JP2 2019: Lab exam (Version F)

This lab exam is intended to be completed during the 3-5pm Tuesday timeslot (Lab sections 11 and 12). If you are taking the exam at a different time, you should locate the correct specification instead of this one.

Overview

In this lab, you will develop a set of classes to support the game **Rock-Paper-Scissors-Lizard-Spock** (referred to from now on as **RPSLS**). This is a game based on the classic **Rock-Paper-Scissors** (also known as "Roshambo"), but with the addition of two more possible symbols to choose from.[1]

The game proceeds as follows, in rounds:

- Two players each choose one symbol from the following list:
  - Rock, Paper, Scissor, Lizard, Spock
- If each player chooses the same symbol, the round is a draw; otherwise, the winner is chosen as follows:
  - Rock defeats {Lizard, Scissors}
  - Paper defeats {Rock, Spock}
  - Scissors defeats {Paper, Lizard}
  - Lizard defeats {Spock, Paper}
  - Spock defeats {Scissors, Rock}
- The game continues until one player has won a specified number of rounds

For example, one possible sequence could be as follows (where the required number to win is 2):

- Round 1: Player 1 chooses **Rock**, Player 2 chooses **Lizard**
  - Player 1 wins, score is 1-0
- Round 2: Player 1 chooses **Scissors**, Player 2 chooses **Scissors**
  - The round is a draw, score remains 1-0
- Round 3: Player 1 chooses **Spock**, Player 2 chooses **Paper**
  - Player 2 wins, score is 1-1
- Round 4: Player 1 chooses **Lizard**, Player 2 chooses **Scissors**
  - Player 2 wins, score is 1-2

Because Player 2 has won 2 rounds, the game is over and Player 2 is the overall winner.

[1] RPSLS was created on the US network TV show "The Big Bang Theory." More details are available at http://bigbangtheory.wikia.com/wiki/Rock_Paper_Scissors_Lizard_Spock.

Task 1: Symbol (2 marks)

*Note about implementation: all classes created in this exam should be put in the **rpsls** package.*

You must create an enumerated type **Symbol** with the following values:

ROCK, PAPER, SCISSORS, LIZARD, SPOCK

Task 2: Player (6 marks)

You must create a class **Player** representing a player of the RPSLS game. This class should have the following fields

- name: (a String)
- score: (an integer)

Player should have a constructor with the following signature:

public Player(String name)

This constructor should set the name, and should also initialise the score to zero.

The **Player** class should also include the following:

- **get** methods for both fields, as well as a **set** method for the score
- Appropriate implementations of **equals()**, **hashCode()**, and **toString()**

Task 3: RPSLS (3 marks)

Create a class **RPSLS** representing an instance of the RPSLS game. This class should have two fields

- player1: (a Player object)
- player2: (a Player object)

The **RPSLS** class should also have a constructor that sets the value of both fields. **You do not need to override equals(), hashCode(), or toString() for this class.**

Task 4: playGame (8 marks) ~~(7 marks)~~[2]

Add an additional method to the **RPSLS** class with the following signature:

public Player playGame(int numToWin)

This method should run a number of rounds of the RPSLS game with the two players that were set in the constructor, until one of the players has won **numToWin** rounds. You should reset the score of both players to zero at the start of the game, and then each round should proceed as follows:

- Randomly choose a symbol for player1 and player 2
- If the chosen symbols are different, then update the score of the winning player depending on which symbol wins

At the end, this method should return the Player object corresponding to the winner.

What to submit

On Moodle, go to **Lab Exam Submission – Version F** and upload the following three files:

- Symbol.java
- Player.java
- RPSLS.java

Be sure to submit to the correct assignment link, and be sure to submit before the deadline.

[2] There was an error on the initial specification about the marks for this question.