

Implementation of N Queen Problem

```
1 import java.util.*;
2
3 public class N_Queens {
4     private static boolean isSafe(int row,int col,char[][] board){
5         for(int j=0;j<board.length;j++){
6             if(board[row][j]=='Q') return false;
7         }
8         for(int i=0;i<board.length;i++){
9             if(board[i][col]=='Q') return false;
10        }
11        for(int i=row,j=col;i>=0 && j>=0;i--,j--){
12            if(board[i][j]=='Q') return false;
13        }
14        for(int i=row,j=col;i>=0 && j<board.length;i--,j++){
15            if(board[i][j]=='Q') return false;
16        }
17        for(int i=row,j=col;i<board.length && j>=0;i++,j--){
18            if(board[i][j]=='Q') return false;
19        }
20        for(int i=row,j=col;i<board.length && j<board.length;i++,j++){
21            if(board[i][j]=='Q') return false;
22        }
23        return true;
24    }
25    private static void saveBoard(char[][] board,List<List<String>>
26 allBoards){
27        String str="";
28        List<String> newBoard = new ArrayList();
29        for(int i=0;i<board.length;i++){
30            String row="";
31            for(int j=0;j<board[0].length;j++){
32                if(board[i][j]=='Q'){
33                    row+='Q';
34                }
35                else{
36                    row+='_';
37                }
38            }
39            newBoard.add(row);
40        }
41        allBoards.add(newBoard);
42    }
43    private static void helper(char[][] board,List<List<String>>
44 allBoards,int col){
45        if(col==board.length){
46            saveBoard(board,allBoards);
47            return;
48        }
49        for(int row=0;row<board.length;row++){
50            if(isSafe(row,col,board)){
51                board[row][col]='Q';
52                helper(board,allBoards,col+1);
53                board[row][col]='_';
```

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54         }
55     }
56 }
57 public static List<List<String>> solveNQueens(int n) {
58     List<List<String>> allBoards=new ArrayList();
59     char[][] board =new char[n][n];
60     helper(board,allBoards,0);
61     return allBoards;
62 }
63
64 public static void main(String[] args) {
65     int n=8;
66     List<List<String>> ll=solveNQueens(n);
67     int i=0;
68     for(List<String> res:ll){
69         System.out.println("Sol."+(++i));
70         for(String str:res){
71             for(char c:str.toCharArray()){
72                 System.out.print(c+" ");
73             }
74             System.out.println();
75         }
76         System.out.println('\n');
77     }
78 }
```