

Lecture #5: Repeat & For

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Iteration

- Loop
- Execute a set of command repeatedly

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Iteration

While Loop Repeat-until Loop For Loop

While Loop

Count Controlled

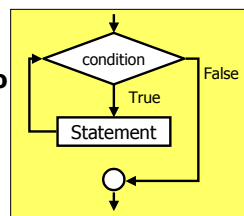
- Exact number of loops
- Exit loop after "n" times

Event Controlled

- Vary number of loops
- Exit loop when condition = "False"

While Loop

While condition **do**
statement



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Repeat-Until Loop

Count Controlled

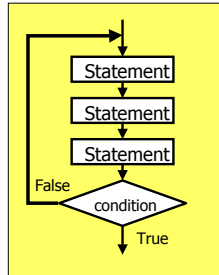
- Exact number of loops
- Exit loop after "n" times

Event Controlled

- Vary number of loops
- Exit loop when condition = "False"

Repeat-until Loop

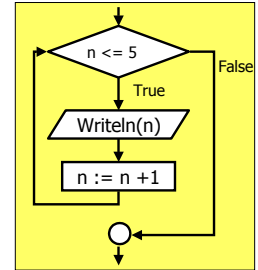
Repeat
Statement;
...
Statement;
Until condition



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While Loop Count Controlled

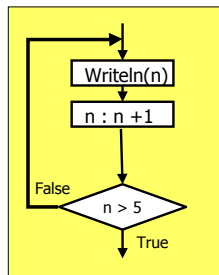
While $n \leq 5$ **do**
begin
 writeln(n);
 $n := n + 1$;
end;



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Repeat-until Loop Count Controlled

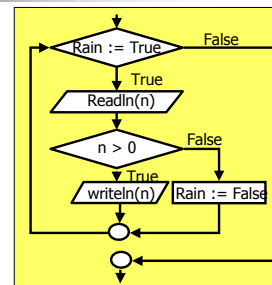
Repeat
 writeln(n);
 $n := n + 1$;
Until $n > 5$;



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While Loop Event Controlled

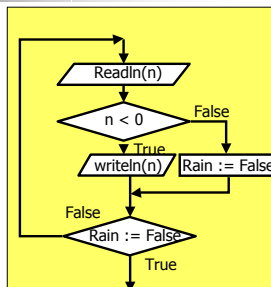
$rain := True$;
While $rain = do$
begin
 readln (n);
 if $n < 0$ **then**
 writeln(n)
 else
 $rain := False$
end;



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Repeat-Until Loop Event Controlled

$rain := True$;
Repeat
 readln (n);
 if $n < 0$ **then**
 writeln(n)
 else
 $rain := False$
Until ($rain = False$);



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For Loop

- Same as While loop

For variable:= initial value **to** final value **do**
 statement

For variable:= initial value **downto** final value **do**
 value **do**
 tatement

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For Loop

```
for n := 1 to 5 do
  writeln(n);

for n := 5 downto 1 do
  writeln(n);
```

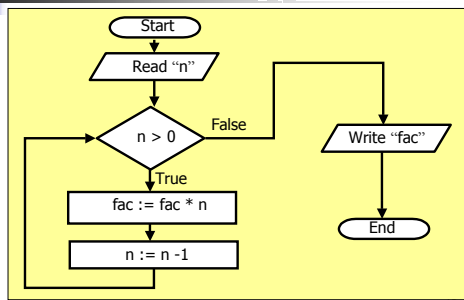
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Nested For-Loops

```
for x := 1 to 3 do
  for y := 20 to 25 do
    writeln(x:5, y:5);
```

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Example 1 Calculate the “n!” (n-factorial)



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n! program

```
begin
  fac := 1;
  write('Please input n ');
  readln(n);
  while n > 0 do
    begin
      fac := fac * n;
      n := n - 1;
    end;
  writeln(n, '! = ', fac)
end.
```

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n! program Repeat-Until

```
begin
  fac := 1;
  write('Please input n ');
  readln(n);
  Repeat
    begin
      fac := fac * n;
      n := n - 1;
    end;
  Until (n <= 0);
  writeln(n, '! = ', fac)
end.
```

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n! program For

```
Begin
  fac := 1;
  write('Please input n ');
  readln(n);
  For i := n downto 1 do
    fac := fac * i;
  writeln(n, '! = ', fac)
end.
```

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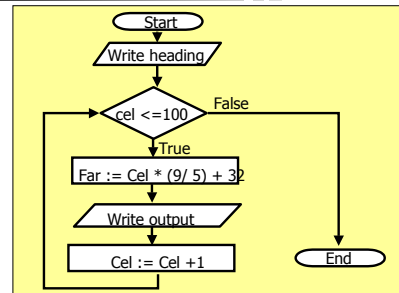
Example 2 Convert Celcius to Farenheit

Celcius	Farenheit
0.0	32.0
1.0	33.8
2.0	35.6
...	...
...	...
99.0	210.2
100.0	212.0

$$\text{Farenheit} = \text{Celcius} * (9/5) + 32$$

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Example 2 Convert Celcius to Farenheit



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Convert Celcius to Farenheit program

```

begin
  Writeln('Celcius':10, 'Farenheit':15);
  Cel := 0;
  while Cel <= 100 do
    begin
      Far := Cel * (9/5) + 32;
      writeln(cel:10:1, farenheit:15:1);
      Cel := Cel + 1
    end
  end
end.
  
```

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Convert Celcius to Farenheit program – Repeat-Until

```

begin
  Writeln('Celcius':10, 'Farenheit':15);
  Cel := 0;
  repeat
    begin
      Far := Cel * (9/5) + 32;
      writeln(cel:10:1, farenheit:15:1);
      Cel := Cel + 1
    end
  until Cel > 100;
end.
  
```

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Convert Celcius to Farenheit program -- for

```

begin
  Writeln('Celcius':10, 'Farenheit':15);
  for Cel :=0 to 100 do
    begin
      Far := Cel * (9/5) + 32;
      writeln(cel:10:1, farenheit:15:1)
    end
  end
end.
  
```

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