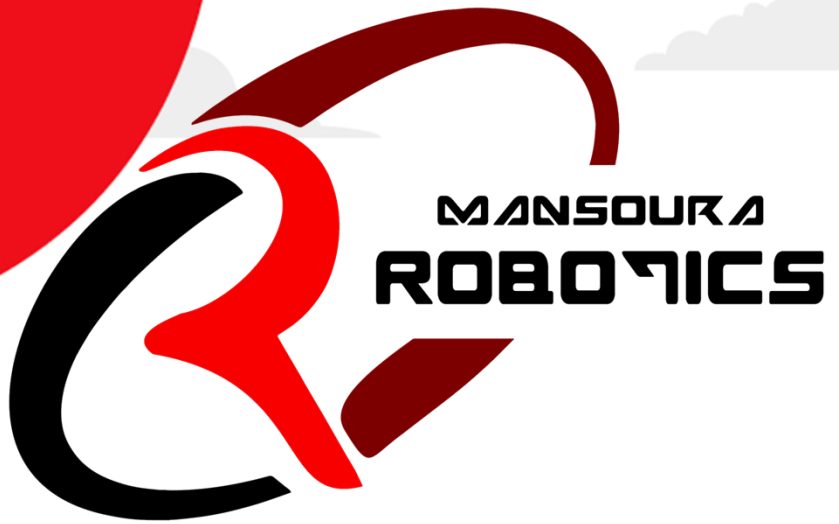
# Loops in C

# Lecture 3



01

For Loop

02

While Loop

03

Do while Loop

04

Break Vs Continue

01

# For Loop

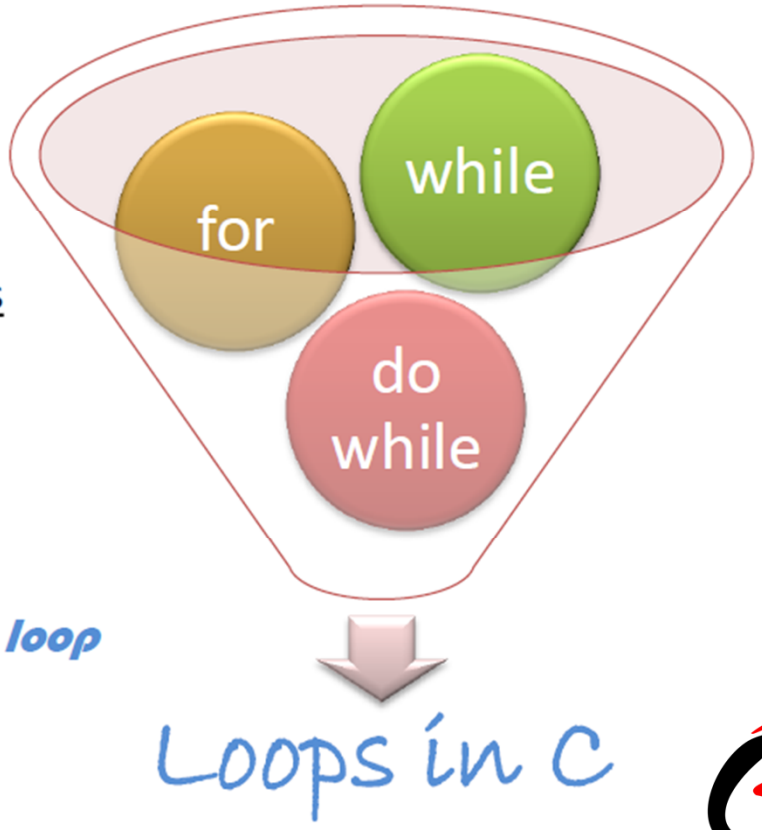
# Introduction to loops

**Loops** are a part of C programming used to repeat a specific block of code.

We need to repeat the a specific code for two reasons:

1- Repeat the code for <u>defined number of iterations</u>
for ex: repeat a part of code for 10 times
In this case we usually use ***for loop***

2- Repeat the code until <u>a certain event happens</u>
for: repeat a part of code until the user enter x
In this case we usually use ***while loop*** or ***do while loop***

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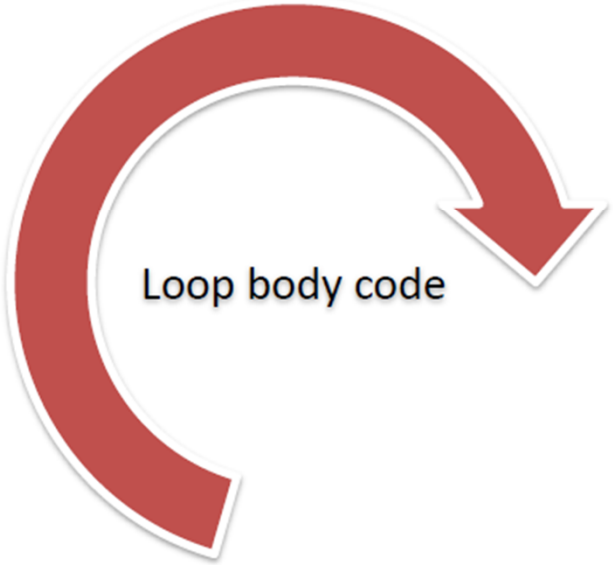
# For Loop

Used to apply the code for defined number of iterations.

*Apply this code for defined number of iterations*




**Syntax:**

```
for ( start; condition; action )
{
    loop body statements
}
```

**Example**

```
int i;

for (i=0; i<5; i++)
{
    printf("Ahmed");
}
```

This loop will start initially @ i = 0 , each iteration it will increment i as said in the ***action***, the loop will be applied as long as i is less than 5 as said in ***condition***.
i.e. This loop will be applied 5 times

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# Relational operators in C

```c
int x = 10;

int y = 5 ;
```

This operators are used to check the relation between new values and return either true or false.

**1- Check Equality**

*example*

```c
x == y   /* checks if x equals to y
            this statement will return false */
```

**2- Check Not Equality**

*example*

```c
x != y   /* checks if x is not equal to y
            this statement will return true  */
```

**3- Check More Than**

*example*

```c
x >  y   /* check if x is more than y
            this statement will return true  */
```

**4- Check More Than or equal**

*example*

```c
x >= y   /* check if x is more than or equals to y
            this statement will return true  */
```

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# LAB1

Write C code that will print your name 10 times

Expected Output

```
Ahmed
Ahmed
Ahmed
Ahmed
Ahmed
Ahmed
Ahmed
Ahmed
Ahmed
Ahmed
```

Time to Code

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# LAB2

Write C print the first ten natural numbers

Expected Output

```
The first 10 natural number are:
1 2 3 4 5 6 7 8 9 10
```

Time to Code

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# LAB3

Write a program in C to read 10 numbers from the user and find their summation and average

Time to Code

Expected Output

```
Enter the 10 numbers
Number-0 :5
Number-1 :6
Number-2 :19
Number-3 :17
Number-4 :4
Number-5 :35
Number-6 :12
Number-7 :7
Number-8 :20
Number-9 :11
The sum of 10 no is : 136
The Average is      : 13.600000
```

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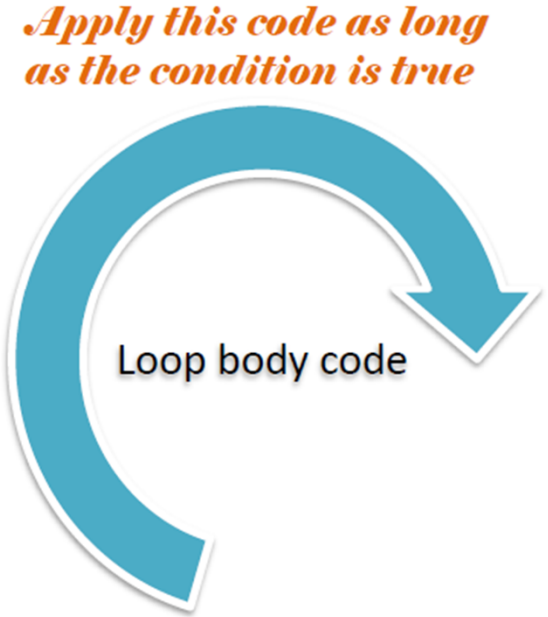
02

# While Loop

# While Loop

Used to apply the code as long as the condition is true




**Syntax:**

```
while ( condition )
{
    loop body statements
}
```

**Example**

```
int x=0;

while (x != 10)
{
    printf("Try Again");
    scanf("%d",&x);
}
```

The code inside this loop will be repeated until the user enters 10, hence the condition will be false.

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# Lab4

Write C code that ask will ask the user to enter the result of 3 x 4, In case the user entered correct answer the program will print Thanks, otherwise the program will print try again until the user enters the correct answer

Expected Output

```
Enter the answer of 3 x 4 = 5
Not correct, Please try again: 19
Not correct, Please try again: 12
Thank You
```

Time to Code

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# Lab5

Write a program in C to display the multiplication table of a given integer.

Expected Output

```
Enter the number to display its multiplication table : 6

6 X 1 = 6
6 X 2 = 12
6 X 3 = 18
6 X 4 = 24
6 X 5 = 30
6 X 6 = 36
```

Time to Code

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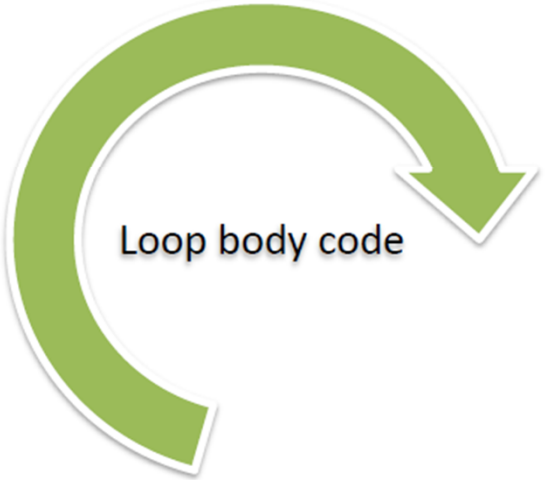
03

# Do while loop

# Do while loop

Apply the loop once then check the condition and repeat the loop as long as the condition is true.

***Apply this code once then re-apply this code as long as the condition is true***




**Syntax:**

```
do
{
    loop body statements

} while ( condition );
```

**Example**

```
int x=1;

do
{
    printf("I'm in the Loop");
    scanf("%d",&x);
}while (x != 0);
```

The string will be printed at least one time, then it will be repeated until the user enter 0

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# Lab6

Write a program in C to calculate the factorial of an integer entered by the user using while loop

Expected Output

```
Enter an integer: 7
Factorial= 5040
```

Time to Code

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04

# Break Vs Continue

# Break Vs Continue

***break*** statement can be used with the loop to exit the loop immediately and execute the outside code starting after the loop.

**Example**

```
while(1)
{
    scanf("%d",&x);

    if(x==1)
        break;
}
```

*infinite loop*

*break the loop in case the user enters 1*

***continue*** statement will skip the current iteration and jump to the next iteration

**Example**

```
for(i=1; i<10;i++)
{
    if (i==6)
        continue;

    printf("%d\n",i);
}
```

*print all numbers from 1 to 9 except 6*

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# Thank you!

Do you have any questions?

# Assignment 1

Write a C program that ask the user to enter two numbers and print their summation, this program should never ends until the user close the window

Expected Output

```
Please enter first number 10
Please enter second number 20
The result is 30

Please enter first number
```

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# Assignment 2

Write a login program in C that ask the user to enter his ID and his password, if the ID is correct the system will ask the user to enter his password up to 3 times, if he enters the password right the systems welcomes him, if the three times are incorrect, the system print ***No more tries***. If the user ID is incorrect the system print ***You are not registered***

| User | ID | Password |
|---|---|---|
| Ahmed | 1234 | 7788 |
| Amr | 5678 | 5566 |
| Wael | 9870 | 1122 |

## Expected Output

```
Please Enter your ID: 7471
You are not registered
```

```
Please Enter your ID: 1234
Please Enter Password: 4512
Try again: 7788
Welcome Ahmed
```

```
Please Enter your ID: 1234
Please Enter Password: 5050
Try again: 6060
Try again: 7070
Incorrect password for 3 times, No more tries
```

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# Assignment 3

Write a c program that draw a pyramid of stars with height entered by the user

Expected Output

```
Please Enter the hieght of the pyramid: 4
   *
  ***
 *****
*******
```

```
Please Enter the hieght of the pyramid: 8
        *
       ***
      *****
     *******
    *********
   ***********
  *************
 ***************
*****************
```

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