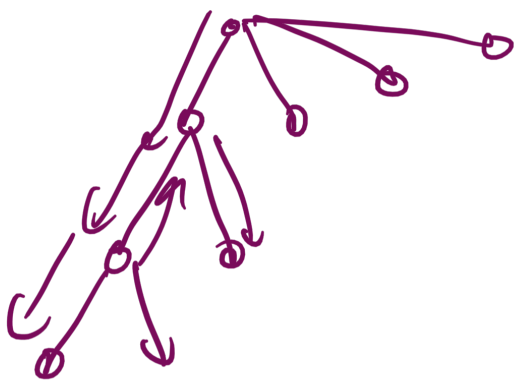
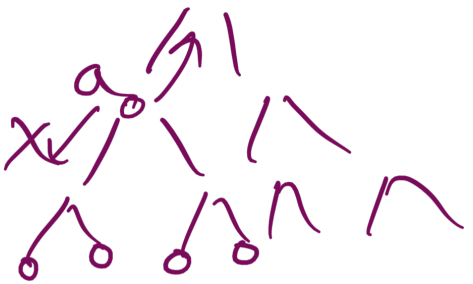
Recursion
& Backtracking - III

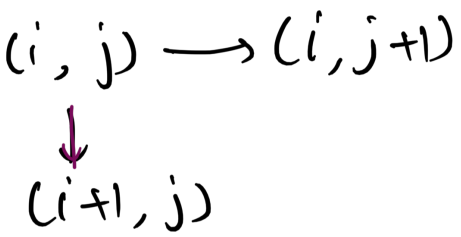
Back tracking

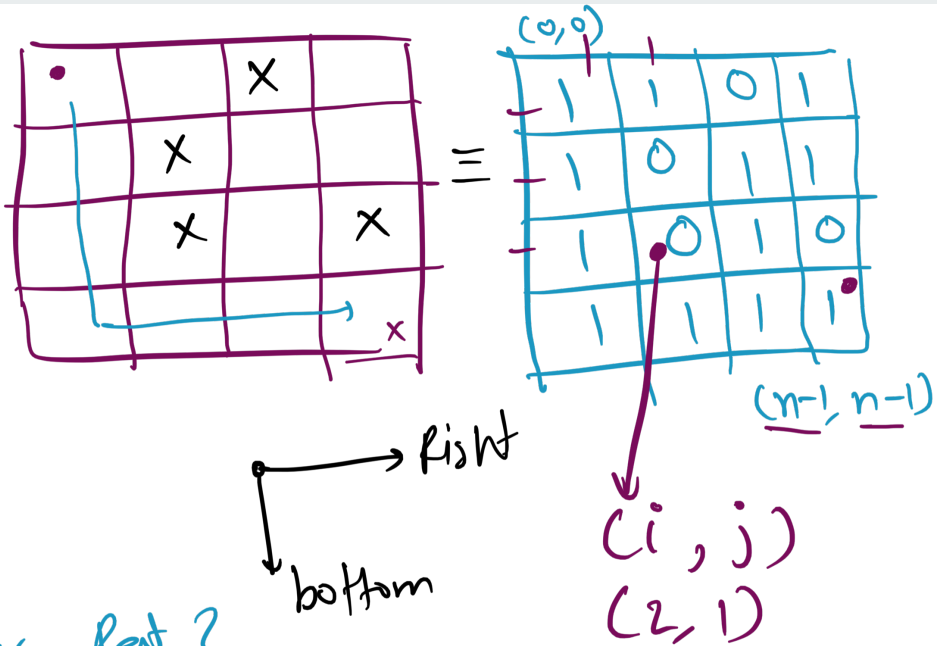
abc





Rat in a Maze Problem

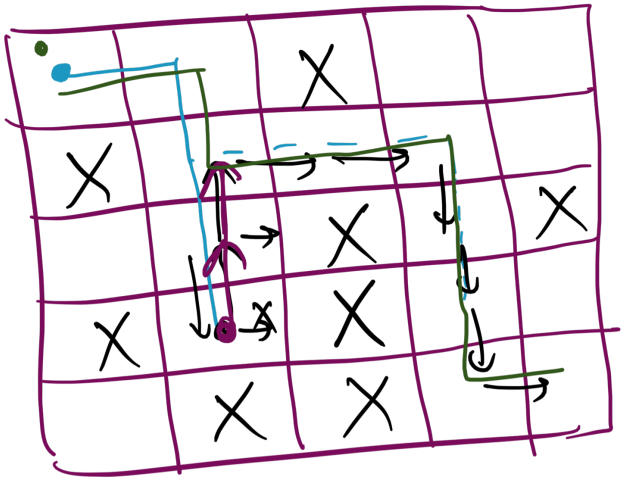




Q. Is there a path for Rat?

a[ ][ ]

a.length → n



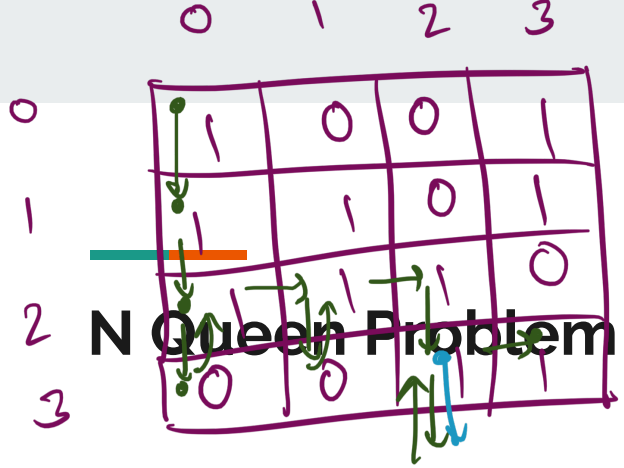
rat(a, vis, 0, 0)

(n, m)

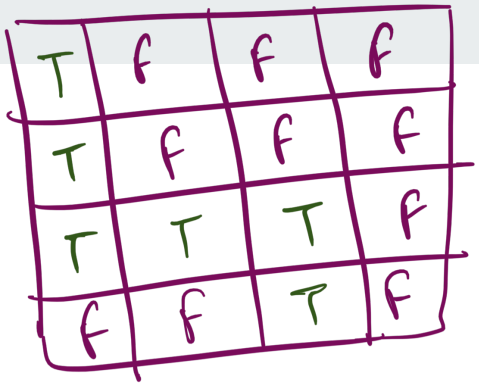
how many paths

```
rat(int a[][], int vis[][],
    int i, int j) {
```

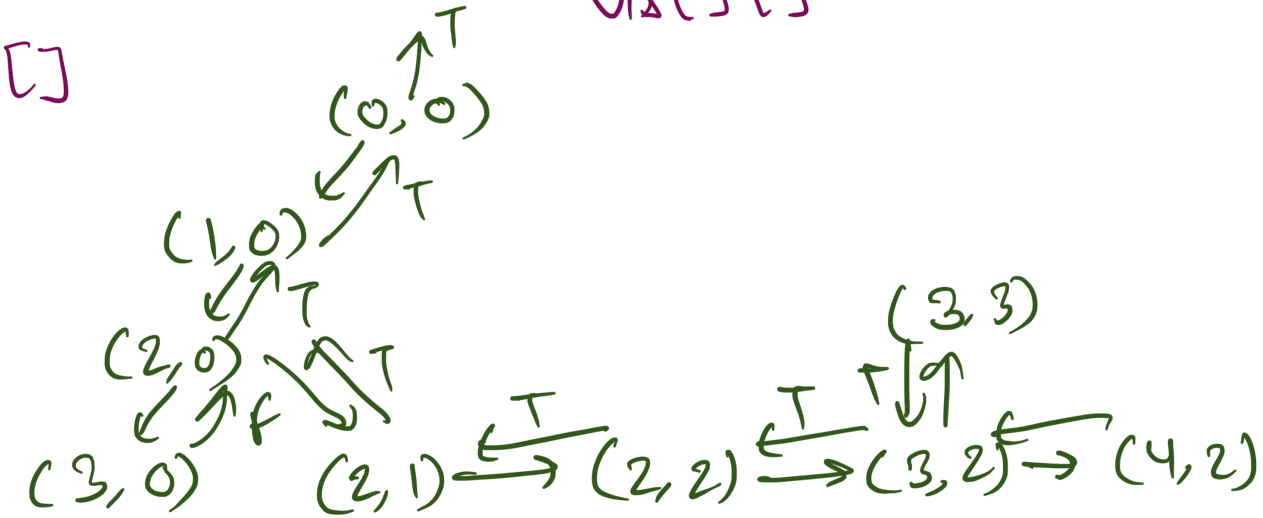
N Queen Problem

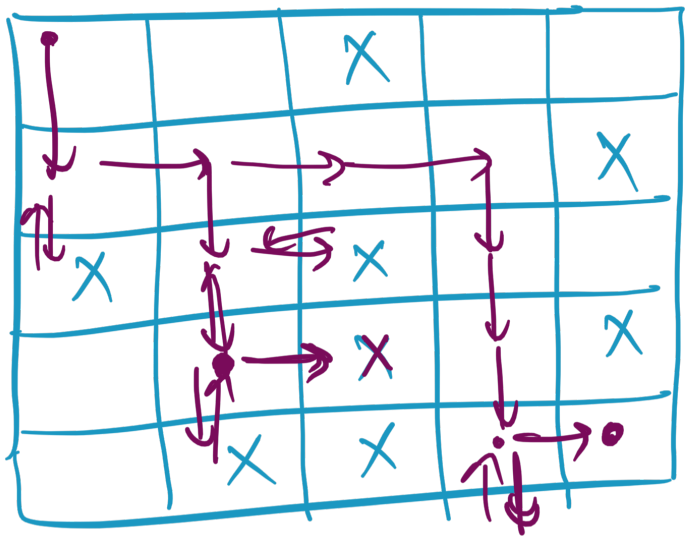


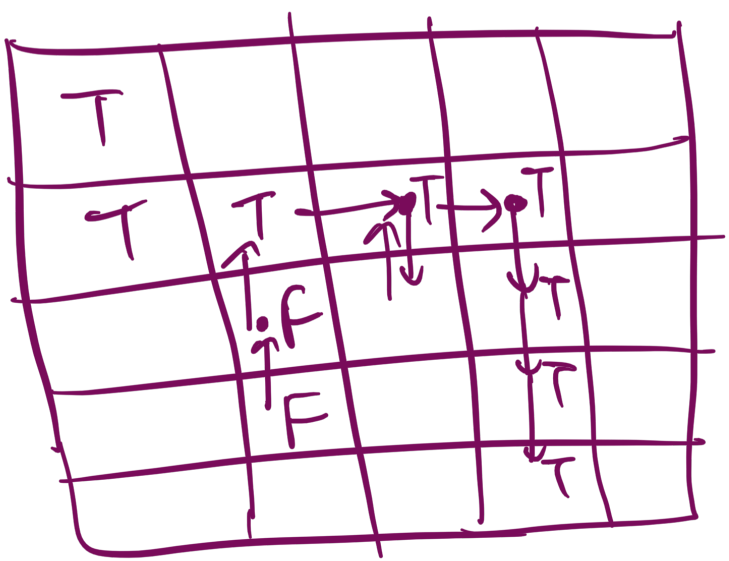
a[][]

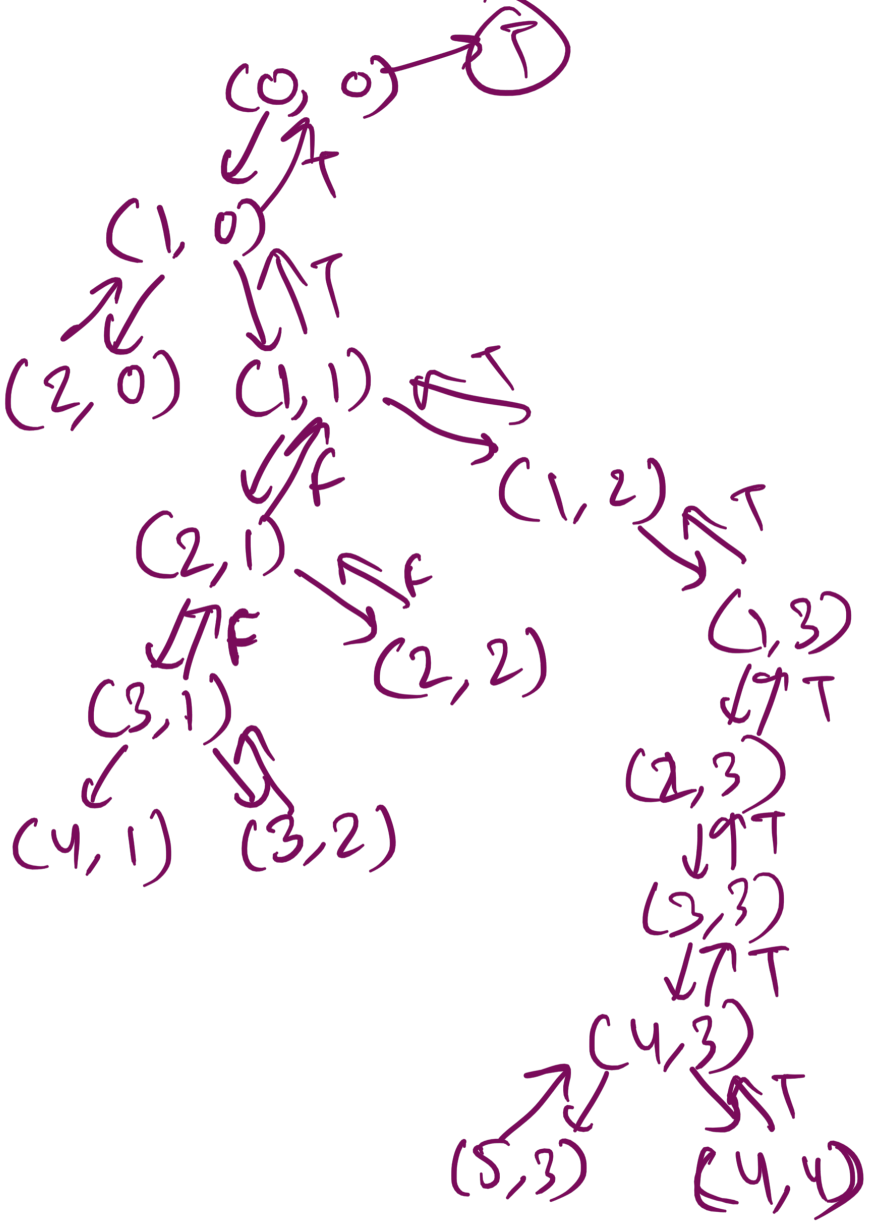


vis[][]

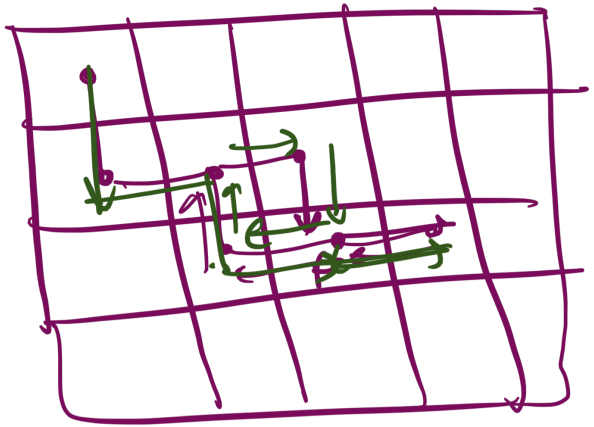


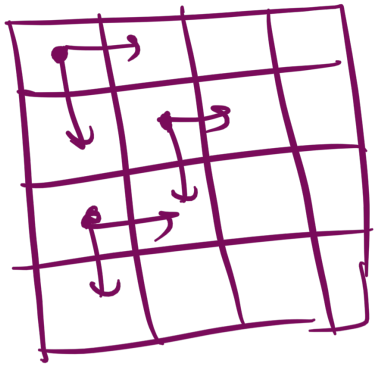

X
X
X
X
X
X
X
X


T
T
T
T
T
F
F
T
T
T
T


(0, 0)
T
(1, 0)
T
(2, 0)
(1, 1)
T
F
(1, 2)
T
(2, 1)
F
(2, 2)
F
(1, 3)
T
(3, 1)
(2, 3)
T
(4, 1)
(3, 2)
(3, 3)
T
(4, 3)
T
(5, 3)
(4, 4)

vij

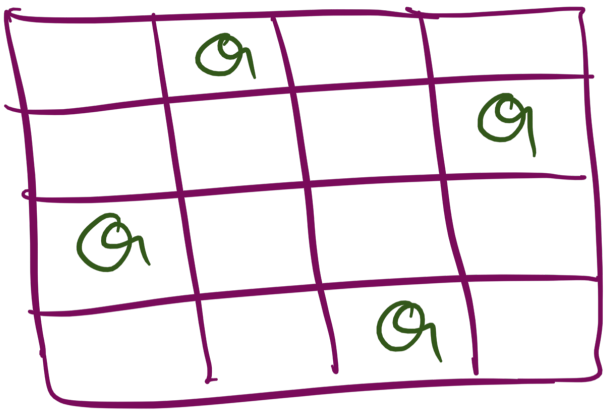




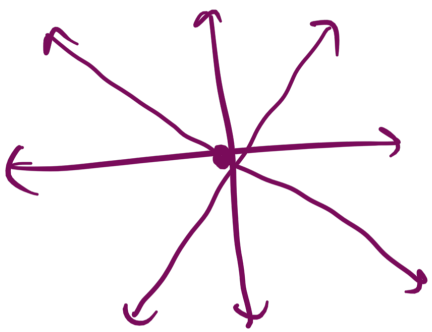
n x n

$O(2^{n^2})$

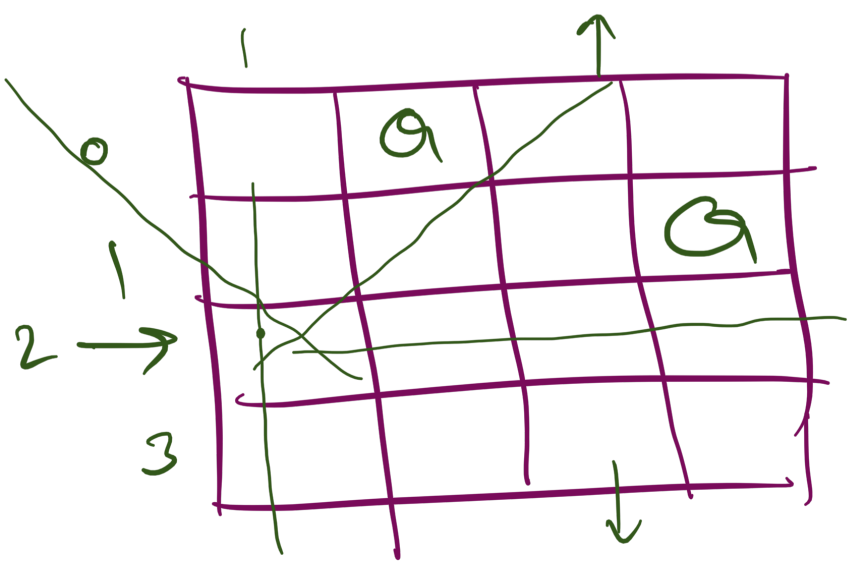
N Queen Problem

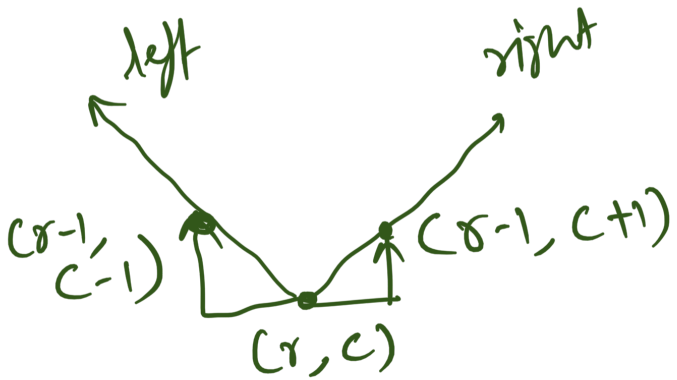


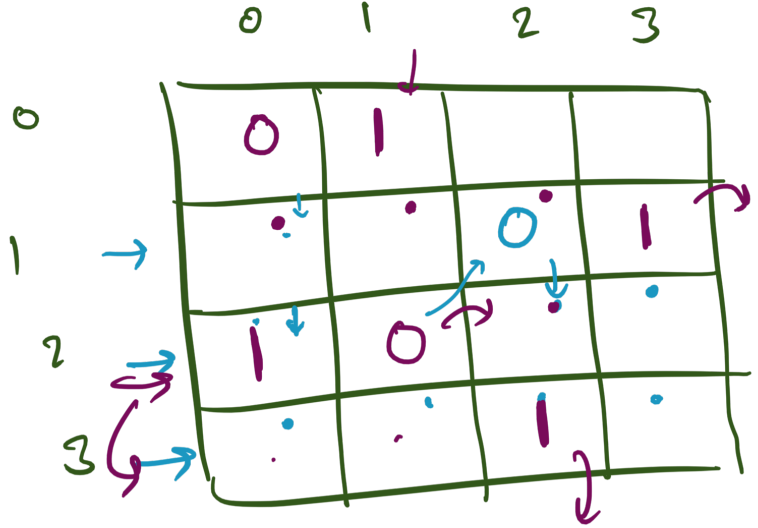
N Queens

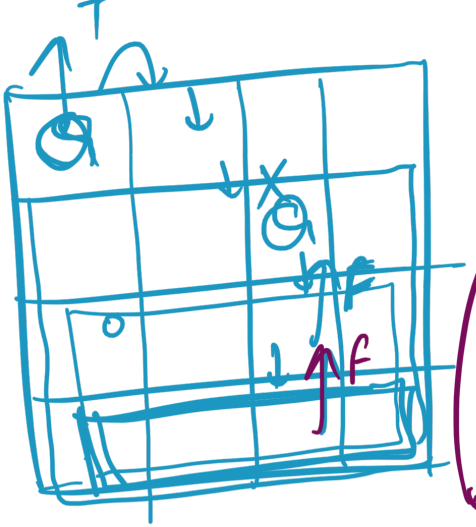


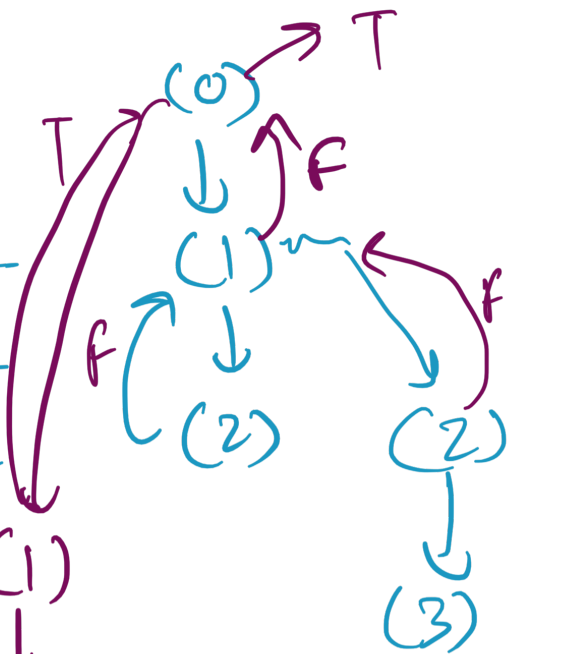
$N^2 C_N$

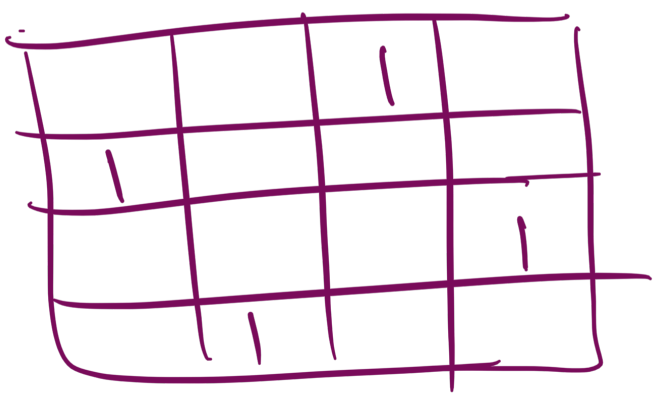




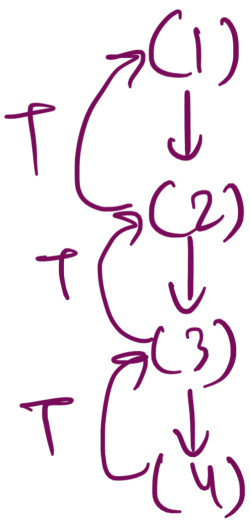








N



N=4

Practice Problems

1. Sudoku Solver Problem
2. Subset sum Problem

These questions and more can be found here:
https://www.geeksforgeeks.org/backtracking-algorithms/