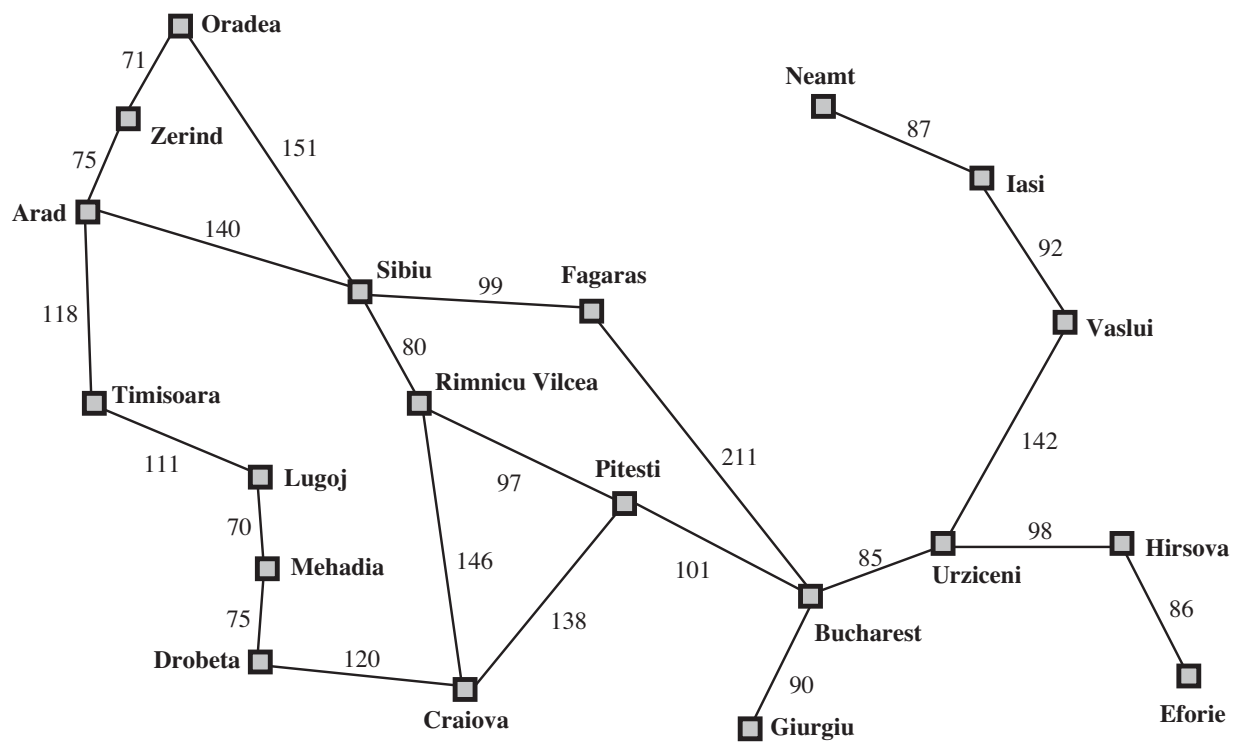


**Exercise A.1.** Consider a state-space in which the starting state is number 1 and each state  $n$  has two siblings, the numbers  $2n$  and  $2n + 1$ . Suppose the goal-state is number 11.

- (1) Draw the portion of the state-space for states 1 to 15;
- (2) Show the evolution of the states that will be visited by a breadth-first search algorithm;
- (3) Show the evolution of the states that will be visited by a depth-first search algorithm.

**Exercise A.2.** Trace the operations of the search algorithms listed below when they are applied to the problem of getting from Oradea to Bucharest (see next page). Show the sequence of nodes that the algorithms will consider and the  $f$ ,  $g$ , and  $h$  score for each node, whenever appropriate.

- (1) Uniform-cost search;
- (2) Greedy best-first search;
- (3) A\* search, using the straight-line heuristic.



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