BACKTRACKING

INTRODUCTION TO ALGORITHMS

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INTRODUCTION

In this presentation, we are going to discuss my problem statement, how Backtracking technique is helpful and how we can solve the problem with the Backtracking technique approach.

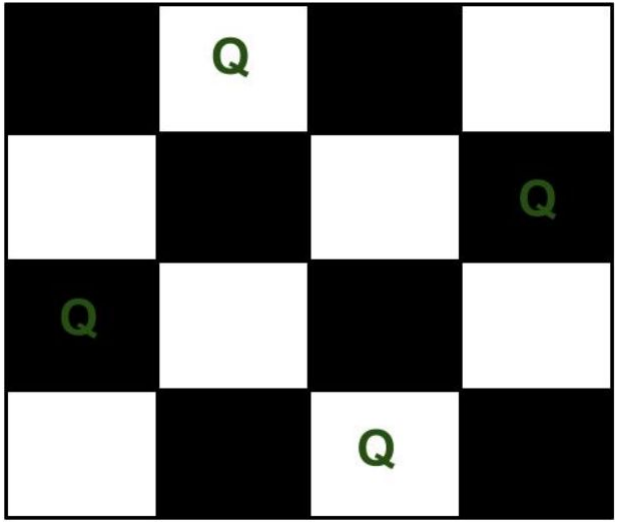
The Backtracking is an algorithmic-method to solve a problem with an additional way. It uses a recursive approach to explain the problems. We can say that the backtracking is needed to find all possible combination to solve an optimization problem.

Backtracking is a systematic way of trying out different sequences of decisions until we find one that "works."

Problem statement

N Queen problem

The N Queen is the problem of placing N chess queens on an N×N chessboard so that no two queens attack each other. For example, following is a solution for 4 Queen problem.



Approach

We will divide the task into function-

First function - This function solves the N Queen problem using Backtracking. It mainly uses solve the problem. It returns false if queens cannot be placed, otherwise return true and placement of queens in the form of 1s.note that there may be more than one solutions, this function prints one of the feasible solutions.

Second function - A utility function to check if a queen can be placed on board[row][col]. Note that this function is called when "col" queens are already placed in columns from 0 to col -1. So we need to check only left side for attacking queens

Now we will show a diagram explaining the backtracking

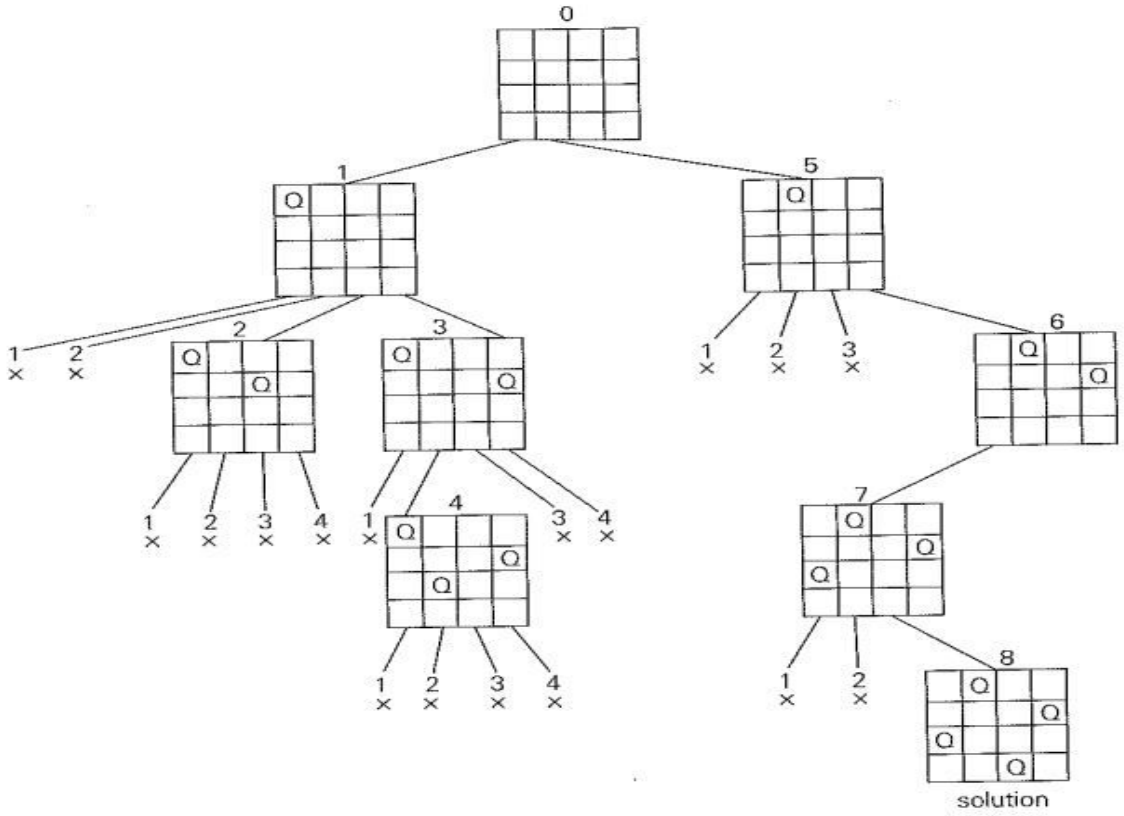


FIGURE 12.2 State-space tree of solving the four-queens problem by backtracking. × denotes an unsuccessful attempt to place a queen in the indicated column. The numbers above the nodes indicate the order in which the nodes are generated.