

LAMPIRAN A

DESKRIPSI PAKET PROGRAM

1. PENDAHULUAN

Paket program ini dikelola oleh program utama dalam bentuk menu pilihan yang dibagi menurut kegunaan dan fungsinya masing-masing. Secara umum program ini dikelola dalam enam menu pilihan.

2. MENGGUNAKAN PAKET PROGRAM

Nama program utama paket program ini adalahj SIMC.EXE. Oleh karena itu untuk menjalankan program ini pertama kali kita tuliskan perintah (misalkan file SIMC.EXE berada drive A): A> SIMC, kemudian dilanjutkan dengan menekan tombol enter.

Segera setelah menuliskan perintah tersebut, pada layar monitor akan terlihat tampilan dari judul Tugas Akhir ini beserta keterangan lain yang menunjang, kemudian tekan tombol enter untuk melanjutkan. Beberapa saat kemudian tampilan judul akan hilang dan diganti tampilan menu dan bidang grafik, dimana pada tampilan menu terdiri atas dua bagian yaitu :

1. Main Menu
2. Help Menu

Main Menu terdiri atas empat menu pilihan, yaitu :

1. Data Input, menu ini berisi parameter fungsi yang digunakan untuk mensimulasikan rangkaian single phase cycloconverter. Menu data input terdiri atas beberapa submenu yaitu :
 1. Vin, yaitu parameter fungsi yang berupa tegangan sumber maksimum.
 2. Alpha, yaitu parameter fungsi yang berupa sudut penyulutan SCR.
 3. Perioda penyalaan konverter, yaitu parameter fungsi yang menunjukkan berapa lama masing-masing konverter P dan N bekerja. Parameter ini menentukan frekuensi output dari rangkaian single phase cycloconverter. Parameter fungsi ini dibatasi sampai 12 T gelombang input.
 4. Nilai resistansi beban (RL), yaitu parameter fungsi yang menunjukkan nilai resistansi dari beban resistif yang digunakan.
2. Grafik, menu ini berisi grafik yang digunakan untuk mengetahui karakteristik kerja rangkaian single phase cycloconverter. Grafik yang ditampilkan berupa grafik tegangan dan arus input output yang menunjukkan perubahan amplitudo dan frekuensi output.
3. Tabel, menu ini berisi tabel data output V_o rms yang menunjukkan waktu bekerjanya konverter P dan N dari tabel data input output.
4. Rangkaian, menu ini berisi rangkaian single phase cycloconverter yang disimulasikan karakteristik kerjanya.

Sedangkan Help Menu terdiri atas dua bagian yaitu:

1. F1 Help, menu ini berisi cara menggunakan atau mengoperasikan menu yang terdapat dalam paket program.
2. Exit, menu ini berisi prosedur untuk mengakhiri atau tidak penggunaan paket program.

Untuk mengoperasikan tiap menu dapat dilakukan dengan menekan tombol *Alt + Huruf depan* dari masing-masing menu, kecuali untuk menu *F1 Help* yang dapat dilakukan dengan menekan tombol F1 secara langsung.

LAMPIRAN B: LISTING PROGRAM SIMULASI CYCLOCONVERTER

```
Program Utama;
Uses Crt,Data,Graph,Mouse,S_P_C1,Keyboard,Tampilan,Tombmenu;

Var
  ModelLayer,GraphDriver,GraphMode,
  Driv,Mode : Integer;
  BufferLayar : Pointer;
  Layar : Byte;
  Pilih,I,k,Perioda
  T1,T2,V_load_p,Vom,A,B,Vs,Vo,Fo,
  C,V_load_n,V_load : Real;
  Is,I_load_p,I_load_n,I_Trig1,
  I_Trig2,I_load : Real;
  J : Word;
  VString : String;

Const
  Pola:FillPatternType=($FF,$FF,$FF,$FF,$FF,$FF,$FF,$FF);

Procedure SetData(Var Vmax,Alpha,R:real;T:byte);
Procedure TampilanData;
Begin
  Settextjustify(Lefttext,Centertext);
  Bar(502,212,615,330);
  Setcolor(Black);
  Settextstyle(Smallfont.Horizdir,1);
  SetUserCharSize(1,1,1,1);
  Outtextxy(500,220,'Data Input Output :');
  Outtextxy(520,240,'Vm    := '+Konversi(Vmax,'V'));
  Outtextxy(520,255,'α    := '+Konversi(Alpha,'derajat'));
  Outtextxy(520,270,'T    := '+Konversi(T#2,'phi'));
  Outtextxy(520,285,'Vo   := '+Konversi(Vo,'V'));
  Outtextxy(520,300,'Fo   := '+Konversi(Fo,'Hz'));
  Outtextxy(520,315,'Vom  := '+Konversi(Vom,'V'));
  Settextstyle(Defaultfont.Horizdir,1);
end;

Procedure TampilanData1;
Begin
  Settextjustify(Lefttext,Centertext);
  Bar(502,212,615,330);
  Setcolor(Black);
  Settextstyle(Smallfont.Horizdir,1);
  SetUserCharSize(1,1,1,1);
  Outtextxy(500,220,'Data Input Output :');
  Outextxy(520,240,'Im    := '+Konversi(Vmax/R,'A'));
  Outtextxy(520,255,'α    := '+Konversi(Alpha,'derajat'));
  Outtextxy(520,270,'T    := '+Konversi(T#2,'phi'));
  Outtextxy(520,285,'Io   := '+Konversi(Vo/R,'A'));
  Outtextxy(520,300,'Fo   := '+Konversi(Fo,'Hz'));
  Outtextxy(520,315,'Iom  := '+Konversi(Vom/R,'V'));
  Settextstyle(Defaultfont.Horizdir,1);
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end;

Procedure DataBaru;
Var
  Pilih:Byte;
Procedure TampilkanDataBaru;
Begin
  NoKursorMouse;
  Settextjustify(Lefttext.CenterText);
  SetfillPattern(Pola.cyan);
  Bar(120,20,265,140);
  Setcolor(blue);
  Outtextxy(120,35,Konversi(Vmax, 'Vo It'));
  Outtextxy(120,65,Konversi(Alpha, 'derajat'));
  Outtextxy(120,95,Konversi(T#2, 'phi'));
  Outtextxy(120,125,Konversi(R, 'Ohm'));
  KursorMouse;
end:

Begin
  TombolMenuDataInput;
  TampilkanDataBaru;
  Repeat
    Pilih:=PilihTombol;
    Case Pilih Of
      1:Vin(Vmax, 'Tegangan Sumber (Vmaximum)');
      2:Delay(Alpha, 'Sudut Penyulutan SCR ( $\alpha \leq 90$  derajat)');
      3:Sinval(T, 'Perioda Penyalaan Konverter( $T_{conv.} \leq 12$  Ti)');
      4:Resistor(R, 'Nilai Resistansi Beban (R Load)');
      0.5:
    end:
    If Pilih In[1..4] Then TampilkanDataBaru;
  Until Pilih In[0.5];
  CloseWindow;
end:

Procedure TanyaInput;
Begin
  NoKursorMouse;
  Perioda:=T;
  F0 :=(1/T)*#50;
  Vo :=(Vmax/sqrt(2))*sqrt(1/pi(pi-alpha/57.3
    +0.5*sin(2*pi*alpha/(57.3))));
  Rom :=Vo*sqrt(2);
  NoKursorMouse;
end:

Procedure Tanda;
Var i:byte;
  Vstring:string;
  Xstring:string;
Begin
  Settextstyle(SmallFont,Horizdir,1);
  Setcolor(magenta);
  SetuserCharSize(1,1,1,1);
  Outtextxy(13,88, ''+Konversi(Vmax, ''));

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Outtextxy(13,162, " "+Konversi(-Vmax, " "));
Outtextxy(14,385, " "+Konversi(Vom, " "));
SetTextStyle(SmallFont,Horizdir,4);
For I:=0 to (T#2) do
Begin
If I=0 then Vstring:='O' else begin
Str(I,Vstring);
Vstring:=Vstring+ 'n ';
end;
Outtextxy(round((I#(2#(getmaxx-20)/(6#Perioda)))+33,round(Getmaxy/6)+255,Vstring);
end;
SetColor(magenta);
For I:=0 to 1 do
Begin
if I=0 then Vstring:='O' else begin
Str(I,Vstring);
Vstring:=Vstring+ 'n ';
Str(T#2,Xstring);
Xstring:=Xstring+ 'n ';
end;
Outtextxy(round((T#I#(2#(getmaxx-20)/(6#T)))+33,round(getmaxy/6)+352,Vstring);
end;
Outtextxy(round((T#2#(2#(getmaxx-20)/(6#T)))+33,round(getmaxy/6)+352,Xstring);
end;

Procedure Tanda;
Var I:byte;
Begin
SetColor(darkgray);
For I:=0 to (Perioda2) do
Begin
SetLineStyle($userhitln,$AAAA,NormalWidth);
Line(round((I#(2#(getmaxx-55)/(6#Perioda)))
+40,77,round((I#(2#(getmaxx-55)/(6#perioda)))
+40,round(getmaxy/6)+335);
end;
end;

Procedure V Input;
Var I,i:byte;
    j:word;
Begin
SetColor (white);
for I:=1 to 2 do
begin
moveTo (40,round((getmaxy/10)+(I-1)*getmaxy/5+60));
for i:=1 to Perioda do
for j:=0 to 360 do
begin
case I of
1 : Vs:=Vmax#sin((pi/180)*j);
end;

lineTo
round (((i - 1) + (j/360))
+ (( round((2/3)*getmaxx) - 20)/perioda)+40),

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        round (((getmaxy/5 - 20)/2) * (1 - Vs/(Vmax)) +
               (K - 1) * getmaxy/5 + 90));
      end;
    end;
  end;

Procedure Triger1;
Var k,i:byte;
  i:word;
Begin
  For k:=1 to 2 do
  begin
    moveto (40, round ((getmaxy/10) + (k - 1) * getmaxy / 5 +80));
    for i :=1 to Perioda do
      for i:= 0 to 180 do
      begin
        case k of
          2: if (j<=alpha/2) or (j)=alpha+1) then
            T1 :=0
          else
            T1 :=Vmax;
        end;
        lineto
        (round (((i - 1) + ((alpha) / 180))
                 * (( round ((2/3)*getmaxx) - 20)/Perioda/2)+40),
         round (((getmaxy / 5 - 20) / 2) * (1 - T1 /(2*Vmax)) +
                (K - 1)* getmaxy /5 +90));
      end;
    end;
  end;
```


Procedure V_load_conv_p;
Var k,i:byte;
 i :word;
Begin
For k:=3 **to** 4 **do**
 begin
 moveto (40, round ((getmaxy / 10) + (k - 1) * getmaxy / 5 +80));
 for i :=1 **to** Perioda **do**
for i:= 1 **to** 180 **do**
 begin
 case k **of**
 3: **if** (j>alpha) **then**
 V_load_p :=0
 else
 V_load_p :=Vmax*sin(pi/180*i)) *sqrt(1/pi*(pi-alpha/57.3)
 +0.5*sin(2*alpha/(57.3)));
 end;
 lineto
 (round (((i - 1) + (j /180))
 * ((round((2/3)*getmaxx) - 20) /perioda/2) +40),
 round (((getmaxy / 5 - 20) / 2) * (1 - V_load_p /(Vmax)) +
 (K - 1) * getmaxy /5 +90));
 end;
 end;
 end;

```

Procedure Triger2;
Var k,i:byte;
    j:word;
Begin
    For k:=2 to 2 do
        begin
            moveto (244,round ((getmaxx / 10) + (k - 1) * getmaxy / 5+126));
            for i := 1 to Perioda do
                for j := 0 to 180 do
                    begin
                        case k of
                            2 : if (j<=alpha/2) or (j>=alpha+1) and (j=180) then
                                T2:=0
                            else
                                T2:=Vmax;
                        end;
                        lineto
                        (round (((i - 1) + ((alpha) / 180))
                            + (( round((2/3)*getmaxx) - 20) / periodo/2) +244),
                        round (((getmaxy / 5 - 20) / 2) + (1 - T2 /(2*Vmax)) +
                            (k - 1) * getmaxy / 5 +136));
                    end;
                end;
            end;
        end:

Procedure V_load_conv_n;
Var k,i:byte;
    j:word;
begin
    Setcolor(white);
    for k:=3 to 4 do
        begin
            moveto (40, round ((getmaxx / 10) + (K - 1) * getmaxy / 5 +80));
            for i:= 1 to Perioda do
                for j:=1 to 180 do
                    begin
                        case k of
                            3: if (i<=alpha) then
                                V_load_n:=0
                            else
                                V_load_n :=-Vmax*sin((pi/180)*j)*sqrt(1/pi*(pi-alpha/57.3
                                    +0.5*sin(2*pi*alpha/(57.3)));
                        end;
                        lineto
                        (round (((i - 1) + (i/180))
                            + (( round((2/3)*getmaxx) - 20) / periodo/2) +243),
                        round (((getmaxy / 5 - 20) / 2) + (1 - V_load_n /(Vmax)) +
                            (k - 1)* getmaxy / 5 + 90));
                    end;
                end;
            end;
        end:

```

Procedure V_load_spc;

Var k,i:byte;

 j:word;

```

begin
  setcolor (white);
  for k:=4 to 5 do
  begin
    moveto (40, round ((getmaxy /10) + (k - 1) * getmaxy / 5+80));
    for i:= 1 to (perioda div perioda) do
      for j:= 1 to 360 do
      begin
        case k of
          4: V_load :=V0sqrt(2)*sin(pi/180)*j;
        end;
        lineto
        (round (30+((i - 1) + (j/360))
        * ((round((2/3)*getmaxx) - 20) +3)),
        round (((getmaxy / 5 - 20) / 2) + (1 -v_load/(1.3*Vom)) +
        (k - 1) * getmaxy /5 + 90));
      end;
      cursorMouse;
    end;
  end;

Procedure V_Grafik;
Begin
  NotcursorMouse;
  BuatEldang (0,30,getmaxx-148,getmaxy,
              10,30+10,getmaxx-158,getmaxy-23,cyan,False);
  Settextjustify(Lefttext,Centertext);
  setcolor(magenta);
  Outtextxy(15,53,'Grafik (V - wt) Single Phase Cycloconverter Beha
if 1:
  TanyaInput;
  VBaris_wt;
  Tanda;
  Sion;
  Tanda1;
  V_innut;
  Triger1;
  V_load_conv_p;
  Triger2;
  V_load_conv_n;
  V_load_sos;
  Bar(502,212,615,330);
  Settextstyle(defaultfont,Horizdir,1);
  TampilkanData;
  cursorMouse;
end;

Procedure Input;
Begin
  NotcursorMouse;
  Perioda :=T;
  Fo :=(1/T)*50;
  Vo :=(Vmax/sqrt(2))*sqrt(1/2)*(pi-alpha/57.3
                                +0.5*sin(2*alpha/(57.3)));
  Voa :=V0sqrt(2);
  NotcursorMouse;
end;

```

```

Procedure Tand1;
Var I:byte;
  Vstring:string;
  Xstring:string;
Begin
  Settextstyle(Smallfont,Horizdir,1);
  Setcolor(magenta);
  setusercharSize(1,1,1,1);
  Outtextxy(13,88,11+Konversi(Vmax/R, 11));
  Outtextxy(13,162,11+Konversi(-Vmax/R, 11));
  Outtextxy(14,385,11+Konversi(Vem/R, 11));
  Settextstyle(Smallfont,Horizdir,4);
  For I:=0 to (T1) do
  Begin
    If I=0 then Vstring:='O' else begin
      Str(I,Vstring);
      Vstring:=Vstring+'π';
    end;
    Outtextxy(round((I*(2*getmaxx-20)/(6*perioda)))+33,
              round(getmaxx/6)+255,Vstring);
  end;
  Setcolor(magenta);
  for I:=0 to 1 do
  begin
    If I=0 then Vstring:='O' else begin
      Str(I,Vstring);
      Vstring:=Vstring+'pi';
      Str(T12,Xstring);
      Xstring:=Xstring+'pi';
    end;
    Outtextxy(round((T12*(2*getmaxx-20)/(6*T1))+33,
                  round(getmaxx/6)+352,Vstring);
  end;
  Outtextxy(round((T12*(2*getmaxx-20)/(6*T1))+33,
                  round(getmaxx/6)+352,Xstring);
end;

Procedure Tand2;
Var I:byte;
begin
  Setcolor(darkgray);
  for I:=0 to (Periodat2) do
  begin
    Setlinestyle(userbitin,$AAAA,NormalWidth);
    line(round((I*(2*getmaxx-55)/(6*perioda))+40,77,
               round((I*(getmaxx-55)/(6*perioda))+40,round(getmaxx/6)+335));
  end;
end;

Procedure I_input;
Var k,i:byte;
  j:word;
Begin
  Setcolor(white);
  for k:= 1 to 2 do

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begin
  moveto (40, round ((getmaxy / 10) + (k - 1) * getmaxy / 5+80));
  for i:= 1 to Perioda do
    for j:= 0 to 360 do
      begin
        case k of
          1: Is:=(Vmax/R)*sin((o1/180)*j);
        end:

        lineto
        (round(((i - 1) + (j / 360))
           + ((round ((2/3)*getmaxx) - 20)/ periodo) +40),
         round (((getmaxy / 5 - 20) / 2) + (1 - Is /(Vmax/R)) +
           (k - 1) *getmaxy / 5 +90));
      end;
    end:
  end:

Procedure I_converter_p;
Var k,i:byte;
  i:word;
begin
  for k:=1 to 2 do
  begin
    moveto (40, round ((getmaxy / 10) + (k - 1) * getmaxy / 5+80));
    for i:= 1 to periodo do
      for j:= 0 to 180 do
        begin
          case k of
            0: if (j<alpha) or (j>alpha+1) then
              I_Trig1 :=0;
            else
              I_Trig1 :=Vmax;
            end:
          lineto
          (round(((i - 1) + ((alpha) / 180))
             + ((round ((2/3)*getmaxx) - 20) / periodo/2) + 40),
           round (((getmaxy / 5 - 20) / 2) + (1 - I_Trig1 /(2*Vmax)) +
             (k - 1) * getmaxy / 5 +90));
        end;
      end:
    end:
  end:

Procedure I_load_converter_p;
var i,j:byte;
  i:word;
begin
  for k:=3 to 4 do
  begin
    moveto (40, round ((getmaxy / 10) + (k - 1) * getmaxy / 5+80));
    for i:= 1 to periodo do
      for j := 1 to 180 do
        begin
          case k of
            3: if (j<alpha) then
              I_load_p :=0

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    else
      I_load_p :=Vmax*sin((pi/180)*j) *sqrt(1/pi*(pi-alpha/57.3
          +0.5*sin(2*alpha/(57.3)))); 
    end;
    lineto
      (round (((i - 1) + (j / 180))
        + (( round ((2/3)*getmaxx) - 20) / periodo/2) + 40),
       round (((getmaxy / 5 - 20) / 2)*(1 - I_load_p /(Vmax)) +
       (K - 1) * getmaxy / 5 +90));
    end;
  end;
end;

Procedure I_converter_n;
var k,i:byte;
  j:word;
begin
  for k:=2 to 2 do
  begin
    moveto(40, round ((getmaxy / 10) + (k - 1) * getmaxy / 5 +126));
    for i :=1 to periodo do
      for j:=0 to 180 do
      begin
        case k of
          2: if (j=>alpha/2) or (j>=alpha+1) then
            I_Trig2 :=0
          else
            I_Trig2 :=Vmax;
        end;
        lineto
          (round (((i - 1) + ((alpha / 180))
            + (( round ((2/3)*getmaxx) - 20) / Perioda/2) + 244)),
           round(((getmaxy / 5 - 20) / 2)*(1 - I_Trig2 /(2*Vmax))+
           (K - 1) * getmaxy / 5 +136));
        end;
      end;
    end;
  end;

Procedure I_load_converter_n;
var k,i:byte;
  j:word;
begin
  setcolor(white);
  for k := 3 to 4 do
  begin
    moveto (40, round ((getmaxy / 10) + (k - 1) * getmaxy / 5+80));
    for i := 1 to periodo do
      for j:=1 to 180 do
      begin
        case k of
          3: if (j=<alpha) then
            I_load_p :=0
          else
            I_load_p :=-Vmax*sin((pi/180)*j) *sqrt(1/pi*(pi-alpha/57.3
              +0.5*sin(2*alpha/(57.3)))); 
        end;
      end;
    end;
  end;

```

```

    lineto
        (round (((i - 1) + (i / 180))
        * (( round ((2/3)*getmaxx) - 20) / perioda/2) +243),
        round (((getmaxx / 5 - 20) / 2) * (1 - I_load_p /(Vmax)) +
        (k - 1) * getmaxy / 5 + 90));
    end;
end;
end;

Procedure I_load_spc;
var k,i:byte;
    t:word;
begin
    setcolor (white);
    for k:=4 to 5 do
    begin
        moveto (40, round ((getmaxy / 10) + (k - 1) * getmaxy / 5+80));
        for i:=1 to (perioda div perioda) do
        for j:=1 to 360 do
        begin
            case k of
                4: I_load := Volsort(2)*sin((pi/180)*j);
            end;
            lineto
                (round (39+(i - 1) + (j / 360))
                * (( round ((2/3)*getmaxx) - 20) + 3)),
                round((Iloadmaxy / 5 - 20) / 2) * (1 - I_load /(1.3*Vom)) +
                (k - 1) * getmaxy / 5 + 90));
            end;
        cursorMouse;
    end;
    end;

```

Procedure I_Grafik;

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Begin
    cursorHouse;
    BuatRidang (0,30,Getmaxx-148,getmaxy,
                10,30+10,Getmaxx-158,getmaxy-23,cyan,false);
    settextjustify(lefttext,Centertext);
    Setcolor(magenta);
    Outtextxy(15,53,'Grafik (I - wt) Single Phase Cycloconverter Beban Resi
Input:
    ISasis_wt;
    Tand1;
    Pion1;
    Tand2;
    I_Input;
    I_converter_p;
    I_load_converter_p;
    I_converter_n;
    I_load_converter_n;
    I_load_spc;
    Baris(502,212,615,330);
    SetTextStyle(Defaultfont,Horizdir,1);
    TempilikanData;

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    NokursorMouse;
end;

Procedure MenuGraph;
Var Pilih:byte;
Begin
MenuGraph2;
Repeat
Pilih:=PilihTombol;
Until Pilih In[0,1,2,3,4];
if pilih=1 then begin closewindow:V_Grafik;end;
if pilih=2 then begin closewindow:I_Grafik;end;
if pilih=3 then begin closewindow:hapus;end;
if pilih=4 then begin closewindow:end;
end;

Procedure TampilkanTabel;
Var c,d,Vn,Vo      :real;
    i                  :byte;
    Istring,Vstring  :string;
Begin
NokursorMouse;
Perioda      :=1;
c            :=pi-alpha/57.3;
d            :=6.5*sin(2*pi*alpha/57.3);
Vo          :=(Vmax/(sqrt(2))*sqrt(1/pi*(c+d)));
OpenWindow(120,48,295,(T+2)*30,lightgray,blue,'Tegangan Output Vo(rms)');
Setcolor (blue);
Rectangle(5,25,275,(T+2)*28);
Rectangle(5,25,275,45);
Rectangle(5,25,25,(T+2)*28);
Rectangle(5,25,(140,(T+2)*28));
SetTextStyle(SmallFont,HorizDir,1);
SetUserCharSize(1,1,1,1);
Outtextxy(15,35,'T');
Outtextxy(83,35,'Vo (P Converter)');
Outtextxy(210,35,'Vo (H Converter)');
For i:= 1 To (2tperioda) do Begin
If i=1 then Istring:='π' else begin
Str(i,Istring);
Istring:=Istring+'π';
end;
Outtextxy(15,45+(14*I),Istring);
end;

Vo:=0;
For i:=1 to perioda do
Begin
Outtextxy(75,43+(14*I),''+Konversi(Vo,'volt'));
Outtextxy(200,43+(14*I),''+Konversi(Vo,'voIt'));
end;

Vo:=(Vmax/(sqrt(2))*sqrt(1/pi*(c+d)));
Vo :=0;
For i:=(perioda+1) to (2tperioda) do

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Begin
  Outtextxy(200,43+(14#I), " " + Konversi(Vo1, "volt"));
  Outtextxy(75,43+(14#I), " " + konversi(Vo, "volt"));
end:
Repeat Until ReadKey=#27;
CloseWindow;
KursorMouse;
SetTextStyle(defultfont,horizdir,1);
end:

Procedure InoutOutput;
Var Vin,Perioda,X,Y,Is,Irms_conv,Po,PF,
    Vmax,Vomax,Fo,Res,Iorms,Irms_scr :real;
    Ti,Fi :byte;
    Istring,Vstring :string;
begin
  Ti :=2;
  Fi :=50;
  Fo :=(1/Ti)*Fi;
  Res :=R;
  Perioda :=T;
  X :=pi-alpha/57.3;
  Y :=0.5*sin(2*pi*alpha/57.3);

  Vmax :=(Vmax/(sqrt(2)))*sqrt(1/pi(x+y)));
  Vomax :=(Vmax*sqrt(1/pi(x+y)));
  Iorms :=Vmax/Res;
  Is :=Iorms;
  Irms_conv :=Iorms/sqrt(2);
  Irms_scr :=Irms_conv/sqrt(2);
  Po :=Vmax*Iorms;
  Pf :=sqrt(1/pi(x+y));
  OpenWindow(120,68,295,320,cyan,blue,"Data Input Output");
  NotursorMouse;
  Setcolor(blue);
  Outtextxy(130,45, "Vin max" ; " " + konversi(Vmax, "Volt"));
  Outtextxy(118,60, "Alpha (α)" ; " " + konversi(Alpha, "derajad"));
  Outtextxy(118,75, "Ti" ; " " + konversi(Ti, "Hz"));
  Outtextxy(122,90, "Fi" ; " " + konversi(Fi, "Hz"));
  Outtextxy(118,105, "R Load" ; " " + konversi(Res, "Ω"));
  Outtextxy(118,120, "To" ; " " + konversi(Tt2, "Hz"));
  Outtextxy(122,135, "Fo" ; " " + konversi(Fo, "Hz"));
  Outtextxy(130,150, "Vo rms" ; " " + konversi(Vrms, "Volt"));
  Outtextxy(130,165, "Vo max" ; " " + konversi(Vmax, "Volt"));
  Outtextxy(118,180, "Io rms" ; " " + konversi(Iorms, "A"));
  Outtextxy(118,195, "Is rms" ; " " + konversi(Is, "A"));
  Outtextxy(118,210, "I rms conv." ; " " + konversi(Irms_conv, "A"));
  Outtextxy(118,225, "I rms scr" ; " " + konversi(Irms_scr, "A"));
  Outtextxy(130,240, "Po" ; " " + konversi(Po, "watt"));
  Outtextxy(122,255, "PF" ; " " + konversi(PF, ""));
  Outtextxy(140,290, "< Escape >");

Repeat Until Readkey=#27;
CloseWindow;
KursorMouse;

```

```

Procedure Tabel;
Var Pilih:byte;
Begin
TombolTabel;
Repeat
Pilih:=PilihTombol;
Case Pilih of
1:TampilkanTabel;
2:InputOutput;
0,3:
end:
Until Pilih In {0,3};
CloseWindow;
end:
Begin
Driv:=detect;
InitGraph(Driv,Mode, " ");
ModeLayar := GetGraphMode;
If ModeLayar<0 then begin
GetMem(BufferLayar,4000);
Move(Layar,BufferLayar^,4000);
end:
inialisasiGrafik;
LangkahMouse(2,2);
NoKursorMouse;
RidangGrafik;
TombolMenuUtama;
ketJudul;
ketBerikutnya;
BidRangk;
cursorMouse;
Repeat
Pilih :=PilihTombol;
Case Pilih Of
1 :DataBaru;
2 :Tabel;
3 :MenuGraph;
4 :Rangkaien;
5 :Help;
6 :AkhirProgram;
0,7;;
end:
Until Pilih In{0,7};
end:
Var
Vx,Vmax,Alpha,R :Real;
T :byte;
Begin
Vmax :=90;
Alpha :=45;
T :=5;
R :=25;
SetData(Vmax,Alpha,R,T);
end.

```