Lab # 2

*Ngoc Hoang Cuong, Dinh*

*100385851*

CPSC 1150 - W01

Instructor: H. Darbandi

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 or the equation.

Input: a, b and c

Output: x1 and x2

Technical Information:

Compiler: Java SDK version 17.0.4

Computer: Intel Core 2 Duo T9400 2.53GHz, 3.00 GB of RAM

Operating System: Ubuntu 20.04.3 LTS

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 and b=0 then return error

3. 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 no real root**

Input: a=1 b=3 c=5

Output: No real root

Expect: No real root

Passed

**Test double root**

Input: a=2 b=4 c=2

Output: Double root x=-1.0

Expect: Double root x=-1

Passed

**Test two roots**

Input: a=3 b=7.5 c=2

Output:

* x1: -0.3035152756999544
* x2: -2.1964847243000456

Expect:

* x1: -2.196
* x2: 0.304

Passed

**Test negative input**

Input: a=-2.9 b=3 c=-1

Output: No real root

Expect: No real root

Passed

**Test negative input 2**

Input: a=-1 b=6 c=2

Output:

* x1: -0.3166247903553998
* x2: 6.3166247903554

Expect:

* x1: -0.317
* x2: 6.317

Passed