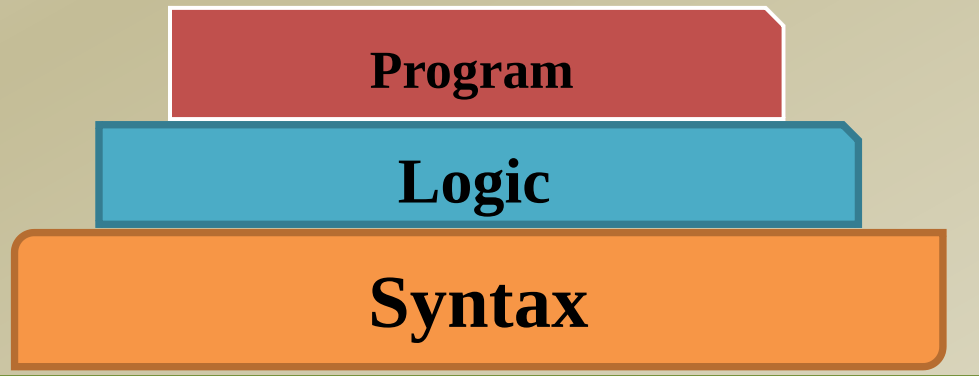
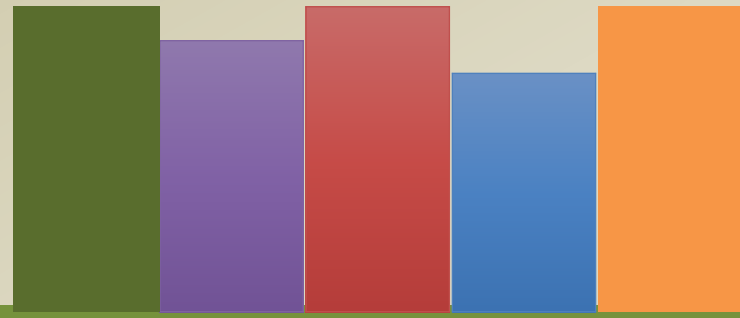
Code at Random (OPC) PVT. LTD.

Module 5: Series Programming Based On For Loop





What is a Series??

- ✓ A series is a group of numbers which are placed one after another in a certain order.
- ✓ Example:- 1,2,3,4,…..
- ✓ All numbers in a series follows a specific order such as common difference, or any common order.
- ✓ For Example:- In the above series the common difference between two numbers is 1.
- ✓ 2nd Example: 1,4,9,16,25,…… ., here the order is the square of all the positive integers from 1 to n ,where n is any +ve integer.

How to print Series Using Loop??

- Let's say we have to print the series ***2, 4, 6, … n.***
- Step 1: Series is starting from 2. So the loop will start from 2.
- Step 2: The second number is 4, which means the series is following a order of common difference 2.
- Step 3: So the iteration is i=i+2
- Step 4: Loop will move upto nth terms i.e., 2n. (where n is the number of terms given by user.)
- Step 5: In loop body, we will simply print the value of i which is the loop counter.

How will code run??

- As discussed our code will be

```
for(i=2; i<=n*2; i+=2)
{
    System.out.println( i );
}
```

- Here n= number of terms in the series which will be given by the user.
- For example: If the user enters n=5 then 5 terms of the loop will have to be printed. So loop will go from 2 to 10 and iteration will happen plus two everytime.
- So, 1st iteration : 2
  - *2nd iteration : 4*
  - *3rd iteration : 6*
  - *4th iteration : 8*
  - *5th iteration : 10*
- These terms will be printed in the same line and we will get our series.

Final Program & Output

Program

```
import java. util. *;
class series1 {
    public static void main(String[] Args)
   {
     int i,n;
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter the terms in the series");
     n=sc.nextInt();
     for(i=2;i<=2*n;i+=2)
     {
         System.out.print(i+ " ");
     }
    }
}
```

Output

Enter the terms in the series - 5

2 4 6 8 10

How To Find nth Term of the Series.

- In an arithmetic progression, i.e., where there is a common difference between two numbers in a series then

Nth term = First Term + (n-1) (common difference)

- **For Example:-** In a series, 2 , 4 , 6 , 8 ,10,…….n

Nth Term is 2 + (n-1)(2)

i.e., nth term ➔ 2 + 2n -2 **➔ 2n**

- **For Example:-** In a series, 1, 5, 9, … *n*

Nth Term is 1+(n-1)(4)

i.e., nth term ➔ 1 + 4n -4 **➔ 4n-3**

More Series

WAP to print these series as it is. Here n is the number of terms in series given by the user.

1. 10, 20, 30, 40, 50, …..n
2. 23, 27, 31, 35, 39,…..n
3. 2, 5, 8, 11, 14,…..n
4. 1, 4, 9, 16, 25 … *n*
5. 0, 7, 26, 63, 124, 215 … *n*

Solution to above questions

```
1. import java. util. *;
class series2 {
    public static void main(String[] Args)  {
     int i,n;
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter the terms in the series");
     n=sc.nextInt();
     for(i=1;i<=n;i++)   {
         System.out.print(i*10+" ");
     }
    }
}
```

```
2. import java. util. *;
class series3 {
    public static void main(String[] Args)
    {
     int i,n;
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter the terms in the series");
     n=sc.nextInt();
     for(i=1;i<=n;i++)
     {
         System.out.print(i*4+19+" ");
     }
    }
}
```

Solution to above questions

3.
```
import java. util. *;
class series4 {
    public static void main(String[] Args)
   {
     int i,n;
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter the terms in the series");
     n=sc.nextInt();
     for(i=1;i<=n;i++)
     {
         System.out.print(i*3-1+" ");
     }
    }
}
```

4.
```
import java. util. *;
class series5 {
    public static void main(String[] Args)
   {
     int i,n;
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter the terms in the series");
     n=sc.nextInt();
     for(i=1;i<=n;i++)
     {
         System.out.print(i*i+" ");
     }
    }
}
```

Solution to above questions

```
5. import java. util. *;
class series6 {
    public static void main(String[] Args)
   {
     int i,n;
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter the terms in the series");
     n=sc.nextInt();
     for(i=1;i<=n;i++)
     {
         System.out.print(i*i*i-1+" ");
     }
    }
}
```