CS 5007 Individual Project Assignment 5 (100 Points)
Due: 11:59 p.m. on 12/03/2021

Project Objective: The goal of this project is to practice using Stack to complete a simple application that can evaluate an arithmetic expression to compute the value. The operations only include +, -, * and /.

Project Deliverables:
1. Submit a zip file that contains the Stack.py that we discussed in the class and your driver program **.py** file with the hierarchy chart to Canvas.
2. Provide the clear **comment documentations** to your code.

Note:
(1) This project is to be done by each student individually. No help besides the textbook, materials, and the instructor should be taken. Copying any answers or part of answers from other sources (including your classmates) will earn you a grade of zero.
(2) All programming conventions mentioned in class should be followed.
(3) You should test your program before submitting.
(4) Your program must be developed and implemented in the PyCharm IDE, or 10% of the graded score is deducted.
(5) Assignments are accepted in their assigned Canvas drop box without penalty if they are received by 11:59PM EST on the due date, or 10% of the graded score is deducted for the late submission per day. Work submitted after one week of its original due date will not be accepted.

Task: Using the Stack class provided, you need to develop and implement a functional program that will generate the below output. This program includes the five functions, including the main() function. The rest of those sub-functions are described as follows:

Functions	Description
isBalanced(expression): Boolean	Check if the expression is balanced. If yes, return True. If no, return False. In this function, you need to use the Stack to help you complete this function.
query(input): Boolean	Check if there is another expression from the user. If yes, return True. If no, return False. This function accepts the user's input and only allows the user to enter "Y", "y", "N", or "n". If the input is not any one of the answers, it displays "**Invalid Response. Please type Y or N.**" on the screen and asks the user to enter again.
evaluate(expression): float	If the expression is balanced and valid, this function analyzes the expression and then calls **evaluateStackTops(numbers, operation)** to perform a specific operation, including addition, subtraction, multiplication, or division respectively, on this **numbers** parameter and then return the computed value. At the end, **evaluate(expression)** returns the final resultant value of the entire expression. The final resultant value must be in the two decimal places.

	If the expression is balanced but invalid, it displays the error message "**The Expression is Illegal.**" on the screen and return **-1**. In this function, you need to use the Stack class to help you complete this function.
evaluateStackTops(numbers, operation): float	This function computes the value based upon a specific operation (i.e., +, -, *, or /) on the **numbers** parameter. In this function, you need to use the Stack class to help you complete this function.

Note: No additional function can be added. The input parameters and the output value of the above sub-functions need to meet the above requirements.

```
Please type an arithmetic expression made from
unsigned numbers and the operations + - * /.
The expression must be fully parenthesized.

Your expression: {{[(12+9)/3]+7.2}*[(6-4)/8]

That is not balanced.

Another string? [Y or N]: Y

Your expression: {{[(12+9)/3]+7.2}*}

The expression is illegal.

Another string? [Y or N]: Y

Your expression: {{[(12+9)/3]+7.2}*[(6-4)/8]}

The value is 3.55

Another string? [Y or N]: N
All numbers are interesting.
```

Grading Criteria:

Checkpoint:	Possible Points
Hierarchy Chart (.pdf)	5
Proper Naming Conventions	5
Program Documentation	10
main()	15
isBalanced(expression)	15
query(input)	10
evaluate(expression)	15
evaluateStackTops(numbers, operations)	15
Correct Above Sample Program Outputs	10
Total	100