TCP1201 Object-Oriented Programming and Data Structures

Lab05 Exception Handling

Exercise 1: Handling Exception

The following program is provided.

```
import java.util.ArrayList;
import java.util.Scanner;

public class Rectangle {
  private double width = 1;
  private double height = 1;
  public Rectangle() { }
  public Rectangle(double width, double height) {
    setWidth (width);
    setHeight (height);
  }
  public void setWidth (double width) {
    this.width = width;
  }
  public void setHeight (double height) {
    this.height = height;
  }
  public double getArea() {
    return width * height;
  }
  public String toString() {
    return "width = " + width + ", height = " + height + ", area = " +
getArea();
  }
}

class TestRectangle {
  public static void main (String[] args) {
    ArrayList<Rectangle> list = new ArrayList<>();
    Scanner input = new Scanner(System.in);
    double width, height;

    do {
      System.out.print ("Enter width & height (0 to finish): ");

      width = input.nextDouble();
      if (width == 0)
        break;

      height = input.nextDouble();
      if (height == 0)
        break;

      list.add (new Rectangle(width, height));
    }
    while (true);
```

```
    System.out.println ("No\tRectangles");
    for (int i = 0; i < list.size(); i++)
      System.out.println (i + "\t" + list.get(i));
  }
}
```

The program above accepts invalid user input. Update the program to handle invalid input as follows:

a) Handle the runtime exception when a letter is entered for width or height.
b) In the Rectangle class, throw an IllegalArgumentException with message "Width must be positive" or "Height must be positive" when a negative width or height is passed to the Rectangle.

Sample run:

```
Enter width & height (0 to finish): 2 3
Enter width & height (0 to finish): 5 6
Enter width & height (0 to finish): a
Input Error: 2 positive numbers are required.
Enter width & height (0 to finish): 1 a
Input Error: 2 positive numbers are required.
Enter width & height (0 to finish): -1 2
Input error: Width must be positive.
Enter width & height (0 to finish): 2 -3
Input error: Height must be positive.
Enter width & height (0 to finish): 7 8
Enter width & height (0 to finish): 0
No      Rectangles
0       width = 2.0, height = 3.0, area = 6.0
1       width = 5.0, height = 6.0, area = 30.0
2       width = 7.0, height = 8.0, area = 56.0
```

Exercise 2: Handling Checked Exception

The following program prompts user to enter a URL, then count the total number of lines of codes in the URL. Compile the code below and study the errors. The errors are caused by checked exceptions. Fix the errors so that it produces the output as shown in sample run.

Sample run 1:

```
Enter a URL: https://www.mmu.edu.my
The webpage has 955 lines of codes.
```

Sample run 2:

```
Enter a URL: www.mmu.edu.my
Error: URL must have a protocol such as https://
```

Sample run 3:

```
Enter a URL: https://www.mmu.edu
Error: The URL does not exist or does not accept connection.
```

```
import java.net.URL;
import java.util.Scanner;

public class WebpageCounter {
```

```
  public static int countLine (String urlString) {
    URL url = new URL (urlString);
    int count = 0;
    Scanner input = new Scanner(url.openStream());
    while (input.hasNext()) {
      input.nextLine();
      count++;
    }
    return count;
  }
}

class TestWebpageCounter {
  public static void main(String[] args) {
    System.out.print("Enter a URL: ");
    Scanner input = new Scanner(System.in);
    String urlString = input.next();

    int count = WebpageCounter.countLine (urlString);
    System.out.println("The webpage has " + count + " lines of codes.");
  }
}
```