Due: Tue 23:50

Name: _____ Student ID: _____ Class: _____

Professor: Jong-Kyou Kim, PhD _____

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1. Enter the following code and answer the questions.

```
import java.util.Scanner;
import java.util.InputMismatchException;

public class MyException {
  public static void main(String[] args) {
    Scanner input = new Scanner(System.in);
    for(;;) {
      try {
        int x = input.nextInt();
        int y = input.nextInt();
        System.out.format("%d/%d = %d\n", x, y, x/y);
      }
      catch (InputMismatchException ex) {
        System.out.println("Really an integer? Try again");
        input.nextLine();
      }
      catch (ArithmeticException ex) {
        System.out.println("Division by zero?");
      }
      finally {
        System.out.println("Always called");
      }
    }
```

```
    }
}
```

(a) Compile the above code and follow the instructions below.

```
C:> java MyException > output.txt
```

- Enter the following two lines.

```
1 2 3
3 2 1
```

- Enter the following three lines.

```
1.1 2 3
3 2 1
1
```

- Enter the following line.

```
3 2 1 0 0 1
```

- Press the key 'C' while holding the control key and check whether the following message appears.

```
Exception in thread "main"
```

- Submit the generated file `output.txt`

(b) Follow the above instructions with the following command and submit the generated file `output.txt`

```
C:> java MyException > output.txt
```

2. Design a class named LinearEquation for a 2×2 system of linear equations:

$$\begin{aligned} ax + by &= e \\ cx + dy &= f \end{aligned} \quad x = \frac{ed - bf}{ad - bc} \quad y = \frac{af - ec}{ad - bc}$$

The class contains:

- Private data fields `a`, `b`, `c`, `d`, `e`, and `f`
- A constructor with the arguments for `a`, `b`, `c`, `d`, `e`, and `f`
- Six getter methods for `a`, `b`, `c`, `d`, `e`, and `f`
- A method named `isSolvable()` that returns true if $ad - bc$ is not zero.

- Methods `getX()` and `getY()` that return the solution for the equation.

(a) Draw the UML diagram for the class

(b) Implement the class based on the following code.

```
public class LinearEquation {
  private double ...;
  LinearEquation(double a, double b, double c,
                 double d, double e, double f) {
    ...
  }
  double getA() { ... }
  double getB() { ... }
  double getC() { ... }
  double getD() { ... }
  double getE() { ... }
  double getF() { ... }

  boolean isSolvable() {
    ...
  }
  double getX() {
    ...
  }
  double getY() {
    ...
  }
}
```

(c) Execute the following code and write the output in `output.txt`

```
public class TestLE {
  public static void main(String [] args) {
    LinearEquation le
      = new LinearEquation(9.0, 4.0, 3.0, -5.0, -6.0, -21.0);
    if (le.isSolvable())
      System.out.println("x = " + le.getX() + ", y = " + le.getY());
    else
```

```
      System.out.println("The equation has no solution");
    le = new LinearEquation(1.0, 2.0, 2.0, 4.0, 4.0, 5.0);
    if (le.isSolvable())
      System.out.println("x = " + le.getX() + ", y = " + le.getY());
    else
      System.out.println("The equation has no solution");
  }
}
```