

# Kumpulan Program Pascal

**Decky Hendarsyah**

dex\_3000@yahoo.com

## **Lisensi Dokumen:**

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Kumpulan program pascal ini merupakan kumpulan latihan saat penulis belajar bahasa pemrograman pascal. Penulis menggunakan Turbo Pascal for Windows (TPW) Versi 1.5 sebagai kompilernya. Mungkin ada kekurangan disana sini, tapi mudah-mudahan kumpulan program ini bermanfaat bagi pembaca yang berminat dan baru mempelajari bahasa pemrograman pascal.

```
Program Menghitung_Jarak;
Uses WinCrt;
var
  x1,x2,y1,y2:integer;
  d:real;
begin
  Writeln('Program Menghitung Jarak Titik A dan B');
  Writeln('=====');
  Writeln;
  Write('Masukan Nilai A (X1): ');readln(x1);
  Write('Masukan Nilai B (X2): ');readln(x2);
  Write('Masukan Nilai A (Y1): ');readln(y1);
  Write('Masukan Nilai B (Y2): ');readln(y2);
  d:=sqrt(sqr(x2-x1)+sqr(y2-y1));
  Writeln;
  Writeln('Jadi Jarak Titik A ke B Adalah: ',d:4:2);
end.
```

## **Output:**

```
Program Menghitung Jarak Titik A dan B
=====

Masukan Nilai A (X1): 2
Masukan Nilai B (X2): 3
Masukan Nilai A (Y1): 4
Masukan Nilai B (Y2): 5

Jadi Jarak Titik A ke B Adalah: 1.41
```

```
Program Konversi_Suhu;  
Uses WinCrt;  
var f,c:real;  
begin  
  Writeln('Program Konversi Farenheit Ke Celcius');  
  Writeln('=====');  
  Writeln;  
  Write('Masukan Suhu dalam Farenheit: ');readln(f);  
  c:=5/9*(f-32);  
  Writeln;  
  Writeln('Jadi Suhu Dalam Celcius Adalah: ',c:4:2);  
end.
```

**Output:**

```
Program Konversi Farenheit Ke Celcius  
=====
```

**Masukan Suhu dalam Farenheit: 100**

**Jadi Suhu Dalam Celcius Adalah: 37.78**

```
Program Konversi_Waktu;  
Uses Wincrt;  
Var j,m,d,h:integer;  
begin  
  Writeln('Program Konversi Waktu');  
  Writeln('=====');  
  Writeln;  
  Write('Masukkan Jumlah Jam   : ');readln(j);  
  Write('Masukkan Jumlah Menit  : ');readln(m);  
  Write('Masukkan Jumlah Detik   : ');readln(d);  
  Writeln;  
  h:=(j*3600)+(m*60)+d;  
  Writeln('Jadi Hasil Konversi : ',h,' Detik');  
end.
```

**Output:**

```
Program Konversi Waktu  
=====
```

**Masukkan Jumlah Jam : 2**  
**Masukkan Jumlah Menit : 30**  
**Masukkan Jumlah Detik : 40**

**Jadi Hasil Konversi : 9040 Detik**

```
Program Konversi_Waktu1;  
Uses WinCrt;  
var j,m,d,dm, sisa, sisal:integer;  
begin  
  Writeln('Program Konversi Waktu 1');  
  Writeln('=====');  
  Writeln;  
  Write('Masukkan Jumlah Detik : ');readln(dm);  
  if (dm/3600)>0 then  
  begin  
    j:=dm div 3600;  
    sisa:=dm-(j*3600);
```

```
end
else
begin
j:=0;
sisa:=dm;
end;
if (sisa/60)>0 then
begin
m:=sisa div 60;
sisal:=sisa-(m*60);
end
else
begin
m:=0;
sisal:=sisa;
end;
d:=sisal;
Writeln;
Writeln('Hasil => ',j,' jam ',m,' menit ',d,' detik');
end.
```

**Output:**

**Program Konversi Waktu 1**

=====

**Masukkan Jumlah Detik : 3500**

**Hasil => 0 jam 58 menit 20 detik**

**Program Menghitung\_Selisih\_Waktu;**

```
Uses WinCrt;
Var j,m,d,h,j1,m1,d1,h1,hj,hm,sl,sisa,sisal:longint;
Begin
Writeln('Program Menghitung Selisih Waktu');
Writeln('=====');
Writeln;
Write('Waktu ke-1 jam : ');readln(j);
Write('Waktu ke-1 Menit : ');readln(m);
Write('Waktu ke-1 Detik : ');readln(d);
Writeln('=====');
Write('Waktu ke-2 jam : ');readln(j1);
Write('Waktu ke-2 Menit : ');readln(m1);
Write('Waktu ke-2 Detik : ');readln(d1);
h:=(j*3600)+(m*60)+d;
h1:=(j1*3600)+(m1*60)+d1;
sl:=h1-h;
if (sl/3600)>0 then
begin
hj:=sl div 3600;
sisa:=sl-(hj*3600);
end
else
begin
hj:=0;
sisa:=sl;
end;
if (sisa/60)>0 then
begin
hm:=sisa div 60;
```

```
        sisa:=sisa-(hm*60);
    end
else
    begin
        hm:=0;
        sisa:=sisa;
    end;
    Writeln;
    Writeln('Selisih Waktu: ',hj,' jam ',hm,' Menit ',sisa,' Detik');
End.
```

**Output:**

**Program Menghitung Selisih Waktu**

```
=====
Waktu ke-1 jam   : 4
Waktu ke-1 Menit : 34
Waktu ke-1 Detik : 21
=====
Waktu ke-2 jam   : 6
Waktu ke-2 Menit : 20
Waktu ke-2 Detik : 10

Selisih Waktu: 1 jam 45 Menit 49 Detik
```

```
Program Menukar_Nilai;
Uses WinCrt;
var A,B,C:integer;
Begin
    Writeln('Program Menukar Nilai A Menjadi B');
    Writeln('=====');
    Writeln;
    Write('Masukkan Nilai A: ');readln(A);
    Write('Masukkan Nilai B: ');readln(B);
    Writeln;
    C:=A;
    A:=B;
    B:=C;
    Writeln;
    Writeln('Hasil A=',A,' B=',B);
End.
```

**Output:**

**Program Menukar Nilai A Menjadi B**

```
=====
Masukkan Nilai A: 20
Masukkan Nilai B: 100

Hasil A=100 B=20
```

```
Program Menukar_Nilai1;
Uses WinCrt;
var A,B:integer;
Begin
    Writeln('Program Menukar Nilai A Menjadi B');
    Writeln('=====');
    Writeln;
    Write('Masukkan Nilai A: ');readln(A);
```

```
Write('Masukkan Nilai B: ');readln(B);
Writeln;
A:=A-B;
B:=B+A;
A:=B-A;
Writeln;
Writeln('Hasil A=',A,' B=',B);
End.
```

**Output:**

**Program Menukar Nilai A Menjadi B**

=====

**Masukkan Nilai A: 25  
Masukkan Nilai B: 90**

**Hasil A=90 B=25**

```
Program Urut_Bilangan;
Uses Wincrt;
Var A,B,C:integer;
Begin
  Writeln('Program Mengurut Bilangan');
  Writeln('=====');
  Writeln;
  Write('Masukkan Nilai A: ');readln(A);
  Write('Masukkan Nilai B: ');readln(B);
  Write('Masukkan Nilai C: ');readln(C);
  Writeln;
  if (A<=B) and (A<=C) then
    if (B<=C) then
      Writeln(A,' ',B,' ',C)
    else
      Writeln(A,' ',C,' ',B)
  else if (B<=A) and (B<=C) then
    if (A<=C) then
      Writeln(B,' ',A,' ',C)
    else
      Writeln(B,' ',C,' ',A)
  else if (C<=A) and (C<=B) then
    if (A<=B) then
      Writeln(C,' ',A,' ',B)
    else
      Writeln(C,' ',B,' ',A)
End.
```

**Output:**

**Program Mengurut Bilangan**

=====

**Masukkan Nilai A: 34  
Masukkan Nilai B: 90  
Masukkan Nilai C: 20**

**20 34 90**

```
Program Menentukan_Segitiga;  
Uses Wincrt;  
Var A,B,C,X,Y:integer;  
Begin  
  Writeln('Program Menentukan Segitiga');  
  Writeln('=====');  
  Writeln;  
  Write('Masukkan Sisi A: ');readln(A);  
  Write('Masukkan Sisi B: ');readln(B);  
  Write('Masukkan Sisi C: ');readln(C);  
  Writeln;  
  X:=sqr(C);  
  Y:=sqr(A)+sqr(B);  
  if (X<Y) then  
    Writeln('Segitiga Lancip')  
  else if (X=Y) then  
    Writeln('Segitiga Siku-Siku')  
  else  
    Writeln('Segitiga Tumpul')  
End.
```

**Output:**

**Program Menentukan Segitiga**

```
=====
```

**Masukkan Sisi A: 3**  
**Masukkan Sisi B: 4**  
**Masukkan Sisi C: 5**

**Segitiga Siku-Siku**

```
Program Persamaan_Kuadrat;  
Uses Wincrt;  
Var A,B,C:integer;  
    D,X1,X2:real;  
Begin  
  Writeln('Program Persamaan Kuadrat');  
  Writeln('=====');  
  Writeln;  
  Write('Masukkan Nilai A: ');readln(A);  
  Write('Masukkan Nilai B: ');readln(B);  
  Write('Masukkan Nilai C: ');readln(C);  
  Writeln;  
  D:=sqr(B)-(4*A*C);  
  if (D>0) then  
    begin  
      X1:=(-B+sqrt(D))/2*A;  
      X2:=(-B-sqrt(D))/2*A;  
      Writeln('X1= ',X1:4:1,'      ', 'X2= ',X2:4:1);  
    end  
  else if (D=0) then  
    begin  
      X1:=-B/(2*A);  
      Writeln('X1=X2=',X1:4:1);  
    end  
  else  
    Writeln('Akar Imajiner!');  
End.
```

**Output:**

**Program Persamaan Kuadrat**

=====

Masukkan Nilai A: 3  
Masukkan Nilai B: 6  
Masukkan Nilai C: 9

Akar Imajiner!

```
Program Faktorial;
Uses Wincrt;
Var i,n,x:integer;
Begin
  Writeln('Program Faktorial');
  Writeln('=====');
  Writeln;
  Write('Masukkan Nilai Faktorial: ');Readln(n);
  Writeln;
  if (n<=0) then
    Writeln('Hasil Faktorial: ',1)
  else
    Begin
      x:=1;
      For i := 1 to n do
        x:=x*i;
      Writeln('Hasil Faktorial: ',x);
    End;
End.
```

**Output:**

**Program Faktorial**

=====

Masukkan Nilai Faktorial: 4

Hasil Faktorial: 24

```
Program Menghitung_Rata_Rata;
Uses Wincrt;
Var n,x,i,tot:integer;
    rata:real;
Begin
  Writeln('Program Menghitung Rata-Rata');
  Writeln('=====');
  Writeln;
  Write('Masukkan Jumlah Bilangan: ');readln(n);
  Writeln;
  Writeln('Masukkan Bilangan: ');
  tot:=0;
  For i:= 1 to n do
    Begin
      Readln(x);
      tot:=tot+x;
    End;
  rata:=tot/n;
  Writeln;
  Writeln('Total Bilangan: ',tot:6);
  Writeln('Rata-Rata      : ',rata:6:2);
End.
```

**Output:**

**Program Menghitung Rata-Rata**

=====

**Masukkan Jumlah Bilangan: 6**

**Masukkan Bilangan:**

2  
10  
7  
9  
4  
12

**Total Bilangan: 44**

**Rata-Rata : 7.33**

```
Program Menghitung_Pangkat;  
Uses Wincrt;  
Var i,n,m: integer;  
    x: real;  
Begin  
    Writeln('Program Menghitung Pangkat');  
    Writeln('=====');  
    Writeln;  
    Write('Masukkan Jumlah Pangkat      : ');readln(n);  
    Write('Masukkan Bil. Yang DiPangkat : ');readln(m);  
    Writeln;  
    x:=1;  
    if (n>0) then  
        For i:= 1 to n do  
            x:=x*m  
    else if (n=0) then  
        x:=1  
    else  
        begin  
            n:=-1*n;  
            For i:= 1 to n do  
                begin  
                    x:=x*(1/m);  
                end;  
        end;  
    Writeln('Hasil Pangkat: ',x:6:2);  
End.
```

**Output:**

**Program Menghitung Pangkat**

=====

**Masukkan Jumlah Pangkat : 3**

**Masukkan Bil. Yang DiPangkat : 2**

**Hasil Pangkat: 8.00**

```
Program Menampilkan_Bintang;  
Uses Wincrt;  
Var i,j,n:integer;  
Begin  
    Writeln('Program Menampilkan Bintang');
```



```
Writeln('=====');
Writeln;
Write('Masukkan Jumlah Baris: ');readln(n);
For i:= 1 to n do
  Begin
    For j:= 1 to i do
      Write('*');
    Writeln;
  End;
End.
```

**Output:**

**Program Menampilkan Bintang**

=====

Masukkan Jumlah Baris: 6

```
*
**
***
****
*****
*****
```

```
Program Solusi_Bilangan_Bulat;
Uses Wincrt;
Var i,n,x,y,z:integer;
Begin
  Writeln('Program Solusi Bilangan Bulat');
  Writeln('=====');
  Writeln;
  for x:= 0 to 25 do
    for y:= 0 to 25 do
      for z:= 0 to 25 do
        if (x+y+z=25) then
          begin
            writeln(x,' ',y,' ',z);
            readln;
          end;
      end;
    end;
  End.
```

**Output:**

**Program Solusi Bilangan Bulat**

=====

```
0 0 25
0 1 24
0 2 23
0 3 22
dst... tekan enter..._
```

**Program Array1;**

```
Uses Wincrt;
Var x : array [1..100] of integer;
    n,i :integer;
Begin
  Writeln('Program Array');
  Writeln('=====');
  Writeln;
  Write('Masukkan Jumlah Data: ');readln(n);
  Writeln;
  For i:= 1 to n do
    Readln(x[i]);
  Writeln;
  Write('Data Yang Telah Dimasukkan: ');
  For i:= 1 to n do
    Write(x[i], ' ');
End.
```

**Output:**

**Program Array**  
=====

**Masukkan Jumlah Data: 5**

**4  
23  
17  
9  
10**

**Data Yang Telah Dimasukkan: 4 23 17 9 10**

```
Program Array2;
Uses Wincrt;
Var x : array [1..100] of integer;
    n,i,max,min : integer;
Begin
  Writeln('Program Array');
  Writeln('=====');
  Writeln;
  Write('Masukkan Jumlah Data: ');readln(n);
  Writeln;Writeln('Data Harus Urut');
  For i:= 1 to n do
    Readln(x[i]);
  Writeln;
  Write('Data Yang Telah Dimasukkan: ');
  max:=x[1];
  min:=x[1];
  For i:= 1 to n do
    Begin
      Write(x[i], ' ');
      if (max<x[i]) then
        max:=x[i]
      else
        min:=x[i];
    End;
  Writeln;
  Writeln('Nilai Maximal: ',max);
  Writeln('Nilai Minimal: ',min);
End.
```

**Output:**

**Program Array**

=====

**Masukkan Jumlah Data: 4**

**Data Harus Urut**

**4**

**8**

**10**

**34**

**Data Yang Telah Dimasukkan: 4 8 10 34**

**Nilai Maximal: 34**

**Nilai Minimal: 4**

```
Program Array3;
Uses Wincrt;
Var x: array [1..100] of integer;
    n,i,max,min,tot,pos:integer;
    rt,sdt,sd,md:real;
Begin
  Writeln('Program Array');
  Writeln('=====');
  Writeln;
  Write('Masukkan Jumlah Data (Data harus Urut): ');readln(n);
  Writeln;
  For i:= 1 to n do
    Readln(x[i]);
  Writeln;
  Write('Data Yang Telah Dimasukkan: ');
  max:=x[1];
  min:=x[1];
  tot:=0;
  sdt:=0;
  For i:= 1 to n do
    Begin
      Write(x[i],' ');
      if (max<x[i]) then
        max:=x[i]
      else
        min:=x[i];
      tot:=tot+x[i];
    End;
  rt:=tot/n;
  For i:= 1 to n do
    Begin
      sdt:=sdt+sqr(x[i]-rt);
    End;
  sd:=sqrt(sdt/(n-1));
  if (n mod 2 = 1) then
    begin
      pos:=(n div 2)+1;
      md:=x[pos];
    end
  else
    begin
      pos:=(n div 2);
      md:=(x[pos]+x[pos+1])/2;
    end;
end;
```

```
Writeln;  
Writeln('Nilai Maximal   : ',max);  
Writeln('Nilai Minimal   : ',min);  
Writeln('Nilai Rata-Rata  : ',rt:4:2);  
Writeln('Standar Deviasi  : ',sd:4:2);  
Writeln('Median          : ',md:4:2);  
End.
```

**Output:**

**Program Array**

=====

**Masukkan Jumlah Data (Data harus Urut): 5**

**12  
34  
42  
47  
78**

**Data Yang Telah Dimasukkan: 12 34 42 47 78  
Nilai Maximal : 78  
Nilai Minimal : 12  
Nilai Rata-Rata : 42.60  
Standar Deviasi : 23.89  
Median : 42.00**

**Program Polindrom;**

```
Uses Wincrt;  
Var kt,hkt,hkt1:string;  
    i,j:integer;  
Begin  
  Writeln('Program Polindrom');  
  Writeln('=====');  
  Writeln;  
  Write('Masukkan Kata: ');Readln(kt);  
  Writeln;  
  j:=length(kt);  
  hkt:='';  
  For i:= 1 to j do  
    hkt:=hkt+kt[i];  
  For i:= j downto 1 do  
    hkt1:=hkt1+kt[i];  
  Writeln('Asal: ',hkt,'          Dibalik: ',hkt1);  
  Writeln;  
  if (hkt=hkt1) then  
    Writeln('Kata Tersebut Termasuk Polindrom!')  
  else  
    Writeln('Kata Tersebut Tidak Termasuk Polindrom!');  
End.
```

**Output:**

**Program Polindrom**

=====

**Masukkan Kata: KODOK**

**Asal: KODOK Dibalik: KODOK**

**Kata Tersebut Termasuk Polindrom!**

**Program Data mahasiswa;**

```
Uses Wincrt;
Type mhs = record
  NIM    : String[4];
  Nama   : String[20];
  Prodi  : String[20];
  IP     : Real;
End;
Var data : mhs;
Begin
  With data do
    Begin
      Write('NIM           : ');Readln(NIM);
      Write('Nama          : ');Readln>Nama);
      Write('Program Studi : ');Readln(Prodi);
      Write('IP            : ');Readln(IP);
    End;
    Writeln;
    Writeln;
    Writeln('NIM           : ',data.NIM);
    Writeln('Nama          : ',data>Nama);
    Writeln('Program Studi : ',data.Prodi);
    Writeln('IP            : ',data.IP:2:2);
  End.
```

**Output:**

```
NIM           : 12345
Nama          : Decky H
Program Studi : Sistem Informasi
IP            : 3.70
```

```
NIM           : 1234
Nama          : Decky H
Program Studi : Sistem Informasi
IP            : 3.70
```

**Program Pecahan;**

```
Uses Wincrt;
Var pmb, pny    : array [1..10] of integer;
    i, j, n, t1, t2 : integer;
Begin
  Writeln('Program Pecahan');
  Writeln('=====');
  Writeln;
  Write('Jumlah Data Pecahan: ');Readln(n);
  Writeln;
  For i := 1 to n do
    Begin
      Write('Pembilang ke-', i, ' : ');Readln(pmb[i]);
      Write('Penyebut ke-', i, ' : ');Readln(pny[i]);
    End;
  Writeln;
  Writeln('Pecahan Yang Di Masukkan:');
  For i := 1 to n do
    Writeln(pmb[i], '/', pny[i]);
  For i := 1 to n-1 do
    For j := i+1 to n do
      Begin
        if ((pmb[i]/pny[i]) > (pmb[j]/pny[j])) then
```

```
        Begin
            t1:=pmb[i];
            t2:=pny[i];
            pmb[i]:=pmb[j];
            pny[i]:=pny[j];
            pmb[j]:=t1;
            pny[j]:=t2;
        End;
    End;
Writeln;
Writeln('Hasilnya: ');
For i := 1 to n do
    Writeln(pmb[i], '/' ,pny[i]);
End.
```

**Output:**

**Program Pecahan**

=====

**Jumlah Data Pecahan: 2**

**Pembilang ke-1 : 2**

**Penyebut ke-1 : 4**

**Pembilang ke-2 : 3**

**Penyebut ke-2 : 4**

**Pecahan Yang Di Masukkan:**

**2/4**

**3/4**

**Hasilnya:**

**2/4**

**3/4**

**Program DataPegawai;**

Uses Wincrt;

Type Pegawai = record

    NIP        : String[9];

    Nama        : String[30];

    Golongan    : Char;

    Jamkerja    : Real;

End;

Var

    Data                    : Pegawai;

    Gapok                  : Real;

    Insentif,Gaber         : Real;

    Ul                      : Char;

Begin

    Repeat

        Clrscr;

        Writeln('Entry Data Pegawai PT. XYZ');

        Writeln('=====');

        Writeln;

        Write('NIP          : ');Readln(Data.NIP);

        Write('Nama         : ');Readln(Data>Nama);

        Write('Golongan     : ');Readln(Data.Golongan);

        Write('Jam Kerja    : ');Readln(Data.Jamkerja);

        Writeln;

        Writeln;

        Case Data.Golongan of

```

'1' : Gapok:=1000000;
'2' : Gapok:=1500000;
'3' : Gapok:=2000000;
Else
  Gapok:=0;
End;

if Data.Jamkerja>200 then
  Insentif:=(Data.Jamkerja-200)*10000
else
  Insentif:=0;

Gaber:=Gapok+Insentif;

Clrscr;
Writeln('Laporan Gaji Pegawai');
Writeln('PT. XYZ');
Writeln;

Writeln('=====');
Writeln('=====');
      Writeln(' |NIP          | Nama          | Golongan | Jam
Kerja | Gaji          | ');
Writeln('=====');
Writeln('=====');

Writeln(' |',Data.NIP:10,' | ',Data>Nama:25,' | ',Data.Golongan:10,' | ',Data
.Jamkerja:11:0,' | ',Gaber:14:2,' | ');

Writeln('=====');
Writeln('=====');
      Writeln;
      Write('Mau Ulang Lagi? [Y/T]: ');Readln(Ul);
      Until Upcase(Ul)<>'Y';
End.

```

**Output:**

Laporan Gaji Pegawai  
PT. XYZ

```

=====
|NIP          | Nama          | Golongan | Jam Kerja | Gaji          |
=====
|      123|          desi|         2|      200| 1500000.00|
=====

```

Mau Ulang Lagi? [Y/T]: \_

```

Program DataPegawai_Array;
Uses Wincrt;
Type Pegawai = record
  NIP      : String[9];
  Nama     : String[30];
  Golongan : Char;
  Jamkerja : Real;
End;
Var

```

```

Data          : Array [1..100] of Pegawai;
Gapok,Insentif,Gaber  : Real;
Tot,Rata      : Real;
Ul           : Char;
i,n          : Integer;
Begin
Repeat
  Clrscr;
  Write('Masukkan Jumlah Data Pegawai : ');Readln(n);
  For i := 1 to n do
    Begin
      Clrscr;
      Writeln('Entry Data Pegawai PT. XYZ');
      Writeln('=====');
      Writeln;
      Writeln('Data Ke-',i);
      Writeln;
      Write('NIP          : ');Readln(Data[i].NIP);
      Write('Nama          : ');Readln(Data[i].Nama);
      Write('Golongan       : ');Readln(Data[i].Golongan);
      Write('Jam Kerja       : ');Readln(Data[i].Jamkerja);
      Writeln;
    End;
    Clrscr;
    Writeln('Laporan Gaji Pegawai');
    Writeln('PT. XYZ');
    Writeln;
    Writeln('=====');
    Writeln('=====');
    Writeln('NO. |NIP          | Nama          | Golongan | Jam
Kerja | Gaji          |');
    Writeln('=====');
    Writeln('=====');
    Tot:=0;
    For i := 1 to n do
      Begin
        Case Data[i].Golongan of
          '1' : Gapok:=1000000;
          '2' : Gapok:=1500000;
          '3' : Gapok:=2000000;
        Else
          Gapok:=0;
        End;

        if Data[i].Jamkerja>200 then
          Insentif:=(Data[i].Jamkerja-200)*10000
        else
          Insentif:=0;
        Gaber:=Gapok+Insentif;
        Tot:=Tot+Gaber;
      Writeln(' | ',i:4,' | ',Data[i].NIP:10,' | ',Data[i].Nama:25,' | ',Data[i].Gol
ongan:10,' | ',Data[i].Jamkerja:10:0,
        ' | ',Gaber:13:0,' | ');
      End;
      Rata:=Tot/n;
    Writeln('=====');
    Writeln('=====');
    Writeln('Total Gaji Keseluruhan : Rp.',Tot:12:0);
    Writeln('Rata Gaji Pegawai      : Rp.',Rata:12:0);
  
```



```

Writeln;
Write('Mau Ulang Lagi? [Y/T]: ');Readln(U1);
Until Ucase(U1)<>'Y';
End.

```

**Output:**

Laporan Gaji Pegawai  
PT. XYZ

```

=====
|NO. |NIP      | Nama                | Golongan | Jam Kerja | Gaji      |
=====
|  1|    123|          feri       |    2    |    3000   | 29500000|
|  2|    234|          andi       |    3    |    5400   | 54000000|
=====
Total Gaji Keseluruhan : Rp.    83500000
Rata Gaji Pegawai      : Rp.    41750000
Mau Ulang Lagi? [Y/T]:

```

```

Program Prosedur_aktual;
Uses Wincrt;
Var Y:char;
    m:byte;

Procedure Tampil(x:char;n:byte);
Var i:integer;
Begin
  for i := 1 to n do
    Write(x);
  Writeln;
End;

Begin
  Tampil('+',8);
  Tampil('*',10);
  Tampil('A',5);
  Y:='B';
  m:=11;
  Tampil(Y,m);
End.

```

**Output:**

```

+++++++
*****
AAAAA
BBBBBBBBBBB

```

```

Program Prosedur_reference;
Uses Wincrt;
Var a,b,c : Integer;

Procedure Coba(x,y:integer; var z:integer);
Begin
  x:=x+1;
  y:=y+1;
  z:=x+y;
End;

Begin

```

```
a:=2;b:=3;c:=0;  
Coba(a,b,c);  
Writeln('a = ',a);  
Writeln('b = ',b);  
Writeln('c = ',c);  
End.
```

**Output:**

```
a = 2  
b = 3  
c = 7
```

```
Program Tukar_Nilai;  
Uses WinCrt;  
Type Larik = Array [1..100] of Integer;  
Var  
  A,B    : Larik;  
  i,x,m  : Byte;  
  
Procedure Tukar;  
Var T:Integer;  
Begin  
  x:=0;  
  For i := 1 to m do  
    Begin  
      T:=A[i];  
      A[i]:=B[i];  
      B[i]:=T;  
      Gotoxy(15+x,6);Write(A[i]);  
      Gotoxy(15+x,7);Write(B[i]);  
      x:=x+2;  
    End;  
End;  
  
Procedure Input;  
Var x:Byte;  
Begin  
  Randomize;  
  x:=0;  
  For i := 1 to m do  
    Begin  
      A[i]:=Random(10);  
      B[i]:=Random(10);  
      Gotoxy(15+x,12);Write(A[i]);  
      Gotoxy(15+x,13);Write(B[i]);  
      x:=x+2;  
    End;  
End;  
  
Begin  
  Gotoxy(21,1);Write('Program Menukar Nilai Larik A & B');  
  Gotoxy(21,2);Write('=====');  
  Gotoxy(1,4);Write('Jumlah Data : ');Readln(m);  
  Gotoxy(5,6);Write('Nilai A:');  
  Gotoxy(5,7);Write('Nilai B:');  
  Input;  
  Gotoxy(1,9);Write('Setelah Di Tukar');  
  Gotoxy(1,10);Write('=====');  
  Gotoxy(5,12);Write('Nilai A:');
```

```
Gotoxy(5,13);Write('Nilai B:');  
Tukar;  
End.
```

**Output:**

**Program Menukar Nilai Larik A & B**

=====

**Jumlah Data : 10**

**Nilai A: 3 9 0 4 8 5 5 3 6 7**  
**Nilai B: 7 2 9 1 7 5 9 5 6 5**

**Setelah Di Tukar**

=====

**Nilai A: 7 2 9 1 7 5 9 5 6 5**  
**Nilai B: 3 9 0 4 8 5 5 3 6 7**

```
Program Urut_Pecahan;  
Uses Wincrt;  
Var pmb, pny      : array [1..10] of integer;  
    i, j, n       : integer;  
  
Procedure Urut(x : integer);  
Var t1, t2 : integer;  
Begin  
  For i := 1 to x-1 do  
    For j := i+1 to x do  
      Begin  
        if ((pmb[i]/pny[i]) > (pmb[j]/pny[j])) then  
          Begin  
            t1:=pmb[i];  
            t2:=pny[i];  
            pmb[i]:=pmb[j];  
            pny[i]:=pny[j];  
            pmb[j]:=t1;  
            pny[j]:=t2;  
          End;  
        End;  
      End;  
    End;  
  End;  
End;  
Begin  
  Gotoxy(30,1);Write('Program Urut Pecahan');  
  Gotoxy(30,2);Write('=====');  
  Gotoxy(1,4);Write('Jumlah Data Pecahan: ');Readln(n);  
  
  For i := 1 to n do  
    Begin  
      Gotoxy(1,5+i);Write('Input Pecahan ke-', i, ' : ');Readln(pmb[i]);  
      Gotoxy(24,5+i);Write('/ ');Readln(pny[i]);  
    End;  
  Urut(n);  
  Writeln;  
  Writeln('Hasilnya: ');  
  For i := 1 to n do  
    Writeln(pmb[i], '/', pny[i]);  
End.
```

**Output:**

**Program Urut Pecahan**

=====

**Jumlah Data Pecahan: 3**

**Input Pecahan ke-1 : 2 / 4**

**Input Pecahan ke-2 : 1 / 3**

**Input Pecahan ke-3 : 4 / 5**

**Hasilnya:**

**1/3**

**2/4**

**4/5**

```
Program Indeks_Larik;
Uses WinCrt;
Var
  x      : Array [1..100] of Integer;
  i,n    : Integer;
  Ul     : Char;

Procedure CekIndeks(m: integer);
Var t: Integer;
Begin
  Writeln;
  Write('Nomor Indeks > Total Nilai Larik Sebelumnya Adalah: ');
  t:=0;
  For i := 1 to m-1 do
    Begin
      t:=t+x[i];
      if x[i+1]>t then
        Write(i+1, ' ');
    End;
  End;

Begin
  Repeat
    ClrScr;
    Writeln('Program Menentukan Indeks Larik');
    Writeln('=====');
    Writeln;
    Write('Jumlah Data : ');Readln(n);
    Writeln;
    For i := 1 to n do
      Begin
        Write('Data Ke-',i,': ');Readln(x[i]);
      End;
    CekIndeks(n);
    Writeln;Writeln;
    Write('Mau Coba Lagi [Y/T]: ');Readln(Ul);
  Until Upcase(Ul)<>'Y';
End.
```

**Output:**

**Program Menentukan Indeks Larik**

=====

**Jumlah Data : 3**

**Data Ke-1: 2**

**Data Ke-2: 3**

**Data Ke-3: 4**

**Nomor Indeks > Total Nilai Larik Sebelumnya Adalah: 2**

**Mau Coba Lagi [Y/T]: \_**

```
Program Acckerman;
Uses Wincrt;

Function ACC(m,n:integer):integer;
Begin
  if m=0 then
    begin
      ACC:=n+1;
      Write(n+1,' ');
    end
  else if n=0 then
    begin
      ACC:=ACC(m-1,1);
      Writeln(ACC(m-1,1),' ');
    end
  else
    begin
      ACC:=ACC(m-1,ACC(m,n-1));
      Writeln(ACC(m-1,ACC(m,n-1)),' ');
    end;
End;

Begin
  Writeln(ACC(2,1));
End.
```

**Program Menghitung\_Suku;**

```
Uses Wincrt;
Var tot,suku:real;
    i:integer;
Begin
  tot:=0;
  suku:=2;
  While tot <= 3.9999 Do
    Begin
      tot:=tot+suku;
      i:=i+1;
      suku:=suku/2;
    End;
  writeln(i);
End.
```

**Output:**

**16**

```
Program Menyusun_Kali_Matrik;  
Uses Wincrt;  
Var i,j,n:integer;  
Begin  
  Write('Masukkan Jumlah Perkalian: ');Readln(n);  
  Write('*':5);  
  For i:= 1 to n do  
    Write(i:5);  
  Writeln;  
  For i:= 1 to n do  
    Begin  
      Write(i:5);  
      For j:= 1 to n do  
        write(i*j:5);  
      Writeln;  
    End;  
End.
```

**Output:**

```
Masukkan Jumlah Perkalian: 8  
* 1 2 3 4 5 6 7 8  
1 1 2 3 4 5 6 7 8  
2 2 4 6 8 10 12 14 16  
3 3 6 9 12 15 18 21 24  
4 4 8 12 16 20 24 28 32  
5 5 10 15 20 25 30 35 40  
6 6 12 18 24 30 36 42 48  
7 7 14 21 28 35 42 49 56  
8 8 16 24 32 40 48 56 64
```

```
Program matrik;  
uses wincrt;  
type data = array[1..10,1..10] of integer;  
var matrikI,matrikII : data;  
    baris,kolom,pil : integer;  
  
procedure isimatrik;  
var i,j : integer;  
begin  
  writeln('Penentuan ORDO MATRIK I');  
  write('Masukan banyak baris matrik I = ');readln(baris);  
  write('Masukan banyak kolom matrik I = ');readln(kolom);  
  for i:=1 to baris do  
    for j:=1 to kolom do  
      begin  
        gotoxy(j*10,i*5);  
        readln(matrikI[i,j]);  
      end;  
  clrscr;  
  writeln('Penentuan ORDO MATRIK II');  
  write('Masukan banyak baris matrik II = ');readln(baris);  
  write('Masukan banyak kolom matrik II = ');readln(kolom);  
  for i:=1 to baris do  
    for j:=1 to kolom do  
      begin  
        gotoxy(j*10,i*5);  
        readln(matrikII[i,j]);  
      end;  
end;
```

```
procedure jumlahmatrik(m1,m2 : data);
var hasil : data;
    i,j : integer;
begin
    for i:=1 to baris do
        for j:=1 to kolom do
            begin
                hasil[i,j]:=m1[i,j]+m2[i,j];
            end;
        clrscr;
        writeln('Hasil Penjumlahan Matrik');
        for i:=1 to baris do
            for j:=1 to kolom do
                begin
                    gotoxy(j*10,i*5);
                    write(hasil[i,j]);
                end;
            end;
        end;

procedure kurangmatrik(m1,m2 : data);
var hasil : data;
    i,j : integer;
begin
    for i:=1 to baris do
        for j:=1 to kolom do
            begin
                hasil[i,j]:=m1[i,j]-m2[i,j];
            end;
        clrscr;
        writeln('Hasil Penjumlahan Matrik');
        for i:=1 to baris do
            for j:=1 to kolom do
                begin
                    gotoxy(j*10,i*5);
                    write(hasil[i,j]);
                end;
            end;
        end;

procedure kalimatrik(m1,m2 : data);
var hasil : data;
    i,j,z : integer;
begin
    for i:=1 to baris do
        for j:=1 to kolom do
            begin
                hasil[i,j]:=0;
                for z:=1 to baris do
                    hasil[i,j]:=hasil[i,j]+m1[i,z]*m2[z,j];
                end;
            end;
        clrscr;
        writeln('Hasil Penjumlahan Matrik');
        for i:=1 to baris do
            for j:=1 to kolom do
                begin
                    gotoxy(j*10,i*5);
                    write(hasil[i,j]);
                end;
            end;
        end;
end;
```

```
begin
  writeln(' M E N U');
  writeln('(1) Penjumlahan Matrik');
  writeln('(2) Pengurangan Matrik');
  writeln('(3) Perkalian Matrik');
  write('Pilihan = ');readln(pil);
  clrscr;
  case pil of
    1 : begin
        isimatrik;
        jumlahmatrik(matrikI,matrikII);
      end;
    2 : begin
        isimatrik;
        kurangmatrik(matrikI,matrikII);
      end;
    3 : begin
        isimatrik;
        kalimatrik(matrikI,matrikII);
      end;
  end;
end.
```

**Output:**

```
M E N U
(1) Penjumlahan Matrik
(2) Pengurangan Matrik
(3) Perkalian Matrik
Pilihan = _
```

```
Program Max1_Max2;
Uses Wincrt;
Var
  x: array[1..100] of integer;
  i,n,max,sec: integer;

Begin
  Write('Masukkan Jumlah Data: ');readln(n);
  for i := 1 to n do
    begin
      x[i]:=random(18);
      write(x[i],' ');
      {readln(x[i]);}
    end;
  max:=x[1];
  sec:=0;
  for i := 1 to n do
    begin
      if (x[i]>max) then
        begin
          if (sec<max) then
            sec:=max;
          max:=x[i];
        end;
      if (max>x[i]) and (sec<x[i]) then sec:=x[i];
    end;
  writeln;
  writeln('Max= ',max);
```



```
writeln('Second= ',sec);  
End.
```

**Output:**

**Masukkan Jumlah Data: 20**  
**0 0 15 3 4 12 5 2 6 7 1 8 1 15 1 5 16 6 13 5**  
**Max= 16**  
**Second= 15**

**Program Pisahkan Rekursif;**

```
Uses Wincrt;  
  
Procedure pisah(x,y:integer);  
Begin  
  Writeln(x,'<--->',y);  
  if x<y then  
    begin  
      pisah(x,(x+y) div 2);  
      pisah((x+y) div 2+1,y);  
    end;  
End;  
  
Begin  
  pisah(5,10);  
End.
```

**Output:**

**5<--->10**  
**5<--->7**  
**5<--->6**  
**5<--->5**  
**6<--->6**  
**7<--->7**  
**8<--->10**  
**8<--->9**  
**8<--->8**  
**9<--->9**  
**10<--->10**

**Program Polinomial;**

```
Uses Wincrt;  
Type Larik = Array [1..10] of Integer;  
  
var P1,P2,HP: Larik;  
    i,n,m,o: Integer;  
  
Procedure Input(q:integer; var P:Larik);  
Begin  
  for i := q+1 downto 1 do  
    begin  
      Write('nilai dari pangkat ke-',i-1,': ');Readln(P[i]);  
    end;  
End;  
  
Procedure Tampil(q:integer; P:Larik);  
Begin  
  for i := q+1 downto 1 do  
    begin  
      if P[i]<>0 then
```

```
        if i=q+1 then
            Write(P[i],'x^',i-1)
        else if P[i]>0 then
            begin
                if i=1 then
                    Write('+',P[i])
                else if i=2 then
                    Write('+',P[i],'x')
                else
                    Write('+',P[i],'x^',i-1);
            end
        else
            begin
                if i=1 then
                    Write(P[i])
                else if i=2 then
                    Write(P[i],'x')
                else
                    Write(P[i],'x^',i-1);
            end;
        end;
    End;

Begin
    Clrscr;
    Writeln('Program Penjumlahan 2 Polinomial');
    Writeln('=====');
    Write('Masukkan    Jumlah    Pangkat    Tertinggi    Polinomial    Ke-1:');
    Readln(n);
    Input(n,P1);
    Write('P1 = ');
    Tampil(n,P1);

    Writeln;Writeln;
    Write('Masukkan    Jumlah    Pangkat    Tertinggi    Polinomial    Ke-2:');
    Readln(m);
    Input(m,P2);
    Write('P2 = ');
    Tampil(m,P2);

    if m>n then
        o:=m
    else
        o:=n;

    Writeln;
    Writeln;
    Write('Hasil Polinomial (P1+P2): ');

    for i := o+1 downto 1 do
        HP[i]:=P1[i]+P2[i];
    Tampil(o,HP);
End.
```

**Output:**

**Program Penjumlahan 2 Polinomial**

=====

Masukkan Jumlah Pangkat Tertinggi Polinomial Ke-1: 4  
nilai dari pangkat ke-4: 4  
nilai dari pangkat ke-3: -2  
nilai dari pangkat ke-2: 0  
nilai dari pangkat ke-1: 3  
nilai dari pangkat ke-0: -6  
P1 =  $4x^4 - 2x^3 + 3x - 6$

Masukkan Jumlah Pangkat Tertinggi Polinomial Ke-2: 3  
nilai dari pangkat ke-3: 5  
nilai dari pangkat ke-2: -3  
nilai dari pangkat ke-1: -2  
nilai dari pangkat ke-0: 9  
P2 =  $5x^3 - 3x^2 - 2x + 9$

Hasil Polinomial (P1+P2):  $4x^4 + 3x^3 - 3x^2 + 1x + 3$

```
Program Menyusun_Rentang_Nilai;  
Uses WinCRT;  
Var i,tot,n:integer;  
Begin  
  Write('Masukkan Jumlah Rentang Nilai: ');Readln(n);  
  For i:= 1 to n do  
    Begin  
      if (i mod 3 = 0) then  
        Begin  
          tot:=tot-i;  
          write('-',i);  
        End  
      else  
        Begin  
          tot:=tot+i;  
          if (i=1) then  
            write(i)  
          else  
            write('+',i);  
          End;  
        End;  
      End;  
    Writeln;  
  Writeln('Total Rentang Nilai: ',tot);  
End.
```

**Output:**

Masukkan Jumlah Rentang Nilai: 15  
1+2-3+4+5-6+7+8-9+10+11-12+13+14-15  
Total Rentang Nilai: 30

```
Program Segitiga_Pascal;  
Uses WinCRT;  
Var  
  i,j,n:integer;  
  x: array[1..100, 1..100] of integer;  
Begin  
  Write('Masukkan Jumlah Baris: ');Readln(n);  
  For i:= 1 to n do  
    For j:= 1 to i do  
      Begin
```

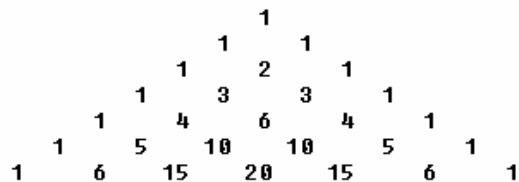
```

    if j=1 then x[i,j]:=1
    else if j=i then x[i,j]:=1
    else x[i,j]:=x[i-1,j-1]+x[i-1,j];
  End;
For i:= 1 to n do
  Begin
    Gotoxy(40-3*i,2+i);
    For j:= 1 to i do
      write(x[i,j]:6);
    End;
  End.

```

**Output:**

Masukkan Jumlah Baris: 7



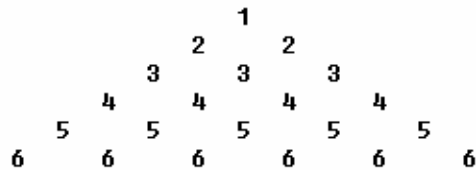
```

Program Menyusun_Angka;
Uses Wincrt;
Var i,j,n:integer;
Begin
  Write('Masukkan Jumlah Baris: ');Readln(n);
  For i:= 1 to n do
    Begin
      Gotoxy(40-3*i,1+i);
      For j:= 1 to i do
        write(i:6);
      End;
    End;
  End.

```

**Output:**

Masukkan Jumlah Baris: 6



```

Program Menyusun_Bintang;
Uses Wincrt;
Var i,j,n:integer;
Begin
  Write('Masukkan Jumlah Baris: ');Readln(n);
  For i:= 1 to n do
    Begin
      Gotoxy(40-3*i,1+i);
      For j:= 1 to i do
        write('*':6);
      End;
    End;
  End.

```

**Output:**

Masukkan Jumlah Baris: 5

```

      *
     * *
    * * *
   * * * *
  * * * * *

```

```

Program Transpose_Matrix;
Uses Wincrt;
Var A: Array [1..10,1..10] of integer;
    i,j,baris,kolom :integer;
Begin
  Clrscr;
  Write('Masukkan Jumlah Baris : ');Readln(baris);
  Write('Masukkan Jumlah Kolom : ');Readln(kolom);
  Writeln;
  Gotoxy(1,5);Write('A= ');
  for i := 1 to baris do
    for j := 1 to kolom do
      begin
        Gotoxy(j*5,i*2+3);
        Readln(A[i,j]);
      end;
  Gotoxy(20,5);Write('AT=');
  for i := 1 to kolom do
    for j := 1 to baris do
      begin
        Gotoxy(j*5+20,i*2+3);
        Write(A[j,i]);
      end;
  End.

```

**Output:**

Masukkan Jumlah Baris : 3  
 Masukkan Jumlah Kolom : 2

```

A=  3   5
      6   2
      4   7

AT=  3   6   4
      5   2   7

```

```

Program Hitung_Nilai_Mhs;
Uses Wincrt;
Type Larik = array [1..100] of integer;
Var nilai,A,B,C,D,E : Larik;
    n,i,tot          : Integer;
    mean,sdt,sd      : real;
    iA,iB,iC,iD,iE   : Integer;

Procedure input;
Begin
  Writeln('Program Hitung Nilai');
  Writeln('=====');
  Write('Jumlah Data : ');readln(n);
  Writeln;
  Randomize;

```

```
For i:= 1 to n do
  Begin
    Write('Masukan Nilai [0..100] ke-',i,' : ');Readln(nilai[i]);
  End;
  Writeln;
End;

Procedure hitung_mean_sd;
Begin
  tot:=0;
  sdt:=0;
  For i:= 1 to n do
    Begin
      tot:=tot+nilai[i];
    End;
  mean:=tot/n;
  For i:= 1 to n do
    Begin
      sdt:=sdt+sqr(nilai[i]-mean);
    End;
  sd:=sqrt(sdt/(n));
End;

Procedure cari_nilai;
Begin
  iA:=0; iB:=0; iC:=0; iD:=0; iE:=0;
  For i := 1 to n Do
    Begin
      If (nilai[i]>=(mean+(1.5*sd))) Then
        Begin
          Inc(iA);
          A[iA]:=nilai[i];
        End
      Else If ((nilai[i]>=mean+(0.5*sd)) And (nilai[i]<mean+(1.5*sd)))
Then
        Begin
          Inc(iB);
          B[iB]:=nilai[i];
        End
      Else If ((nilai[i]>=mean-(0.5*sd)) And (nilai[i]<mean+(0.5*sd)))
Then
        Begin
          Inc(iC);
          C[iC]:=nilai[i];
        End
      Else If ((nilai[i]>=mean-(1.5*sd)) And (nilai[i]<mean-(0.5*sd)))
Then
        Begin
          Inc(iD);
          D[iD]:=nilai[i];
        End
      Else
        Begin
          Inc(iE);
          E[iE]:=nilai[i];
        End;
    End;
  End;
End;
Procedure urut_desc(z:Integer;Var X:Larik);
```

```
Var i,j,T: Integer;
Begin
  For i:= 1 to z-1 Do
    For j := 1 to z-1 Do
      If X[j]<x[j+1] Then           {kalau ascending X[j]>x[j+1]}
        Begin
          T:=X[j];
          X[j]:=X[j+1];
          X[j+1]:=T;
        End;
      End;
    End;
  End;

Procedure tampil;
Begin
  Writeln('Rata-Rata Nilai : ',mean:3:2);
  Writeln('Standar Deviasi : ',sd:3:2);
  Writeln;
  Write('Nilai A: ');
 urut_desc(iA,A);
  For i:= 1 to iA Do
    Write(A[i]:3,' ');
  Writeln;

  Write('Nilai B: ');
 urut_desc(iB,B);
  For i:= 1 to iB Do
    Write(B[i]:3,' ');
  Writeln;

  Write('Nilai C: ');
 urut_desc(iC,C);
  For i:= 1 to iC Do
    Write(C[i]:3,' ');
  Writeln;

  Write('Nilai D: ');
 urut_desc(iD,D);
  For i:= 1 to iD Do
    Write(D[i]:3,' ');
  Writeln;

  Write('Nilai E: ');
 urut_desc(iE,E);
  For i:= 1 to iE Do
    Write(E[i]:3,' ');
  Writeln;
End;

Begin
  Clrscr;
  input;
  hitung_mean_sd;
  cari_nilai;
  tampil;
End.
```

**Output:**

**Program Hitung Nilai**

=====

**Jumlah Data : 5**

**Masukan Nilai [0..100] ke-1 : 88  
Masukan Nilai [0..100] ke-2 : 90  
Masukan Nilai [0..100] ke-3 : 67  
Masukan Nilai [0..100] ke-4 : 56  
Masukan Nilai [0..100] ke-5 : 98**

**Rata-Rata Nilai : 79.80  
Standar Deviasi : 15.70**

**Nilai A:  
Nilai B: 98 90 88  
Nilai C:  
Nilai D: 67  
Nilai E: 56**

```
Program Konversi_Decimal_Ke_Romawi_Pakai_Array;
Uses WinCrt;
Const
  Romawi : array [1..13] of String =
    ('M','CM','D','CD','C','XC','L','XL','X','IX','V','IV','I');
  Desimal : array [1..13] of integer =
    (1000,900,500,400,100,90,50,40,10,9,5,4,1);
Var
  B,B1,i : Integer;
  Ul:Char;
  Rom : String;
Begin
  Repeat
    Clrscr;
    Writeln('Program Konversi Desimal Menjadi Romawi');
    Writeln('=====');
    Writeln;
    Write('Masukkan Bilangan Antara [1..9999] : ');Readln(B);
    Writeln;
    Rom:='';
    B1:=B;
    If (B>0) And (B<10000) Then
      Begin
        For i:=1 To 13 Do
          Begin
            While (B>=Desimal[i]) Do
              Begin
                B:=B-Desimal[i];
                Rom:=Rom+Romawi[i]
              End;
            End;
          Writeln('Desimal ',B1,' = ',Rom,' Romawi');
        End
      Else
        Writeln('Tidak Diketahui Simbol Romawinya!');
        Writeln;
        Write('Mau Ulang Lagi? [Y/T]: ');Readln(Ul);
        Ul:=Uppcase(Ul);
      Until (Ul<>'Y');
```



End.

**Output:**

**Program Konversi Desimal Menjadi Romawi**

```
=====
Masukkan Bilangan Antara [1..9999] : 3456
Desimal 3456 = MMMCDLVI Romawi
Mau Ulang Lagi? [Y/T]:
```

```
Program Konversi_Decimal_Ke_Romawi_Pakai_If;
Uses WinCrt;
Var
  B,B1,i : Integer;
  Ul:Char;
  Rom : String;
Begin
  Repeat
    Clrscr;
    Writeln('Program Konversi Desimal Menjadi Romawi');
    Writeln('=====');
    Writeln;
    Write('Masukkan Bilangan Antara [1..9999] : ');Readln(B);
    Writeln;
    Rom:='';
    B1:=B;
    if (B>0) And (B<10000) Then
      Begin
        While (B>0) Do
          Begin
            If (B>=1000) Then
              Begin
                B:=B-1000;
                Rom:=Rom+'M';
              End
            Else If (B>=900) Then
              Begin
                B:=B-900;
                Rom:=Rom+'CM';
              End
            Else If (B>=500) Then
              Begin
                B:=B-500;
                Rom:=Rom+'D';
              End
            Else If (B>=400) Then
              Begin
                B:=B-400;
                Rom:=Rom+'CD';
              End
            Else If (B>=100) Then
              Begin
                B:=B-100;
                Rom:=Rom+'C';
              End
            Else If (B>=90) Then
```

```
Begin
  B:=B-90;
  Rom:=Rom+'XC';
End
Else If (B>=50) Then
  Begin
    B:=B-50;
    Rom:=Rom+'L';
  End
Else If (B>=40) Then
  Begin
    B:=B-40;
    Rom:=Rom+'XL';
  End
Else If (B>=10) Then
  Begin
    B:=B-10;
    Rom:=Rom+'X';
  End
Else If (B>=9) Then
  Begin
    B:=B-9;
    Rom:=Rom+'IX';
  End
Else If (B>=5) Then
  Begin
    B:=B-5;
    Rom:=Rom+'V';
  End
Else If (B>=4) Then
  Begin
    B:=B-4;
    Rom:=Rom+'IV';
  End
Else If (B>=1) Then
  Begin
    B:=B-1;
    Rom:=Rom+'I';
  End
Else
  B:=B-1;
End;
  Writeln('Desimal ',B1,' = ',Rom,' Romawi');
End
Else
  Writeln('Tidak Diketahui Simbol Romawinya!');
  Writeln;
  Write('Mau Coba Lagi? [Y/T]: ');
  Ul:=Ucase(ReadKey);
  Until (Ul<>'Y');
End.
```

### **Output:**

**Program Konversi Desimal Menjadi Romawi**

=====

**Masukkan Bilangan Antara [1..9999] : 3456**

**Desimal 3456 = MMMCDLVI Romawi**

**Mau Coba Lagi? [Y/T]:**

```
Program Konversi_Desimal_Ke_Biner;
Uses WinCrt;
Var
  Des,Desi: Integer;
  Bin: String;
  Ul:Char;
Begin
  Repeat
    Clrscr;
    Writeln('Program Konversi Desimal Menjadi Biner');
    Writeln('=====');
    Writeln;
    Write('Masukkan Bilangan Desimal: ');Readln(Des);
    Desi:=Des;
    Bin:='';
    Repeat
      If(Des Mod 2 = 0) Then
        Bin:='0'+Bin
      Else
        Bin:='1'+Bin;
      Des:=Des Div 2;
    Until Des=0;
    Writeln;
    Writeln(Desi,' Desimal = ',Bin,' Biner');
    Writeln;
    Write('Mau Ulang Lagi? [Y/T]: ');Readln(Ul);
    Ul:=Uppcase(Ul);
  Until (Ul<>'Y');
End.
```

### **Output:**

**Program Konversi Desimal Menjadi Biner**

=====

**Masukkan Bilangan Desimal: 5**

**5 Desimal = 101 Biner**

**Mau Ulang Lagi? [Y/T]:**

```
Program String1;
Uses WinCrt;
Var JumKal : Integer;
    Kal      : String;
    Ul       : Char;

Procedure CekJKal(Teks: String; Var JK: Integer);
Var i: Integer;
Begin
  If (Teks[1]=' ') Then
    JK:=0
  Else
    JK:=1;
  For i:= 1 To Length(Teks) Do
    Begin
      If (Teks[i]=' ') And (Teks[i+1]<>' ') And (Teks[i+2]<>' ') Then
        Inc(JK)
      Else If (Teks[i]='-') And (Teks[i-1]<>' ') And (Teks[i+1]<>' ')
    Then
```

```
        Inc(JK);
    End;
End;

Begin
    Repeat
        Clrscr;
        Writeln('Program Menghitung Jumlah Kata Dalam Kalimat');
        Writeln('=====');
        Writeln;
        Writeln('Masukkan Kalimat:');Readln(Kal);
        CekJKal(Kal,JumKal);
        Writeln;
        Writeln('Jumlah Kata Dalam Kalimat Di Atas Sebanyak: ',JumKal,'
Buah');
        Writeln;
        Write('Mau Ulang Lagi [Y/T]: ');Ul:=Uppcase(Readkey);
        Until Ul<>'Y';
    End.
```

### **Output:**

#### **Program Menghitung Jumlah Kata Dalam Kalimat**

=====

**Masukkan Kalimat:**

**Saya Sedang mencoba membuat program string menggunakan turbo pascal**

**Jumlah Kata Dalam Kalimat Di Atas Sebanyak: 9 Buah**

**Mau Ulang Lagi [Y/T]:**

```
Program String2;
Uses WinCrt;
Type Data=Record
    Kata    : String;
End;
Larikdata = Array [1..100] of Data;
Var KataPjg : Larikdata;
    i,j,idx  : Integer;
    Kal      : String;
    Ul       : Char;

Procedure Ambilkata(Var a,b: Integer; Kalimat: String);
Var Tmp : String;
Begin
    Tmp:='';
    While (Kalimat[a]<>' ') And (Kalimat[a]<>'-' ) And (Kalimat[a]<>'!')
        And (Kalimat[a]<>'?')    And (Kalimat[a]<>',' ) And
(Kalimat[a]<>'.' )
        And (Kalimat[a]<>':' )    And (Kalimat[a]<>';' ) And
(a<=Length(Kalimat)) Do
    Begin
        Tmp:=Tmp+Kalimat[a];
        Inc(a);
    End;
    Inc(b);
    KataPjg[b].Kata:=Tmp;
End;
```

```
Procedure CariKataTerpanjang(x:Integer;Var indeks: Integer);
Var i,max: Integer;
Begin
  max:=0;
  For i:= 1 to x Do
    If max<Length(KataPjg[i].Kata) Then
      Begin
        max:=Length(KataPjg[i].Kata);
        indeks:=i;
      End;
  End;

Begin
  Repeat
    Clrscr;
    Writeln('Program Cari Kata Terpanjang Dalam Kalimat');
    Writeln('=====');
    Writeln;
    Writeln('Masukkan Kalimat:');Readln(Kal);

    i:=1;
    j:=0;
    While i<=Length(Kal) Do
      Begin
        If (i=1) And (Kal[1]<>' ') Then
          AmbilKata(i,j,Kal)
        Else If (Kal[i]=' ') And (Kal[i+1]<>' ') And (Kal[i+2]<>' ')
Then
          Begin
            Inc(i);
            AmbilKata(i,j,Kal);
          End
        Else If (Kal[i]='-') And (Kal[i-1]<>' ') And (Kal[i+1]<>' ')
Then
          Begin
            Inc(i);
            AmbilKata(i,j,Kal);
          End
        Else
          Inc(i);
      End;

      CariKataTerpanjang(j,idx);

      Writeln;
      Writeln('Kata Terpanjang Dalam Kalimat Di Atas:
',Katapjg[idx].kata);
      Writeln;
      Write('Mau Ulang Lagi [Y/T]: ');Ul:=Uppcase(Readkey);
      Until Ul<>'Y';
    End.
```

### Output:

```
Program Cari Kata Terpanjang Dalam Kalimat
=====
Masukkan Kalimat:
Saya sedang coba buat program mencari kata terpanjang dengan turbo pascal for windows.

Kata Terpanjang Dalam Kalimat Di Atas: terpanjang
Mau Ulang Lagi [Y/T]:
```

```
Program String3;
Uses WinCrt;
Type Data=Record
    Kata    : String;
End;
Larikdata = Array [1..100] of Data;
Var Kataacr    : Larikdata;
    i,j        : Integer;
    Kal        : String;
    Ul        : Char;
    Crkata,idx : String;
    ketemu     : Integer;

Procedure Ambilkata(Var a,b: Integer; Kalimat: String);
Var Tmp : String;
Begin
    Tmp:='';
    While (Kalimat[a]<>' ') And (Kalimat[a]<>'-' ) And (Kalimat[a]<>'!')
        And (Kalimat[a]<>'?') And (Kalimat[a]<>',' ) And
(Kalimat[a]<>'.' )
        And (Kalimat[a]<>':' ) And (Kalimat[a]<>';' ) And
(a<=Length(Kalimat)) Do
    Begin
        Tmp:=Tmp+Kalimat[a];
        Inc(a);
    End;
    Inc(b);
    Kataacr[b].Kata:=Tmp;
End;

Procedure CariKata(x: Integer; Carikt: String; Var indeks: String; Var
ktm: Integer);
Function IntToStr(k: Longint): String;
Var
    S: string[11];
Begin
    Str(k, S);
    IntToStr := S;
End;

Var i: Integer;
Begin
    For i:= 1 to x Do
    Begin
        If Carikt=Kataacr[i].Kata Then
        Begin
            Inc(ktm);
            indeks:=indeks+IntToStr(i)+' ';
        End;
    End;
End;

Begin
    Repeat
        Clrscr;
        Writeln('Program Cari Kata Dalam Kalimat');
        Writeln('=====');
        Writeln;
        Writeln('Masukkan Kalimat:');Readln(Kal);
```

```
Writeln;
Write('Masukkan Kata Yang Dicari: ');Readln(Crkata);
i:=1;
j:=0;
idx:='';
ketemu:=0;
While i<=Length(Kal) Do
  Begin
    If (i=1) And (Kal[1]<>' ') Then
      AmbilKata(i,j,Kal)
    Else If (Kal[i]=' ') And (Kal[i+1]<>' ') And (Kal[i+2]<>' ')
Then
      Begin
        Inc(i);
        AmbilKata(i,j,Kal);
      End
    Else If (Kal[i]='-') And (Kal[i-1]<>' ') And (Kal[i+1]<>' ')
Then
      Begin
        Inc(i);
        AmbilKata(i,j,Kal);
      End
    Else
      Inc(i);
    End;
  CariKata(j,Crkata,idx,ketemu);
  Writeln;
  if (ketemu>0) then
    Writeln('Kata "',Crkata,'" Ditemukan Dalam Kalimat Pada Posisi:
',idx,'.')
  else
    Writeln('Kata "',Crkata,'" Tidak Ditemukan Dalam Kalimat!');
  Writeln;
  Write('Mau Ulang Lagi [Y/T]: ');Ul:=Uppcase(Readkey);
  Until Ul<>'Y';
End.
```

### **Output:**

**Program Cari Kata Dalam Kalimat**  
=====

**Masukkan Kalimat:**

**Pembuatan program cari kata menggunakan string pada turbo pascal terkendala input string yang pendek.**

**Masukkan Kata Yang Dicari: string**

**Kata "string" Ditemukan Dalam Kalimat Pada Posisi: 6 12 .**

**Mau Ulang Lagi [Y/T]: \_**

### **Program Data\_Mahasiswa;**

```
Uses WinCrt;
Type Mahasiswa = Record
  NoMhs : Word;
  Nama : String[20];
  IPK : Real;
  Usia : Byte;
End;
```

```
Var Filemhs : File of Mahasiswa;
    Data : Mahasiswa;
    Pil,Ul : Char;

Procedure Menu;
Begin
    Clrscr;
    Gotoxy(34,1);Write('MENU PILIHAN');
    Gotoxy(34,2);Write('=====');
    Gotoxy(27,4);Write('1. Tambah Data Mahasiswa');
    Gotoxy(27,5);Write('2. Edit Data Mahasiswa');
    Gotoxy(27,6);Write('3. Hapus Data Mahasiswa');
    Gotoxy(27,7);Write('4. Tampilkan Data Mahasiswa');
    Gotoxy(27,8);Write('5. View Mahasiswa Berdasarkan Umur');
    Gotoxy(27,9);Write('6. Hapus NoMhs Ganjil');
    Gotoxy(27,10);Write('9. Keluar (Exit)');
    Gotoxy(32,12);Write('Pilihan [1..9]: ');Pil:=Readkey;
End;

Procedure BukaFile;
Begin
    Assign(FileMhs,'Mhs.Dat');
    {$I-};
    Reset(FileMhs);
    {$I+};
End;

Procedure Tambah;
Var Lagi: Char;
    Ada : Boolean;
    i : Integer;
    NOCR: Word;
Begin
    Ul:='Y';
    Lagi:='Y';
    Clrscr;

    BukaFile;
    If IOResult<>0 Then
        Rewrite(FileMhs);

    Repeat
        Clrscr;
        Ada:=False;
        i:=0;
        Gotoxy(30,1);Write('TAMBAH DATA MAHASISWA');
        Gotoxy(30,2);Write('=====');
        Gotoxy(20,4);Write('No. Mahasiswa : ');Readln(NOCR);
        While (Ada=False) And (i<>Filesize(FileMhs)) Do
            Begin
                Seek(FileMhs,i);
                Read(FileMhs,Data);
                If Data.NoMhs=NOCR Then
                    Ada:=True
                Else
                    Inc(i);
            End;
        If (Ada=True) Then
            Begin
```



```
Gotoxy(20,9);Write('Nomor Mahasiswa "',NOCR,'" Ini Sudah
Ada!');
End
Else
Begin
Seek(FileMhs,Filesize(FileMhs));
Data.NoMhs:=NOCR;
Gotoxy(20,5);Write('Nama Mahasiswa : ');Readln(Data>Nama);
Gotoxy(20,6);Write('IPK : ');Readln(Data.IPK);
Gotoxy(20,7);Write('Umur : ');Readln(Data.Usia);
Write(FileMhs,Data);
End;
Gotoxy(20,10);Write('Mau Tambah Data Lagi [Y/T]:
');Lagi:=Uppcase(Readkey);
Until Lagi<>'Y';
Close(FileMhs);
End;

Procedure Edit;
Var Lagi: Char;
Ada : Boolean;
i : Integer;
NOCR: Word;
Begin
Ul:='Y';
Lagi:='Y';
Clrscr;

BukaFile;
If IOResult<>0 Then
Write('Data Masih Kosong...!')
Else
Begin
Repeat
Clrscr;
Ada:=False;
i:=0;
Gotoxy(30,1);Write('EDIT DATA MAHASISWA');
Gotoxy(30,2);Write('=====');
Gotoxy(20,4);Write('No. Mahasiswa : ');Readln(NOCR);
While (Ada=False) And (i<>Filesize(FileMhs)) Do
Begin
Seek(FileMhs,i);
Read(FileMhs,Data);
If Data.NoMhs=NOCR Then
Begin
Ada:=True;
Gotoxy(20,5);Write('Nama Mahasiswa : ',Data>Nama);
Gotoxy(20,6);Write('IPK : ',Data.IPK:1:2);
Gotoxy(20,7);Write('Umur : ',Data.Usia);
End
Else
Inc(i);
End;
If (Ada=True) Then
Begin
Data.NoMhs:=NOCR;
Gotoxy(20,9);Write('Nama Mahasiswa : ');Readln(Data>Nama);
Gotoxy(20,10);Write('IPK : ');Readln(Data.IPK);
```

```
        Gotoxy(20,11);Write('Umur
');Readln(Data.Usia);
        Seek(FileMhs,i);
        Write(FileMhs,Data);
    End
Else
    Begin
        Gotoxy(20,13);Write('Nomor Mahasiswa "',NOCR,'" Ini Tidak
Ada!');
    End;
    Gotoxy(20,14);Write('Mau Edit Data Lagi [Y/T]:
');Lagi:=Uppcase(Readkey);
    Until Lagi<>'Y';
    End;
    Close(FileMhs);
End;

Procedure Hapus;
Var FileTmp : File of Mahasiswa;
    Lagi,Hapus: Char;
    Ada : Boolean;
    i : Integer;
    NOCR : Word;
Begin
    Ul:='Y';
    Lagi:='Y';
    Clrscr;
    Repeat
        BukaFile;
        If IOResult<>0 Then
            Write('Data Masih Kosong...!')
        Else
            Begin
                Clrscr;
                Assign(FileTmp,'mhs.tmp');
                Rewrite(FileTmp);
                Ada:=False;
                i:=0;
                Gotoxy(30,1);Write('HAPUS DATA MAHASISWA');
                Gotoxy(30,2);Write('=====');
                Gotoxy(20,4);Write('No. Mahasiswa : ');Readln(NOCR);
                While (Ada=False) And (i<>Filesize(FileMhs)) Do
                    Begin
                        Seek(FileMhs,i);
                        Read(FileMhs,Data);
                        If Data.NoMhs=NOCR Then
                            Ada:=True
                        Else
                            Inc(i);
                    End;
                If (Ada=True) Then
                    Begin
                        Gotoxy(20,5);Write('Nama Mahasiswa : ',Data>Nama);
                        Gotoxy(20,6);Write('IPK : ',Data.IPK:1:2);
                        Gotoxy(20,7);Write('Umur : ',Data.Usia);
                        Gotoxy(20,9);Write('Data Ini Mau Di Hapus [Y/T]:
');Readln(Hapus);
                        If Uppcase(Hapus)='Y' Then
                            Begin
```

```

        For i := 1 to Filesize(FileMhs) Do
        Begin
            Seek(FileMhs,i-1);
            Read(FileMhs,Data);
            If Data.NoMhs<>NOCR Then
                Write(FileTmp,Data);
            End;
        Close(FileMhs);
        Assign(FileMhs,'MHS.Dat');
        Erase(FileMhs);
        Assign(FileTmp,'Mhs.tmp');
        Rename(FileTmp,'Mhs.Dat');
        Gotoxy(20,10);Write('Nomor Mahasiswa "',NOCR,'" Sudah
Di Hapus!');
        End;
    End
    Else
    Begin
        Gotoxy(20,10);Write('Nomor Mahasiswa "',NOCR,'" Ini Tidak
Ada!');
        End;
        Gotoxy(20,11);Write('Mau Hapus Data Lagi [Y/T]:
');Lagi:=Ucase(Readkey);
        End;
    Until Lagi<>'Y';
End;

Function RataIPK(TIPK:Real;n:integer):Real;
Begin
    RataIPK:=TIPK/n;
End;

Procedure Tampil;
Var i : Integer;
    TIPK : Real;
Begin
    Ul:='Y';
    TIPK:=0;
    BukaFile;
    If IoResult <> 0 Then
        Write('Maaf Data Masih Kosong ! ');
    Else
        Begin
            Clrscr;
            Writeln('          DATA MAHASISWA          ');
            Writeln;
            Writeln('=====');
            Writeln(' NO      NIM          NAMA      IPK      UMUR ');
            Writeln('=====');
            i:=0;
            While Not EOF(FileMhs) Do
                Begin
                    Inc(i);
                    Read(FileMhs,Data);

Writeln(i:3,Data.NoMhs:6,Data>Nama:20,Data.IPK:8:2,Data.Usia:10);
                    TIPK:=TIPK+Data.IPK;
                End;
            Writeln('=====');

```

```
        Writeln('Rata-Rata IPK: ',RataIPK(TIPK,i):1:2);
        Writeln('=====');
        Close(FileMhs);
    End;

    Writeln;
    Write('Press Any Key to Continue...');Readkey;
End;

Procedure View_Umur;
Var i      : Integer;
    Umur   : Byte;
    Lagi   : Char;
Begin
    Ul:='Y';
    Lagi:='Y';
    Repeat
        Clrscr;
        Write('Tampilkan Umur Besar Dari: ');Readln(Umur);
        BukaFile;
        If IoResult <> 0 Then
            Write('Maaf Data Masih Kosong ! ');
        Else
            Begin
                Writeln('          DATA MAHASISWA          ');
                Writeln('          UMUR DI ATAS ',Umur:2,' TAHUN');
                Writeln;
                Writeln('=====');
                Writeln(' NO      NIM          NAMA      IPK      UMUR ');
                Writeln('=====');
                i:=0;
                While Not EoF(FileMhs) Do
                    Begin
                        Read(FileMhs,Data);
                        If Data.Usia>Umur Then
                            Begin
                                Inc(i);
                                Writeln(i:3,Data.NoMhs:6,Data>Nama:20,Data.IPK:8:2,Data.Usia:10);
                            End;
                    End;
                Writeln('=====');
                Close(FileMhs);
            End;
            Writeln;
            Write('Mau Lihat Data Lagi [Y/T]: ');Lagi:=Uppcase(Readkey);
            Until Lagi<>'Y';
    End;

Procedure Hapus_NoMhs;
Var FileTmp   : File of Mahasiswa;
    Lagi,Hapus: Char;
    i          : Integer;
Begin
    Ul:='Y';
    Lagi:='Y';
    Clrscr;
    Repeat
        BukaFile;
```

```
If IOResult<>0 Then
  Write('Data Masih Kosong...!')
Else
  Begin
    Clrscr;
    Assign(FileTmp, 'mhs.tmp');
    Rewrite(FileTmp);
    i:=0;
    Gotoxy(20,3);Write('Mau Menghapus No. Mahasiswa Yang Ganjil
[Y/T]: ');Readln(Hapus);
    If Uppcase(Hapus)='Y' Then
      Begin
        For i := 1 to Filesize(FileMhs) Do
          Begin
            Seek(FileMhs,i-1);
            Read(FileMhs,Data);
            If (Data.NoMhs Mod 2)=0 Then
              Write(FileTmp,Data);
            End;
          Close(FileMhs);
          Assign(FileMhs, 'Mhs.Dat ');
          Erase(FileMhs);
          Assign(FileTmp, 'Mhs.tmp');
          Rename(FileTmp, 'Mhs.Dat ');
          Gotoxy(20,10);Write('Nomor Mahasiswa Sudah Di Hapus!');
        End;
        Gotoxy(20,11);Write('Mau Hapus Data Lagi [Y/T]:
');Lagi:=Uppcase(Readkey);
      End;
      Until Lagi<>'Y';
    End;
  End;
Begin
  Repeat
    Menu;
    Case Pil Of
      '1' : Tambah;
      '2' : Edit;
      '3' : Hapus;
      '4' : Tampil;
      '5' : View_Umur;
      '6' : Hapus_NoMhs;
    End;
  Until (Ul<>'Y') Or (Pil='9');
  DoneWinCrt;
End.
```

**Output:**

**MENU PILIHAN**

=====

1. Tambah Data Mahasiswa
2. Edit Data Mahasiswa
3. Hapus Data Mahasiswa
4. Tampilkan Data Mahasiswa
5. View Mahasiswa Berdasarkan Umur
6. Hapus Nomhs Ganjil
9. Keluar (Exit)

Pilihan [1..9]: \_

```
Program Sorting;
Uses WinCrt,WinDos;
Const Max=1000;
Type Larik = Array [0..Max] Of Word;
Var X                               : Larik;
    n                               : Longint;
    PolaIns,PolaBub,PolaQck,
    PolaMrg,PolaSlk,PolaShl       : Longint;
    J1,J2,M1,M2,D1,D2,MD1,MD2    : Word;
    SI,SB,SQ,SM,SS,SH             : Longint;
    Lg                             : Char;

Procedure AcakData(Var A: Larik; m: Longint);
Var i:Longint;
Begin
  Writeln('Data Yang Di Acak: ');
  Randomize;
  For i:= 1 To m Do
    Begin
      A[i]:=Random(1000)+1;
      Write(A[i], ' ');
    End;
End;

Procedure Ganti(Var A,B: Word);
Var G:Word;
Begin
  G:=A;
  A:=B;
  B:=G;
End;

Procedure Insert(A: Larik; m: Longint; Var baca: Longint);
Var i,j,G: Longint;
Begin
  baca:=0;
  For i:= 2 To m Do
    Begin
      G:=A[i];
      j:=i-1;
      A[0]:=G;
      While G<A[j] Do
        Begin
          A[j+1]:=A[j];
          Dec(j);
        End;
      A[j+1]:=G;
    End;
  End;
End;
```

```
        Inc(baca);
    End;
    A[j+1]:=G;
End;

Writeln('Hasil Pengurutan Insert: ');
For i:= 1 To m Do
    Write(A[i], ' ');
End;

Procedure Buble(A: Larik; m:Longint; Var baca: Longint);
Var i,j: Longint;
Begin
    baca:=0;
    For i:= 1 To m-1 Do
        For j := 1 To m-i Do
            if A[j]>A[j+1] Then
                Begin
                    Ganti(A[j],A[j+1]);
                    Inc(baca);
                End;
        End;

    Writeln('Hasil Pengurutan Buble: ');
    For i:= 1 To m Do
        Write(A[i], ' ');
    End;

Procedure Quick(A: Larik; m : Longint; Var baca:Longint);
Var i: Longint;
    Procedure Urut(awal, akhir: Longint);
    Var kiri, kanan, pusat : Longint;
    Begin
        pusat:=A[(awal+akhir) div 2];
        kiri:=awal;
        kanan:=akhir;
        While kiri<=kanan Do
            Begin
                While A[kiri]<pusat Do
                    Inc(kiri);
                While A[kanan]>pusat Do
                    Dec(kanan);
                If kiri<=kanan Then
                    Begin
                        Ganti(A[kiri],A[kanan]);
                        Inc(kiri);
                        Dec(kanan);
                        Inc(baca);
                    End;
            End;
        If kanan>awal Then
            Urut(awal,kanan);
        If akhir>kiri Then
            Urut(kiri,akhir);
    End;
Begin
    baca:=0;
    Urut(1,m);
    Writeln('Hasil Pengurutan Quick: ');
    For i:= 1 To m Do
```

```
Write(A[i], ' ');
End;

Procedure Merge(A: Larik; m : Integer; Var baca : Longint);
Var cch,i : Longint;
    B : Larik;
    Procedure MergeSort(Var A,B: Larik; awal, tengah, akhir: Longint);
    Var i,j,k,t: Longint;
    Begin
        i:=awal;
        k:=awal;
        j:=tengah+1;
        Repeat
            If A[i]<A[j] Then
                Begin
                    B[k]:=A[i];
                    Inc(i);
                End
            Else
                Begin
                    B[k]:=A[j];
                    Inc(j);
                End;
            Inc(k);
            Inc(baca);
        Until (i>tengah) Or (j>akhir);
        If i>tengah Then
            For t:= j To akhir Do
                Begin
                    B[k+t-j]:=A[t];
                End
            Else
                For t:= i To tengah Do
                    Begin
                        B[k+t-i]:=A[t];
                    End;
        End;

    Procedure Iterasi(Var A,B: Larik; m,cch: Longint);
    Var i,t: Longint;
    Begin
        i:=1;
        While i<=(m-2*cch+1) Do
            Begin
                MergeSort(A,B,i,i+cch-1,i+2*cch-1);
                i:=i+2*cch;
            End;
        If (i+cch-1)<m Then
            MergeSort(A,B,i,i+cch-1,m)
        Else
            For t:= i To m do
                B[t]:=A[t];
            End;

    Begin
        baca:=0;
        cch:=1;
        While cch<m Do
            Begin
```



```
        Iterasi(A,B,m,cch);
        cch:=2*cch;
        Iterasi(B,A,m,cch);
        cch:=2*cch;
    End;
    Writeln('Hasil Pengurutan Merge: ');
    For i:= 1 To m Do
        Write(A[i], ' ');
    End;

Procedure Selek(A: Larik; m: Longint; Var baca : Longint);
Var i,j,tempat: Longint;
Begin
    baca:=0;
    For i:= 1 To m-1 Do
        Begin
            tempat:=i;
            For j:= i+1 To m Do
                If A[tempat]>A[j] Then
                    tempat:=j;
            Ganti(A[i],A[tempat]);
            Inc(baca);
        End;
    Writeln('Hasil Pengurutan Seleksi: ');
    For i:= 1 To m Do
        Write(A[i], ' ');
    End;

Procedure Shell(A: Larik; m: Longint; Var baca: Longint);
Var i,j: Longint;
Begin
    baca:=0;
    For i:= (m Div 2) Downto 1 Do
        For j:= 1 To m-i Do
            If A[j]>A[j+i] Then
                Begin
                    Ganti(A[j],A[j+i]);
                    Inc(baca);
                End;
        End;

    Writeln('Hasil Pengurutan Shell: ');
    For i:= 1 To m Do
        Write(A[i], ' ');
    Writeln;
End;

Procedure SelisihWaktu(J1,M1,D1,MD1,J2,M2,D2,MD2: Word; Var Selisih: Longint);
Begin
    Selisih:=((J2*360000)+(M2*6000)+(D2*100)+MD2)-
    ((J1*360000)+(M1*6000)+(D1*100)+MD1);
End;

Begin
    Repeat
        Clrscr;
        Writeln('Program Pengurutan/Sorting');
        Writeln('=====');
        Write('Masukkan Jumlah Data: ');Readln(n);
```

```
AcakData(X,n);
Writeln;Writeln;

GetTime(J1,M1,D1,MD1);
Insert(X,n,PolaIns);
GetTime(J2,M2,D2,MD2);
SelisihWaktu(J1,M1,D1,MD1,J2,M2,D2,MD2,SI);

Writeln;
GetTime(J1,M1,D1,MD1);
Buble(X,n,PolaBub);
GetTime(J2,M2,D2,MD2);
SelisihWaktu(J1,M1,D1,MD1,J2,M2,D2,MD2,SB);

Writeln;
GetTime(J1,M1,D1,MD1);
Quick(X,n,PolaQck);
GetTime(J2,M2,D2,MD2);
SelisihWaktu(J1,M1,D1,MD1,J2,M2,D2,MD2,SQ);

Writeln;
GetTime(J1,M1,D1,MD1);
Merge(X,n,PolaMrg);
GetTime(J2,M2,D2,MD2);
SelisihWaktu(J1,M1,D1,MD1,J2,M2,D2,MD2,SM);

Writeln;
GetTime(J1,M1,D1,MD1);
Selek(X,n,PolaSlk);
GetTime(J2,M2,D2,MD2);
SelisihWaktu(J1,M1,D1,MD1,J2,M2,D2,MD2,SS);

Writeln;
GetTime(J1,M1,D1,MD1);
Shell(X,n,PolaShl);
GetTime(J2,M2,D2,MD2);
SelisihWaktu(J1,M1,D1,MD1,J2,M2,D2,MD2,SH);

Writeln;
Writeln('Jumlah Data Sebanyak ',n,'" Dapat Dilakukan:');
Writeln('1. Pola Urut Data (Insert) : ',PolaIns:10,' Kali, Waktu:
',SI:5,' MiliDetik');
Writeln('2. Pola Urut Data (Buble) : ',PolaBub:10,' Kali, Waktu:
',SB:5,' MiliDetik');
Writeln('3. Pola Urut Data (Quick) : ',PolaQck:10,' Kali, Waktu:
',SQ:5,' MiliDetik');
Writeln('4. Pola Urut Data (Merge) : ',PolaMrg:10,' Kali, Waktu:
',SM:5,' MiliDetik');
Writeln('5. Pola Urut Data (Seleksi) : ',PolaSlk:10,' Kali, Waktu:
',SS:5,' MiliDetik');
Writeln('6. Pola Urut Data (Shell) : ',PolaShl:10,' Kali, Waktu:
',SH:5,' MiliDetik');
Writeln;
Write('Mau Coba Lagi? [Y/T]: ');Lg:=Uppcase(Readkey);
Until Lg<>'Y';
End.
```

### **Output:**

**Data Yang Di Acak:**

116 289 94 529 650 653 264 537 521 376 859 165 607 987 975

**Hasil Pengurutan Insert:**

94 116 165 264 289 376 521 529 537 607 650 653 859 975 987

**Hasil Pengurutan Buble:**

94 116 165 264 289 376 521 529 537 607 650 653 859 975 987

**Hasil Pengurutan Quick:**

94 116 165 264 289 376 521 529 537 607 650 653 859 975 987

**Hasil Pengurutan Merge:**

94 116 165 264 289 376 521 529 537 607 650 653 859 975 987

**Hasil Pengurutan Seleksi:**

94 116 165 264 289 376 521 529 537 607 650 653 859 975 987

**Hasil Pengurutan Shell:**

94 116 165 264 289 376 521 529 537 607 650 653 859 975 987

**Jumlah Data Sebanyak "15" Dapat Dilakukan:**

1. Pola Urut Data (Insert) :	30 Kali,	Waktu:	0 MiliDetik
2. Pola Urut Data (Buble) :	30 Kali,	Waktu:	0 MiliDetik
3. Pola Urut Data (Quick) :	16 Kali,	Waktu:	0 MiliDetik
4. Pola Urut Data (Merge) :	39 Kali,	Waktu:	0 MiliDetik
5. Pola Urut Data (Seleksi) :	14 Kali,	Waktu:	0 MiliDetik
6. Pola Urut Data (Shell) :	16 Kali,	Waktu:	0 MiliDetik

**Mau Coba Lagi? [Y/T]:**

```
Program Antrian_Statis_Tanpa_Geser;
Uses WinCrt;
Const Max_Antrian = 10;
Type Antri = Array [1..Max_Antrian] of Char;
Var Antrian      : Antri;
    Depan, Belakang : Integer;
    Elemen, Pil, Pill : Char;

Procedure InitAntrian;
Begin
    Depan:=0;
    Belakang:=0;
End;

Procedure Tambah(Var Antrian: Antri; X: Char);
Begin
    If Belakang<>Max_Antrian Then
        Begin
            Inc(Belakang);
            Antrian[Belakang]:=X;
        End
    Else
        Writeln('ANTRIAN SUDAH PENUH');
End;

Procedure Hapus(Var Antrian: Antri);
Begin
    If Depan<>Belakang Then
        Begin
            Inc(Depan);
            Antrian[Depan]:=' ';
            If Depan=Belakang Then
                Begin
```

```
        {Depan:=0;Belakang:=0;}InitAntrian;
    End;
End
Else
    Begin
        Writeln('ANTRIAN KOSONG');
        {Depan:=0;Belakang:=0;}w
        InitAntrian;
    End;
End;

Procedure Tampilkan;
Var i : Integer;
Begin
    Write('Keluar <== |');
    For i := 1 To Max_Antrian Do
        Write(' ',Antrian[i],' |');
    Write(' <== Masuk');
End;

Begin
    InitAntrian;
    Repeat
        Clrscr;
        Writeln('DAFTAR MENU PILIHAN');
        Writeln('=====');
        Writeln('1. Tambah Elemen');
        Writeln('2. Hapus Elemen');
        Writeln('3. Exit');
        Write('Pilihan [1..3]: ');Pil:=ReadKey;
        Case Pil of
            '1' : Begin
                Repeat
                    Clrscr;
                    Writeln('TAMBAH ELEMEN');
                    Writeln('=====');
                    Writeln;
                    Write('Isikan Elemen: ');Readln(Elemen);
                    Tambah(Antrian,Elemen);
                    Writeln;Writeln;
                    Tampilkan;
                    Writeln;Writeln;
                    Write('Mau      Tambah      Elemen      Lagi?      [Y/T]:
                ');Pil:=Uppcase(ReadKey);
                    Until Pill<>'Y';
                End;
            '2' : Begin
                Repeat
                    Clrscr;
                    Writeln('HAPUS ELEMEN');
                    Writeln('=====');
                    Hapus(Antrian);
                    Writeln;Writeln;
                    Tampilkan;
                    Writeln;Writeln;
                    Write('Mau      Hapus      Elemen      Lagi?      [Y/T]:
                ');Pil:=Uppcase(ReadKey);
                    Until Pill<>'Y';
                End;
            End;
        End;
    End;
End;
```

```
End;  
Until Pil='3';  
End.
```

```
Program Antrian_Statis_Geser;  
Uses Wincrt;  
Const Max_Antrian = 5;  
Type Antri = Array [1..Max_Antrian] of Char;  
Var Antrian      : Antri;  
    Depan, Belakang : Integer;  
    Elemen,Pil,Pill : Char;  
  
Procedure InitAntrian;  
Begin  
    Depan:=0;  
    Belakang:=0;  
End;  
  
Procedure Tambah(Var Antrian: Antri; X: Char);  
Begin  
    If Belakang<>Max_Antrian Then  
        Begin  
            Inc(Belakang);  
            Antrian[Belakang]:=X;  
        End  
    Else  
        Writeln('ANTRIAN SUDAH PENUH');  
End;  
  
Procedure Hapus(Var Antrian: Antri);  
Var i: Integer;  
Begin  
    If Depan<>Belakang Then  
        Begin  
            For i:= 2 To Belakang Do  
                Begin  
                    Antrian[i-1]:=Antrian[i];  
                End;  
            Antrian[Belakang]:=' '  
            Dec(Belakang);  
        End  
    Else  
        Writeln('ANTRIAN KOSONG');  
End;  
  
Procedure Tampilkan;  
Var i : Integer;  
Begin  
    Write('Keluar <== |');  
    For i := 1 To Max_Antrian Do  
        Write(' ',Antrian[i],' |');  
    Write(' <== Masuk');  
End;  
  
Begin  
    InitAntrian;  
    Repeat
```

```
Clrscr;
Writeln('DAFTAR MENU PILIHAN');
Writeln('=====');
Writeln('1. Tambah Elemen');
Writeln('2. Hapus Elemen');
Writeln('3. Exit');
Write('Pilihan [1..3]: ');Pil:=ReadKey;
Case Pil of
  '1' : Begin
    Repeat
      Clrscr;
      Writeln('TAMBAH ELEMEN');
      Writeln('=====');
      Writeln;
      Write('Isikan Elemen: ');Readln(Elemen);
      Tambah(Antrian,Elemen);
      Writeln;Writeln;
      Tampilkan;
      Writeln;Writeln;
      Write('Mau      Tambah      Elemen      Lagi?      [Y/T]:
');Pil1:=Uppcase(ReadKey);
      Until Pill<>'Y';
    End;
  '2' : Begin
    Repeat
      Clrscr;
      Writeln('HAPUS ELEMEN');
      Writeln('=====');
      Hapus(Antrian);
      Writeln;Writeln;
      Tampilkan;
      Writeln;Writeln;
      Write('Mau      Hapus      Elemen      Lagi?      [Y/T]:
');Pil1:=Uppcase(ReadKey);
      Until Pill<>'Y';
    End;
  End;
Until Pil='3';
End.
```

```
Program Antrian_Statis_Circular;
Uses Wincrt;
Const Max_Antrian = 5;
Type Antri = Array [1..Max_Antrian] of Char;
Var Antrian      : Antri;
    Depan, Belakang : Integer;
    Elemen,Pil,Pill : Char;

Procedure InitAntrian;
Begin
  Depan:=0;
  Belakang:=0;
End;

Procedure Tambah(Var Antrian: Antri; X: Char);
Begin
  If Belakang=Max_Antrian Then
```

```
Begin
  Belakang:=1;
End
Else
  Inc(Belakang);

If Depan=Belakang Then
Begin
  Writeln('ANTRIAN SUDAH PENUH');
  Dec(Belakang);
  If Belakang=0 Then
    Belakang:=Max_Antrian;
  End
Else
  Antrian[Belakang]:=X;
  Writeln('Depan: ',Depan,'   Belakang: ',Belakang);
End;

Procedure Hapus(Var Antrian: Antri);
Begin
  If Depan<>Belakang Then
  Begin
    If Depan=Max_Antrian Then
      Depan:=1
    Else
      Begin
        Inc(Depan);
        Antrian[Depan]:=' ';
      End;
    End
  Else
    Writeln('ANTRIAN KOSONG');

  Writeln('Depan: ',Depan,'   Belakang: ',Belakang);
End;

Procedure Tampilkan;
Var i : Integer;
Begin
  Write('Keluar <== |');
  For i := 1 To Max_Antrian Do
    Write(' ',Antrian[i],' |');
  Write(' <== Masuk');
End;

Begin
  InitAntrian;
  Repeat
    Clrscr;
    Writeln('DAFTAR MENU PILIHAN');
    Writeln('=====');
    Writeln('1. Tambah Elemen');
    Writeln('2. Hapus Elemen');
    Writeln('3. Exit');
    Write('Pilihan [1..3]: ');Pil:=ReadKey;
    Case Pil of
      '1' : Begin
        Repeat
          Clrscr;
```

```
        Writeln('TAMBAH ELEMEN');
        Writeln('=====');
        Writeln;
        Write('Isikan Elemen: ');Readln(Elemen);
        Tambah(Antrian,Elemen);
        Writeln;Writeln;
        Tampilkan;
        Writeln;Writeln;
        Write('Mau      Tambah      Elemen      Lagi?      [Y/T]:
');Pill:=Uppcase(ReadKey);
        Until Pill<>'Y';
        End;
    '2' : Begin
        Repeat
            Clrscr;
            Writeln('HAPUS ELEMEN');
            Writeln('=====');
            Hapus(Antrian);
            Writeln;Writeln;
            Tampilkan;
            Writeln;Writeln;
            Write('Mau      Hapus      Elemen      Lagi?      [Y/T]:
');Pill:=Uppcase(ReadKey);
            Until Pill<>'Y';
            End;
        End;
    Until Pil='3';
End.
```

## Biografi Penulis



**Decky Hendarsyah**, lahir di Bukittinggi Sumatera Barat pada tahun 1978. SD sampai SMU ditempuh di Padang Panjang Sumatera Barat. Merupakan Alumni SMU Negeri 1 Padang Panjang, tamat tahun 1997. Kemudian melanjutkan pendidikan Komputer 1 tahun setingkat Diploma 1 (D1) di IPK Bukittinggi, tamat pada tahun 1998. Kuliah S1 di Universitas Putra Indonesia (UPI) “YPTK” Padang mengambil jurusan Sistem Informasi, lulus tahun 2002. Bekerja sebagai dosen dan Kepala UPT Puskom STIE Syari’ah Bengkulu.

Pertengahan tahun 2008 melanjutkan pendidikan S2 di Megister Ilmu Komputer FMIPA UGM Yogyakarta. Menyukai kryptographi, database, pemrograman seperti bahasa pemrograman Pascal, Borland Delphi dan PHP. Sekarang sedang mempelajari dan ingin memperdalam bahasa pemrograman java dan juga tertarik pada GIS/SIG dan komunikasi data.