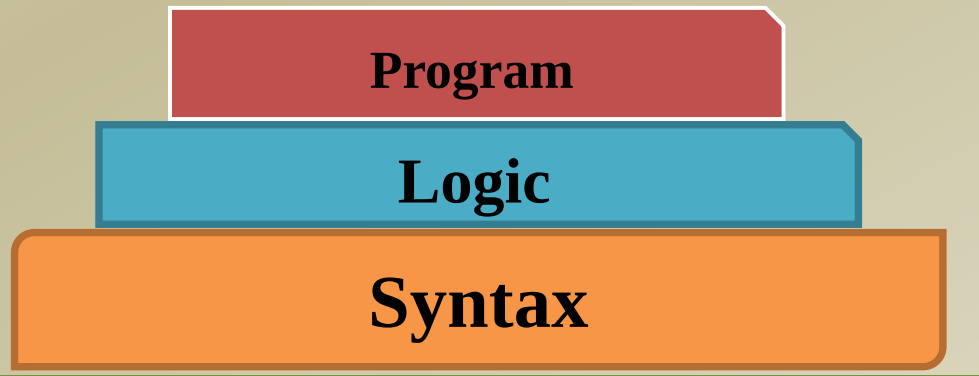
Code at Random (OPC) PVT. LTD.

Nested Loops: Factorial Series With Alternate Sign



Some Examples

- $S = \frac{x}{2!} - \frac{2x}{3!} + \frac{3x}{4!} - \ldots$ *n terms*
- $S = x - \frac{x^2}{2!} + \frac{x^3}{3!} - \frac{x^4}{4!} + \ldots$ *n terms*
- $S = 1 - x + \frac{x^2}{3!} - \frac{x^3}{5!} + \ldots$ *n terms*
- $S = 1 - \frac{(x+1)!}{5} + \frac{(x+2)!}{10} - \frac{(x+3)!}{15} + \ldots$ *n terms*

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Programming Based On Factorial Series With Alternate Sign

- $S = \frac{x}{2!} - \frac{2x}{3!} + \frac{3x}{4!} - \ldots$ *n terms*

```
import java.util.*;
class series1 {
    public static void main(String Args[])   {
        int n,i,f=1,j,sign=1;
        double sum=0.0;
        Scanner sc= new Scanner(System.in);
        System.out.println("Enter the number of terms");
        n= sc.nextInt();
       System.out.println("Enter the value of x");
        x=sc.nextInt();
for(i=1;i<=n;i++) {
            f=1;
            for(j=1 ; j<=i+1 ; j++)
            {
                f=f*j;
            }
        sum= sum+((x*i)/f)*sign;
        sign= sign*-1;
       }
        System.out.println(sum);
    }
}
```

- $S = 1 - x + \frac{x^2}{3!} - \frac{x^3}{5!} + \ldots$ *n terms*

```
import java.util.*;
class series2 {
    public static void main(String Args[])   {
        int n,i,f=1,j,sign=-1;
        double sum=1.0;
        Scanner sc= new Scanner(System.in);
        System.out.println("Enter the number of terms");
        n= sc.nextInt();
       System.out.println("Enter the value of x");
        x=sc.nextInt();
 for(i=1;i<=n;i++)
        {
            f=1;
            for(j=1 ; j<=2*i-1 ; j++)
            {
                f=f*j;
            }
        sum= sum+((x*i)/f)*sign;
        sign= sign*-1;
       }
        System.out.println(sum);
    }
}
```

- $S = 1 - \frac{(x+1)!}{5} + \frac{(x+2)!}{10} - \frac{(x+3)!}{15} + \ldots$ *n terms*

```
import java.util.*;
class series3 {
    public static void main(String Args[])
    {
        int n,i,f=1,j,sign=-1;
        double sum=1.0;
        Scanner sc= new Scanner(System.in);
        System.out.println("Enter the number of terms");
        n= sc.nextInt();
       System.out.println("Enter the value of x");
        x=sc.nextInt();
 for(i=1;i<=n;i++)
       {
          f=1;
          for(j=1 ; j<=x+i ; j++)
          {
             f=f*j;
          }
          sum= sum+(f/(5*i)*sign;
          sign = sign*-1;
       }
       System.out.println(sum);
    }
}
```