Object Oriented Programming-1 (PROG100082)
Assignment 5
Due: 1:00 PM, Apr 11, 2018 (Wednesday)

INSTRUCTIONS

- This Assignment must be completed independently without any outside collaboration. All work must be your own. Copying or reproducing the work done by others (in part or in full) or letting others to copy or reproduce your own, and/or unauthorized collaboration will be treated as academic dishonesty under the College's Academic Dishonesty Policy.
- This is an out of class Assignment and you are required to complete this Assignment on your own time.
- Your application must compile and run upon download to receive any mark.
- In all program you develop, you must demonstrate correct Java naming convention, and other code writing industry standards (e.g., comments, indentation, spacing, etc.).
- You must hand in the Assignment by the deadline. Late submissions (without a valid documented reason e.g., medical, etc.) will be subject to a reduction in the grade earned as follows: late penalties are 5% for submissions received later the same day of the due date and 10% per day. Late submissions will be accepted only until **three calendar days** after the due date.
- To submit the Assignments, please follow the Submission Guideline provided at the end of this Assignment.
- You **MUST** demonstrate your work and simulation during the class session on the submission date. Demonstration is important and missing it may cost significant part (at least 40%) of this Assignment marks.
- You must include following information as comments at the beginning of your main class file.
    - Assignment No.: 5
    - Your Name:
    - Your Id:
    - Submission date:
    - Instructor's name: Syed Tanbeer
- Total mark = 20 (weight = 4% of the final grade).

Exercise 1 [marks 6]: Area/Perimeter of Shapes- Revisited-1

In Exercise 1, Assignment 1 you developed a Java program to display the area and perimeter of a rectangle, given the dimensions of the rectangle, and those of a circle, given the radius of the circle. In this exercise, develop a Java program to solve the same problem using methods.

Your program must define and use following methods (i) *rectangleArea* and *rectanglePerimeter* to calculate the area and perimeter of rectangle, respectively and (ii) *circleArea* and *circlePerimeter* to calculate the area and perimeter of circle, respectively. All methods should communicate with the main method through passing arguments and returning values.

The program should use the following formula:
Area of rectangle = width * height
Perimeter of rectangle = 2 * width + 2 * height
Area of circle = ∏ * radius * radius
Perimeter of circle = 2 * radius * ∏
(∏ = 3.141)

Sample run:

Input:

```
Enter the length of the rectangle: 4
Enter the width of the rectangle: 2
Enter the radius of the circle: 6
```

Output:

```
The area of the rectangle = 8
The perimeter of the rectangle = 12
The area of the circle = 113.076
The perimeter of the circle = 37.692
```

Exercise 2 [marks 4]: Area/Perimeter of Shapes-Revisited-2

Rewrite the Java program you have developed in Exercise 1 to demonstrate method overloading feature. This program must define and use (i) two overloaded methods called *calculateArea*—one to calculate the area of the rectangle and the other to calculate the area of the circle, and (ii) two overloaded methods called *calculatePerimeter* – one to calculate the perimeter of the rectangle, and the other to calculate the perimeter of the circle. All overloaded methods *claculateArea* and *calculatePerimeter* should communicate with the main method through passing arguments and returning values.

Sample run:

Input:

```
Enter the length of the rectangle: 4
Enter the width of the rectangle: 2
Enter the radius of the circle: 6
```

Output:

```
The area of the rectangle = 8
The perimeter of the rectangle = 12
The area of the circle = 113.076
The perimeter of the circle = 37.692
```

Exercise 3 [marks 10]: Check Password

Write a Java program to check whether a string is a valid password. Assume a valid password must satisfy following three rules:

1. A password must be between 5 to 12 characters long.
2. Only letters and digits are allowed in a password.
3. A password must not contain 5 or more letters or digits in sequence (e.g., 'abcde12' and '12345ab', 'a12345b' and '1abced2' are invalid, but 'abc123de45' is valid).

Your program must use at least 3 methods to check the validity of above 3 rules for a user-given password string. It should display the password rules to the user first. For an invalid password, it should output "Invalid Password" and the reason. For a valid password, it should output "Valid Password".

The program should repeatedly ask for passwords until user enters a valid password.

Sample run:

```
Password Rules:
1. A password must be between 5 to 12 characters long.
2. Only letters and digits are allowed in a password.
3. A password must not contain 5 or more letters or digits in
sequence.
Enter your password: PROG10082
Invalid Password: Rule 3
Enter your password: SheridanCollege
Invalid Password: Rule 1
Enter your password: PROG_82
Invalid Password: Rule 2
Enter your password: PROG10K82
Valid Password
```

Hand-in:

Hand-in the source code files of all exercises to the Assignment 5 dropbox at Slate.

[Note: Your program will not be marked, if any required file is missing, corrupted, or it fails to open. Also no marks will be awarded to codes that are broken and/or fails to execute.]

---: End of Assignment 5 :--