



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**

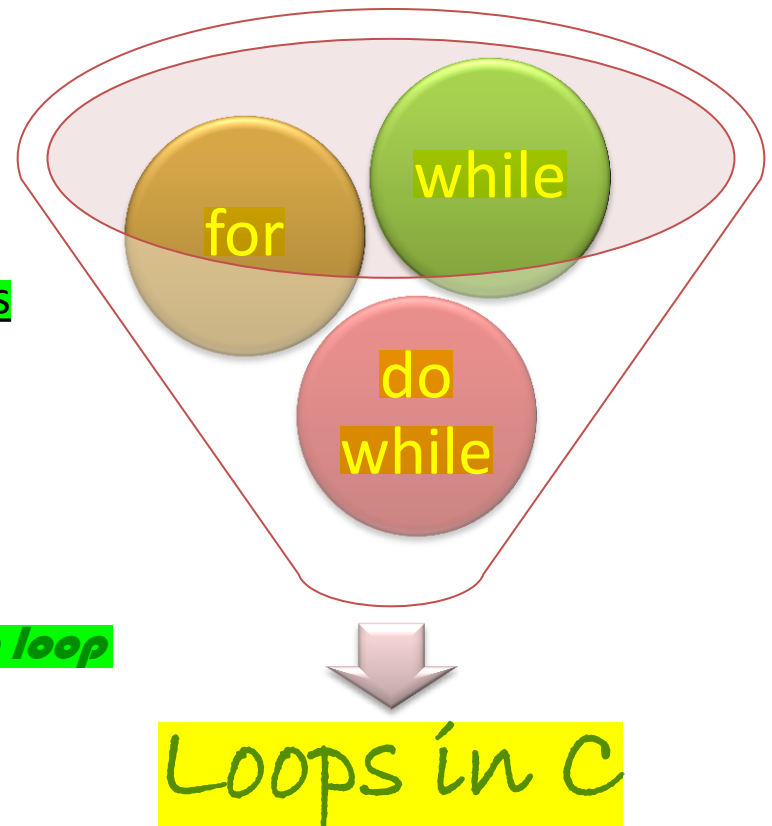
for ex: repeat a part of code for 10 times

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.

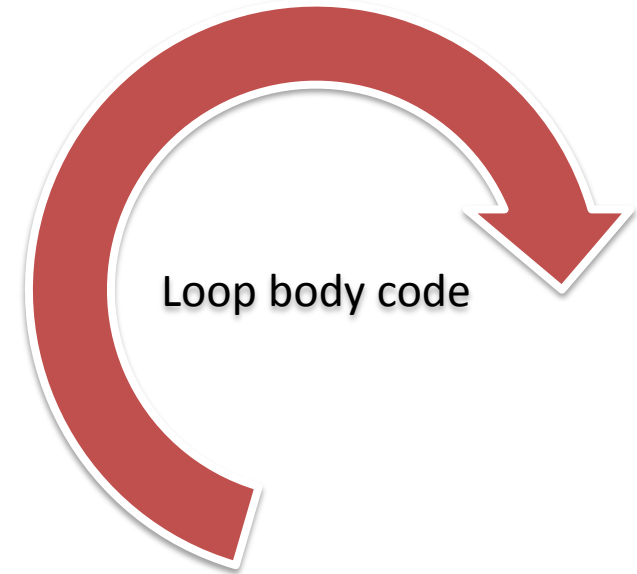
### Syntax:

```
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

```

1 //Author : @adilshah @adilshaham/
2 #include <stdio.h>
3 #include <stdlib.h>
4
5 int main(void)
6 {
7
8     int i, arr[10];
9     float avg, sum=0;
10
11     for(i=0; i<10; i++)
12     {
13         printf("Enter no %d:", i+1);
14         scanf("%d", &arr[i]);
15         sum+=arr[i];
16     }
17     avg=sum/10;
18
19     printf("sum is %0.2f ", sum);
20     printf("avg is %0.2f ", avg);
21
22

```

## 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

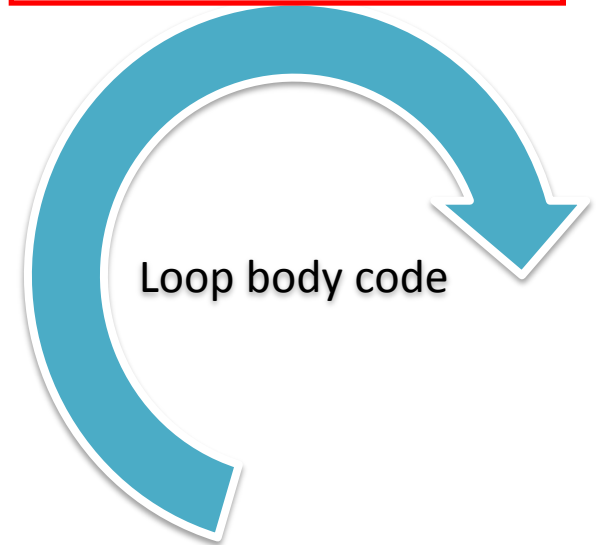
### Syntax:

```
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*

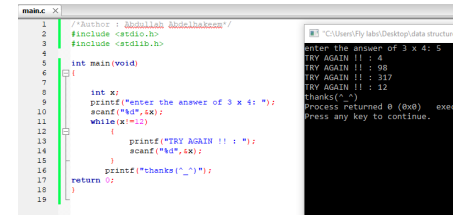


The code inside this loop will be repeated until the user enters 10, hence the condition will be false.

Write C code that ask will ask the user to enter the result of  $3 \times 4$ , 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
```



```
1  /*Author : @shubham @shubham*/
2  #include <stdio.h>
3  #include <stdlib.h>
4
5  int main(void)
6  {
7
8
9      int x;
10     printf("Enter the answer of 3 x 4: ");
11     scanf("%d", &x);
12     while(x != 5)
13     {
14         printf("TRY AGAIN !! : ");
15         scanf("%d", &x);
16     }
17     printf("Thanks!! : ");
18     return 0;
19 }
```

# Time To Code





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

```

1 // C program to display multiplication table of a given integer
2 #include <stdio.h>
3 #include <conio.h>
4
5 int main(void)
6 {
7     int i, n;
8     clrscr();
9     printf("Enter number which is want its table :");
10    scanf("%d", &n);
11    printf("Table of %d is\n", n);
12    for (i = 1; i <= 10; i++)
13        printf("%d X %d = %d\n", n, i, n*i);
14    getch();
15    return 0;
16 }

```

## 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:

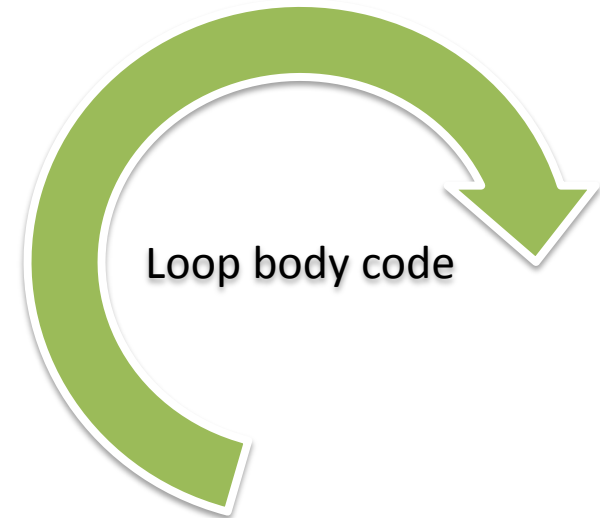
```
do
{
    loop body statements
} while ( condition );
```

### 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
```

```
//Factorial of a number using while loop
#include <stdio.h>
#include <conio.h>

int main(void)
{
    int n, i, fact=1;
    clrscr();
    printf("Enter a number whose factorial you want to find: ");
    scanf("%d", &n);
    while(n >= 1)
    {
        fact = fact * n;
        n--;
    }
    printf("Factorial of %d is %d\n", n+1, fact);
    getch();
}
```

# 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 ...

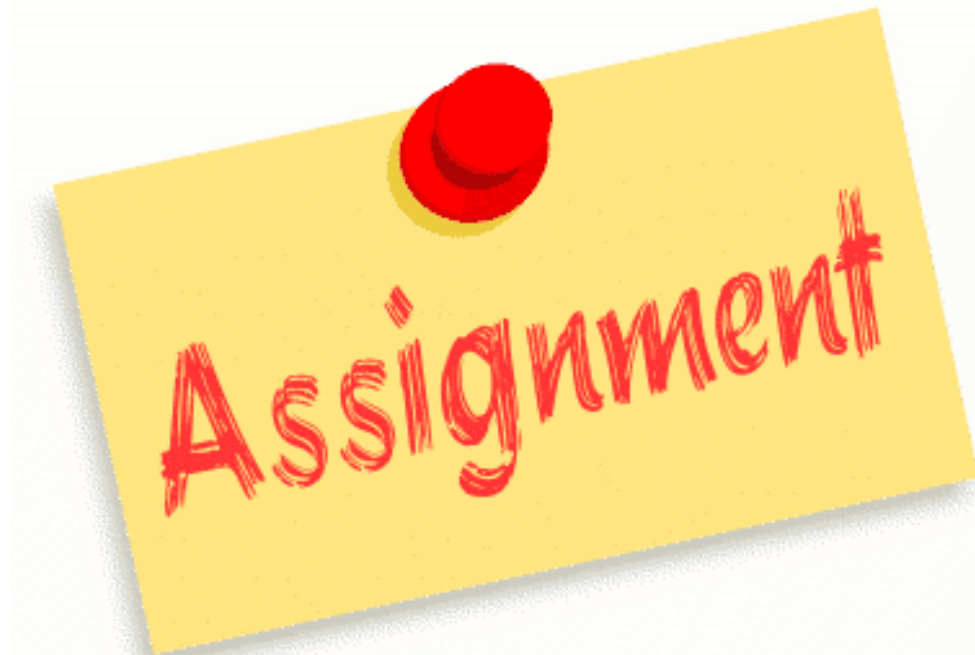


## Assignment 1

### 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

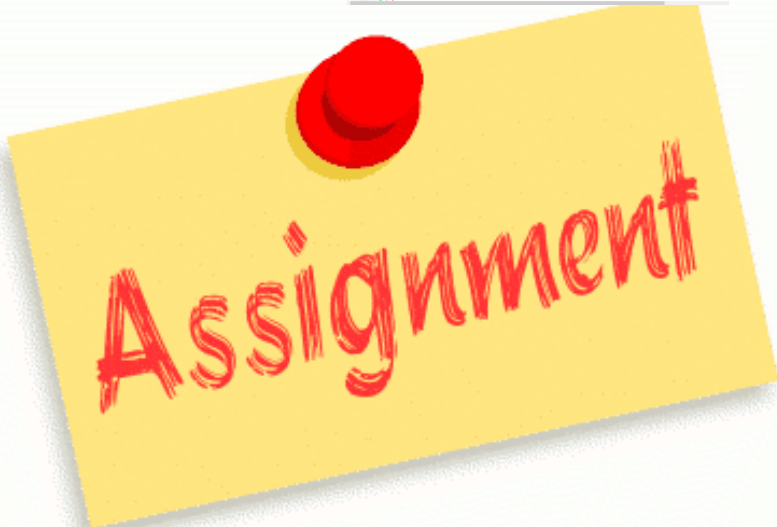
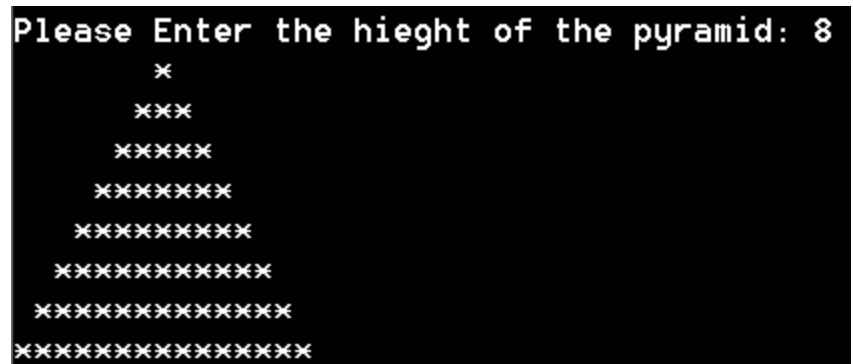
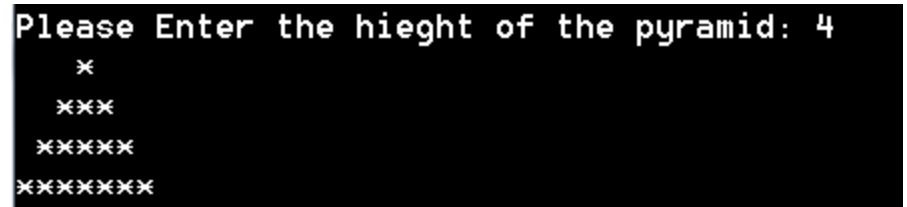
```
1 // login.c
2 #include <stdio.h>
3 #include <string.h>
4
5 int main(void)
6 {
7     int id, pass;
8     while(1)
9     {
10         printf("Please enter your ID: ");
11         scanf("%d", &id);
12         if(id == 1234)
13         {
14             printf("Please enter your password: ");
15             scanf("%d", &pass);
16             if(pass == 7788)
17             {
18                 printf("Welcome Ahmed\n");
19                 break;
20             }
21             else
22             {
23                 printf("Try again\n");
24                 continue;
25             }
26         }
27         else
28         {
29             printf("You are not registered\n");
30             continue;
31         }
32     }
33 }
```



## Assignment 3

### Expected Output

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

[illegible]





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