Lab # 2

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CPSC 1150 - 003

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Lab Title: Quadratic Formula Lab

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Department: CSIS

Program Quadratic Formula

File Name: Lab2.java

Purpose: Calculate roots, x1 and x2, of a quadratic equation:

where a, b, and c are parameters of the equation.

Input: a, b and c

Output: x1 and x2

Technical Information:

(You should fill the following information based on compiler and computer you are using).

Compiler: Java SDK version 14

Computer: AMD Ryzen 5 2600 3.40 GHz, 16 GB ram, 64 bit processor, Java SDK 14

Operating System: Windows 10

Language: Java

Program Logic (Pseudocode)

Algorithm: find the roots of a quadratic equation in the form of: ax2 + bx + c =0

START

1. a, b, c ← input

2. if a = 0 then

solve the linear equation bx + c =0

x ← -c/b

END

3. delta ← b2 - 4ac

4. if delta < 0 then

equation has no real roots

END

5. if delta = 0 then

two equal roots

END

7. otherwise

equation has two roots

END

Generate your test cases based on the specifications in your lab assignment. Follow following format for each test case: (Refer to external document of your previous lab)

*purpose*

*input*

*output*

*expected value*

*passed or failed*

Test Cases:

**Test Case 1:** Test the results of the first case, where both A and B are equal to 0

Inputs:

A = 0

B = 0

C = 234

Output: Both a and b values are 0, so it should be an invalid input.

Expected value: invalid input

Passed.

**Test Case 2:** Test the results of the second case, where only A is equal to 0.

Inputs:

A = 0

B = 332

C = 123

Output: A is 0, so the calculation should be -c/b which is a linear equation

Expected Value: -0.37

Result: -0.37048192771

Passed

**Test Case 3:** Discriminant is positive

Inputs:

A = 148

B = -595

C = 259

Output: Discriminant is positive, so there are 2 real roots.

Expected Value: x1: 3.5 and x2: .50

Result: x1: 3.52362225483743 and x2: 0.4966480154328404

Passed

**Test Case 4:** Discriminant is 0

Inputs:

A= 9

B= 12

C= 4

Output: Discriminant is 0, so there should only be one answer.

Expected Value: -.67

Result:-0.6666666666

Passed

**Test Case 5:** Discriminant is negative.

Inputs:

A= 3

B= 4

C= 2

Output: Discriminant is negative, so there should be no real roots possible.

Expected Value: no real solution

Results: No real roots

Passed