



PRACTICE 2

UNINFORMED SEARCH

1. Give a complete problem formulation for each of the following scenarios. Characterize these problems.

REMINDER 1: A problem is defined by four items:

- Initial state
 - Actions (defined by the state-transition function) / Successor function
 - Goal test
 - Path cost / Cost function
- Abstract away real-world details to define a state space that can feasibly be explored.

REMINDER 2: Problems can be characterized into different types, which include:

- Deterministic, fully observable states → Single-state problem
- Non-observable states → Sensorless problem
- Non-deterministic and/or partially observable states → Contingency problem
- Unknown state space → Exploration problem

1. Give a complete problem formulation for each of the following scenarios. Characterize these problems.

1. Using only four colors, you want to color a planar map in such a way that no two adjacent regions have the same color.
2. A 3-foot-tall monkey is in a room where some bananas are suspended from the 8-foot ceiling. He would like to get the bananas. The room contains two stackable, movable, climbable 3-foot-high crates.
3. You have three jugs, measuring 12 gallons, 8 gallons, and 3 gallons, and a water faucet. You can fill the jugs up or empty them out from one to another or onto the ground. You need to measure out exactly one gallon.

1. Give a complete problem formulation for each of the following scenarios. Characterize these problems.

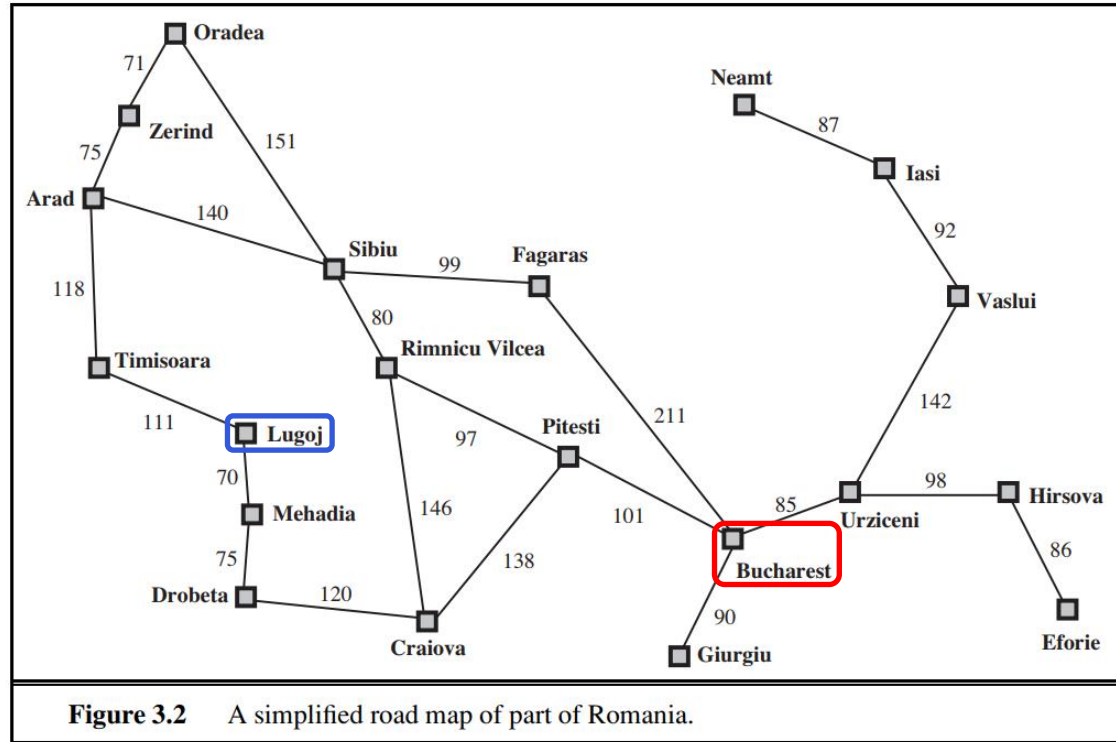
Problem	Initial state	Goal test	Actions	Cost function
Scenario 1 <i>Map coloring</i>				
Scenario 2 <i>Monkey & banana</i>				
Scenario 3 <i>Water measuring</i>				

1. Give a complete problem formulation for each of the following scenarios. **Characterize these problems.**

Problem	Problem type
Scenario 1 <i>Map coloring</i>	
Scenario 2 <i>Monkey & banana</i>	
Scenario 3 <i>Water measuring</i>	

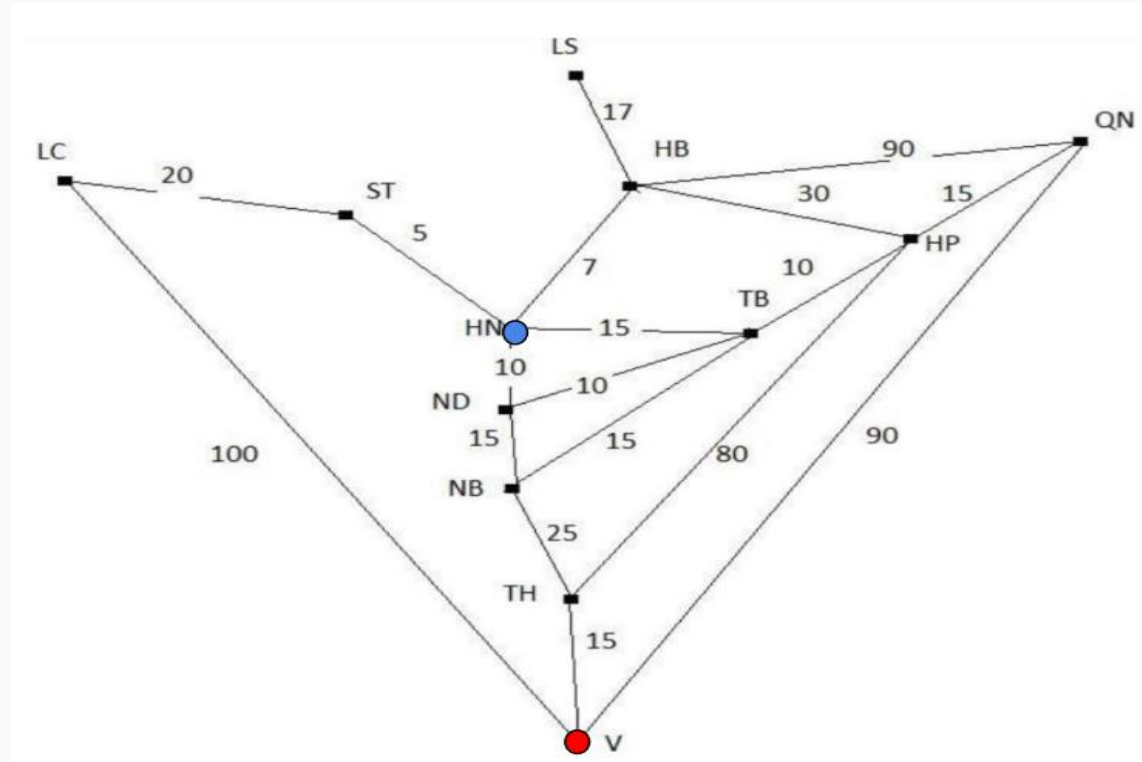
2. Perform the algorithms to search for a path from **Lugoj** to **Bucharest**.

1. Breadth-first search (BFS)
2. Uniform-cost search (UCS)
3. Depth-first search (DFS)
4. Iterative-deepening search (IDS)



3. Perform the algorithms to search for a path from HN to V.

1. Breadth-first search (BFS)
2. Uniform-cost search (UCS)
3. Depth-first search (DFS)
4. Iterative-deepening search (IDS)



4. Suggest a strategy for a shortest path from the start (S) to the goal (G) states. In that strategy, how large is the state space?

