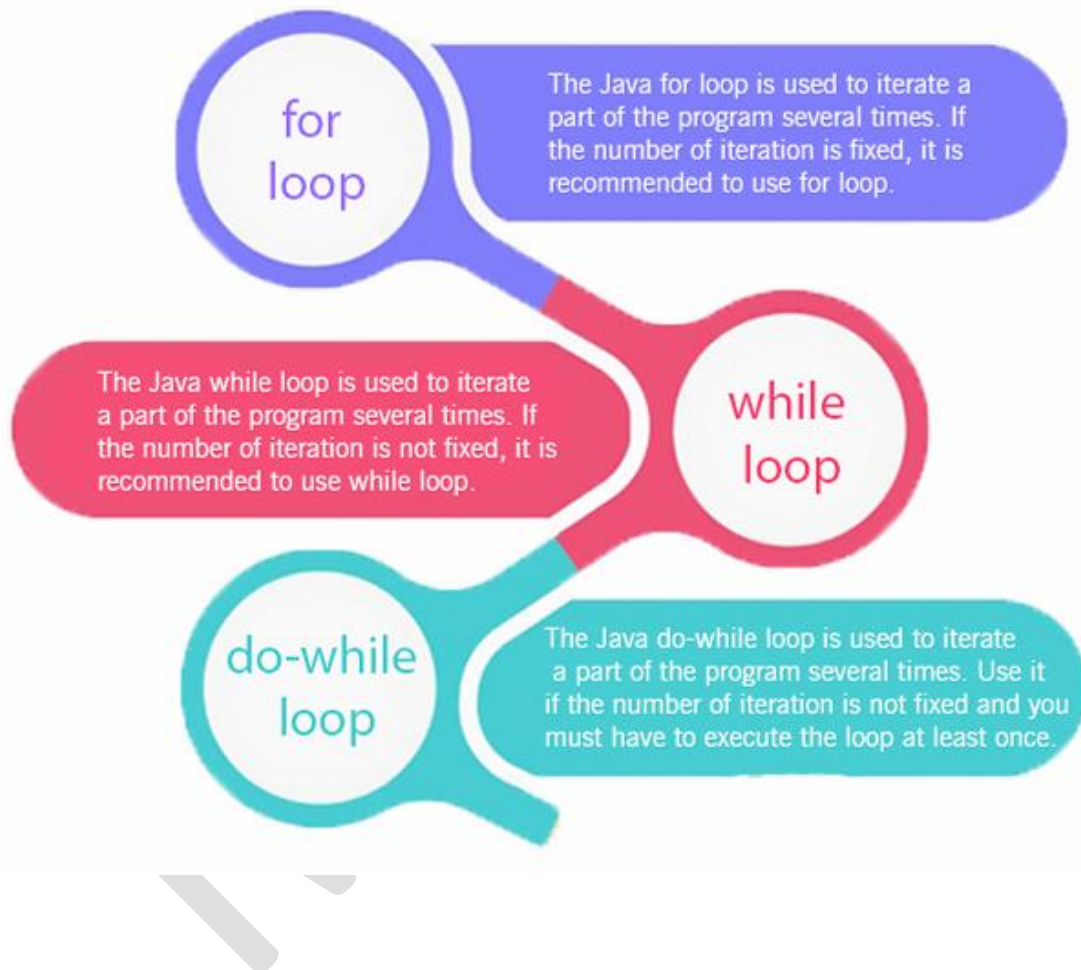## Loops in Java

- The Java for loop is used to iterate a part of the program several times. If the number of iteration is fixed, it is recommended to use for loop.
- There are three types of for loops in Java.

for loop

The Java for loop is used to iterate a part of the program several times. If the number of iteration is fixed, it is recommended to use for loop.

The Java while loop is used to iterate a part of the program several times. If the number of iteration is not fixed, it is recommended to use while loop.

while loop

do-while loop

The Java do-while loop is used to iterate a part of the program several times. Use it if the number of iteration is not fixed and you must have to execute the loop at least once.

Java Simple for Loop
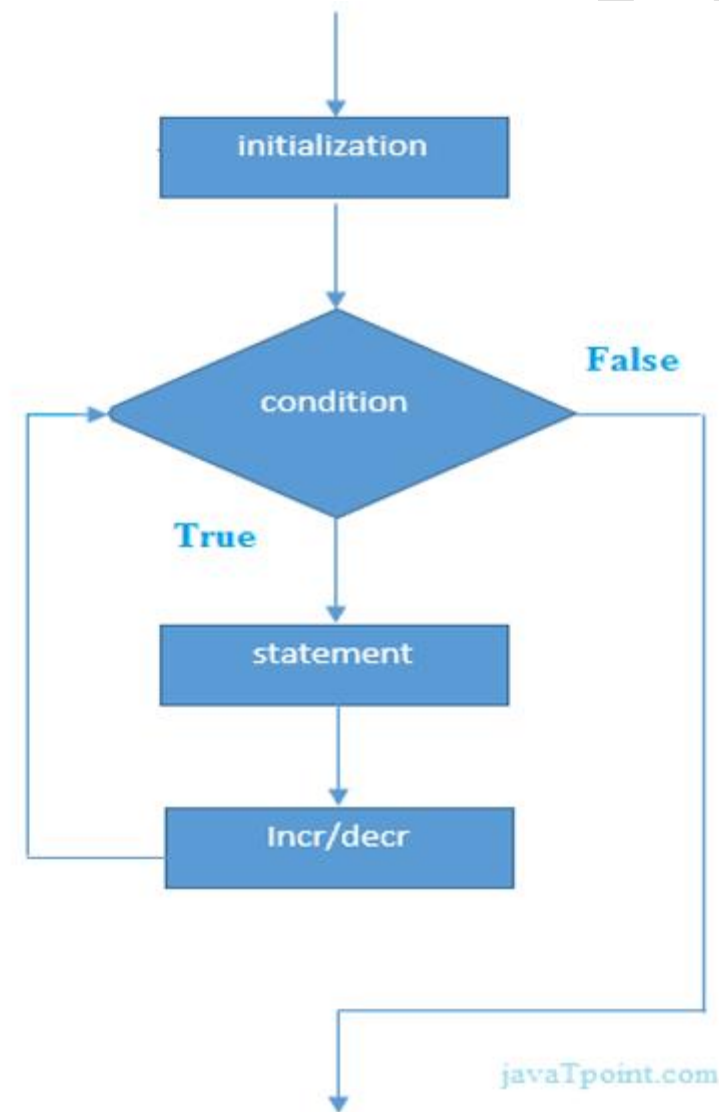
It consists of four parts

1. **Initialization:** It 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. It is an optional condition.

2. **Condition:** It is the second condition which is executed each time to test the condition of the loop. It continues execution until the condition is false. It must return boolean value either true or false. It is an optional condition.

3. **Increment/ Decrement:** It increments or decrements the variable value. It is an optional condition.

4. **Statement:** The statement of the loop is executed each time until the second condition is false.

Syntax

for (initialization; condition; increment/decrement) {

    //statement or code to be executed

}

Example # 1:

Write a program in Java to print the numbers between (1 to 10)?

The code is:

```java
public class ForLoopPrint1To10{
        public static void main(String[]args){
        //Code of Java for loop
        for(int i=1;i<=10;i++){
        System.out.println(i);
        }
        } }
```

Output:

1

2

3

4

5

6

7

8

9

10

Example # 2:

Write a program in Java to print even numbers between (1 to 10)?

The code is:

```java
public class ForLoopEvenNumbers {

    public static void main(String[] args) {

        for ( int i = 1; i <= 10; i++ )
        {

            if (i % 2==0)

                System.out.print(i+" ");

        }

    }
}
```

Output: 2 4 6 8 10

Another Solution

```java
public class ForLoopExample2 {

public static void main( String[] args )

{

for ( int i = 2; i <= 10; i=i+2 )

}

System.out.print(i+" ");

} } }
```

Example # 3:

Write a program in Java to find the summation odd numbers between (1 to 100)?

The code is:

```java
public class SummationOddNumbers {
    public static void main(String[] args) {
        int sum = 0;
        for ( int j = 1; j <= 100; j++ ) {
            if (j % 2 != 0)
                sum = sum + j;
        }
                System.out.print("The summation is "+ sum);


    }
}
```
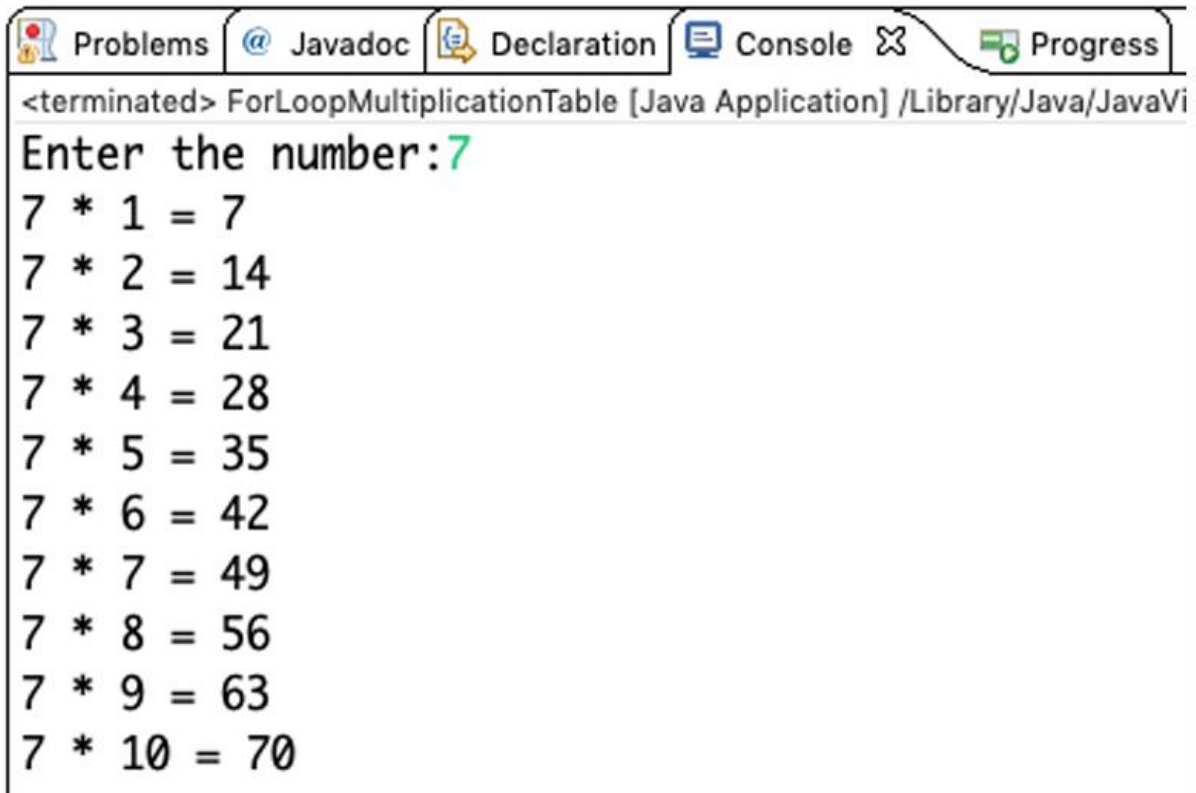
Output: The summation is 2500

Example # 4:

Write a program in Java to print the Multiplication table of any number?

The code is:

```java
import java.util.Scanner;
public class MultiplicationTable {
    public static void main(String[] args) {
        Scanner reader = new Scanner(System.in);
                System.out.print("Enter the Number:");
                int n=reader.nextInt();
                for(int i=1; i <= 10; i++)
            { System.out.println(n+" * "+ i +" = " + n * i);
                }
    }
}
```

Output:

```
Problems  @ Javadoc  Declaration  Console ☒  Progress
<terminated> ForLoopMultiplicationTable [Java Application] /Library/Java/JavaVi
Enter the number:7
7 * 1 = 7
7 * 2 = 14
7 * 3 = 21
7 * 4 = 28
7 * 5 = 35
7 * 6 = 42
7 * 7 = 49
7 * 8 = 56
7 * 9 = 63
7 * 10 = 70
```
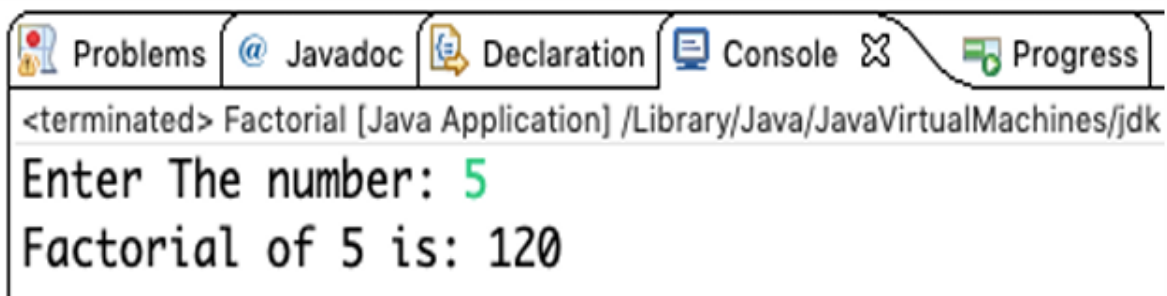
Example # 5:

Write a program in Java to find the factorial of any number?

The code is:

```java
import java.util.Scanner;
public class Factorial {
    public static void main(String[] args) {
        int i,fact = 1;
        Scanner scanner = new Scanner( System.in );
        System.out.print( "Enter The Number: " );
        int number = scanner.nextInt();
        for(i = 1; i <= number; i++)
        {
            fact = fact * i;
        }
    System.out.println("Factorial of "+number+" is: "+fact);
    }
}
```

```
Problems  @ Javadoc  Declaration  Console ☒  Progress
<terminated> Factorial [Java Application] /Library/Java/JavaVirtualMachines/jdk
Enter The number: 5
Factorial of 5 is: 120
```

9

Java Nested for Loop

- If we have a for loop inside the another loop, it is known as nested for loop. The inner loop executes completely whenever outer loop executes.

Example # 6:

What is the output of the following program?

The code is:

```java
public class NestedForExample {
    public static void main(String[] args) {
    // loop of i
        for(int i = 1; i <= 3; i++){
    // loop of j
            for(int j = 1; j <= 3; j++){
                System.out.println(i+ " " + j);
            }   // end of i
        }       // end of j
    }
}
```

output:
```
1 1
1 2
1 3
2 1
2 2
2 3
3 1
3 2
3 3
```

10

Example # 7:

Write a program in Java to print the following pattern?

1

1 2

1 2 3

1 2 3 4

1 2 3 4 5

1 2 3 4 5 6

The code is:

```java
public class ForLoopPattern {
    public static void main(String[] args) {
        int i,j;
        for (i= 1; i<= 6; i++)
        {
            for (j = 1; j <= i; j++)
            {
                System.out.print(j + " ");
            }
            System.out.println();  }
    }
}
```

Homework:

1. Write a program in Java to calculate the power of a number using for loop.
2. Write a program in Java to check if a number is prime or not.
3. Write a program in Java to print the following pattern.

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

4. Write a program in Java to print the following pattern

2   4   8   16   32   64   128

Thank You

د. محمد رضا الكعبي

Mobile: 07801582655

E-mail: mridha.hamoodi@uokufa.edu.iq

" انصح ولا تفضح، وعاتب دون أن تجرح، عامل الشخص على حاضره

وليس ماضيه، وعلى عقله وليس عمره، وإن لم تنفع أحد فلا تضره "