PROGRAMMING SKILLS II

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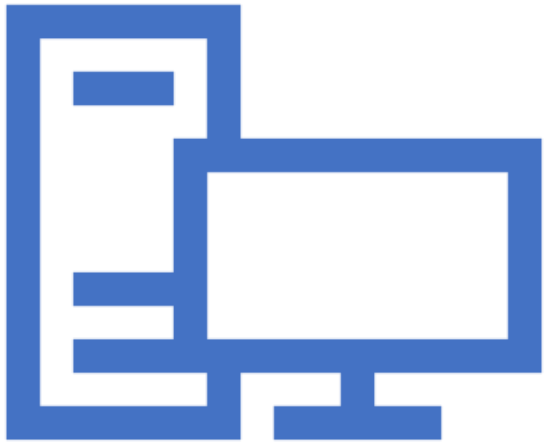
Lecture 08

Foundation Certificate in IT – Curtin Batch



LOOP STATEMENTS

LECTURE 08

WHY WE NEED OF A LOOP??

- There can be some situation of Same process can be execute / iterate in number of times.
  - Example – Print “Hello World..!!” in 5 times

    Take 10 temparatures continuously in order to calculate average

    Input students details to a system continously

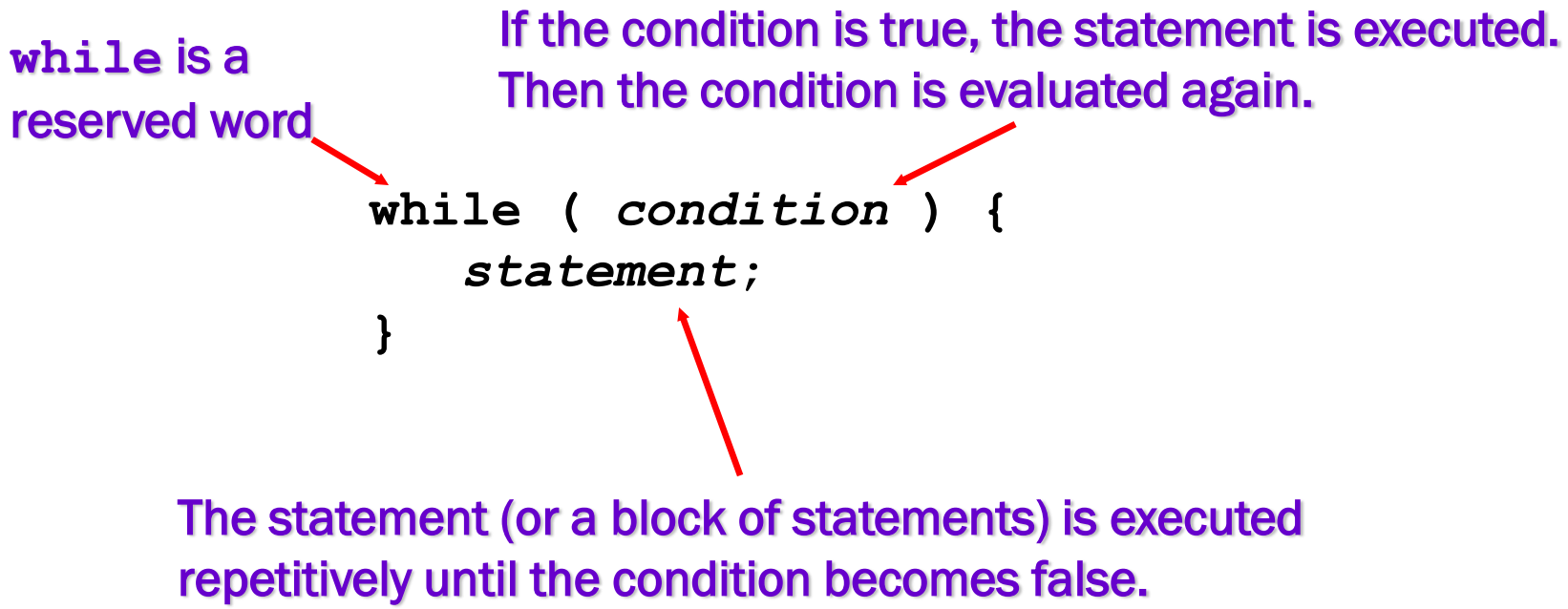
- So we have to execute the same (iterate the process / loop the process) in order to get the expected results.

ITERATIONS / LOOP STRUCTURES

- Four kinds of loops
  - while structure
  - do/while structure
  - for structure
  - foreach structure

WHILE STATEMENT

- The *while statement* has the following syntax:

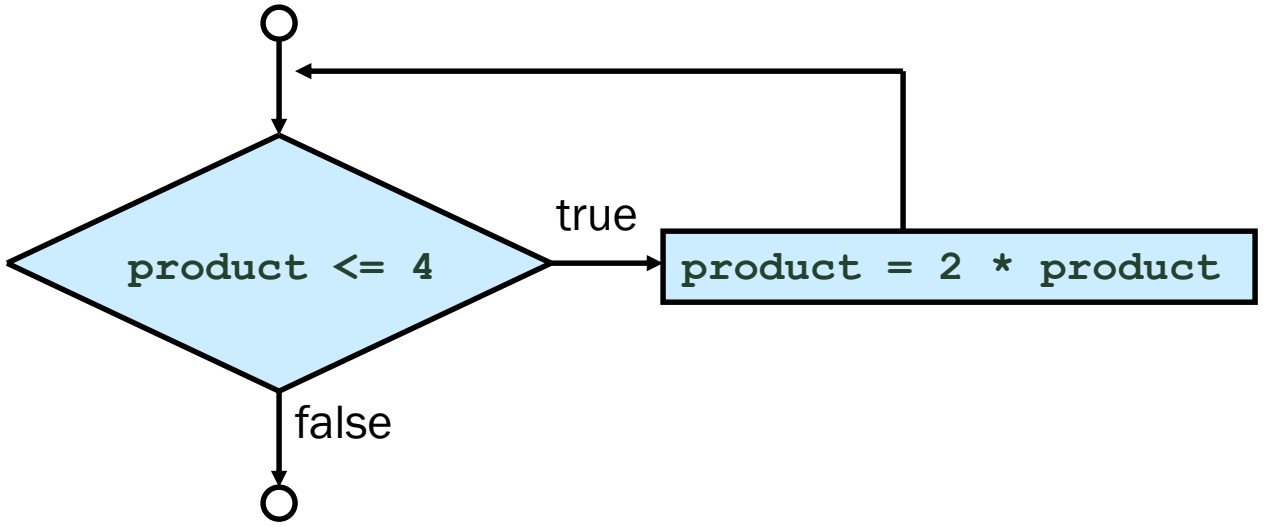


WHILE **STATEMENT**

```
while ( <condition> )
{
   <code to be repeated if <condition> is true>  ;
}
```

- Repetition Structure
  - An action is to be repeated
    - Continues while <condition> is true
    - Ends when <condition> is false
  - *Contains either a line or a body of code*
  - *Use brackets to group multiple statements*

WHILE STATEMENT (CONT'D)




```
int product;
product = 2;
while (product <= 4){
  product = 2 * product;
}
// beginning of the next statement
```

THE WHILE STATEMENT

- Execute embedded statements based on Boolean value
- Evaluate Boolean expression at beginning of loop
- Execute embedded statements while Boolean value Is True

```
0 1 2 3 4 5 6 7 8 9
```

```
int i = 0;
while (i < 10) {
    Console.WriteLine(i);
    i++;
}
```

WHILE STATEMENT

- Note that if the condition of a while statement is false initially, the statement is never executed
  - Example:

```
int product;
product = 5;
while (product <= 4){
  product = 2 * product;
}
// beginning of the next statement
```

- Therefore, the body of a while loop will execute zero or more times

PROGRAMMING EXAMPLE

Print “Hello World..!!” in 5 times

```
int num = 1;  // use increment value to get next occurrence

while(num<=5){
    Console.WriteLine("Hello World..!!");

    num = num +1;   //increment by 1
}
```

Condition

If the condition is True ---> Loop statements Execute
If the condition is False ---> Terminate the Loop

PROGRAMMING EXAMPLE

- Write a C# program to print numbers from 1 to 100 using a while loop

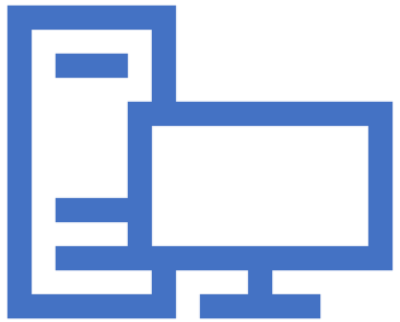
  Output

  1 2 3 4 5 6 7 ..... 99 100

- Modify the program to print only even numbers from 1 to 100

  Output

  2 4 6 8 10 12 14 ..... 98 100



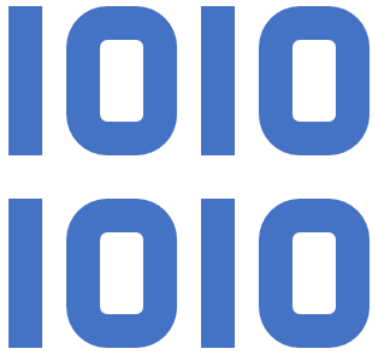
DO-WHILE STATEMENT

- Execute embedded statements based on Boolean value
- Evaluate Boolean expression at end of loop
- Even if the boolean expression is false the program execute **at least one time**
- Execute embedded statements while Boolean value Is True

```
int num = 0;
do
{
    Console.WriteLine(num);
    num = num+1;   //num++;
}while(num<10);
```

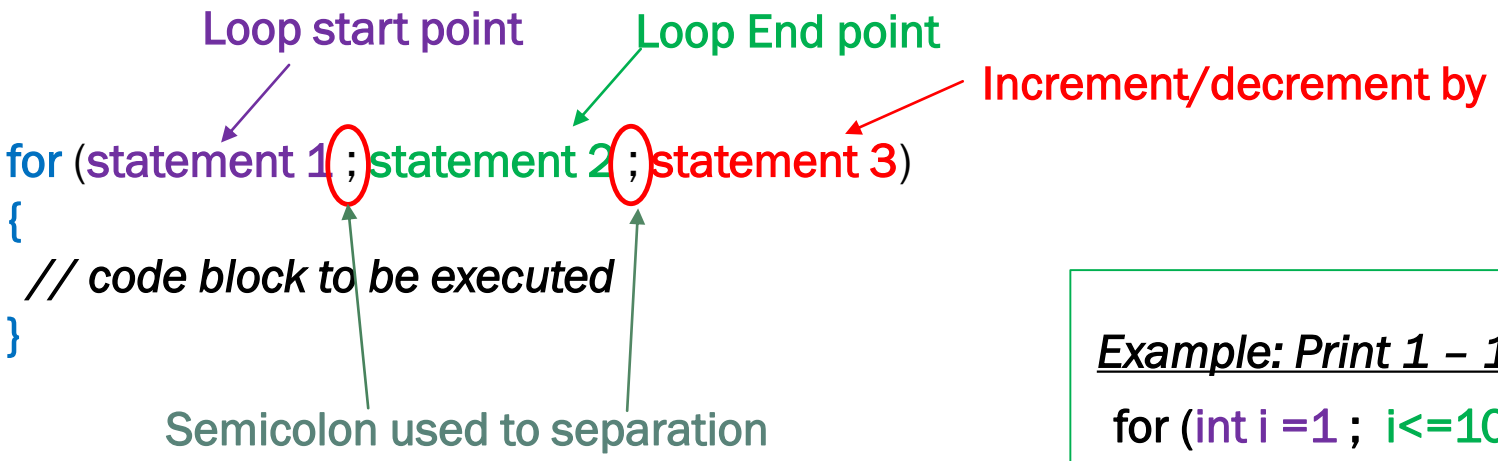
PROGRAMMING QUESTION

- Write a C# program to print numbers from 1 to 100 using a do-while loop
- Modify the program to print only even numbers from 1 to 100



THE FOR STATEMENT

- Place update information at the start of the loop
- Variables in a for block are scoped only within the block



Example: Print 1 – 10

```
for (int i =1 ;  i<=10 ; i = i+1)  {

            Console.WriteLine(i);

      }
```

PROGRAMMING QUESTION

- Write a C# program to print numbers from 1 to 100 using a for loop
- Modify the program to print only even numbers from 1 to 100

THE FOREACH STATEMENT

- The foreach Statement Choose the type and name of the iteration variable
- Execute embedded statements for each element of the collection class

```
string[] cars = {"Volvo", "BMW", "Ford", "Mazda"};

foreach (string i in cars)
{
  Console.WriteLine(i);
}
```

THE BREAK AND CONTINUE STATEMENTS

- The break statement *jumps out of an iteration / Exit in iteration*
- The continue statement *jumps to the next iteration / Move to next iteration occurrence*

```
int i = 0;
while (i < 10) {
    Console.Write(i);
    i++;

    if (i == 2)
        continue;
    else if (i == 8)
        break;
}
```

Output:
0 1 2 3 4 5 6 7

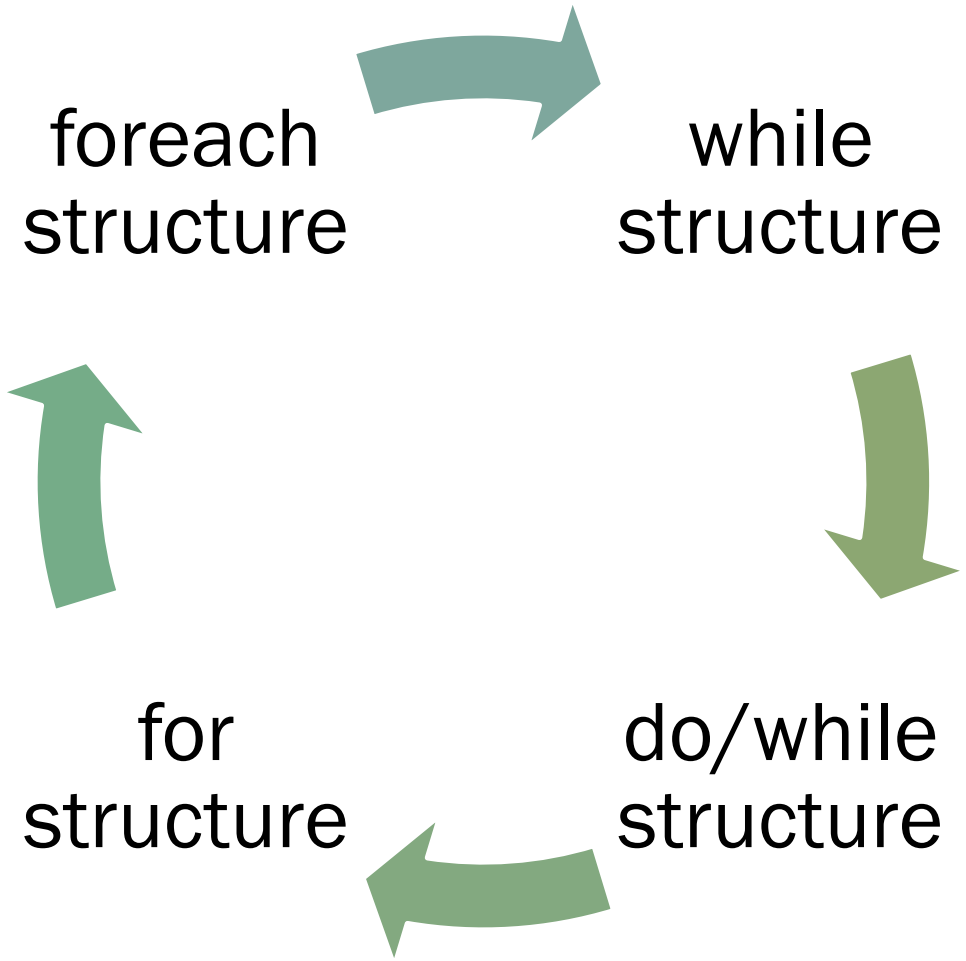
INFINITE LOOPS

The body of a while loop must eventually make the condition false

If not, it is an *infinite loop*, which will execute until the user interrupts the program

This is a common type of logical error

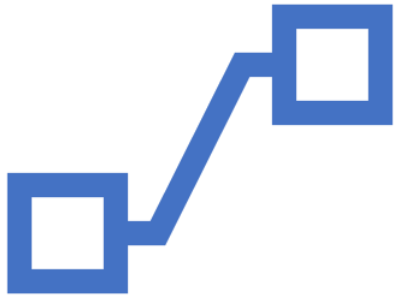
You should always double check to ensure that your loops will terminate normally



LET'S SUMMARIZE

RECAP: LOOP STATEMENTS

- *Loop statements* allow us to execute a statement multiple times
- They are often simply referred to as *loops*
- Like conditional statements, they are controlled by boolean expressions
- C# has four kinds of loop statements: the *while loop*, the *do loop*, the *for loop, and* the *foreach loop*
- The programmer must choose the right kind of loop for the situation



THANK YOU