import java.util.ArrayList;

import java.util.List;

import java.util.Scanner;

public class NQueens {

public static boolean isSafe(List<Integer> board, int row, int col) {

for (int i = 0; i < row; i++) {

int prevCol = board.get(i);

if (prevCol == col || prevCol - i == col - row || prevCol + i == col + row) {

return false;

}

}

return true;

}

public static List<List<Integer>> solveNQueens(int n) {

List<List<Integer>> solutions = new ArrayList<>();

List<Integer> board = new ArrayList<>();

solveNQueensUtil(n, 0, board, solutions);

return solutions;

}

public static void solveNQueensUtil(int n, int row, List<Integer> board, List<List<Integer>> solutions) {

if (row == n) {

solutions.add(new ArrayList<>(board));

return;

}

for (int col = 0; col < n; col++) {

if (isSafe(board, row, col)) {

board.add(col);

solveNQueensUtil(n, row + 1, board, solutions);

board.remove(board.size() - 1);

}

}

}

public static void printSolutions(List<List<Integer>> solutions, int n) {

if (solutions.isEmpty()) {

System.out.println("No solutions found.");

} else {

System.out.println("Total solutions: " + solutions.size());

int count = 1;

for (List<Integer> solution : solutions) {

System.out.println("Solution " + count + ":");

for (int row = 0; row < n; row++) {

for (int col = 0; col < n; col++) {

if (solution.get(row) == col) {

System.out.print("Q ");

} else {

System.out.print(". ");

}

}

System.out.println();

}

System.out.println();

count++;

}

}

}

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter the number of queens (N): ");

int n = scanner.nextInt();

List<List<Integer>> solutions = solveNQueens(n);

printSolutions(solutions, n);

}

}

output:-

Enter the number of queens (N): 4

Total solutions: 2

Solution 1 :

.Q..

...Q

Q...

..Q.

Solution 2 :

..Q.

Q...

...Q

.Q..