**1. Write a program to find the integration of f(x) using Composite Trapezoidal formula.**

**Algorithm:**

1. Enter initial value of x, i.e. a and final value of x, i.e. b
2. Enter the no. of segment points, n
3. Compute h=(b-a)/n
4. Compute

**Source Code:**

/\*Composite Trapezoidal rule\*/

#include<stdio.h>

#include<math.h>

#define MAX 10

#define f(x) (pow(x,3)+1)

int main()

{

int i,n;

float a,b,f[MAX],h,sum=0,Ig;

printf("Enter the initial value of x ");

scanf("%f",&a);

printf("Enter the final value of x: ");

scanf("%f",&b);

printf("Enter the no. of segments: ");

scanf("%d",&n);

h=(b-a)/n;

for(i=0;i<=n;i++)

f[i]=f(a+i\*h);

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

sum+=f[i];

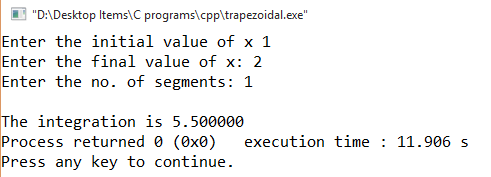
Ig=h/2\*(f[0]+f[n]+2\*sum);

printf("\nThe integration is %f",Ig);

return 0;

}

**Output**:

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**2. Write a program to find the integration of f(x) using Simpson’s 1/3 rule.**

**Algorithm:**

1. Enter initial value of x, i.e. a and final value of x, i.e. b
2. Assign n=2
3. Compute h=(b-a)/n
4. Compute

**Source Code:**

/\*Simpson's 1/3 Rule\*/

#include<stdio.h>

#include<math.h>

#define f(x) (sin(x))

int main()

{

int i,n=2;

float a,b,f[3],h,Ig;

printf("Enter the initial value of x ");

scanf("%f",&a);

printf("Enter the final value of x: ");

scanf("%f",&b);

h=(b-a)/n;

for(i=0;i<=n;i++)

f[i]=f(a+i\*h);

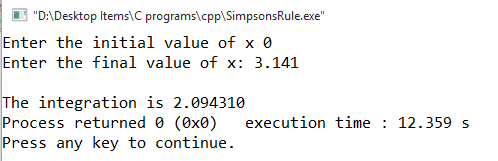
Ig=h/3\*(f[0]+f[n]+4\*f[1]);

printf("\nThe integration is %f",Ig);

return 0;

}

**Output:**



**3. Write a program to find the integration of f(x) using Simpson’s 3/8 rule.**

**Algorithm:**

1. Enter initial value of x, i.e. a and final value of x, i.e. b
2. Assign n=3
3. Compute h=(b-a)/n
4. Compute

**Source Code:**

/\*Simpson's 3/8 Rule\*/

#include<stdio.h>

#include<math.h>

#define f(x) (pow(x,3)+1)

int main()

{

int i,n=3;

float a,b,f[3],h,Ig;

printf("Enter the initial value of x ");

scanf("%f",&a);

printf("Enter the final value of x: ");

scanf("%f",&b);

h=(b-a)/n;

for(i=0;i<=n;i++)

f[i]=f(a+i\*h);

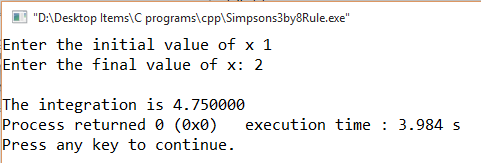
Ig=3\*h/8\*(f[0]+f[n]+3\*(f[1]+f[2]));

printf("\nThe integration is %f",Ig);

return 0;

}

**Output:**



**4. Write a program to find the integration of f(x) using Gaussian formula for 2 points.**

**Algorithm:**

1. Enter initial value of x, i.e. a and final value of x, i.e. b
2. Assign n=2
3. Compute c=(b-a)/2
4. Compute c\*[w1f(x1)+w2f(x2)]

Where xi= c\*zi+(b+a)/2 for i=1,2 and w1=w2=1 and z1=-0.57735, z2= -z1

**Source Code:**

/\*Gaussian Integration for 2 points\*/

#include<stdio.h>

#include<math.h>

#define f(x) (exp(x\*x))

int main()

{

int i,n=2;

float a,b,c,k[5],x[5],z[5],w[5],Ig=0;

printf("Enter the initial value of x: ");

scanf("%f",&a);

printf("Enter the final value of x: ");

scanf("%f",&b);

z[0]=-1/sqrt(3);

z[1]=-z[0];

w[0]=w[1]=1;

c=(b-a)/2;

for(i=0;i<n;i++)

x[i]=c\*z[i]+(b+a)/2;

for(i=0;i<n;i++){

k[i]=f(x[i]);

Ig+=w[i]\*k[i];

}

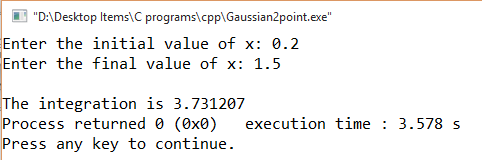
Ig=c\*Ig;

printf("\nThe integration is %f",Ig);

return 0;

}

**Output:**



**5. Write a program to find the integration of f(x) using Gaussian formula for 3 points.**

**Algorithm:**

1. Enter initial value of x, i.e. a and final value of x, i.e. b
2. Assign n=3
3. Compute c=(b-a)/2
4. Compute c\*[w1f(x1)+w2f(x2)+w3f(x3)]

Where xi= c\*zi+(b+a)/2 for i=1,2,3 and w1=w3= 0.55556, w2=0.88889 and

z1= -0.77460, z2=0 and z3= -z­1

**Source Code:**

/\*Gaussian Integration for 3 points\*/

#include<stdio.h>

#include<math.h>

#define f(x) (exp(pow(x,2)))

int main()

{

int i,n=3;

float a,b,c,k[5],x[5],z[5],w[5],Ig=0;

printf("Enter the initial value of x: ");

scanf("%f",&a);

printf("Enter the final value of x: ");

scanf("%f",&b);

z[0]=-0.77460;

z[1]=0;

z[2]=-z[0];

w[0]=w[2]=0.55556;

w[1]=0.88889;

c=(b-a)/2;

for(i=0;i<n;i++)

x[i]=c\*z[i]+(b+a)/2;

for(i=0;i<n;i++){

k[i]=f(x[i]);

Ig+=(w[i]\*k[i]);

}

Ig=c\*Ig;

printf("\nThe integration is %f",Ig);

return 0;

}

**Output:**

