



C Programming

Lecture Three

Loops in C

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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 defined number of iterations

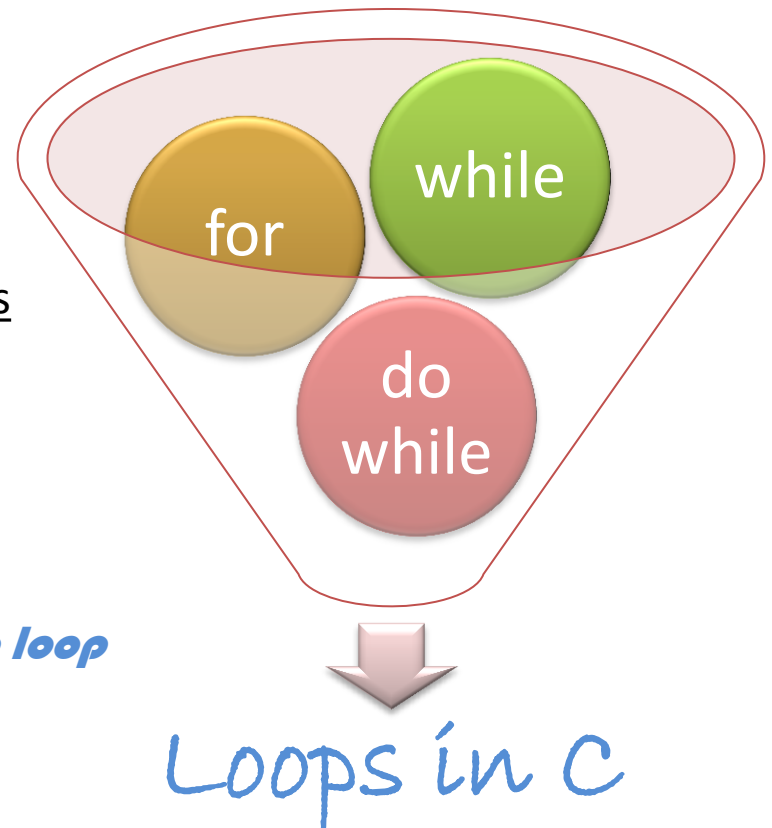
for ex: repeat a part of code for 10 times

In this case we usually use *for loop*

2- Repeat the code until a certain event happens

for: repeat a part of code until the user enter x

In this case we usually use *while loop* or *do while loop*



For Loop

Used to apply the code for defined number of iterations.

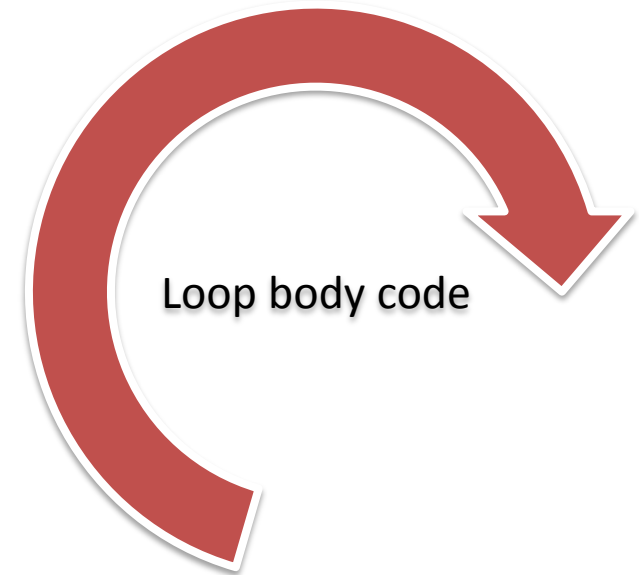
Syntax:

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

Example

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

Apply this code for defined number of iterations



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

Expected Output

Write C code that will print your name 10 times

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

Time To
Code



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



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

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
```

Time To Code



while Loop

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

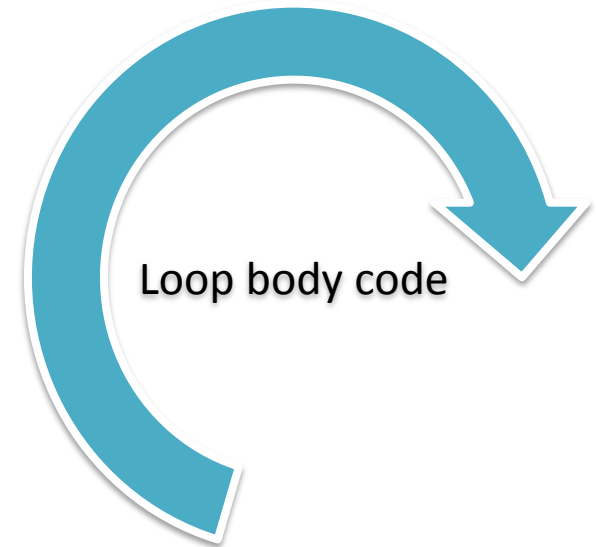
Syntax:

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

Example

```
int x=0;  
  
while (x != 10)  
{  
    printf("Try Again");  
    scanf("%d", &x);  
}
```

*Apply this code as long
as the condition is true*



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

Write C code that ask will ask the user to enter the result of 3×4 , 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



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



do while Loop

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

Syntax:

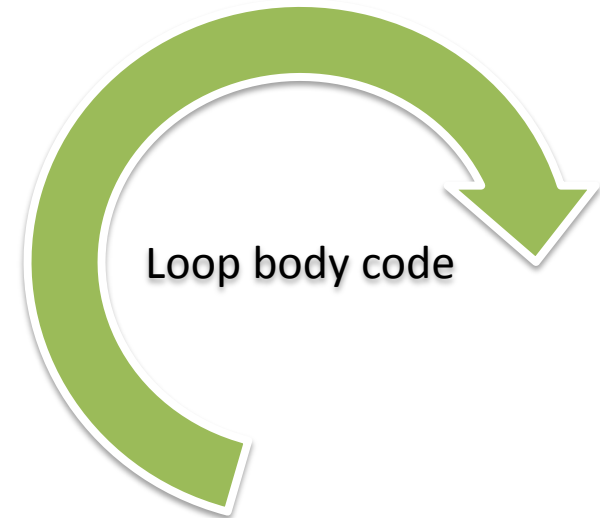
```
do
{
    loop body statements
} while ( condition );
```

Example

```
int x=1;

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

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



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

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



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)  ← infinite loop
{
    scanf ("%d", &x) ;

    if (x==1)  ← break the loop in case
                the user enters 1
        break;
}
```

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

Example

```
for(i=1; i<10;i++)
{
    if (i==6)  ← print all numbers from
                1 to 9 except 6
        continue;

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

The End ...

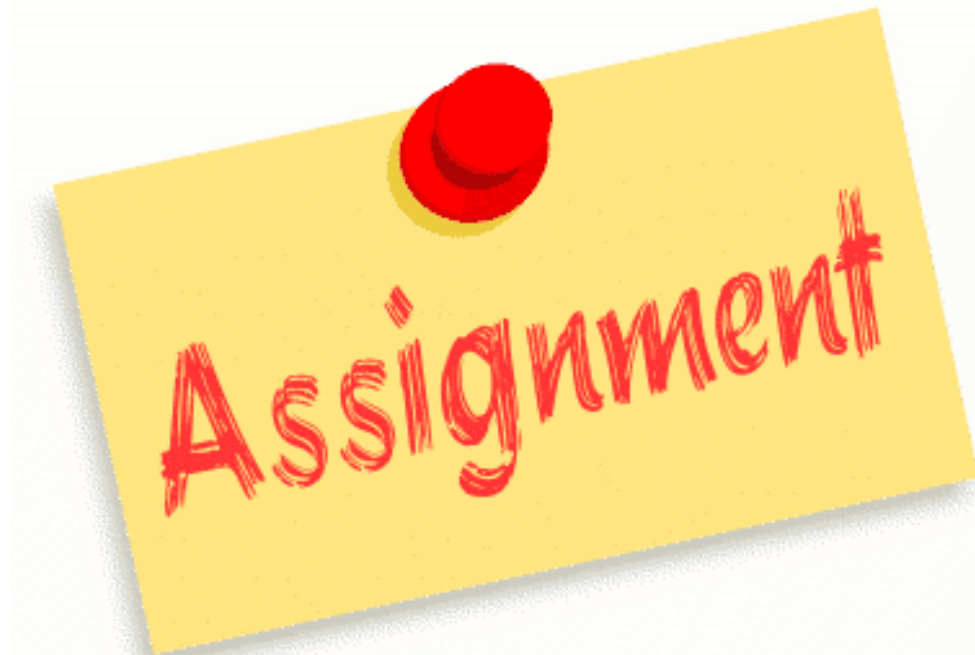


Assignment 1

Expected Output

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

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



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*

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
```

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



Assignment 3

Expected Output

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

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

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





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