Loops

- A loop is a sequence of instructions that is continually repeated until a certain condition is reached.
- Loops are handy because they save time and make code more readable.
- There are for loop, while loop, and do while loop

When to use for loop and while loop ?

- When we know how many time the loop is going to run then use for loop
- And when we don't know how many time the loop is going to run then use while loop

Java For Loop

When you know exactly how many times you want to loop through a block of code, use the `for` loop instead of a `while` loop:

Syntax

```
for (statement 1; statement 2; statement 3) {

  // block of code to be executed

}
```

First Program

```
package Loops_for;

import java.util.Scanner;

//print no from 1 - 5
public class Loops {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int num = sc.nextInt();
        for (int i = 1; i<=num; i++) {
            System.out.print(i+" ");
        }
    }
}
```

Fibonacci series

```java
package Loops_for;

import java.util.Scanner;

public class Fibonacci {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter a number: ");
        int num = sc.nextInt();

        int a = 0;
        int b = 1;

        for (int i = 1 ; i <= num-2 ; i++) {
            int fibo = a + b;
            a = b;
            b = fibo;
            System.out.println(fibo);
        }
    }
}
```

Sum of Natural Number

```java
package Loops_for;

import java.util.Scanner;

public class SumNumber {

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter a number: ");
        int num = sc.nextInt();

        int sum = 0;
        for (int i = 1 ; i<=num ; i++) {
            sum+=i;
        }
        System.out.println(sum);
    }
}
```

Table of N number

```java
package Loops_for;

import java.util.Scanner;

public class Table {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter a number: ");
```

```
        int num = sc.nextInt();

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

Java While Loop

A while loop evaluates the condition. If the condition is True , the code inside the while loop is executed. This process continues until the condition is False.

Syntax

```
while (condition) {

  // block of code to be executed

}
```

First Code

```
package Loops_while;

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

Count occurance of number

```java
package Loops_while;

import java.util.Scanner;

public class CountOccurance {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter a number");
        int num = 83457377;

        int count = 0;
        while(num > 0) {

            int rem = num % 10;

            if (rem == 1) {
                count++;
            }
            num /= 10;
        }
        System.out.println(count);
    }
}
```

Print Fibonacci number

```java
package Loops_while;

import java.util.Scanner;

public class Fibonacci {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("enter a number");
        int num = sc.nextInt();

        int a = 0;
        int b = 1;
        int count = 2;

        while (count <= num){
            int fibo = a + b;
            System.out.println(fibo);
            a = b;
            b = fibo;
            count++;
        }
    }
}
```

Reverse the number

```
package Loops_while;

public class ReverseNumber {
    public static void main(String[] args) {
        int num = 123456789;
        int ans=0;
        while (num > 0) {
            int rem = num % 10;
            num = num / 10;
            ans  = ans * 10 + rem;

        }
        System.out.println(ans);

    }
}
```

The Do/While Loop

The do/while loop is a variant of while loop. But the fact is that the loop will execute atleast once, before checking the condition is true.

Syntax

```
do {
  // code block to be executed
}
while (condition);
```

```
package Loops_dowhile;

public class Loops {
    public static void main(String[] args) {
        int num = 1;
        do {
            System.out.println("hello world");
            num++;
        }while (num != 4);

    }
}
```