COMP 1501 ASSIGNMENT 3

Given: **Monday, October 26th, 2015**

Due Dates: **Monday, November 2, 2015** (pseudo-code / flow-chart – algorithm as well as IPO diagrams)
Monday, November 9, 2015 (Java code – implementation)

- 0 points = November 9 after midnight. Assignments handed in after midnight will be awarded zero points but will be accepted up **until 6am the following morning without any penalties.**
- 1 point = November 9 before midnight.
- 2 points = November 8 before midnight.
- 3 points = November 7 before midnight.
- 4 points = November 6 before midnight.

Objectives:

- To continue to gain experience developing a complete Java program, including:
  - understanding the problem;
  - designing an algorithmic solution using methods;
  - coding and testing that solution.
- To begin to gain basic experience with “if” and “if-else” statements.
- To continue to gain experience with arithmetic expressions, including the use of integer “div” and “mod” operators.

Problem Overview:

You will be writing a Java program from scratch that plays the game “Rock, Paper, Scissors, Lizard, Spock” with a human opponent. This program randomly generates a choice for itself, takes an choice from the user, and determines a winner based on the rules of “Rock, Paper, Scissors, Lizard, Spock”. The basic rules of the game and specific program requirements are discussed in the next sections.

If you have never played the game, you can see a visual description of it at the following website
http://www.wikihow.com/Play-Rock-Paper-Scissors-Lizard-Spock
The game has also been featured on the show “The Big Bang Theory”
https://www.youtube.com/watch?v=x5Q6-wMx-K8

Part 1: Pseudo-code / flowchart

You must do a method decomposition of the program and create an IPO diagram/contract for each method you plan to implement.

For **one** of your methods, that will contain a selection construct, you must provide a complete flow chart that outlines the algorithm of the method.

For the design document, for uniformity sake, use the provided template:
`Firstname_Lastname_DesignDocument.docx`

For the flow chart, use the file “`flow chart template.pptx`” to create the chart and then cut and paste it into the design document.

Part 2: Implementation and Submission Deliverables:

Submit a **BlueJ project folder** (with all its contents) to the “submit” folder, which appears under the “I:” drive each time you log in to a university PC. This folder must include a “.java” file containing an executable class with a main method. If you are submitting from a non-university computer (e.g. a home PC), you can access the submit folder via secure.mtroyal.ca, into which you can upload a compressed (e.g. “.zip”) version of your ENTIRE folder.

Your submitted folder name must follow the format illustrated below: `<FirstName>_<LastName>_Asg3`

1. You must decompose the problem into methods.
2. Your implementation must include a proper driver class and a single secondary class that contains all your methods.

Documentation Template:

File header - Replace all highlighted text with actual values

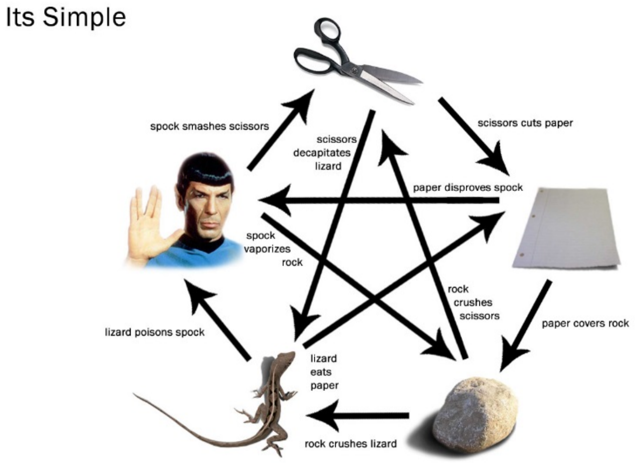
```
/**
 *  <include description of the class here>
 * @author <your name>
 * @version 1.0
 * Last Modified: <date> - <action> <who made the change>
 */
```

Basic Rules of the game:

If you have never played this game before the rules are simple - each player chooses one of “Rock, Paper, Scissors, Lizard, Spock” and they reveal their choices simultaneously. The choices are coded with a single letter code.

The winner is determined in the following way by comparing the two player’s choices.

Scissors cuts Paper	Winner: Scissors
Paper covers Rock	Winner: Paper
Rock crushes Lizard	Winner: Rock
Lizard poisons Spock	Winner: Lizard
Spock smashes Scissors	Winner: Spock
Scissors decapitates Lizard	Winner: Scissors
Lizard eats Paper	Winner: Lizard
Paper disproves Spock	Winner: Paper
Spock vaporises Rock	Winner: Spock
Rock crushes Scissors	Winner: Rock



http://wordpress.morningside.edu/cdl001/files/2010/09/RockPaperScissorsLizardSpock.jpg

Program Specifications:

1. Generate a random choice of “Rock, Paper, Scissors, Lizard, Spock” for the computer.
2. Prompt the user for their choice. The user’s choices are as follows:
    - R = Rock
    - P = Paper
    - S = Scissors
    - L = Lizard
    - SP = Spock

   You must allow the user to enter either uppercase or lowercase letters to make their choice:
3. Have the user input their choice.
4. Error check the input to ensure the choice is valid. If the user enters an incorrect choice the program should report an error message and properly shut down.
5. If a valid choice has been entered, the program must report both choices and then indicate the outcome of the game.
6. If the user’s choice and the program’s choice are the same, the program declares a tie.

Sample output:

Below is a sample output of what your program should do. Multiple **independent** runs of the program are shown. Items in **bold** are user input and should not be put on the screen by your program.

```
Please select one of [R/P/S/L/SP]: R
You chose: Rock
I chose: Paper
Paper beats rock - you lose!
```

```
Please select one of [R/P/S/L/SP]: S
You chose: Scissors
I chose: Paper
Scissors beats Paper - you win!
```

```
Please select one of [R/P/S/L/SP]: 1234
Invalid game choice!
```

```
Please select one of [R/P/S/L/SP]: r
You chose: Rock
I chose: Paper
Paper beats Rock - you lose!
```

```
Please select one of [R/P/S/L/SP]: P
You chose: Paper
I chose: Paper
A Tie!
```

```
Please select one of [R/P/S/L/SP]: Jeffrey
Invalid game choice!
```

```
Please select one of [R/P/S/L/SP]: z
Invalid game choice!
```

```
Please select one of [R/P/S/L/SP]: sP
You chose: Spock
I chose: Paper
Paper beats Spock - you lose!
```

Bonus (Possible 5 marks)

When the user enters an invalid choice, the program displays an error message. The user is asked to enter their choice again.

This process continues until the user enters a valid choice.

For example, on a single execution of the program, the following could happen:

```
Please select one of [R/P/S/L/SP]: Shoba
Invalid choice! Enter your choice again.

Please select one of [R/P/S/L/SP]: Jordan
Invalid choice! Enter your choice again.

Please select one of [R/P/S/L/SP]: z
Invalid choice! Enter your choice again.

Please select one of [R/P/S/L/SP]: sp
You chose: Spock
I chose: Paper
Paper beats Spock - you lose!
```