C Program for Numerical Integration (Trapezoidal Rule, Simpson's Rule and Boole's Rule

Program /* This program is for numerical integration of numerical methods Here we are going to solve the integration of defined functio...

C Program for Runge-Kutta Method
C Program for Heun's Method
C Program for Euler's Method

Program

```
/*
This program is for numerical integration of numerical methods
Here we are going to solve the integration of defined function f(x)
Using...
1. Trapezoidal Rule
```

2. Composite Trapezoidal Rule
3. Simpson's 1/3 Rule
4. Composite Simpson's 1/3 Rule
5. Simpson's 3/8 Rule
6. Boole's Rule

In this program we are going to solve for integration of square root of sin(x)
and get output when lower limit is 0 and upper limit is pie/2.

Note: You can change the integration function f(x) and also can change the lower and upper limit for solution..

For more update visit daily.
Thank You!!!
*/

```
#include<conio.h>
#include<stdio.h>              // header file for standard input and output
#include<stdlib.h>             //for exit() function
#include<math.h>               //for mathematical operation like sqrt
#define f(x) sqrt(sin(x))      //defined the function i.e of which integration is going to calculate
void main()
{
int i,choice;
float n,a,b,h,it,ict,is1,ics1,is2,ib,sum,sum1;
```

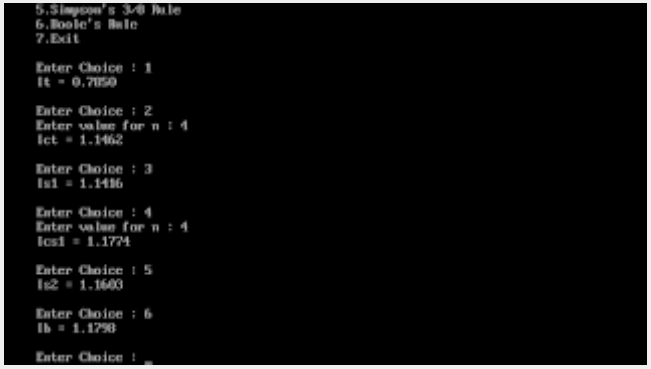
```
clrscr();
printf("Solution for integration of sqrt(sin(x)) \n");
printf("Enter lower limit and upper limit\n");        //lower and upper value of integral
scanf("%f%f",&a,&b);
printf("Select Options\n1.Trapezoidal Rule\n2.Composite Trapezoidal Rule\n3.Simpson's 1/3 Rule\n4.Composite Simpson's 1/3
Rule\n5.Simpson's 3/8 Rule\n6.Boole's Rule\n7.Exit\n");
a:printf("\nEnter Choice : ");
scanf("%d",&choice);
switch(choice)
{

///Solution for Trapezoidal Rule i.e It
case 1:
h=b-a;
it=((f(a)+f(b))/2)*h;
printf("It = %.4f\n",it);
break;

///Solution for Composite Trapezoidal Rule i.e Ict
case 2:
printf("Enter value for n : ");
scanf("%f",&n);
h=(b-a)/n;
sum=0;
for(i=1;i<n;i++)
```

```
{
sum=sum+f(a+i*h);
}
ict=(h/2)*(f(a)+f(b)+2*sum);
printf("Ict = %.4f\n",ict);
break;

///Solution for Simpson's Rule / Simpson's 1/3 Rule i.e Is1
case 3:
h=(b-a)/2;
is1=(h/3)*(f(a)+f(b)+4*f(a+h));
printf("Is1 = %.4f\n",is1);
break;

///Solution for Composite Simpson's Rule i.e Ics1
case 4:
printf("Enter value for n : ");
scanf("%f",&n);
h=(b-a)/n;
sum=0;
sum1=0;
for(i=1;i<n;i++)
{
if(i%2==0)
sum1=sum1+f(a+i*h);
```

```
else
sum=sum+f(a+i*h);
}
ics1=(h/3)*(f(a)+f(b)+4*sum+2*sum1);
printf("Ics1 = %.4f\n",ics1);
break;

///Solution for Simpson's 3/8 Rule i.e Is2
case 5:
h=(b-a)/3;
is2=(3*h/8)*(f(a)+f(b)+3*f(a+h)+3*f(a+2*h));
printf("Is2 = %.4f\n",is2);
break;

///Solution for Boole's Rule i.e Ib
case 6:
h=(b-a)/4;
ib=(2*h/45)*(7*f(a)+7*f(b)+12*f(a+2*h)+32*(f(a+h)+f(a+3*h)));
printf("Ib = %.4f\n",ib);
break;

case 7:
exit(0);

default:
```

```
printf("\nEnter the correct choice...\n");
}
goto a;
getch();
}
```

Output



LABELS: Numerical Method

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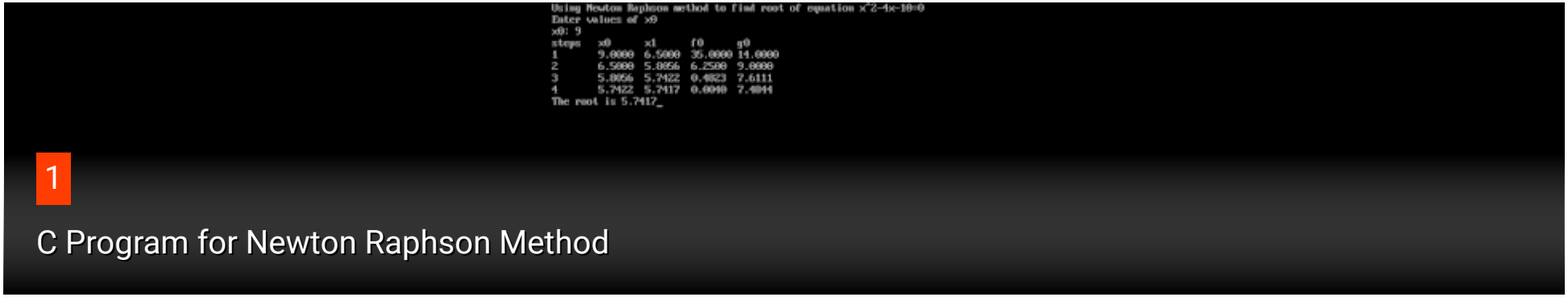
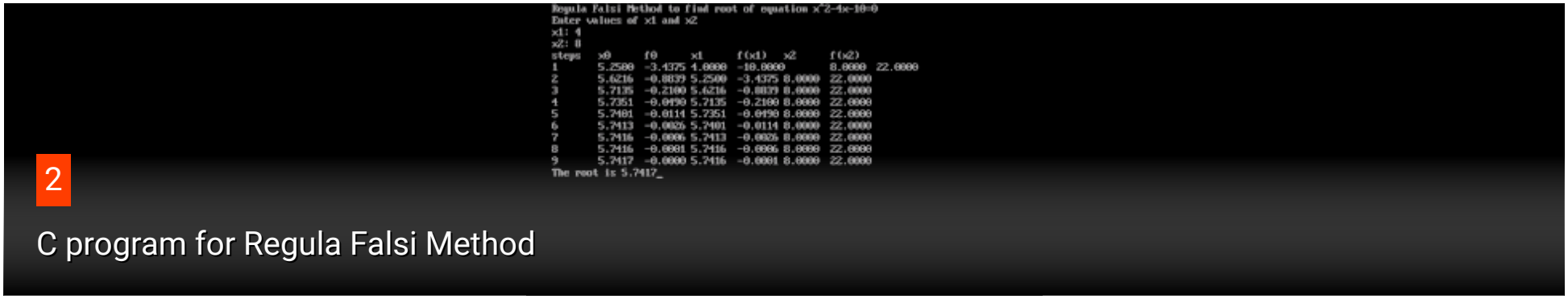


Algorithm First you have to define equation f(x) and its first derivative g(x) or f'(x). Guess the initial value of xo, here the gu... Readmore



Algorithm Enter two guesses value i.e x1 and x2. [note: guesses must selected in such a way that root of the equation is in between gues... Readmore

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C Program for Mid Point Ellipse Drawing Algorithm

Program #include<conio.h> #include<stdio.h> #include<graphics.h> void main() { int gd=DETECT,gm; float x,y,xc,yc... Readmore