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English Class
Informatics Engineering 2011



Algorithms and Programming

Looping Structure



Steps of the Day



Let's Start 



Why We Need Looping Structure?

Make a program to showing “**I LOVE ALGORITHM**” on the screen as much as 1000 times. **WHAT WILL YOU DO?**

What is Looping Structure

An Algorithm structure that allow us to **REPEAT** some statements that fulfill **LOOPING CONDITION**.



Components in Looping Structure

- Looping condition
- Body statement
- Initialization
- Termination

Types of Looping Structure

- FOR
- WHILE
- REPEAT



For Structure

Definition and Structures of For Structure

- For structure was used in looping that have **specified ending** of repetition.
- Number of repetition **have been known** in the beginning.
- Can be in **ASCENDING** or **DESCENDING** way

Format of For Structure (Ascending)

Algorithm Notation:

```
for variable ← start_value to end_value do  
    statement  
endfor
```

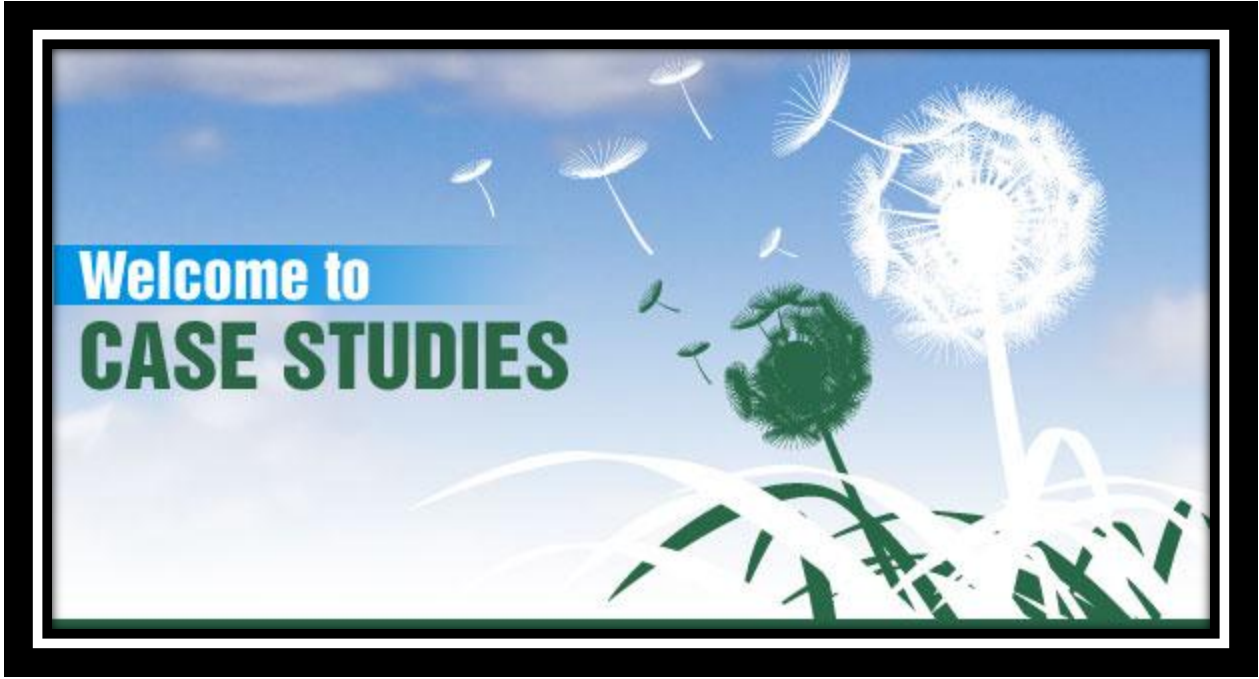
Pascal Notation I:

```
for variable := start_value to end_value do  
    statement;
```

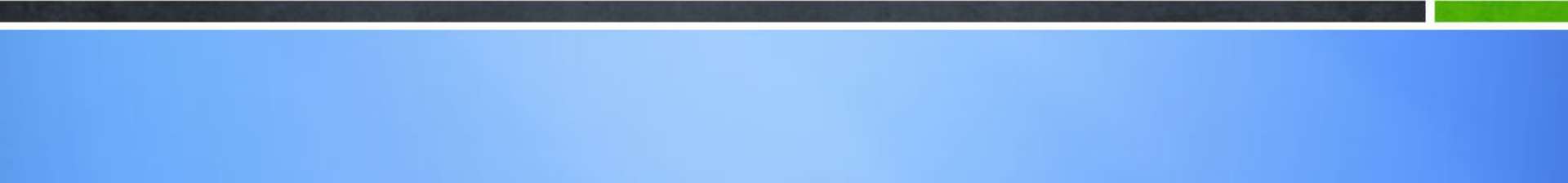
Format of For Structure (Ascending)

Pascal Notation II:

```
for variable := start_value to end_value do  
begin  
    statement;  
end;
```



Welcome to
CASE STUDIES



Example of For in Ascending Way (Algorithm)

```
1  Algoritma Deret_Bilangan_Ganjil
2  {I.S: Diinputkan satu nilai akhir oleh user}
3  {F.S: Menampilkan jumlah deret ganjil}
4
5  Kamus:
6      x,akhir:integer
7      jumlah:integer
8
9  Algoritma:
10     input(akhir)
11     jumlah ← 0
12     for x ← 1 to akhir do
13         if x mod 2 = 1 then
14             jumlah ← jumlah + x;
15     endfor
16     output('Jumlah deret ganjil dari 1 - ',akhir,' = ',jumlah)
```

Example of For in Ascending Way (Pascal)

```
1  program Deret_Bilangan_Ganjil;
2  uses crt;
3
4  var
5      x,akhir:integer;
6      jumlah:integer;
7
8  begin
9      write('Masukan batas akhir angka : ');readln(akhir);
10     jumlah:=0;
11     for x:=1 to akhir do
12     begin
13         if x mod 2=1 then
14             jumlah:=jumlah+x;
15     end;
16     writeln('Jumlah Deret ganjil dari 1 - ',akhir,' = ',jumlah);
17     writeln();
18     write('Tekan sembarang tombol untuk menutup...');
19     readkey();
20 end.
```

Format of For Structure (Descending)

Algorithm Notation:

```
for variable ← end_value downto start_value do  
    statement  
endfor
```

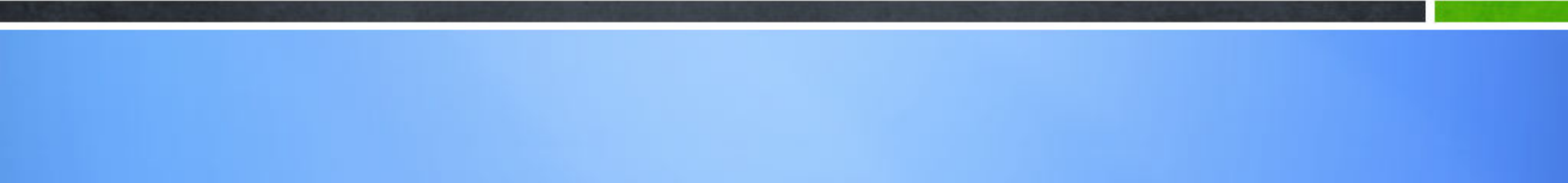
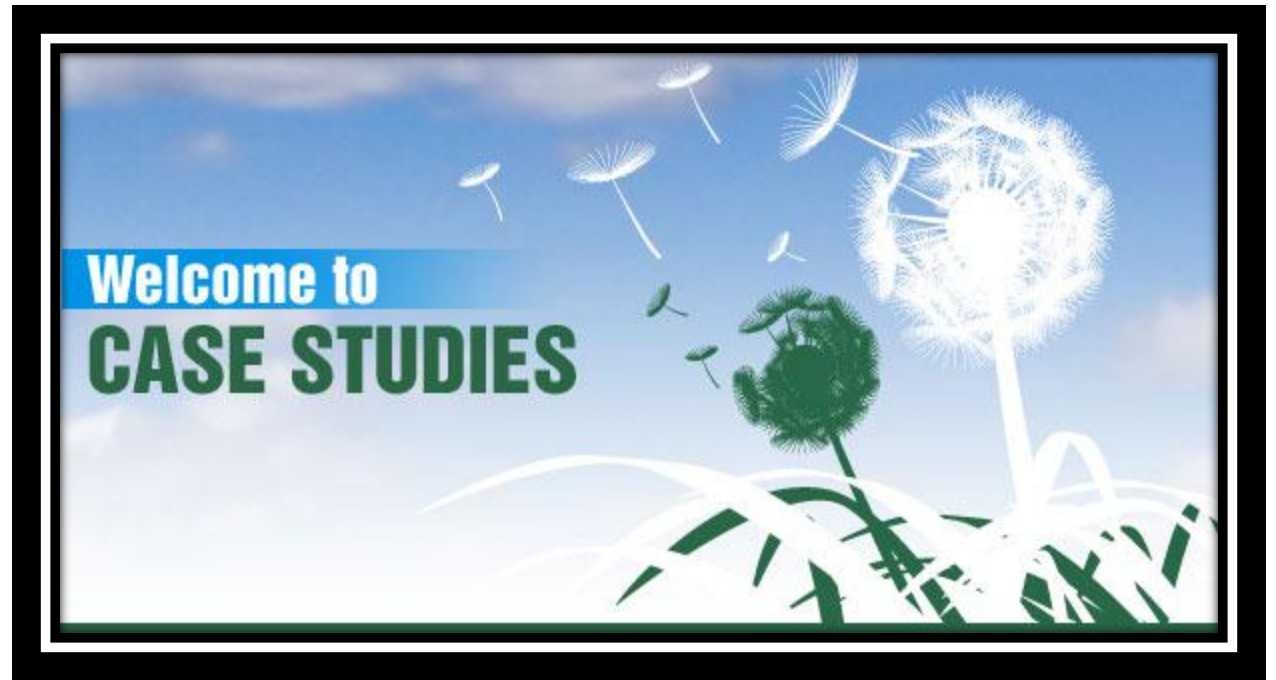
Pascal Notation I:

```
for variable := end_value downto start_value do  
    statement;
```

Format of For Structure (Ascending)

Pascal Notation II:

```
for variable := end_value downto start_value do  
begin  
    statement;  
end;
```



Example of For in Descending Way (Algorithm)

```
1  Algoritma Deret_Faktorial
2  {I.S: Diinputkan satu nilai oleh user}
3  {F.S: Menampilkan faktorial dari bilangan tersebut}
4
5  Kamus:
6      i, nilai: integer
7      faktorial: integer
8
9  Algoritma:
10     input(nilai)
11     faktorial ← 1
12     for i ← nilai downto 1 do
13         faktorial ← faktorial * i
14     endfor
15     output(nilai, ' ! = ', faktorial)
```

Example of For in Descending Way (Pascal)

```
1  program Deret_Faktorial;
2  uses crt;
3
4  var
5      i,nilai:integer;
6      faktorial:integer;
7
8  begin
9      write('Masukan nilai = ');readln(nilai);
10     faktorial:=1;
11     for i:=nilai downto 1 do
12         faktorial:=faktorial*i;
13     writeln(nilai,'! = ',faktorial);
14     writeln();
15     write('Tekan sembarang tombol untuk menutup...');
16     readkey();
17 end.
```



While Structure

Definition and Structures of For Structure

While Structure

- While structure **always be executed** while its condition value is **true**.
- If the condition value is **false**, it **means stop repetition**.
- While structure have condition in the **beginning of structure**.

Format of While Structure

Algorithm Notation:

```
while kondisi do  
    statement  
endwhile
```

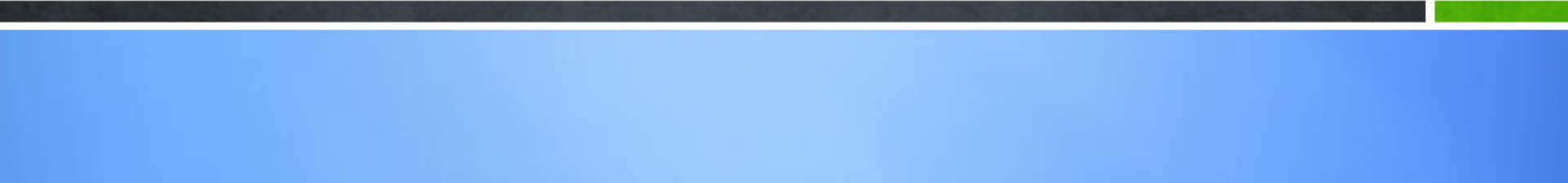
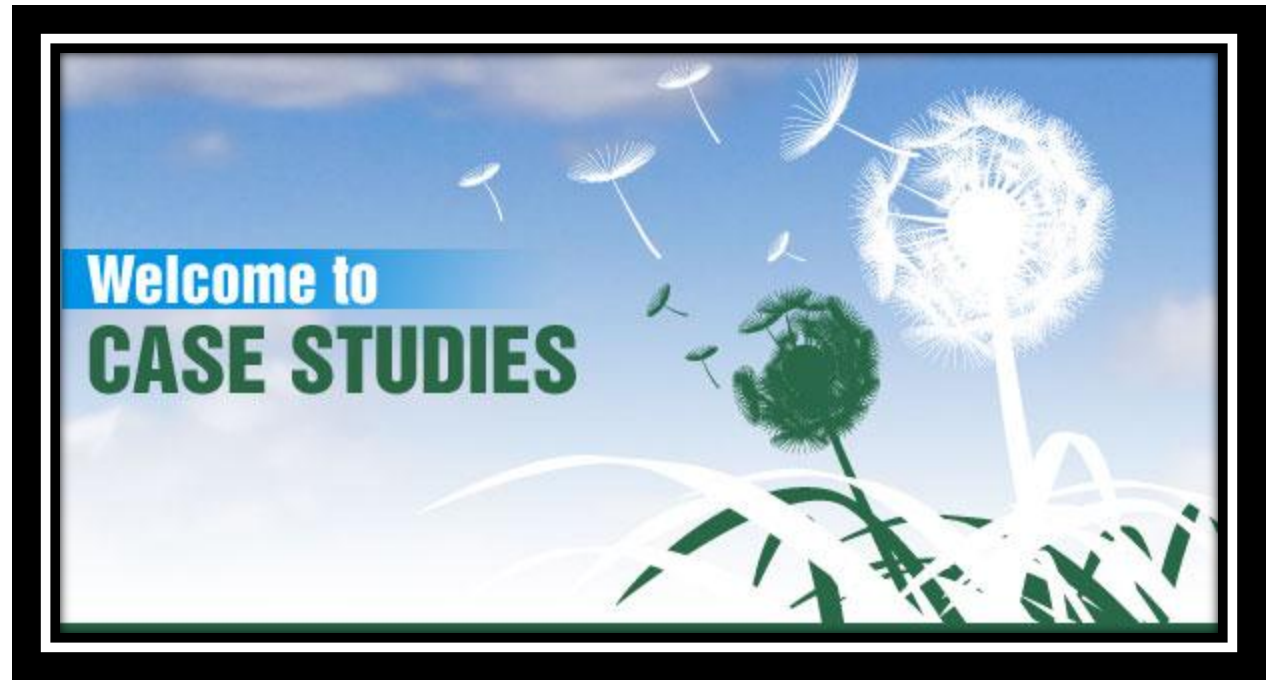
Pascal Notation I:

```
while kondisi do  
    statement;
```

Format of While Structure

Pascal Notation II:

```
while kondisi do  
begin  
    statement;  
end;
```



Example of While (Algorithm)

```
1  Algoritma Deret_Bilangan
2  {I.S: Diinputkan satu angka oleh user}
3  {F.S: Menampilkan jumlah deret dari 1 sampai angka}
4
5  Kamus:
6      i,deret:integer
7      angka:integer
8
9  Algoritma:
10     input(angka)
11     deret←0
12     i←1
13     while i<=angka do
14         deret←deret+i
15         i←i+1;
16     endwhile
17     output('Jumlah deret dari 1 - ',angka,' = ',deret)
```


Example of While (Pascal)

```
1  program Deret_Angka;
2  uses crt;
3
4  var
5      i,deret:integer;
6      angka:integer;
7
8  begin
9      write('Masukan angka = ');readln(angka);
10     deret:=0;
11     i:=1;
12     while i<=angka do
13     begin
14         deret:=deret+i;
15         i:=i+1;
16     end;
17     writeln('Jumlah deret dari 1 - ',angka,' = ',deret);
18     writeln();
19     write('Tekan sembarang tombol untuk menutup...');
20     readkey();
21 end.
```



Repeat Structure

Definition and Structures of For Structure

Repeat Structure

- Repeat structure **always be executed** until its condition value is **true**.
- If the condition value is **true**, it **means stop repetition**.
- Repeat structure have condition in the **end of structure**.

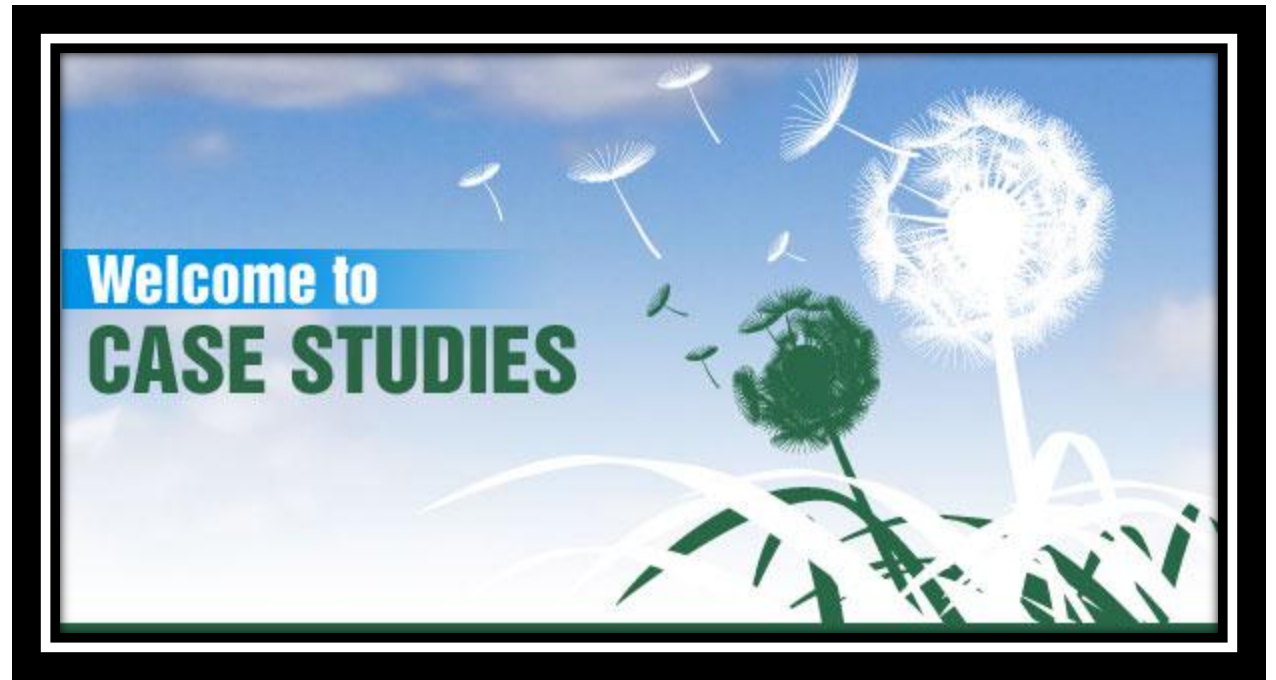
Format of While Structure

Algorithm Notation:

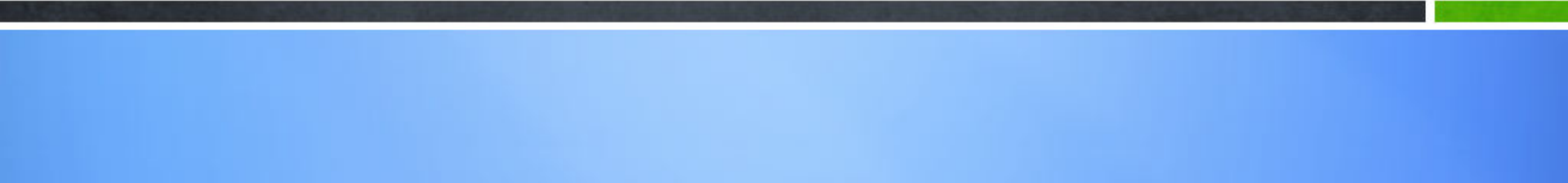
```
repeat  
    statement  
until kondisi
```

Pascal Notation:

```
repeat  
    statement;  
until kondisi;
```



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Example of Repeat (Algorithm)

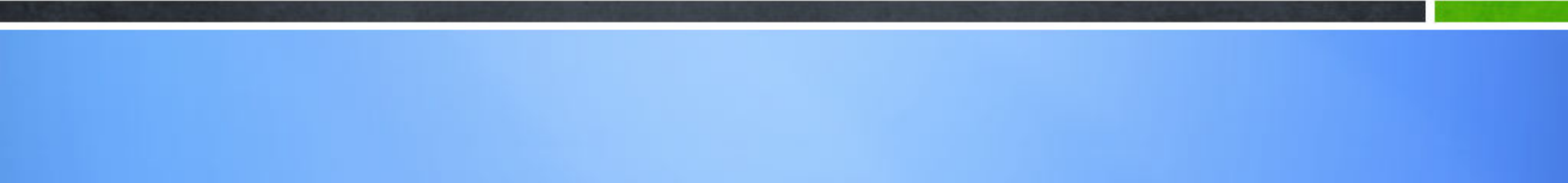
```
1  Algoritma Coba_Password
2  {I.S: Diinputkan password oleh user}
3  {F.S: Menampilkan pesan benar atau salah}
4
5  Kamus:
6      const
7          password=1234
8
9      pass,i,j:integer
10
11 Algoritma:
12     i←1
13     j←3
14     repeat
15         input(pass)
16         if pass=password then
17             output('Password anda benar!');
18         else
19             i←i+1
20             j←j-1
21             output('Password salah (',j,', kali lagi)!')
22         endif
23     until (pass=password)or (i=4)
```

Example of Repeat (Pascal)

```
1 program Coba_Password;
2 uses crt;
3
4 const
5     password=1234;
6
7 var
8     pass,i,j:integer;
9
10 begin
11     i:=1;
12     j:=3;
13     repeat
14         write('Masukan password (' ,i, '): ');readln(pass);
15         if pass=password then
16             begin
17                 writeln('Password anda benar!');
18                 writeln();
19                 writeln('Tekan sembarang tombol untuk menutup...');
20                 readkey();
21             end
22         else
23             begin
24                 i:=i+1;
25                 j:=j-1;
26                 writeln('Password salah (' ,j, ' kali lagi)!');
27                 readkey();
28             end;
29         clrscr();
30     until (pass=password) or (i=4);
31 end.
```



EXERCISE



Exercise 1

Make the algorithm to solve this problem below (Color of stars will be different each row):

N=5

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

Exercise 2

Make the algorithm to solve this problem below (Color of stars will be different each row):

N=3

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

Exercise 3

Make algorithm to count:

$$s = 1 - 2/3 + 3/5 - 4/7 + \dots$$

Exercise 4

Make algorithm to count the maximum value and mean value from n students.

THANK YOU

GRACIAS

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