N-QUEEN PROBLEM

Problem Overview:

The N-Queens problem involves placing N queens on an N×N chessboard such that no two queens threaten each other. A queen threatens other pieces in the same row, column, or diagonal. The objective is to programmatically find all valid solutions using a stack-based backtracking approach.

Key Concepts and Requirements:

Algorithm Design:

Start with an empty board.

Use backtracking with a stack to explore all possible placements row by row.

Backtrack to previous states when no valid position is found.

Optimization with Safe Matrix:

Use a 2D matrix to track safe positions for queen placements.

Update matrix values to reflect threats from queen placements.

Input Validation:

Only accept positive integers for N (N < 14).

Handle invalid inputs by displaying appropriate messages and terminating execution.

Output Specifications:

Save solutions to a text file named Nqueens\_solutions.txt.

Format:

Total number of solutions.

Each solution represented as a one-dimensional array (row indices for queen placements).

Implementation Guidelines:

Submit three files: stack.h, stack.cpp, and main.cpp.

Code must compile, follow the submission format, and include proper documentation.

Notes:

Grading will consider code functionality, structure, and adherence to guidelines.

Good luck with your implementation!