COSC1125/1127 Artificial Intelligence

School of Computer Science and IT
RMIT University
Semester 1, 2017

Tutorial Sheet 2
Search II

Exercises

1. Consider this problem: We have one 3 litre jug, one 5 litre jug and an unlimited supply of water. The goal is to get exactly one litre of water into either jug. Either jug can be emptied or filled, or poured into the other.

   For this problem give:

   (a) An appropriate data structure for representing a state.

   (b) The initial state.

   (c) The final states (there are 2).

   (d) A specification of the operators (or actions) which includes the preconditions that must be satisfied before the operator can be used and the new state generated.

   (e) Draw the full state space.

   (f) What is the solution to the problem.

2. In the previous exercise, a representation for states and the full state space were developed. For the same problem, apply search strategies and note:

   - *The order in which nodes are created in memory.*
   - *The nodes that are not created in memeory at all.*

   for the following search strategies:

   (a) Breadth first search with no checking for duplicate states.

   (b) Breadth first search with checking for duplicate states.

   (c) Depth first search with no checking for duplicate states.

   (d) Depth first search with checking for duplicate states.

   (e) Iterative deepening with no checking for duplicate states.

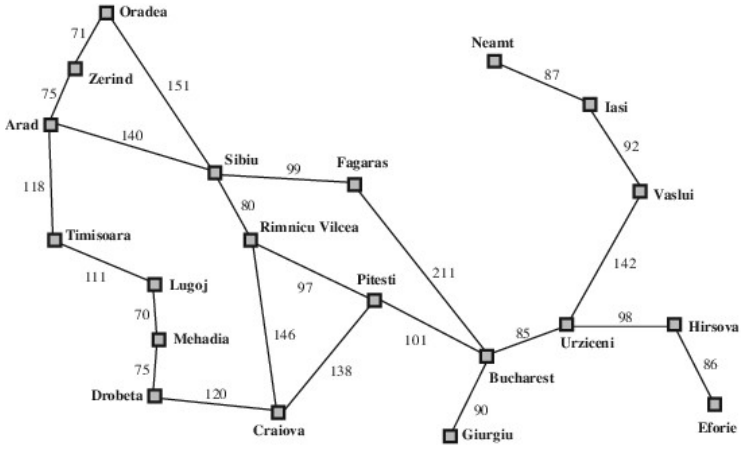
   (f) Iterative deepening with checking for duplicate states.

   (g) Is bi-directional search possible for this problem?

3. Consider the problem of getting from Arad to Bucharest in Romania. For this problem give:

   - Search state descriptions.
   - Initial search state.
   - Final search state.
   - Operators.

- The part of the search space that is realized in memory and the order of node expansion if uniform cost search is used.



4. Finally, get your hands dirty by doing this fun Lab-Search sheet.
5. *You say more?* Lots of cool exercise in RN book, chapter 3....