ITEC1620: Object-Based Programming

Assignment 2

Assignment instructions. Please READ CAREFULLY.

a- The due date for this assignment is Nov. 8, 2020, at 11:59 pm (firm date). No LATE SUBMISSIONS are accepted.

b- You need to submit your assignments to eClass. You should only submit .java or /txt files (NO OTHER FORMAT IS ACCEPTED). You need to use Eclipse IDE for the assignment. If you have any issues, please let your TA know; otherwise, you will not get any mark on the assignment if it is not submitted on eClass and by the due date.

c- In each program, add at the beginning a comment with your name and student number.

d- You need to add comments to your code to explain your solution steps in each question. Do not add unnecessary comments.

Questions

1- Write a program that simulates a game of dice. In this game, 3 players will take alternate turns rolling two dice. On each turn, they record the sum of the two dice and add this to their total. If a player rolls a doublet (both dice have the same value), then the player gets to roll again. After each turn (when both roll), the code checks the sum of each player and the first player to reach a total of 15 or more will win the first place. The code then checks for the second and third place winners. The code will print out to the user the winners in order.

For this question, loop(s) and conditionals should be used otherwise you will lose marks.
Don't hardcode the output otherwise marks will be deducted.

The output should be as follow (note: no user input is required):

```
Player 1 rolls a 1 and a 1
Player 1 now has 2
Player 1 rolls a 6 and a 1
Player 1 now has 9
Player 2 rolls a 3 and a 2
Player 2 now has 5
Player 3 rolls a 5 and a 1
Player 3 now has 6
Player 1 rolls a 4 and a 3
Player 1 now has 16
Player 2 rolls a 6 and a 1
Player 2 now has 12
Player 3 rolls a 6 and a 5
Player 3 now has 17
Player 3 wins the first place with a total of 17
Player 1 wins the second place with a total of 16
Player 2 wins the third place with a total of 12
```

2- Write a class called **Circle** that contains:
   a. Three **private instance variables**: radius (of the type double), color (of the type String), and area (of type double).
   b. Two constructors - a *default* constructor with no argument (default value of radius is 2.0, and color is Green) and a parameterized constructor, which initializes only the radius and the color variables.
   c. Getter and setter for the radius and color variables.
   d. Two public methods: calculateArea(), and getPerimeter, which return the area and perimeter of a circle instance, respectively. Both methods have return.

Then write a driver class that tests the Circle class. In the driver class, create two objects of Circle class, one that tests the default constructor of the Circle class (here no user input is required) and then get the color, radius, area, and perimeter of that object and display them.
The second object should test the parameterized constructor (here you need to ask user to give you input to initialize the class variables). The code should ensure that the radius given by the user is positive. If the radius is not positive, the code will keep asking the user to reenter a value. Once the radius is positive, the code should get the color, radius, area, and perimeter of that object accordingly and display them. Then you need to ask the user again to give you a new radius for the second object of the class Circle. Again, the code should ensure that the new radius given by the user is positive. If the radius is not positive, the code will keep asking the user to reenter a value. Then you need to read the new radius and calculate the new area and perimeter accordingly and display them.
You need to format your output to look as below (print only 4 values after decimal).

- **To ensure that the radius is positive, loop (with sentinel) and conditional should be used otherwise you will lose marks.**
- **If the class variables are not private, you will lose marks.**

- **If you don't create setter/getter methods, you will lose marks.**
- **If you don't do formatting for the output as requested, you will lose marks.**
- **Don't hardcode the output otherwise marks will be deducted.**

The output should be as follow:

```
The first circle is Green and has radius of 2.0, area of 12.5664 and perimeter of 12.5664

Please enter the radius for the second circle:
-2
Please enter a positive value of the radius for the second circle:
6
Please enter color for the second circle:
Yellow
The second circle is Yellow and has radius of 6.0, area of 113.0973 and perimeter of 37.6991

Please enter the new radius for the second circle:
-9.6
Please enter a positive value of the new radius for the second circle:
8.5
The radius of the Yellow became 8.5, its area now is 226.9801 and its perimeter is now 53.4071
```

Good luck!