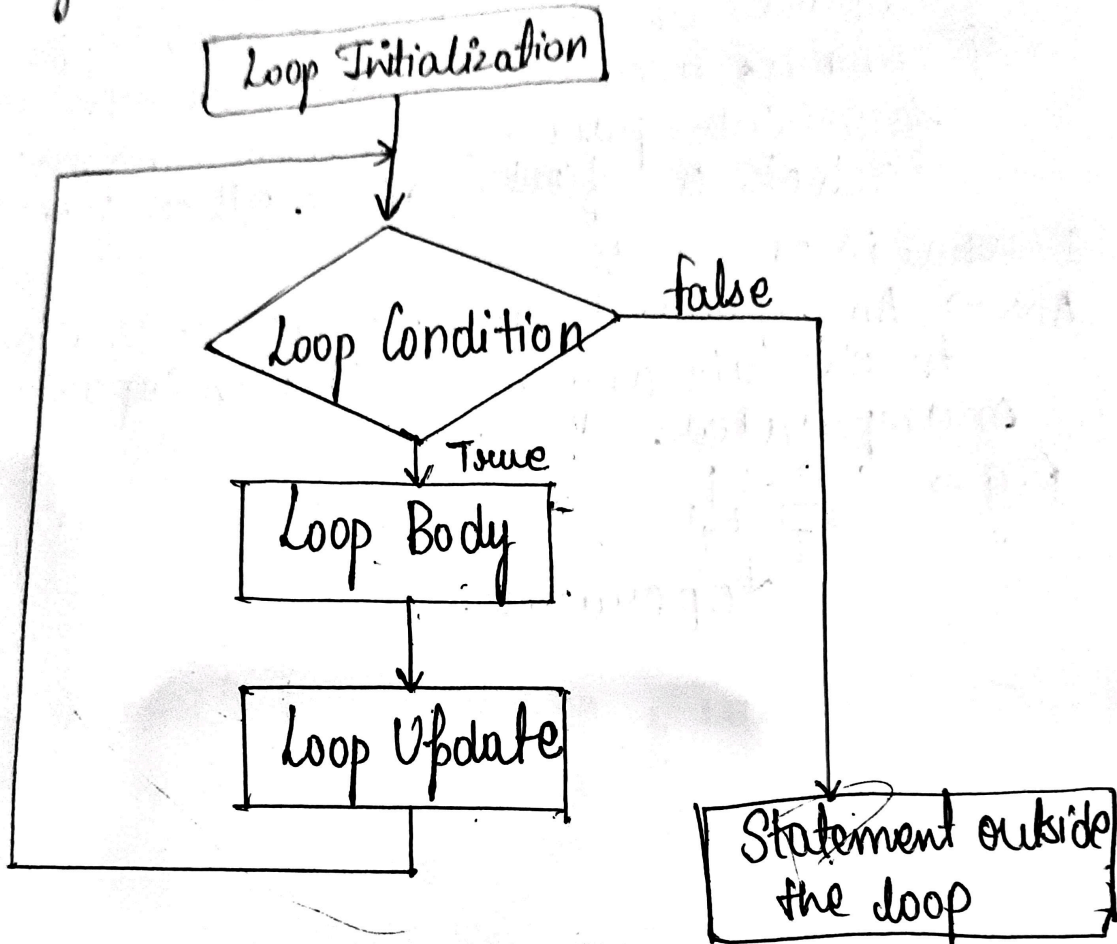


# Unit 2 Lesson 4 Loops

The looping can be defined as repeating the same process multiple times until a specific condition satisfies. It is known as iteration also.

- Loops
- Q- What is an iteration?
- Ans -> Types of loops:-

- a) Entry
- b) Exit Controlled

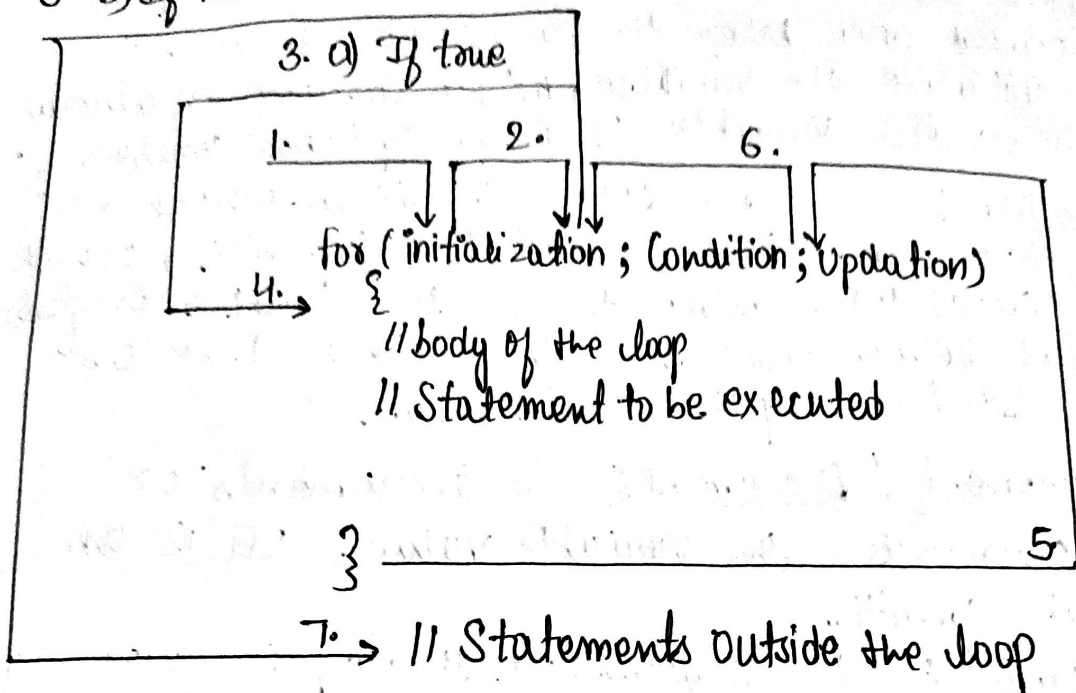


- for loop

```
Void main () {  
    for (int i=1; i <= 10; i++) {  
        Print f ("%d", i);  
    }  
}
```

## for Loop

3. b) If false



Syntax :

```
for (initialization ; Condition ; increment / decrement)
{
    // Statement or Statement or code to be executed
}
```

### • Parts of Loop

```
void main () {
    for (int i=1; i < 10; i++) {
        Print f ("%d", i);
    }
}
```

A simple for loop consists of four parts :-

- a) Initialization :- If is the initial condition which is executed once when the loop starts. Here, we can initialize the variable, or we can use an already initialized variable. If is an optional condition.
- b) Condition :- It is the second condition which is executed each time to test the condition which is executed each time to test the condition is false. If must return boolean value either true or false. If is an optional condition.
- c) Increment / Decrement :- It increments or decrements the variable value, If is an optional condition.
- d) Statement :- The statement of the loop is executed each time until the second condition is false.

→ Example of for loop

// Program to find the factorial of number

```
#include <stdio.h>
```

```
void main()
```

```
{ int n, f;
```

```
printf ("Enter number whose fact is required")
```

```
f = 1;
```

```
scanf ("%d", &n);
```

```
for (int i = 1, i <= n, i++)
```

```
f = f * i;
```

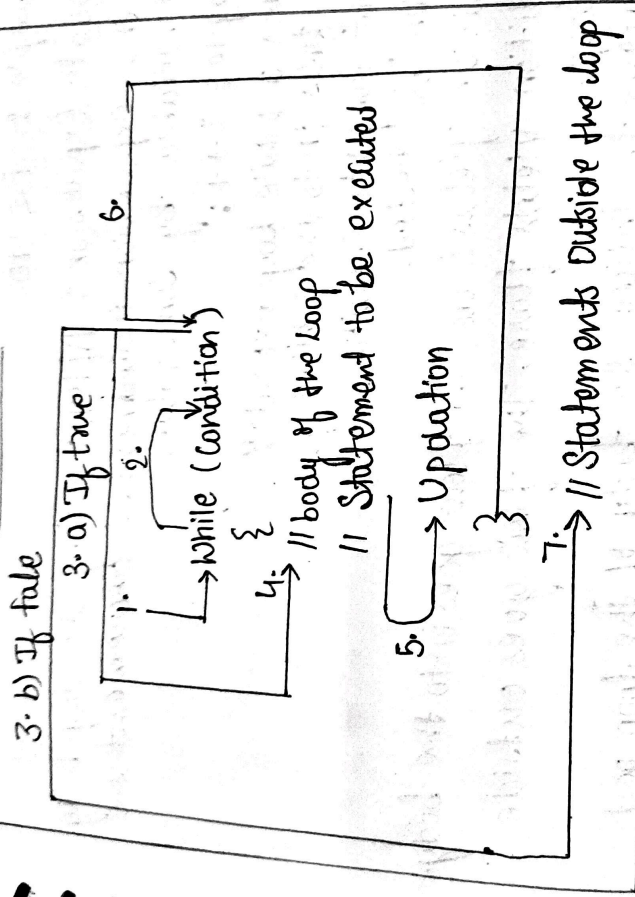
```
printf ("factorial = %d", f);
```

```
}
```

## while loop

1. Syntax of while loop
2. Parts of while loop
3. Infinite loop

### WHILE LOOP



→ Java while loop is a control flow statement that allows code to be executed repeatedly based on a given Boolean condition. The while loop can be thought of as a repeating if statement. While loop in Java comes into use when we need to repeatedly execute a block of statements. The while loop is considered as a repeating if statement. If the number of iterations is not fixed, it is recommended to use the while loop. ☺

The various parts of the while loop are?

1. Test Expression: In this expression, we have to test the condition. If the condition evaluates to true then we will execute the body of the loop and go to update expression. Otherwise, we will exit from the while loop.

Example:  $i < 10$ .

2. Update Expression: After executing the loop body, this expression increments/decrements the loop variable by some value.

Example:  $i++$ ;

• How does a while loop execute?

① Control falls in to the while loop.

② The flow jumps to condition.

③ Condition is tested.

④ If condition yields true, the flow goes into the body.

⑤ If condition yields false, the flow goes outside the loop.

⑥ The statements inside the body of the loop get executed.

⑦ Update taken place.

⑧ Control flows back to step 2.

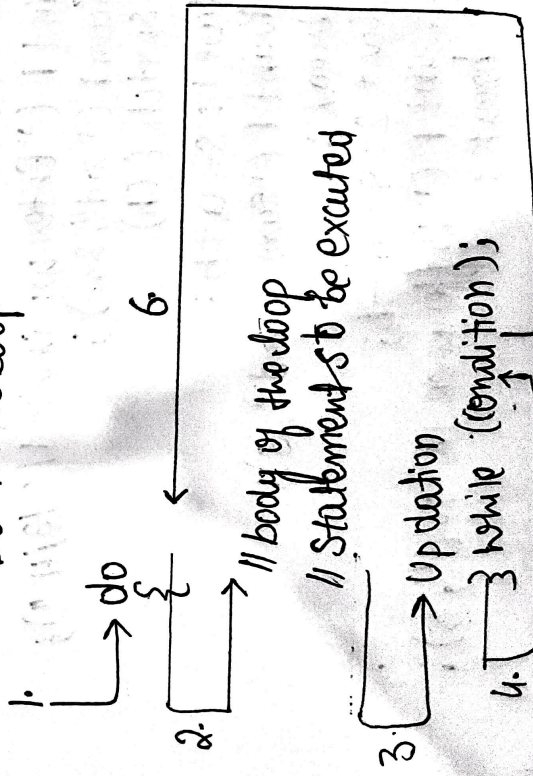
⑨ The while loop has ended and the flow has gone outside.

Example of while loop

```
// Program to find the reverse of number
#include <iostream.h>
void main()
{
    int n, d, r=0;
    printf("Enter number");
    scanf("%d", &n);
    printf("Reverse of number");
    while (n!=0)
    {
        d = n%10;
        r = r*10 + d;
        n = n/10;
    }
    printf("Reverse of number = %d", r);
}
```

Do-while loop

Do-while loop



5. a) True

5. b) If flow → Statements outside the loop

## Syntax of do while loop

```
do
{
    // Loop Body
    Update - expression
}
// Condition check
while (text - expression);
```

## Example of do while loop

```
void main ()
{
    int a, b, s, ch;
    printf ("Enter 2 number");
    scanf ("%d %d", &a, &b);
    do
    {
        printf ("1 : sum");
        printf (" 2 : Difference");
        printf (" 3 : Product");
        printf (" 4 : division");
        printf ("Enter ur choice 1/2/3/4 ");
        scanf ("%d", &n);
        switch (ch)
        {
            case 1: s = a + b;
                printf ("Sum is %d", s);
                break;
            case 2: s = a - b;
                printf ("Difference is %d", s);
                break;
```

Case 3:  $s = a * b;$

printf ("Product is %d", s);

break;

Case 4:  $s = a / b;$

printf ("Division is %d", s);

break;

default: printf ("invalid choice"); } }

while (ch < 5; } }



## Unit 2 Lesson -> 6 Nested Loops

- What is nested loops  
nesting of

1. Outer loop
2. Inner loop

Outer loop

{

Inner-loop

{

// Inner loop statements.

}

// Outer Loop statements.

}

C supports nesting of loops in C. Nesting of loops is the features in C that allows the looping of statements inside another loop.

Any number of loops can be defined inside another loop, i.e., there is no restriction for defining any number of loops. The nesting level can be defined at n times. You can define any the type of loop inside another loop;

For Example, you can define 'while' loop inside a 'for' loop.

Outer loop and Inner loop are the valid loops that can be a 'for' loop; 'while' loop or 'do-while' loops.

### Example of Nested of Loops

```
#include <stdio.h>
int void main()
{
    int n; // variable declaration
    printf("Enter the value of n:");
    // Displaying that n tables.
    for (int i=1; i<=n; i++) // outer loop
    {
        for (int j=1; j<=10; j++) // inner loop
        {
            printf("%d\t", (i*j)); // printing the value.
        }
        printf("\n");
    }
}
```

### • Nested loops for

The nested for loop means any type of loop which is defined inside the 'for' loop.

```
*
* *
* * *
* * * *
* * * * *
```

```
for (int i=1; i<=5; i++)
{
    for (int j=1; j<=1; j++)
        printf("*");
    printf("\n");
}
```

• Nested while loop

The nested while loop means any type of loop which is defined inside the 'while' loop.

```
2 4 6 8 10
2 4 6 8
2 4 6
2 4
```

```
i = 10;
while (i >= 2)
```

```
{
  j = 2;
  while (j <= i)
```

```
{
  printf("%d");
```

```
  j += 2;
```

```
  printf("\n");
```

```
  i = 8;
```

```
}
```

• Nested do while loop

The nested while loop means any type of loop which is defined inside the 'do while' loop.