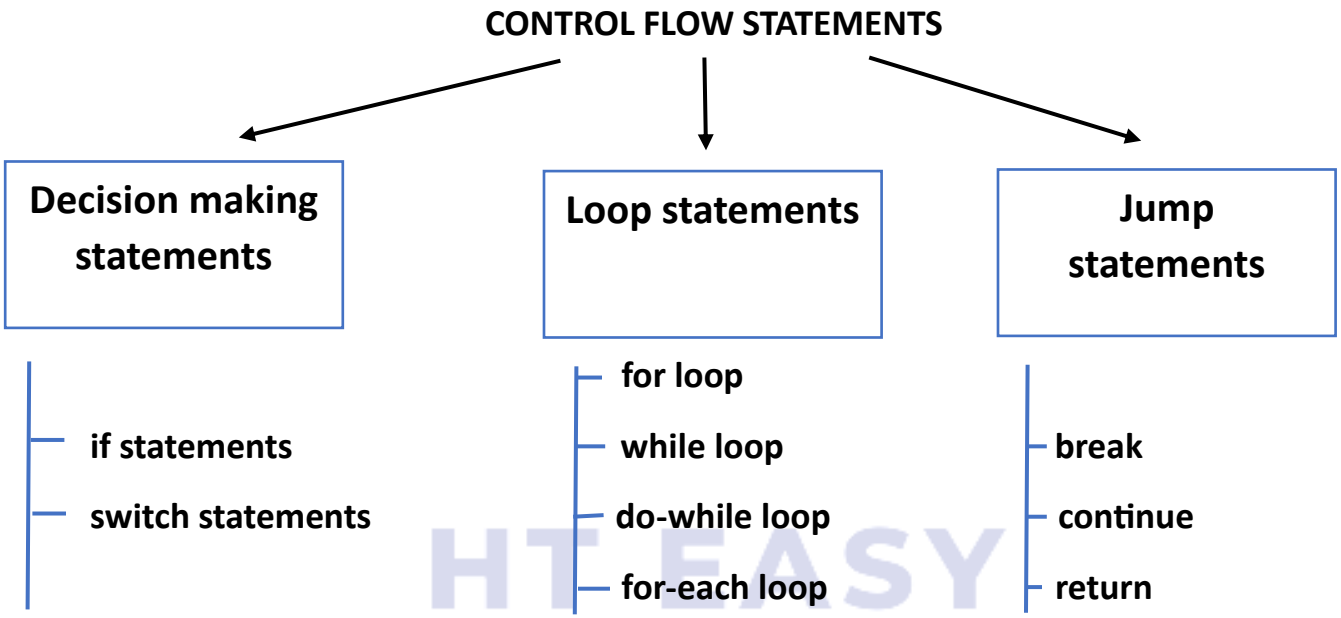
CORE JAVA

JAVA CONTROL STATEMENTS-



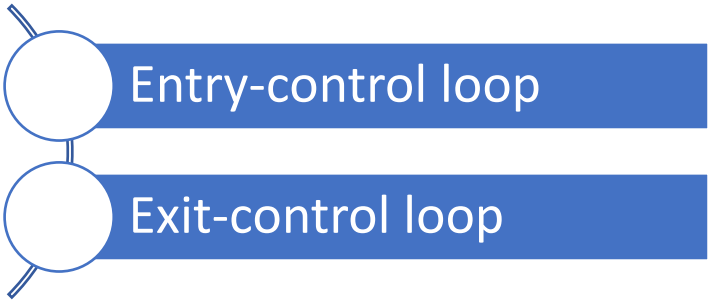
Loop Statements-

When we want to execute certain block of code repeatedly, based on some **condition** then we use Loop statements.

They allow us to perform tasks repeatedly.

Loop statements are very important and are used in almost every Java Program. They are used for controlling the flow of a program and performing repetitive tasks efficiently.

Types of Loop statements-



1.Entry-Control loop-

In entry-control loops, the condition is checked **before** the loop body is executed. If the condition is true, the loop body is executed. If the condition is false, that means the body of the loop will never get executed.

Examples of entry-controlled loops:

- for loop
- while loop

2.Exit-Control loop-

In **exit-controlled** loops, the condition is checked **after** the loop body has been executed at least once. This means that even if the condition is false, the loop body will execute at least one time before terminating.

Example of Exit-control loop-

- do-while loop

In this chapter, we are going to learn **for loop** in detail.

For loop-

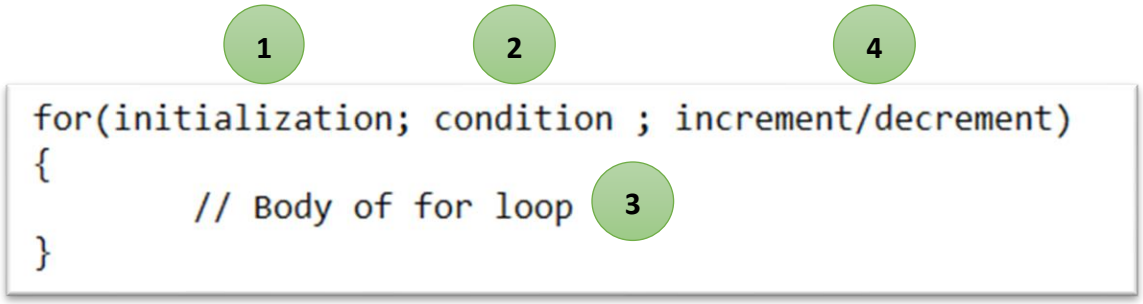
The for loop is one of the most commonly used loops in Java. It's used when we know in advance how many times we want to execute a block of code.

For- loop is an entry-control loop, that means the condition is checked first and if the condition is true, then only the body of the for loop is executed.

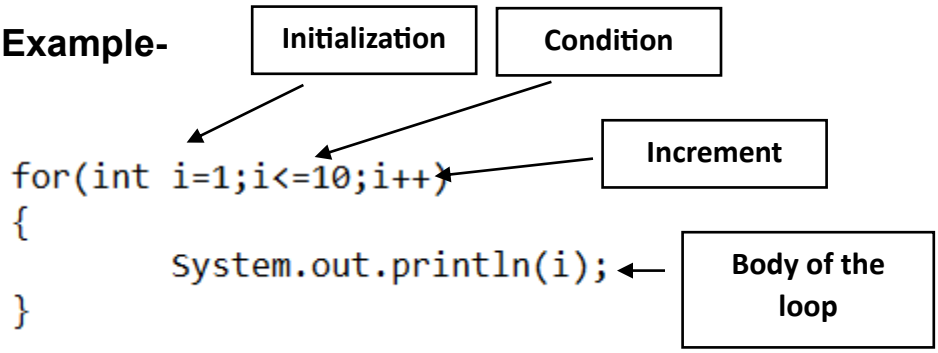
For loop Syntax-

```
for(initialization; condition ; increment/decrement)
{
        // Body of for loop
}
```

- initialization: This part of the loop only executes once before the loop starts. It is used to initialize the loop variable with a starting value.
- Condition: As loop gets executed repeatedly, the condition is checked every time and if it is true then only the body of the loop get executed.
- Increment/decrement(update): After each iteration of loop this part gets executed.



Example-



Now let's understand what is happening in the above example and what will be the output.

1. i is initialized with value 1. i =1

2. Then checked if i<=10. So, 1<=10, the condition returns true.

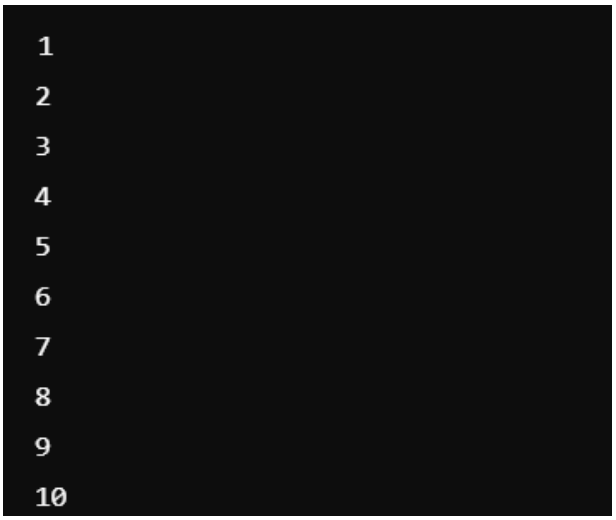
3. The condition is true that means the body of the loop gets executed. And it prints value of i (1) on the console.

4. Then the value of i is increment by 1.

   i++ so, the value of i is now 2.

5. Then it checks the condition again 2<=10, the condition returns true and again the body gets executed and prints 2 on the console. And the repetition continues until the condition becomes false at 11<=10.

Output of the above program-



```
for (int i=1 ; i<=10 ; i++)
{
    System.out.println(i);
}
```

(1) (2) (4) (3)

1) i=1 1<=10 ✓ print 1 i++ i=2

2) i=2 2<=10 ✓ print 2 i++ i=i+1 = 2+1 = 3

3) i=3 3<=10 ✓ print 3 i++ i=4

4) i=4 4<=10 ✓ print 4 i++ i=5

5) i=5 5<=10 ✓ print 5 i++ i=6

6) i=6 6<=10 ✓ print 6 i++ i=7

7) i=7 7<=10 ✓ print 7 i++ i=8

8) i=8 8<=10 ✓ print 8 i++ i=9

9) i=9 9<=10 ✓ print 9 i++ i=10

10) i=10 10<=10 ✓ print 10 i++ i=11

11) i=11 11<=10 ✗ come out of the loop

Que - What will be the value of i, if we print it outside of the loop?

Let's see what will be the value of **i**, if we print it outside of the loop.

Loop1 - Notepad

File Edit Format View Help

```
public class Loop1
{
        public static void main(String args[])
        {
                for(int i=1;i<=10;i++)
                {
                        System.out.println(i);
                }
                System.out.println(i);
        }
}
```

We will get a compile time error in the above program, the reason is **"i"** is a local variable of the for loop, we can access it inside the for-loop body but not outside of it.

```
C:\Users\LENOVO\Documents\java_practical>javac Loop1.java
Loop1.java:9: error: cannot find symbol
                System.out.println(i);
                                   ^
  symbol:   variable i
  location: class Loop1
1 error
```

But what if we first declare **i** variable above the for loop, then what will be the output-

Loop1 - Notepad

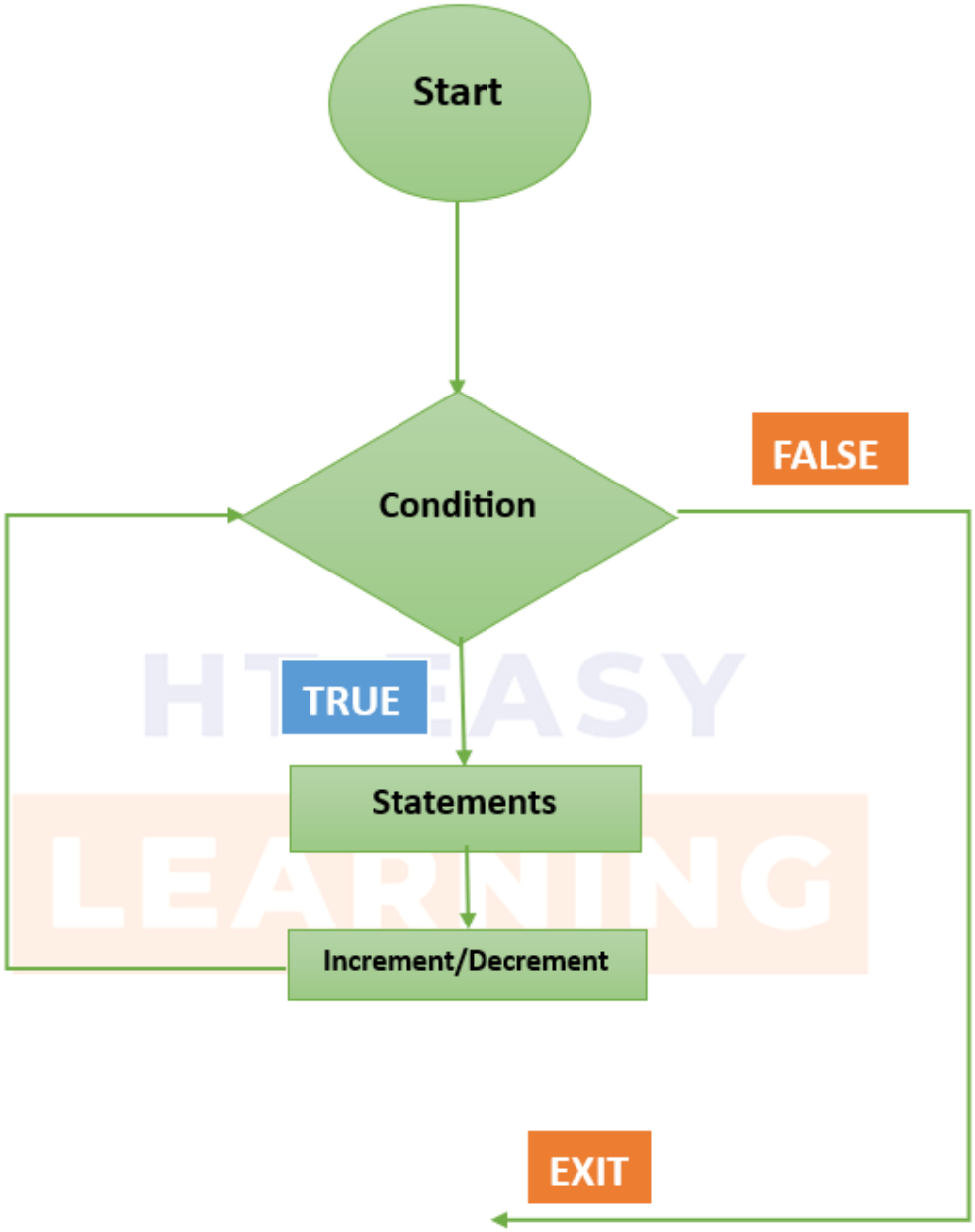
File Edit Format View Help

```
public class Loop1
{
        public static void main(String args[])
        {
                int i;
                for(i=1;i<=10;i++)
                {
                        System.out.println(i);
                }
                System.out.println("Value of i after loop:"+i);
        }
}
```


Output-

```
C:\Users\LENOVO\Documents\java_practical>java Loop1
1
2
3
4
5
6
7
8
9
10
Value of i after loop:11
```

Flowchart


Start
Condition
FALSE
TRUE
Statements
Increment/Decrement
EXIT

Practical 1: Printing numbers from 1 to n.

ForLoop1 - Notepad

File Edit Format View Help

```
import java.util.Scanner;
public class ForLoop1{
        public static void main(String args[])
        {
                Scanner s=new Scanner(System.in);
                System.out.print("Enter last number:");
                int n=s.nextInt();

                for(int i=1;i<=n;i++)
                {
                        System.out.print(i+" ");
                }
        }
}
```


Output-

```
C:\Users\LENOVO\Documents\javacoursepractical>javac ForLoop1.java

C:\Users\LENOVO\Documents\javacoursepractical>java ForLoop1
Enter last number:10
1 2 3 4 5 6 7 8 9 10
```

Practical 2: Sum of first n numbers.

ForLoop2 - Notepad

File Edit Format View Help

```
// Sum of first n numbers
import java.util.Scanner;
public class ForLoop2{
        public static void main(String args[])
        {
                Scanner s=new Scanner(System.in);
                System.out.print("Enter last number:");
                int n=s.nextInt();

                int sum=0;
                for(int i=1;i<=n;i++)
                {
                        sum=sum+i;
                    // sum+=i;
                }
                System.out.println("Sum of numbers:"+sum);
        }
}
```

Output-

```
C:\Users\LENOVO\Documents\javacoursepractical>javac ForLoop2.java

C:\Users\LENOVO\Documents\javacoursepractical>java ForLoop2
Enter last number:5
Sum of numbers:15
```

Practical 3: Print all even numbers till n.

ForLoop3 - Notepad

File Edit Format View Help

```
import java.util.Scanner;
public class ForLoop3{
        public static void main(String args[])
        {
                Scanner s=new Scanner(System.in);
                System.out.print("Enter last number:");
                int n=s.nextInt();

                System.out.println("Even numbers upto "+n+" :");
                for(int i=1;i<=n;i++)
                {
                        if(i%2==0)
                        {
                                System.out.print(i+" ");
                        }
                }

                s.close();
        }
}
```

Output:

```
C:\Users\LENOVO\Documents\javacoursepractical>javac ForLoop3.java

C:\Users\LENOVO\Documents\javacoursepractical>java ForLoop3
Enter last number:20
Even numbers upto 20 :
2 4 6 8 10 12 14 16 18 20
```

HOMEWORK QUESTION:

Print all odd numbers till n.

In the next chapter, we are going to solve and learn some more questions where we will be using for loop.