CISC1600/1610 R03
Lab Instruction #5
Nov 8, 2022

Goal: In this lab, we will focus on practicing designing and implementing several functions.

0. Use “emacs func_exec.cpp” to start writing the program. All functions should be in this program

1. **Check parity:**

Declare a function called **even** that takes one argument of type int, and returns a bool value. The function returns true if its one argument in even number; otherwise, it return false.

And then **implement** the function.

Call the function in main( ) twice, once with an odd argument, and once with an even number as argument.

2. **Quadratic Equation:**

Recall that a quadratic equation $ax^2+bx+c=0$ has no real root if $b^2-4ac<0$; has one root if $b^2-4ac=0$; and has two different roots if $b^2-4ac>0$

1) **Declare** a function that takes the quadratic equation’s coefficients a, b, c as parameters (input), and returns the number of real roots for the equation.

Implement the function

Call the function in main with the following three sets of different inputs,

- $x^2+4x+4=0$, i.e., a=1, b=4, c=4 should return 1
- $x^2+2x+9=0$, i.e., a=1, b=2, c=9 should return 0
- $x^2-3x+2=0$, i.e., a=1, b=-3, c=2 should return 2

2) Declare another function that takes the quadratic equation’s coefficients a, b, c as input, and output the roots in the terminal windows. Depends on the existence and number of real roots, the function displays a line such as the following to the terminal window:

* The equation has no real root.
* The equation has one real root -2.

* The equation has two real roots 1, 2.

Implement the function

And **call** the function in main to solve the three different quadratic equations in part 1).

3. (Bonus) Extra credit practice

1) Write a function that takes a char as input, and output a true/false value to indicate whether the char is a decimal digit symbol ('0',….'9').

2) Write a function that takes a char as input, and output a true/false value to indicate whether the char is a hexadecimal (base 16) digit symbol ('0',….'9', 'A'-'F').

Base 2 (binary number) uses 0 and 1
Base 10 (decimal number) uses 10 symbols: 0, 1, … 9
Base 16 (hexadecimal number) uses 16 symbols: 0, 1, …, 9, A, B, C, D, E, F
Where A represents 10, B represents 11, ….

3) Write a function that takes a hexadecimal digit symbol as input, and returns its value

e.g., if the argument is 'A', the function shall return 10; if the argument is '3', the function shall return 3….

4) Test the above three functions in main….

Submit your program (the func_exec.cpp file) to the following website:

https://storm.cis.fordham.edu:8443/web/project/755