

LAB 6 (RECURSION)

CSC 172 (Data Structures and Algorithms)
Spring 2018
University of Rochester

Due Date: Sunday, March 11 @ 11:59 pm

Note: You can submit until March 18 @ 11:59 pm without penalty (not recommended)

Introduction

The labs in CSC172 will follow a pair programming paradigm. Every student is encouraged (but not strictly required) to have a lab partner. Every student must hand in their own work but also list the name of their lab partner if any on all labs.

In this lab, we will practice recursive thinking. You and your lab partner may discuss the lab with other pairs in the lab. It is acceptable to write pseudocode on the whiteboard for the benefit of other lab pairs, but you are not allowed to electronically copy and/or transfer files between groups.

Task 1 (Make Change) (50 pts)

Given an infinite number of quarters (25 cents), dimes (10 cents), nickels (5 cents), and pennies (1 cent), write a method `makeChange(int n)` that takes 'n' cents as input, and returns the number of ways of representing 'n' cents. You can either write an iterative or a recursive solution. You are also allowed to have any number of helper functions. Though we will allow iterative solution, we recommend you try the recursive solution for this problem.

Task 2 (8-Queen Problem) (50 pts)

Write a java method `findEightQueen` to find and print at least one way of arranging eight queens on a chess board so that none of them attack each other (i.e., they do not share the same row, column, or diagonal). Any textual representation of the board is fine as long as the board is comprehensible. You are encouraged to draw a black&white (or any color of your choice) chess board and make the squares holding the queens blue. [No extra credit.]

Note: You need to **find** the solution. Just printing a solution will not give you any points.

Reference: https://en.wikipedia.org/wiki/Eight_queens_puzzle

Submission

- Your submitted file must be named `Lab6.zip`. No `.rar`, `.7z` or any other formats will be accepted.
- The zip files must contain only two `.java` files — `MakeChange.java` and `EightQueen.java`. The two methods you required to write must be named as `makeChange(int n)` and `findEightQueen()`. You are recommended to supply us the test cases you used. You can make your methods static if you want. Once again, we are looking for only two `.java` files. So, please do not upload the whole project. If you do not know how to find the `.java` files, ask the lab TAs.

Submit `Lab6.zip` at the appropriate location on the Blackboard system at `learn.rochester.edu`. You should hand in a single zip (compressed archive) `Lab6.zip` containing two java files and a README file.

1. README, a plain text file must include your contact information, your partner's name, a brief explanation of the lab (a one-paragraph synopsis. Include information identifying what class and lab number your files represent.), and one sentence explaining the contents of any other files you hand in.
2. Two Java source code files `EightQueen.java` and `MakeChange.java` representing the work accomplished. Following the naming convention is mandatory. All source code files should contain author and partner identification in the comments at the top of the file.
3. Any additional files as required.