Design And Analysis Of Algorithms

BackTracking (DFS)

Plan Of The Talk

- Introduction to Backtracking
- Eight Queen Problem

Introduction To Backtracking

- Backtracking is a general algorithm for finding all solutions to some computational problem, that incrementally builds candidates to the solutions and give up each partial candidate (backtracks) as soon as it determines that candidate cannot possibly be completed to a valid solutions.

Example: B1, B2, G1 & 3 Chairs

- State Space Tree

Eight queens problem

- What is Eight queens problem?
  - Problem of placing 8 queens on 8*8 chess board so that no queens attack each other.
  - No two queens should share same row, column or diagonal.

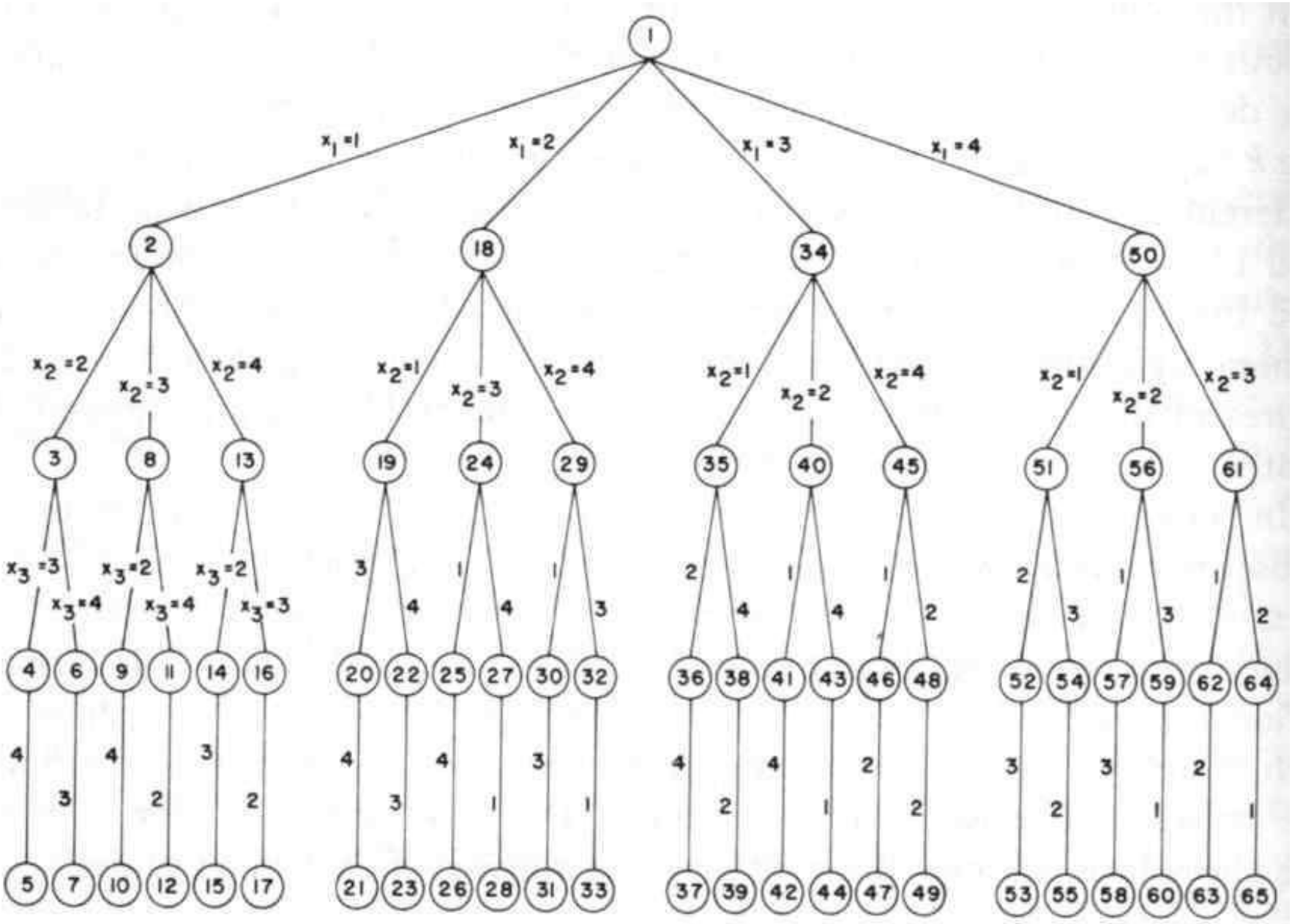
Concept

- Each call places a queen in specific column.
- State of the board from previous placement is known.
- Current Step backtracking:
  - If placement in the column doesn't give you the solution, then move to the next row in the same column.
- Previous Step backtracking:
  - If all rows in a column have been checked, call terminates and backtracks to the previous column.

Animation for 4 Queens Problem

- http://www.slideshare.net/Tech_MX/8-queens-problem-using-back-tracking

- How to draw the solution space for 4 queen problem?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x1 =1
x1 =2
x1 =3
x1 =4
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x2 =2
x2 =3
x2 =4
x2=1
x2=3
x2=4
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x3 =3
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