

Lab Report – 5

Report Title: Implementation of Lagrange's Interpolation formula in Java/Python/C++/C#/-----
---(not in C language).

Implementation of Lagrange's Interpolation formula in JAVA

```
package lagrange;

import java.util.Scanner;

public class Lagrange {

    public static void main(String[] args) {

        Scanner s1=new Scanner(System.in);

        float[] x=new float[100];

        float [] y=new float[100];

        float x0,yi=0,p;

        int i,j,n;

        System.out.println("Number of data :");

        n=s1.nextInt();

        System.out.println("Enter data: ");

        for(i=1;i<=n;i++)

        {

            x[i]=s1.nextFloat();

            y[i]=s1.nextFloat();

        }

        System.out.println("Interpolation point: ");

        x0=s1.nextFloat();

        for(i=1;i<=n;i++){

            p=1;

            for(j=1;j<=n;j++) {

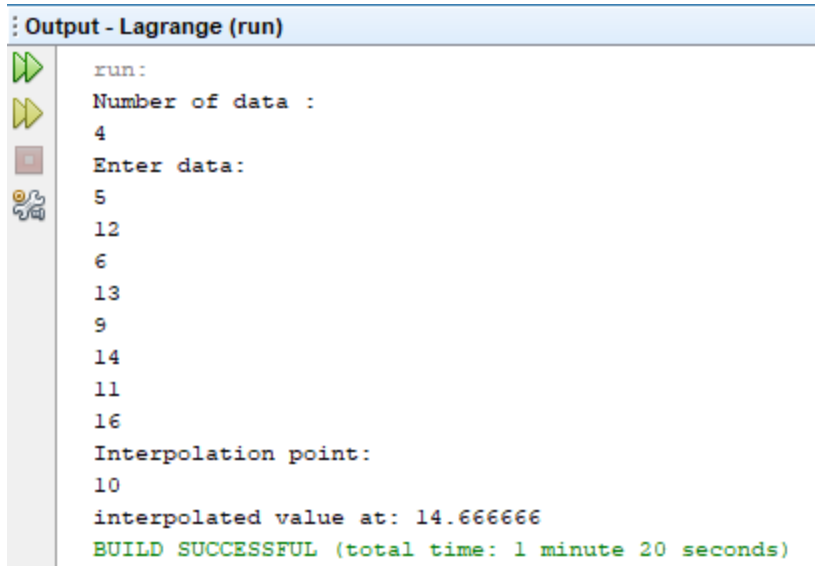
                if(i!=j) {
```

```

p=p*(x0-x[j])/(x[i]-x[j]);
}}
yi=yi+p*y[i];
}
System.out.println("interpolated value at: "+yi);
}
}

```

Output Screens



```

Output - Lagrange (run)
run:
Number of data :
4
Enter data:
5
12
6
13
9
14
11
16
Interpolation point:
10
interpolated value at: 14.666666
BUILD SUCCESSFUL (total time: 1 minute 20 seconds)

```

Report Title: Implementation of Trapezoidal Rule in Java/Python/C++/C#/----- (not in C language).

Implementation of Trapezoidal Rule in JAVA

```
package trapezoidalrule;

import java.util.Scanner;

public class TrapezoidalRule {

    public static void main(String[] args) {

        double a,b,h,area;

        int n;

        Scanner sc = new Scanner(System.in);

        System.out.println("Enter a, b, and n");

        a = sc.nextDouble();

        b = sc.nextDouble();

        n = sc.nextInt();

        h = (b-a)/n;

        area = trap(a, b, n, h);

        System.out.println("Area = " + area);

    }

    static double trap(double a, double b, int n, double h) {

        double area, x;

        int i;

        area = (f(a) + f(b))/2.0;

        for (i = 1; i <= n-1; i++) {

            x = a + i*h;

            area = area + f(x);

        }

        area = area*h;

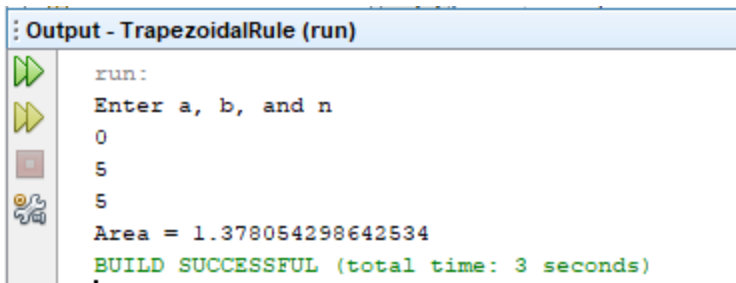
        return area;

    }

}
```

```
static double f(double x) {  
    return 1/(1+(x*x));  
}  
}
```

Output Screens



```
run:  
Enter a, b, and n  
0  
5  
Area = 1.378054298642534  
BUILD SUCCESSFUL (total time: 3 seconds)
```

Report Title: Implementation of Simpson's 1/3 Rule in Java/Python/C++/C#/----- (not in C language).

Implementation of Simpson's 1/3 Rule in JAVA

```
package lab5;

import java.util.Scanner;

public class Lab5 {

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);

        float a,b,n,h, area,xi;

        System.out.println("Enter a & b: ");

        a= sc.nextFloat();

        b= sc.nextFloat();

        System.out.println("Enter n: ");

        n=sc.nextFloat();

        h=(b-a)/n;

        System.out.println("\n Value of h: "+h);

        area = f(a)+f(b);

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

            xi = a+i*h;

            if(i%2==0){

                area=area+(2*f(xi));

            }

            else{

                area= area+(4*f(xi));

            }

        }

        area=(h/3)*area;

        System.out.println("\n Area: "+area);





    }

}
```

```
}  
  
static float f(float x) {  
    float fx = 1/(1+x);  
    return fx;  
}  
}
```

Output Screens

Output - TrapezoidalRule (run)

```
run:  
Enter a & b:  
0  
5  
Enter n:  
4  
  
Value of h: 1.25  
  
Area: 1.8158243
```

Report Title: Implementation of Simpson's 3/8 Rule in Java/Python/C++/C#/------ (not in C language).

Implementation of Simpson's 3/8 Rule Rule in JAVA

```
package simpsons3_8;

import java.util.Scanner;

public class Simpsons3_8 {

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);

        float a,b,n,h, area,xi;

        System.out.println("Enter a & b: ");

        a= sc.nextFloat();

        b= sc.nextFloat();

        System.out.println("Enter n: ");

        n=sc.nextFloat();

        h=(b-a)/n;

        System.out.println("\n Value of h: "+h);

        area = f(a)+f(b);

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

            xi = a+i*h;

            if(i%3==0){

                area=area+(2*f(xi));

            }

            else{

                area= area+(3*f(xi));

            }

        }

        area=((h*3)/8)*area;

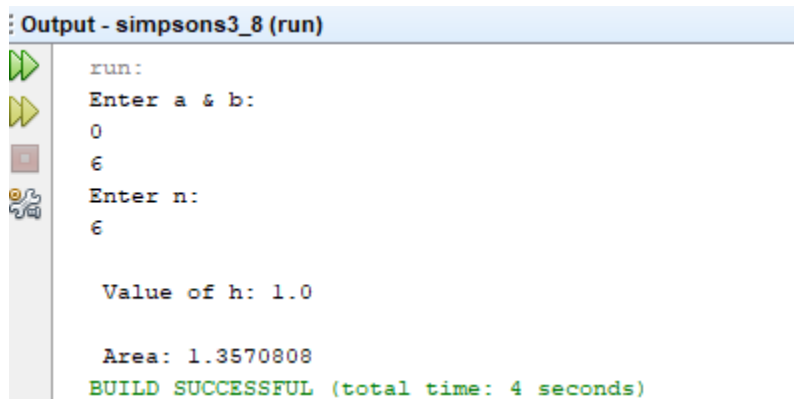
        System.out.println("\n Area: "+area);

    }

}
```

```
}  
  
static float f(float x) {  
    float fx = 1/(1+(x*x));  
    return fx;  
}  
}
```

Output Screens



```
run:  
Enter a & b:  
0  
6  
Enter n:  
6  
  
Value of h: 1.0  
  
Area: 1.3570808  
BUILD SUCCESSFUL (total time: 4 seconds)
```