING 1996 DISAIN : KOLOM Proyek : KAMPUS Halaman : 1 Perencana : FN ABDI File Data : T-AKHIR				
TIPE KOLOM	TULANGAN TARIK	TULANGAN DESAK	TULANGAN SPIRAL	TULANGAN SENGKANG
1 2	10D12 10D12	10D12 10D12	D10- 37 mm -	- D 6-192 mm