**Algoritma dan Pemrograman**

**Tugas Array Dua Dimensi (Menghitung Indeks Prestasi Mahasiswa)**

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Kelas :

IF - 7

**JURUSAN TEKNIK INFORMATIKA**

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program IPMahasiswa;

uses crt;

//kamus global

const

MaksBaris = 50;

MaksKolom = 5;

type

Larik1 = array[1..MaksBaris] of string;

Larik2 = array[1..MaksKolom] of string;

Larik3 = array[1..MaksKolom] of integer;

Larik4 = array[1..MaksBaris] of real;

Matriks1 = array[1..MaksBaris,1..MaksKolom] of integer;

Matriks2 = array[1..MaksBaris,1..MaksKolom] of char;

var

NIM : Larik1;

MK : Larik2;

SKS : Larik3;

IP : Larik4;

Nilai : Matriks1;

Idx : Matriks2;

M,N : integer; //M:banyaknya NIM, N:banyaknya kode mata kuliah

Kelas : string;

TotalSKS, Semester : integer;

procedure IsiData(var M,N,TotalSKS:integer; var Nilai:Matriks1);

{I.S. : user memasukkan kelas, semester, banyaknya NIM(M), banyaknya kode mata kuliah(N), NIM(1:M), kode mata kuliah(1:N), SKS(1:N)

dan matriks Nilai berordo M x N}

{F.S. : menghasilkan banyaknya NIM(M), banyaknya kode mata kuliah(N), total SKS dan matriks Nilai berordo M x N}

var

i,j : integer;

begin

//memasukkan nama kelas

write('Kelas : '); readln(Kelas);

//memasukkan semester

write('Semester : '); readln(Semester);

//memasukkan banyaknya NIM

write('Banyaknya NIM : '); readln(M);

//Validasi banyaknya NIM

while(M > MaksBaris) do

begin

gotoxy(1,4); textcolor(yellow);

writeln('Banyaknya NIM antara 1 - ',MaksBaris,' Ulangi,Tekan Enter!'); readln;

gotoxy(30,3); clreol;

gotoxy(1,4); clreol;

textcolor(15);

gotoxy(30,3);

readln(M);

end;//endwhile

//memasukkan banyaknya kode mata kuliah

write('Banyaknya Kode Mata Kuliah : '); readln(N);

//validasi banyaknya Mata Kuliah

while(N > MaksKolom) do

begin

gotoxy(1,5);textcolor(yellow);

write('Banyaknya kode mata kuliah antara 1 - ',MaksKolom,' Ulangi,Tekan Enter!');readln;

gotoxy(30,4); clreol;

gotoxy(1,5); clreol;

textcolor(15);

gotoxy(30,4);

readln(N);

end;//endwhile

//memasukkan NIM(1:M)

gotoxy(1,3); clreol;

gotoxy(1,4); clreol;

gotoxy(1,4); textcolor(yellow); write('NIM');

for i := 1 to M do

begin

gotoxy(1,i+5); textcolor(15); readln(NIM[i]);

gotoxy(10,i+5); write('|');

end;

//validasi NIM

if(i > 1)

then

begin

for j:=1 to (i-1)do

begin

while(NIM[i]=NIM[j])do

begin

gotoxy(3,i+9); textcolor(yellow);

write('NIM ',NIM[i],' Sudah Ada! Tekan Enter');

readln;

gotoxy(3,i+9);clreol;

gotoxy(1,i+5);clreol;

gotoxy(1,i+5);textcolor(15);write(' |');

gotoxy(1,i+5);textcolor(15);readln(NIM[i]);

end;//endwhile

end;//endfor

end;//endif

TotalSKS := 0;

//memasukkan kode mata kuliah

gotoxy(1,4); textcolor(yellow); write('Kode Mata Kuliah');

for j := 1 to N do

begin

textcolor(15);

gotoxy(j\*13,5); write('IF');

gotoxy(j\*13+2,5); readln(MK[j]);

gotoxy(j\*13+6,5); write('-');

gotoxy(j\*13+7,5); readln(SKS[j]);

TotalSKS := TotalSKS + SKS[j];

end; //endfor

//validasi kode mata kuliah

if(j > 1)then

begin

for i := 1 to (j - 1)do

begin

while(MK[j] = MK[i])do

begin

gotoxy(14,9);textcolor(yellow);

write('Kode Mata Kuliah ',MK[j],' Sudah Ada! Tekan Enter');

readln;

gotoxy(14,9);clreol;

gotoxy(j\*13+2,5);clreol;textcolor(15);

gotoxy(j\*13,5); write('IF - ');

gotoxy(j\*13+2,5);readln(MK[j]);

end;//endwhile

end;//endfor

end;//endif

gotoxy(j\*13+7,5); readln(SKS[j]);

//memasukkan matriks nilai berordo M x N

for i := 1 to M do

for j := 1 to N do

begin

gotoxy(j\*12+5,i+5); readln(Nilai[i,j]);

end; //endfor

end; //endprocedure

function Indeks(Nilai : integer) : char;

{I.S. : nilai per mata kuliah sudah terdefinisi}

{F.S. : menghasilkan fungsi indeks nilai}

begin

case (Nilai) of

80..100 : Indeks := 'A';

70..79 : Indeks := 'B';

60..69 : Indeks := 'C';

50..59 : Indeks := 'D';

0..49 : Indeks := 'E';

end; //endcase

end; //endfunction

procedure TampilData(M,N : integer; Nilai :Matriks1);

{I.S. : banyaknya NIM(M), banyaknya kode mata kuliah(N), total SKS dan matriks Nilai berordo M x N sudah terdefinisi}

{F.S. : menampilkan indeks nilai dan IP per mahasiswa}

var

i,j : integer;

begin

//memasukkan matriks nilai berordo M x N

for i := 1 to M do

for j := 1 to N do

begin

idx[i,j] := Indeks(Nilai[i,j]);

gotoxy(j\*12+5,i+5); textcolor(yellow);

delay(700); write(Idx[i,j],' ');

end; //endfor

end; //endprocedure

function JumlahNilai(Bobot,SKS : integer) : integer;

{I.S. : Bobot nilai dan SKS sudah terdefinsi}

{F.S. : menghasilkan jumlah nilai mahasiswa}

begin

JumlahNilai := Bobot \* SKS;

end; //endfunction

function BobotNilai(Idx : char) : integer;

{I.S. : indeks sudah terdefinisi}

{F.S. : menghasilkan Bobot nilai}

begin

case (Idx) of

'A' : BobotNilai := 4;

'B' : BobotNilai := 3;

'C' : BobotNilai := 2;

'D' : BobotNilai := 1;

'E' : BobotNilai := 0;

end; //endcase

end; //endfunction

procedure TampilIP(M,N,TotalSKS : integer;var IP : Larik4; SKS : Larik3; Idx : Matriks2);

{I.S.: banyaknya NIM(M), banyaknya kode mata kuliah(N), total SKS, SKS, dan indeks sudah terdefinisi}

{F.S.: menampilkan hasil indeks prestasi kumulatif}

var

Bobot : Matriks1;

i,j : integer;

begin

textcolor(15);

for i := 1 to M do

begin

IP[i] := 0;

for j := 1 to N do

begin

Bobot[i,j] := BobotNilai(idx[i,j]);

IP[i] := IP[i]+JumlahNilai(Bobot[i,j],SKS[j]);

end; //endfor

end; //endfor

for i:=1 to M do

begin

IP[i]:=IP[i]/TotalSKS;

gotoxy(N\*13+9,5); textcolor(yellow);

writeln(' IP ');

gotoxy(N\*13+11,i+5); delay(700); writeln(IP[i]:0:2);

end; //endfor

end; //endprocedure

//badan algoritma utama

begin

textcolor(15);

IsiData(M,N,TotalSKS,Nilai);

TampilData(M,N,Nilai);

TampilIP(M,N,TotalSKS,IP,SKS,Idx);

readln;

end.

