

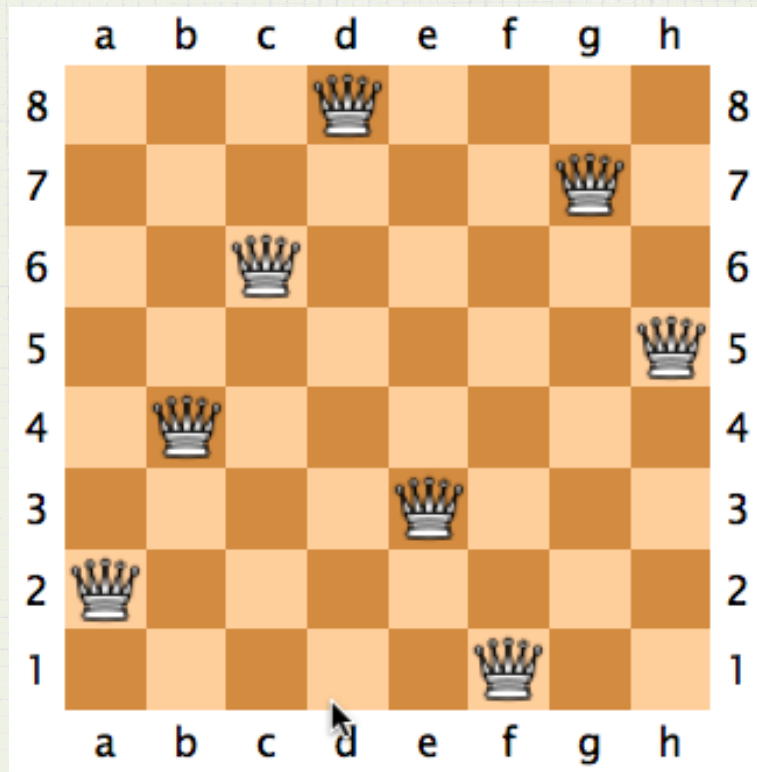
Optimization Problems

“minimum airfare from BOS to SFO on Mon or Tue”

1) Objective function

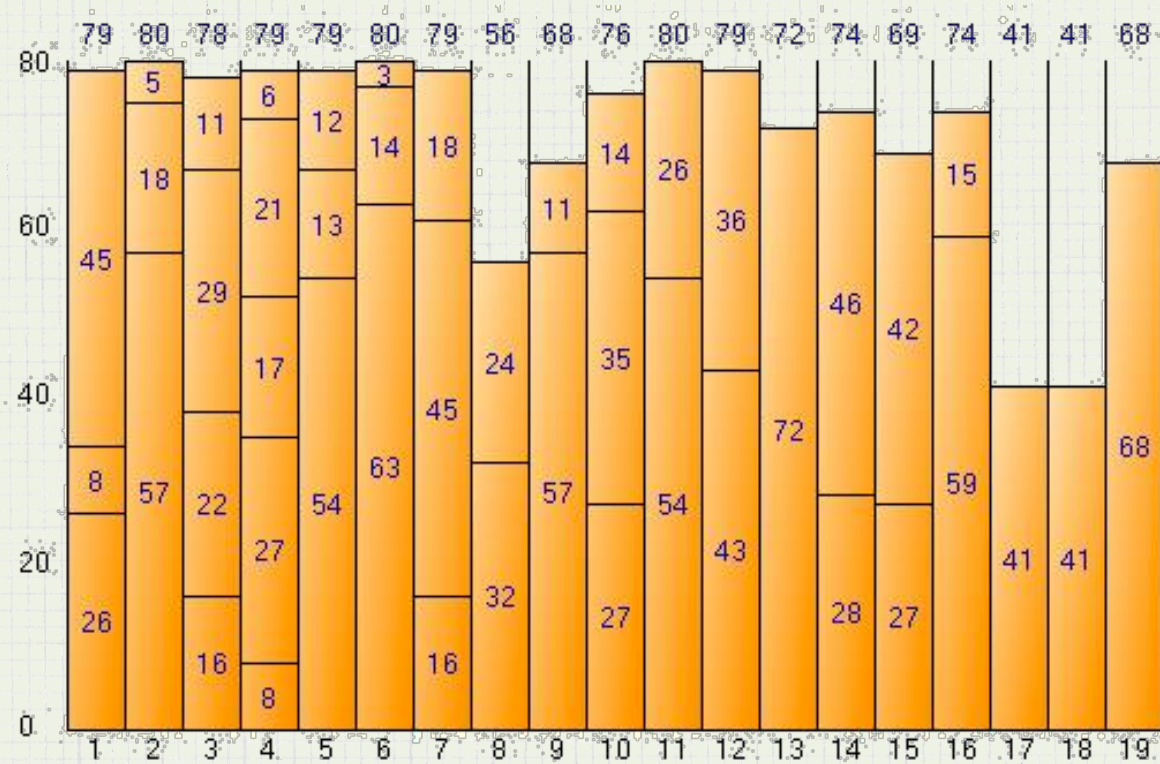
2) Set of constraints solution must satisfy

Example: N-queens

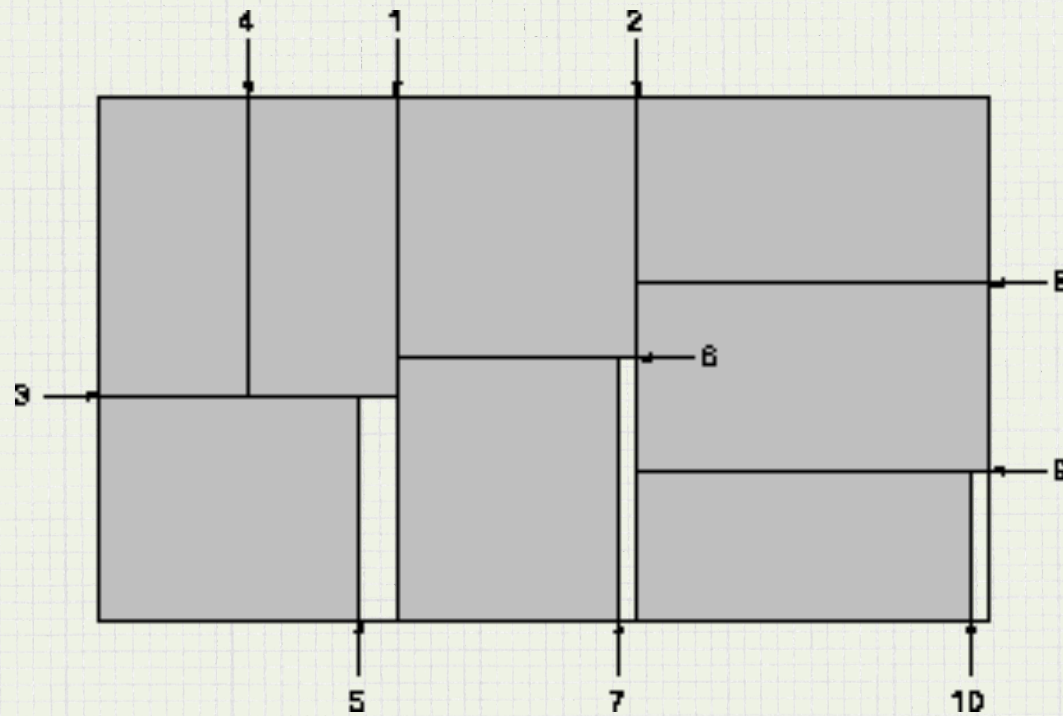


Place N queens on $N \times N$ board so that no two queens attack each other (no two queens share same row, column or diagonal)

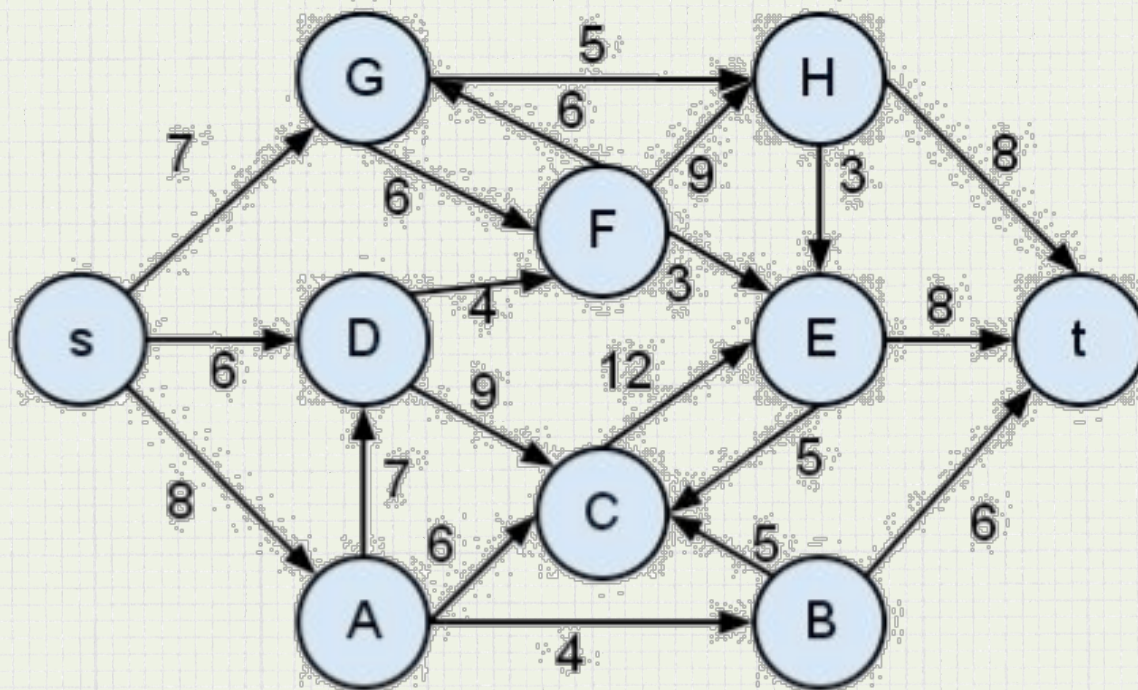
Example: bin packing



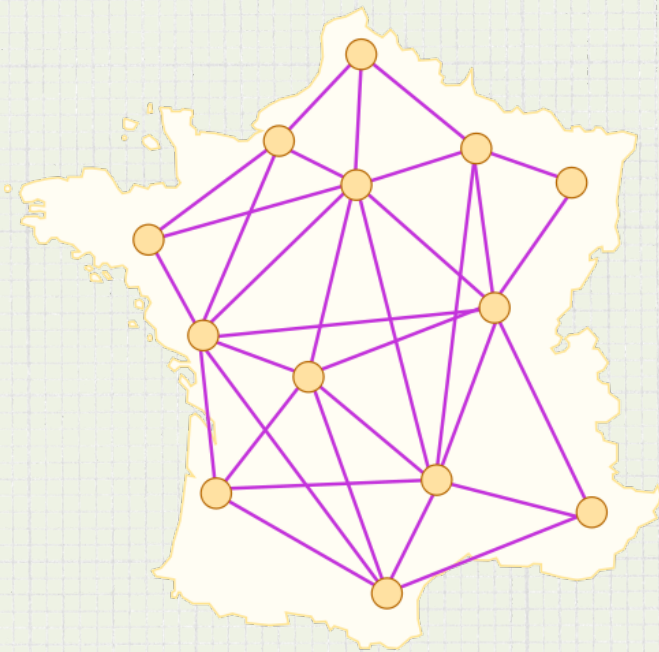
Example: cutting stock



Example: min cut



Example: traveling salesman



Challenge: these problems are “hard” to solve

- Often finding optimal solution requires examining all possible combinations of items
- Time to examine all combinations grows exponentially with number of items
- “real world” problems have large # of items