COSC 2007: Data Structure II

Assignment#1

Write the details algorithm and convert into java code for the solution of 8-Queen Problem.

Basic Concepts:
The 8-queens problem is a problem of placing n queens on an n× n chessboard, where solutions. The question of the problem is how to place eight queens on a chess board in a way that they are not able to attack each other. There should not be any 2 queens in the same horizontal, vertical or diagonal line. The goal is not just to find one possible solution, but all of them. An advanced way of looking at the problem is by trying to solve the problem for any number of queens. The number of queens can be defined in the source code and the amount of horizontal and vertical lines of the board are defied according to number of queens. The one solution is given in following figure.

Q							
						Q	
				Q			
							Q
	Q						
			Q				
					Q		
		Q					

The idea is to place queens one by one in different columns, starting from the leftmost column. When we place a queen in a column, there should not be two queens in same rows or columns or diagonals. If we find a row for which there is no repeating queue, we mark this row and column as part of the solution. If we do not find such a row due to attack, then we backtrack.

Strategies to be used:

- Recursion
- Backtracking

Methods/Functions: You can define any number of methods as you like.

Output: You should display at least three visual output similar to above figure.

What to submit: The submission is Assignment1

How to submit the Assignment: You can prepare a document, either a text file or a pdf file. Course name, Student name, and student number should be written at the top of a report. You can submit the assignment through Assignment#1 from your Moodle account. **You must submit Java source files.**

Submission Due: The submission due is January 27, 2024.

Submission Report Format:

Assignment1

<Course Name>

<Student Name>

<Student Number>

Exercise No

<Type the question here>

Algorithm/ Pseudocode
Code
Three Output
Conclusion

Late Submission will be marked as 0.

Without java source files, marking will be 0.