

CMPSCI 182 – Project 3
Recursion as a Problem-Solving Technique and Stacks
30 points total
Due 4/15/19

1. (15 points) Complete the program that solves the Eight Queens problem (pages 318 through 320). The program's output should look similar to:

```
|1|0|0|0|0|0|0|0|
|0|0|0|0|0|0|1|0|
|0|0|0|0|1|0|0|0|
|0|0|0|0|0|0|0|1|
|0|1|0|0|0|0|0|0|
|0|0|0|1|0|0|0|0|
|0|0|0|0|0|1|0|0|
|0|0|1|0|0|0|0|0|
```

Use the Queens class given on pages 318 through 321 of your textbook. In your implementation of the **Queens** class, complete the body of all methods marked as “To be implemented in Programming Problem 1.” **Do not change any of the global variable declarations, constructor or placeQueens methods.**

2. (5 points) The section on page 362 “Recognizing Strings in a Language” describes a recognition algorithm for the language:

$$L = \{ w\$w' : w \text{ is a possibly empty string of characters other than } \$, w' = \text{reverse}(w) \}$$

In a main class named **StringRecognizer**, implement the String recognition algorithm shown on page 362 using the ADT **StackReferenceBased** given on pages 368 to 369 of your textbook. The main class should prompt the user for a String, then use the stack to determine and display a message indicating whether that String is in the language or not.

3. (10 points) Design and implement a class called **PostfixCalculator**. Use the algorithm given on page 374 to evaluate postfix expressions, as entered into the calculator. Use only the operators **+**, **-**, *****, **%**, and **/**. Assume that the postfix expressions have *single digit numbers* in the expression and are syntactically correct. This means that the expressions will have already been converted into correct postfix form. The **PostfixCalculator** should **not** convert from infix to postfix form. In order to test the **PostfixCalculator**, it will be necessary to manually convert your test expressions into postfix form before entering them into the **PostfixCalculator**.

When you have completed all three exercises, ZIP the entire NetBeans Project 3 folder into a single ZIP file and then submit this ZIP file to Canvas.