CS-II LAB 2

OBJECTIVES:

1. Developing C functions implementing the composite trapezoidal and Simpson quadratures.
2. Application of these functions to a test example.
3. Performing the error analysis.

EXERCISES:

1) Write the general function ***double trapez(double a, double b, int n, double (*fun)(double))***. Here we denote: **a,b** – the end points of the integration interval, **n** – a number of the subintervals, **fun** – a pointer to an integrated "dummy" function which has a single argument of the type double and returns a type double value.
2) Write the general function ***double simpson(double a, double b, int n, double (*fun)(double))***. The arguments are the same as for the function ***trapez*** above.
3) Write a code for the test function $g(x) = \frac{1}{1+x^2}$
4) Write a main function which calculates the value of the integral $\int_0^1 g(x)\,dx$ using ***trapez*** and ***simpson*** for **n** = 10, 20, .., 100. Compare these results with the exact value of this integral and calculate the error (difference between the exact and approximate value) as a function of **n** for both methods.
5) Make the plots showing how the integration error changes with **n** for both methods (use Grapher or Excel)