Simpson's 1/3 RULE

QUESTION:- Write a C programme to evaluate $\int_0^1 \frac{dx}{1+x^2}$, taking 6 equal sub-intervals using Simpson's $\frac{1}{3}$ rule, correct up to six decimal places.

Answer:- input

```
#include<stdio.h>
#include<math.h>

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

main(){
  int n,i;
  double a,b,h,x,sum=0,integral;
  printf("\nEnter the no. of sub-intervals(EVEN): ");
  scanf("%d",&n);
  printf("\nEnter the initial limit: ");
  scanf("%lf",&a);
  printf("\nEnter the final limit: ");
  scanf("%lf",&b);
  h=fabs(b-a)/n;
  for(i=1;i<n;i++){
    x=a+i*h;
    if(i%2==0){
      sum=sum+2*f(x);
    }
    else{
      sum=sum+4*f(x);
    }
  }
  integral=(h/3)*(f(a)+f(b)+sum);
  printf("\nThe integral is: %lf\n",integral);
}
```

Output:-

```
Enter the no. of sub-intervals(EVEN): 6

Enter the initial limit: 0

Enter the final limit: 1

The integral is: 0.785398
```