

COMP3411/9814 Artificial Intelligence

Term 1, 2024

Tutorial - Week 2

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1. Cryptarithmic

Solve the famous Cryptarithmic puzzle

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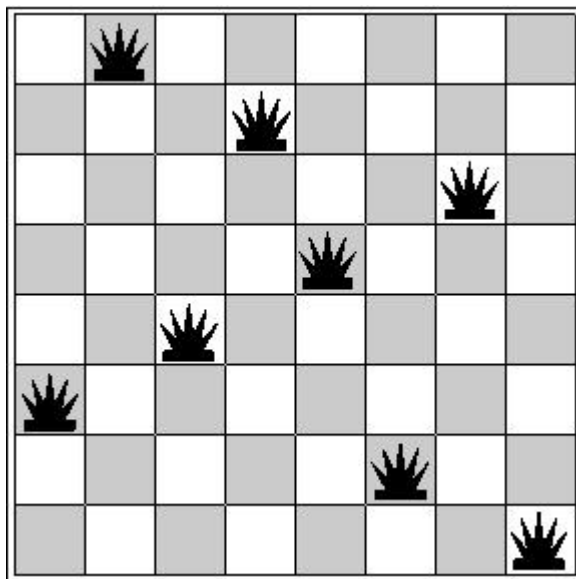
What heuristics and strategies did you use along the way?

2. Forward Checking and Arc Consistency

Use Forward Checking to show that the Australia map-colouring problem has no solution when we assign WA=Green, V=Red, NT=Red. If we apply Arc Consistency as well, can the inevitable failure be detected further up the tree?

3. Local Search

Consider the following state for the 8-queens problem:



- Is this a solution?
- What is the value of h ?

- c. Explain why Hill-climbing with Min Conflicts would get stuck in this state, but Simulated Annealing may be able to "escape" and eventually find a solution.

4. Logic Puzzle (Exercise 6.6 from R & N)

Consider the following logic puzzle: In five houses, each with a different color, live five persons of different nationalities, each of whom prefers a different brand of candy, a different drink, and a different pet. Given the following facts, the questions to answer are "Where does the zebra live, and in which house do they drink water?".

- The Englishman lives in the red house.
- The Spaniard owns a dog.
- The Norwegian lives in the first house on the left.
- The Green house is immediately to the right of the ivory house.
- The man who eats Hershey bars lives in the house next to the man with the fox.
- Kit Kats are eaten in the yellow house.
- The Norwegian lives next to the blue house.
- The Smarties eater owns snails.
- The Snickers eater drinks orange juice.
- The Ukrainian drinks tea.
- The Japanese eats Milky Ways.
- Kit Kats are eaten in a house next to the house where the horse is kept.
- Coffee is drunk in the green house.
- Milk is drunk in the middle house.

Discuss different representations of this problem as a CSP. Why might we prefer one representation over another?
