CMPSC 201
Homework 1

Due Date: Tuesday, 06/16/2015, 11:55 PM

Objectives

- Use C++ to solve a problem.

Description

Create a console application to calculate the real solution of a quadratic equation $ax^2+bx+c=0$. The program should ask the user to enter the coefficients a, b, and c (integer values only) and display the result as shown in the examples below. To solve the quadratic equation, consider the following conditions:

- When *a* and *b* are both zero and c is not zero, the equation is not a valid equation.
- When *a* is zero and *b* is not zero, then there is one solution.
- When the discriminant $b^2 - 4ac < 0$, the equation does not have a real solution.
- When the discriminant $b^2 - 4ac \geq 0$, the solutions are $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$.

Requirements:

Your program should ask for each coefficient one at a time.

Your program should output the quadratic equation (in the correct format) along with the correct solution(s), or output that there is no real solution.

Your program should display the solution(s) with exactly one decimal place (as in the examples).

If your submission does not compile, you will receive 0 points. Fix any syntax errors.

Submission:

Upload your **C++ source file (*.cpp*)** to the Homework 1 dropbox on ANGEL. You may submit as many times as you want, but we will use only latest submission for grading.

Examples

Console output is shown in `plain fixed-width` font, and user input is shown in **`bold underlined fixed-width`** font.

Example 1: Program input and output sample

```
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Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 0
Enter the value of b: 0
Enter the value of c: 6
6 = 0 is not a valid equation
```

Example 2: Program input and output sample

```
CMPSC 201 – Homework 1
Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 0
Enter the value of b: -5
Enter the value of c: 10
```

```
The solution of the quadratic equation -5x+10 = 0 is 2.0
```

Example 3: Program input and output sample

```
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Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 0
Enter the value of b: -5
Enter the value of c: -10
The solution of the quadratic equation -5x-10 = 0 is -2.0
```

Example 4: Program input and output sample

```
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Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 0
Enter the value of b: 5
Enter the value of c: 0
The solution of the quadratic equation 5x = 0 is 0.0
```

Example 5: Program input and output sample

```
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Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 10
Enter the value of b: 2
Enter the value of c: 8
The quadratic equation 10x^2+2x+8 = 0 does not have a real solution.
```

Example 6: Program input and output sample

```
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Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 10
Enter the value of b: -2
Enter the value of c: 0
The solutions of the quadratic equation 10x^2-2x = 0 are 0.2 and 0.0
```

Example 7: Program input and output sample

```
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Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 10
Enter the value of b: 0
Enter the value of c: -8
The solutions of the quadratic equation 10x^2-8 = 0 are 0.9 and -0.9
```

Example 8: Program input and output sample

```
CMPSC 201 – Homework 1
Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 10
Enter the value of b: -8
Enter the value of c: -2
The solutions of the quadratic equation 10x^2-8x-2 = 0 are 1.0 and -0.2
```

Example 9: Program input and output sample

```
CMPSC 201 – Homework 1
```

```
Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 10
Enter the value of b: 0
Enter the value of c: 0
The solution of the quadratic equation 10x^2 = 0 is 0.0
```

Example 10: Program input and output sample

```
CMPSC 201 – Homework 1
Calculate the real solution of the quadratic equation ax^2 + bx + c = 0
Enter the value of a: 2
Enter the value of b: -8
Enter the value of c: 8
The solution of the quadratic equation 2x^2-8x+8 is 2.0
```