

# Local Search and CSP

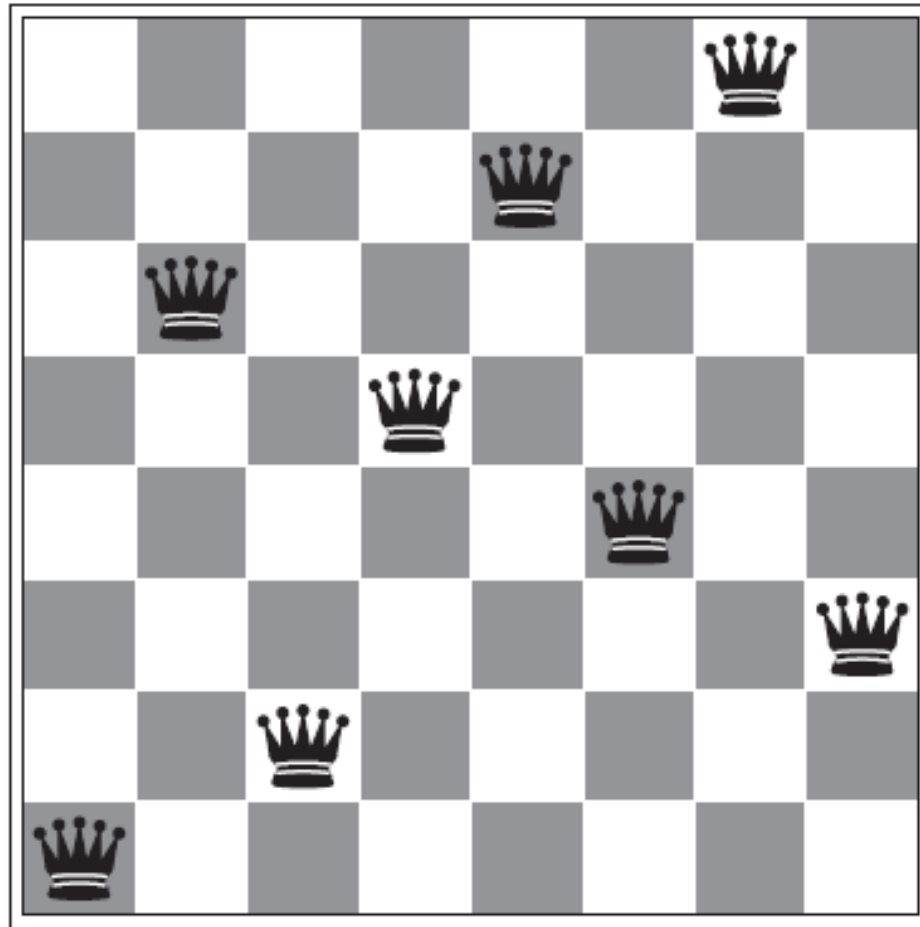
CS161

Guy Van den Broeck

# Local Search

- Sometimes the path to the goal is irrelevant
- Only final configuration matters
  - n-queens, circuit design, road network, cryptarithmic, rubik, sliding tile, TSP?
- Modify a single current node
- Good for optimization problems
  - objective function

# Hill-Climbing Search



# Hill-Climbing Search

18	12	14	13	13	12	14	14
14	16	13	15	12	14	12	16
14	12	18	13	15	12	14	14
15	14	14	♔	13	16	13	16
♔	14	17	15	♔	14	16	16
17	♔	16	18	15	♔	15	♔
18	14	♔	15	15	14	♔	16
14	14	13	17	12	14	12	18

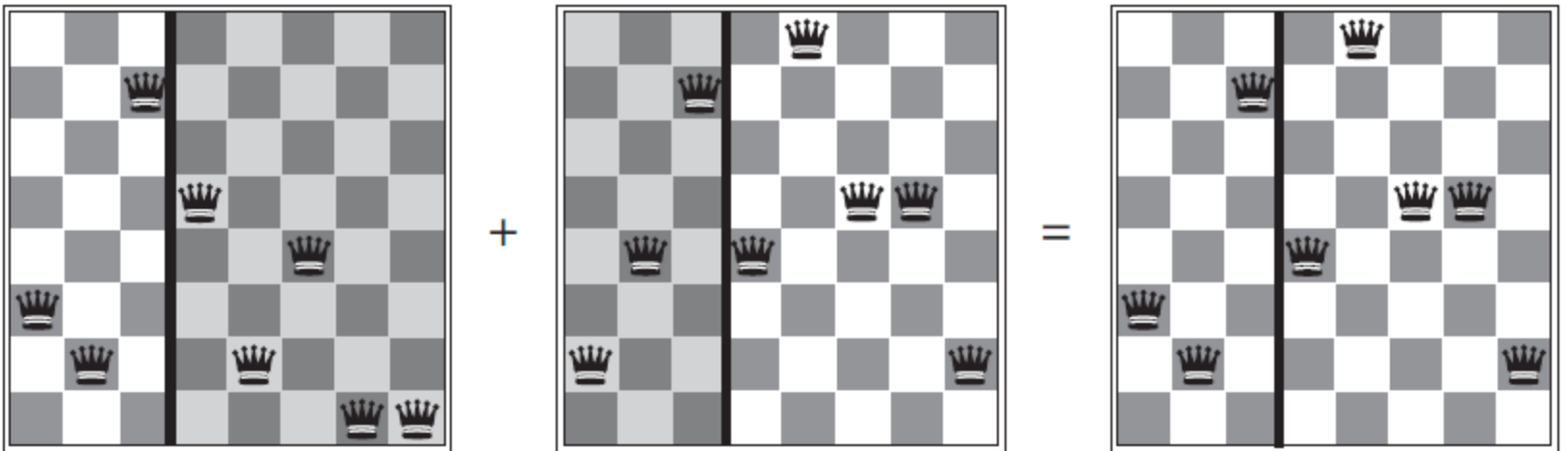
# How to locally modify TSP?

# Simulated Annealing

- Randomly select candidate successor
- Go there if better
- Else go there with probability  
function of “energy” and “temperature”



# Genetic Algorithms



24748552

32752411

24415124

32543213

(a)

Initial Population



