

COL 106 : Data Structures and Algorithms

Semester II, 2022-23, IIT Delhi

Assignment - 1 (due on 15th January, 11:00 PM)

Important Guidelines:

- You must ensure that your submitted code runs in the JDK 11.0.17 environment.
- You are not allowed to share your code with anyone. Cheating of any form will lead to strict disciplinary action. Typical penalty would include Fail grade in the course.
- The assignment must be done individually, and no group submissions are allowed.

1 Frequency of letters

Write a program that given a text file prints the number of occurrences of each letter (i.e. a-z) in the file. If there is no file with the given name, then the program should print appropriate error.

2 Method Overloading

Create a class “area” to calculate and print area. The class should have three methods with the same name but different parameters:

- public double calculate(int a)
Returns area of a square with side a .
- public double calculate(int a , int b)
Returns area of a rectangle with sides a , b .
- public double calculate(int a , int b , int c)
Returns area of a triangle with sides a , b , c .

Create three objects of the class, namely, square, rectangle, triangle to test method overloading.

3 Stack implementation

Implement the following interface for a stack using dynamic arrays (covered in lecture 3).

```
public interface Stack {  
    public void push( Object O);  
    public Object pop();  
    public boolean isEmpty();  
    public int size();  
    public Object top();  
}
```

4 Parenthesis Matching

Write a java program that takes from user a string comprising of only the characters '(', '{', '[', ')', '}', and ']', and checks if the parentheses in the string are balanced. Your program must use the stack data-structure from Question 3.