

Code Assignment 3

Classes and Objects on the Command Line

CS152 – Computer Programming Fundamentals

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Items Due

- Completed Code 3

Instructions

Complete the coding directive in an IntelliJ IDEA project with the assignment name (e.g. Code 1-2) and package name cs152. Compress each completed project separately into a .zip file and upload it to your account on the file server at cec-code-lab.aps.edu in a folder named CS152. Code will be downloaded and archived for grading on the assignment due date.

Directive

Write a program which solves the quadratic equation $ax^2 + bx + c = 0$ for **a**, **b** and **c** as any real number.

Sample Output 1

This program solves equations of the form $a*x^2 + b*x + c = 0$. Enter a, b and c.

-2

9

3

Solutions to $-2x^2 + 9x + 3 = 0$ are $x = -0.312$ and $x = 4.812$.

Sample Output 2

This program solves equations of the form $a*x^2 + b*x + c = 0$. Enter a, b and c.

1

1

2

Solutions to $1x^2 + 1x + 2 = 0$ are $x = -0.500 + 1.323i$ and $x = -0.500 - 1.323i$.

Code 3 Criteria

Create a command line program that completes the above directive and adheres to the following specifications:

- You must structure your code into **two classes** with **fields** and **methods** listed in the Classes section below.
- Each class should be in its own .java file.
- Display the form of the quadratic equation in the input menu, first, before taking input.
- The user should then input the coefficients of a quadratic equation **a**, **b** and **c**. Your program should accept decimal entry and store these values as double type.
- Compute the discriminant with the static method you wrote in the QuadraticCalc class.
- Create a ComplexNo object to store the solution(s).
- Your program should read back the equation with the entered coefficients, along with the solutions to the equation.
- Your program should be able to report back *non-real solutions* formatted as *complex numbers* with accuracy to at least 3 decimal places.
- When a *non-real* solution is needed use the getConjugate() method to obtain the matching solution.
- Your program should also detect when **singular solutions** are present and only **report one value** in these cases.

Code 3 Classes

Class ComplexNo

Fields:

```
private double realPart      private double imaginaryPart
```

Constructors

```
public ComplexNo()    //defaults both parts to zero
public ComplexNo(double realPart)    //sets real part and defaults imaginary to zero
public ComplexNo(double realPart, double imaginaryPart) // sets both
```

Instance Methods:

```
public void setRealPart(double r)          public void setImagPart(double i)

public ComplexNo getConjugate()
```

Overridden Methods:

```
public String toString()
```

Class QuadraticCalculator

Methods:

```
public static void main(String[] args)

public static double getDiscriminant(double a, double b, double c)
```