CIS 263 Introduction to Data Structures and Algorithms

Backtracking

Optimization Problems

Greedy Algorithms

- Mainly Heuristics based

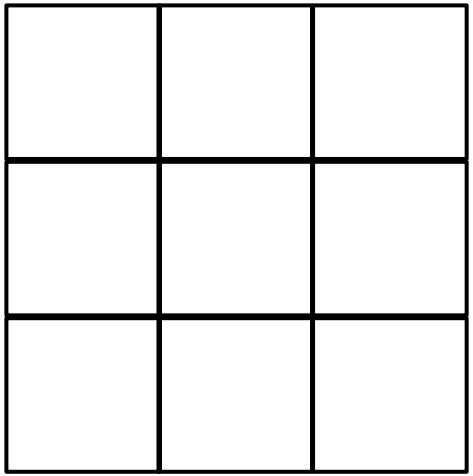
Bruteforce

- Constraints based
- Backtracking

N-Queens problem

- N Queens cannot be on the same row/column/diagonal
- **Can we have a valid solution (placement of all 3 queens)?**

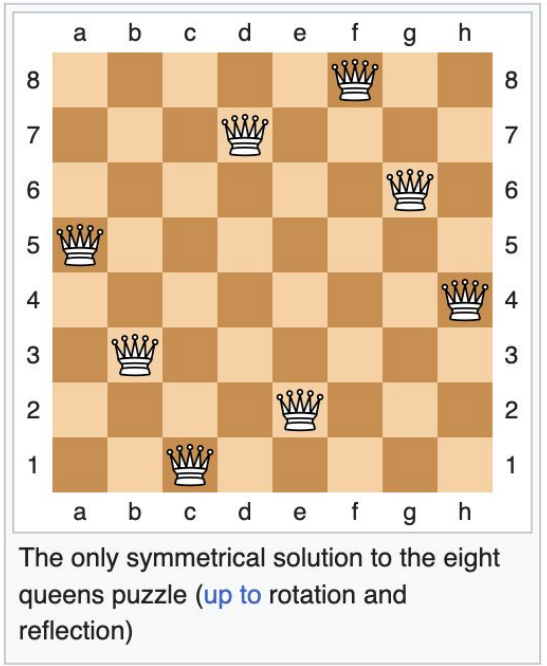
Q1, Q2, Q3



N-Queens problem

- N Queens cannot be on the same row/column/diagonal
- What are the valid options on a chess board of placing 8 queens
- Also known as 8 Queens problem.

Q1, Q2, Q3, .. Q8



The only symmetrical solution to the eight queens puzzle (up to rotation and reflection)

Src: wikipedia

N-Queens problem

- We can use backtracking algorithm
  - Bounding function
    - No two Queens can be on the same row, column or on the diagonals

- Question: How many possibilities we have to search if Bruteforce search (without any condition) applied ?