CSE422 Practice Sheet

A* Search and Greedy Best Search

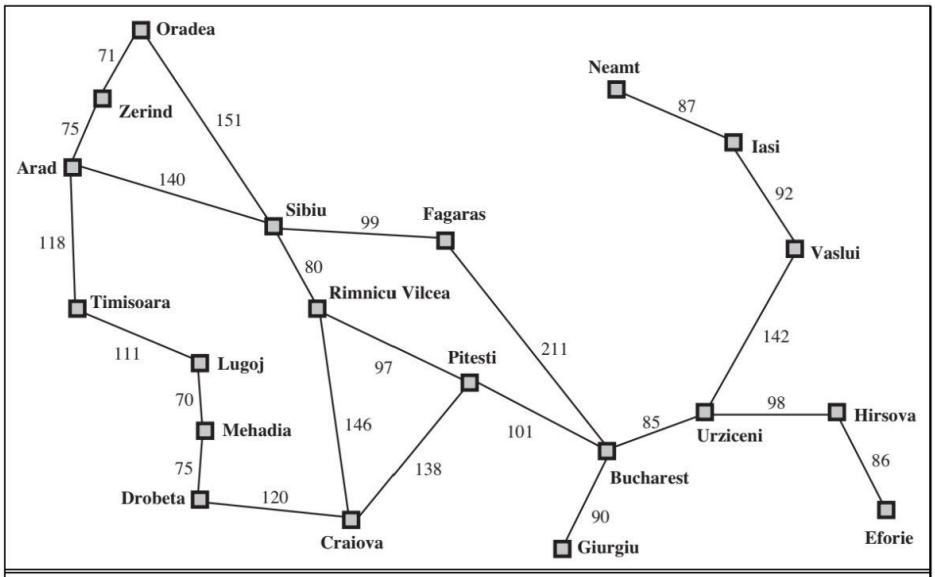

Figure 3.2 A simplified road map of part of Romania.

Arad	366	**Mehadia**	241
Bucharest	0	**Neamt**	234
Craiova	160	**Oradea**	380
Drobeta	242	**Pitesti**	100
Eforie	161	**Rimnicu Vilcea**	193
Fagaras	176	**Sibiu**	253
Giurgiu	77	**Timisoara**	329
Hirsova	151	**Urziceni**	80
Iasi	226	**Vaslui**	199
Lugoj	244	**Zerind**	374

Figure 3.22 Values of h_{SLD}—straight-line distances to Bucharest.

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In the above simplified map (Fig: 3.2) you are given all edge costs from one node to another. The Heuristics for each node are give in Fig: 3.22. You want to go to Bucharest from Arad.

1. **For A* search**
    a. Sequentially write all nodes that will be added to the Frontier, update the parent and g(n) for the nodes.

Frontier	g(n)	n.parent

……
….

    b. Sequentially list all nodes in the explored list.

Explored

…..
…..

    c. Finally write down the solution path to reach Bucharest from Arad.

2. **For Greedy Best Search**
    a. Sequentially write all nodes that will be added to the Frontier, update the parent for the nodes.
    b. Sequentially write all nodes in the explored list.
    c. Finally write down the solution path to reach Bucharest from Arad.

3. Based on the concept of evaluation function, describe for which algorithm(/s) we will need to change the information of the nodes already in the explored list. Why and why not? For such algorithms, which information of the nodes needs to be updated?
4. Explain why Greedy Best Search is cost-efficient but does not provide optimal solutions.
5. What are the conditions on heuristics so the optimal solutions are found by the algorithms?
    a. Do the given heuristics satisfy these conditions?
    b. If you were given another set of heuristics, how would you decide which heuristic to choose?
6. Write down the problem formulation to go from Arad to Bucharest.