Lab 5

The main purpose of this lab is to test your knowledge of Priority Queues. Your teaching assistant will ensure that you are setup to use the IDE.

Instructions:

- You are required to submit your source (.java) and byte code (.class) file on Canvas.
- Students having exactly similar code will get a straight 0.
- Indent your code appropriately. Failing to do so would result in losing of marks.
- Comment your code appropriately. Failing to do so would result in losing of marks.
- You are required to complete this lab using any IDE for Java of your choice.
- The deadline for submission of this lab is during the lab session. If for some reason, you are not able to complete this lab in the lab session, please inform the TAs.
- Soft deadline is submission during the lab session and a hard deadline of submission 2 days after the lab session. A penalty of 1 mark each day will be deducted for late submissions (after hard deadline).

Question

In this exercise, you are provided a list of Tennis Players along with their number of Grand Slam wins of all time and you are required to use a PriorityQueue to list them from highest to lowest wins along with classifying them according to their wins. Please refer to the expected output of the program for more details.

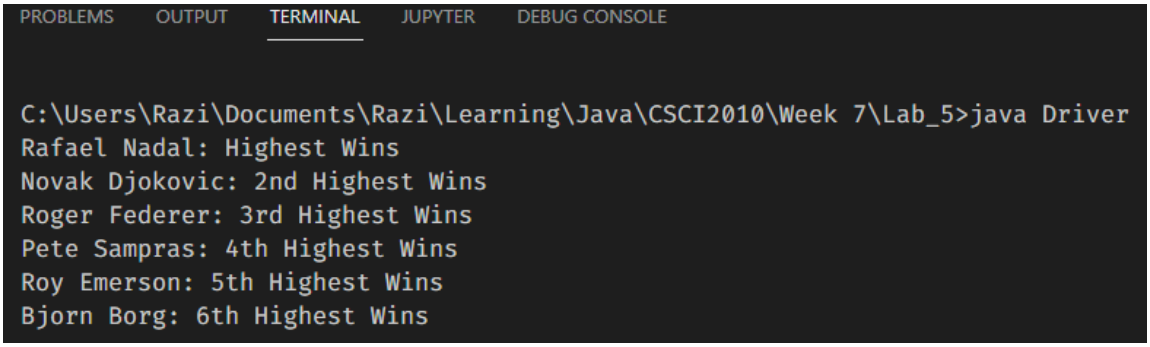
You are required to write a Java program that creates a Java class **`Athlete`** with two data members **`String`** `name` and **`int`** `wins`. This class should have at least one parameterized constructor and a `toString()` method that returns the name of the athlete.

You are provided with Driver class that has a main method which generates the list of players (Athletes) using Athlete class and pass it to a function `public static ArrayList<String> classifyAthletes(Athlete[] athletes).` This function returns an **`ArrayList`** of **`String`** which **`main`** method uses to display the output. The Code for **`Driver`** class with **`main`** method is provided below.

Your job is to complete `public static ArrayList<String> classifyAthletes(Athlete[] athletes)` method. Please note the following:

- Create a PriorityQueue inside this method that sorts in descending order list of Athletes by their wins.
- Create an **`ArrayList`** of **`String`** that would hold the name and the win string (refer to the expected output for more information)
- Win String is a string that is based on the number of wins
    - Player with highest win would have **`Highest Wins`** string concatenated to his name
    - Player with second highest win would have **`2nd Highest Wins`** string concatenated to his name
    - Player with third highest win would have **`3rd Highest Wins`** string concatenated to his name and so on.
    - This Win String should work for any number of players provided to this method.
- Return this **`ArrayList`** of **`String`** containing name of the player with win string concatenated from this function.

Below is the expected output of the program:



Below is the Driver class with main function and prototype of classifyAthletes function.

```
import java.util.ArrayList;
import java.util.PriorityQueue;

public class Driver {

    public static ArrayList<String> classifyAthletes(Athlete[] athletes)
    {
        // Fill in this function
    }

    public static void main(String[] args) {

        Athlete[] athletes = new Athlete[]{
            new Athlete("Pete Sampras", 14),
            new Athlete("Novak Djokovic", 21),
            new Athlete("Roger Federer", 20),
            new Athlete("Roy Emerson", 12),
            new Athlete("Rafael Nadal", 22),
            new Athlete("Bjorn Borg", 11),
        };

        for (String rank: classifyAthletes(athletes))
        {
            System.out.println(rank);
        }

    }
}
```
