LOOPS

- Loops are repeating statements.
- There are four types of loops.
- In loops the steps are repeated till the given condition is reached.

WHILE, DO.....WHILE LOOP

- **While loop:**

→syntax: while(condition)

```
{
  ----------
  ----------
}
```

Example program

```
class Test
{
   Public static void main(string args[])
   {
     int i=1,n=100;
     while(i<n)
     {
       System.out.println(i);
       i=i*2;
     }
   }
}
```

- The steps are executed if the condition is true.
- The condition is checked first and the process is followed.
- It is a pre-tested loop
- If the condition is false then the process is never executed.
- **Do...while loop**

→syntax: do

{

}while(condition)

```
class test
{
  public static void main(string args[])
  {
    int i=1,n=100;
    Do
    {
       System.out.println(i);
       i=i*2;
    }while(i<n)
```

- First the process is followed and then the condition is checked.
- It is a post-tested loop.
- If the condition is false then the process is executed atleast once.
- The both loops work for the same purpose.
- But do....while loop is more suitable than while loop.

For loop:

- For loop is a counter controlled loop.
- It is the most frequently used loop.
- Syntax: for(initialization; condition; updation)

{

}

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

- At first step a variable is initialised.
- At next step the condition Is checked.
- At third step the body is executed.
- At fourth step the updation is done.

Nested loop:

- For loop inside a for loop is he example of nested loop.
- The above one is used commonly.
- The working of the body is more than one dimensional.
- Nesting of any two types of loops can be done.
- Nested for loop may create the dimensional loops.

Example program for nested for loop

```
class test
{
  public static void main(string args[])
  {
    for(int i=1;i<5;i++)
    {
      for(int j=1;j<5;j++)
      {
         System.out.println(i+","+j);
      }
    }
  }
}
```

```java
package loopppractice;

public class LoopPractice {

    public static void main(String[] args) {

        //int i=1;//100
        /*while(i<100)
        {
            System.out.println(i);
            i=i*2;
        }*/

        /*do
        {
            System.out.println(i);
            i=i*2;
        }while(i<100);*/

        /*byte i=1;
        while(true)
        {
            System.out.println(i);
            i++;
        }*/

        byte i=1;

        if(true)
        {
            System.out.println(i);
            i++;
        }
        else
            System.out.println("Bye");
    }

}
```

```java
package looppractice1;

public class LoopPractice1 {

    public static void main(String[] args) {
        //for(int i=0;i<=10;i++)
        //for(int i=0;i>0;i--)

        //int i=0;
        //for(System.out.println("Hi");i<=10;i++)
        //for(;;)

        for(int i=0,j=1;i<=10;i++,j=j*2)
        {
            System.out.println(i);
        }
    }

}
```

```java
package scloop1;

import java.util.*;

public class SCLoop1
{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);

        System.out.println("Enter a Number");
        int n=sc.nextInt();

        long fact=1;

        for(int i=1;i<=n;i++)
        {
            fact=fact*i;
        }

        System.out.println("Factorial is "+fact);

    }

```

```
/* Sum of n Natural Numbers
public static void main(String[] args)
{
    Scanner sc=new Scanner(System.in);

    System.out.println("Enter a Number");
    int n=sc.nextInt();

       int sum=0;

    for(int i=1;i<=n;i++)
    {
        sum=sum+i;
    }

    System.out.println("Sum of "+n+" Number is "+sum);
```

```
46
47      /* Display Multiplication Table
48      public static void main(String[] args)
49      {
50          Scanner sc=new Scanner(System.in);
51
52          System.out.println("Enter a Number");
53          int n=sc.nextInt();
54
55          for(int i=1;i<=10;i++)
56          {
57              System.out.println(n+" x "+i+" = "+n*i);
58          }
59
60
61      }  */
62  }
```

```
1
2   package scloop2;
3
4   import java.lang.*;
5   import java.util.*;
6   public class SCLoop2 {
7
8      /*Display Digits of number
9
10        public static void main(String[] args)
11        {
12           Scanner scan=new Scanner(System.in);
13
14           System.out.println("Enter a Number");
15           int n=scan.nextInt();
16
17           int r;
18           while(n>0)
19           {
20            r=n%10;
21            n=n/10;
22
23            System.out.println(r);
24           }
25            System.out.println(n);
26        }
27  */
```

```
    /* Count Digits Of a Number
      public static void main(String[] args)
      {
         Scanner scan=new Scanner(System.in);

         System.out.println("Enter a Number");
         int n=scan.nextInt();

         int count=0;
         while(n>0)
         {
          n=n/10;
          count++;
         }
          System.out.println(count);
      }
      */
```

```
    /* armstrong number*/

    public static void main(String[] args)
    {
       Scanner scan=new Scanner(System.in);

       System.out.println("Enter a Number");
       int n=scan.nextInt();

       int m=n;
       int sum=0;
       int r;
       while(n>0)
       {
        r=n%10;
        n=n/10;

        sum=sum+r*r*r;
       }
        if(sum==m)
            System.out.println("Its a Armstrong Number");
        else
            System.out.println("Its not an Armsttrong Number");

    }

}
```

```
package scloop4;

import java.util.*;

public class SCLoop4
{

    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);

        System.out.println("Program to Fibonacci Series");
        System.out.println("Enter number of Terms");
        int n=sc.nextInt();

        int a=0,b=1,c;

        System.out.print(a+","+b+",");
        for(int i=0;i<n-2;i++)
        {
            c=a+b;
            System.out.print(c+",");
            a=b;
            b=c;
        }


    }
```

```
public static void main(String[] args)
{
    Scanner sc=new Scanner(System.in);

    System.out.println("Program to print GP Series");
    System.out.println("Enter a, r and n");
    int a=sc.nextInt();
    int r=sc.nextInt();
    int n=sc.nextInt();

    int term=a;

    for(int i=0;i<n;i++)
    {
        System.out.print(term+",");
        term=term*r;
    }


} */


     /* Program to Print AP Series

     public static void main(String[] args)
     {
         Scanner sc=new Scanner(System.in);

         System.out.println("Program to print AP Series");
         System.out.println("Enter a, d and n");
         int a=sc.nextInt();
         int d=sc.nextInt();
         int n=sc.nextInt();

         int term=a;
         for(int i=0;i<n;i++)
         {
             System.out.print(term+",");
             term=term+d;
         }


     }    */
}
```

Nested loops

```
1   package nestedloops;
2
3   public class NestedLoops
4   {
5
6       public static void main(String[] args)
7       {
8           for(int i=1;i<=5;i++)
9           {
10              for(int j=1;j<=7;j++)
11              {
12                  System.out.print("("+i+","+j+") ");
13
14              }
15              System.out.println("");
16          }
17
18      }
19  }
```

```
public class Patterns1 {

    /*
    public static void main(String[] args)
    {
      for(int i=1;i<=5;i++)
      {
          for(int j=1;j<=5;j++)
          {
            System.out.println(j+" ");
          }
          System.out.println("");
      }
    }
    */
```

```
 public static void main(String[] args)
 {
   for(int i=1;i<=5;i++)
   {
       for(int j=1;j<=5;j++)
       {
         System.out.println(i+" ");
       }
       System.out.println("");
   }
 }
 */
```

```
/*
public static void main(String[] args)
{
  for(int i=1;i<=5;i++)
  {
      for(int j=1;j<=5;j++)
      {
        System.out.println(i+j+" ");
      }
      System.out.println("");
  }
}
*/
```

```
    public static void main(String[] args)
    {
        int count=0;

      for(int i=1;i<=5;i++)
      {
          for(int j=1;j<=5;j++)
          {
              count++;
            System.out.format("%02d ",count);
          }
          System.out.println("");
      }
    }
}
```