



United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

Mid Exam: Fall 2020

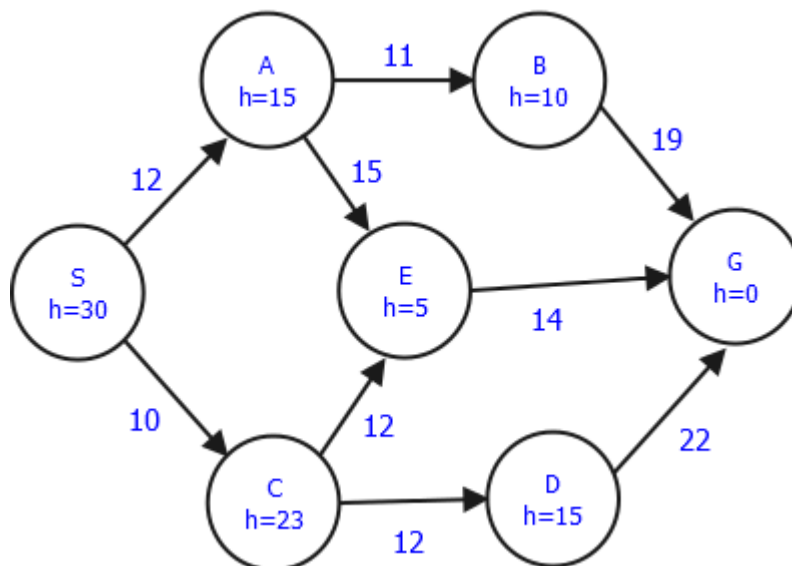
Course Code: CSI 341, Course Title: Artificial Intelligence

Total Marks: 20

Duration: 1 hour

Answer all questions. Marks are indicated in the right side of each question.

1. Suppose you are designing a delivery robot for a hospital. The objective of the robot is to collect medical equipment from the nursing station and deliver them to patient's rooms. Now answer the following:
 - i. Write down the PEAS specification for the delivery robot agent. [2]
 - ii. Characterize the robot's environment as fully observable vs. partially observable, deterministic vs. stochastic, episodic vs. sequential, discrete vs. continuous. [2]
2. Consider the state-space graph in the following figure. S is the start node and G is the goal node. Find out the solution paths and costs returned by the following search algorithms. [2+2+2+2]
 - i. Uniform Cost Search
 - ii. Greedy Best First Search
 - iii. A* Tree Search
 - iv. A* Graph Search



3. Consider the state-space graph of Question 1. Provide heuristic values for each state for two admissible heuristic functions h_1 and h_2 such that in A* tree search, using - i) h_1 produces the maximum number of nodes and ii) h_2 produces the minimum number of nodes. [2]

4. Briefly explain the reasoning behind the following statements:

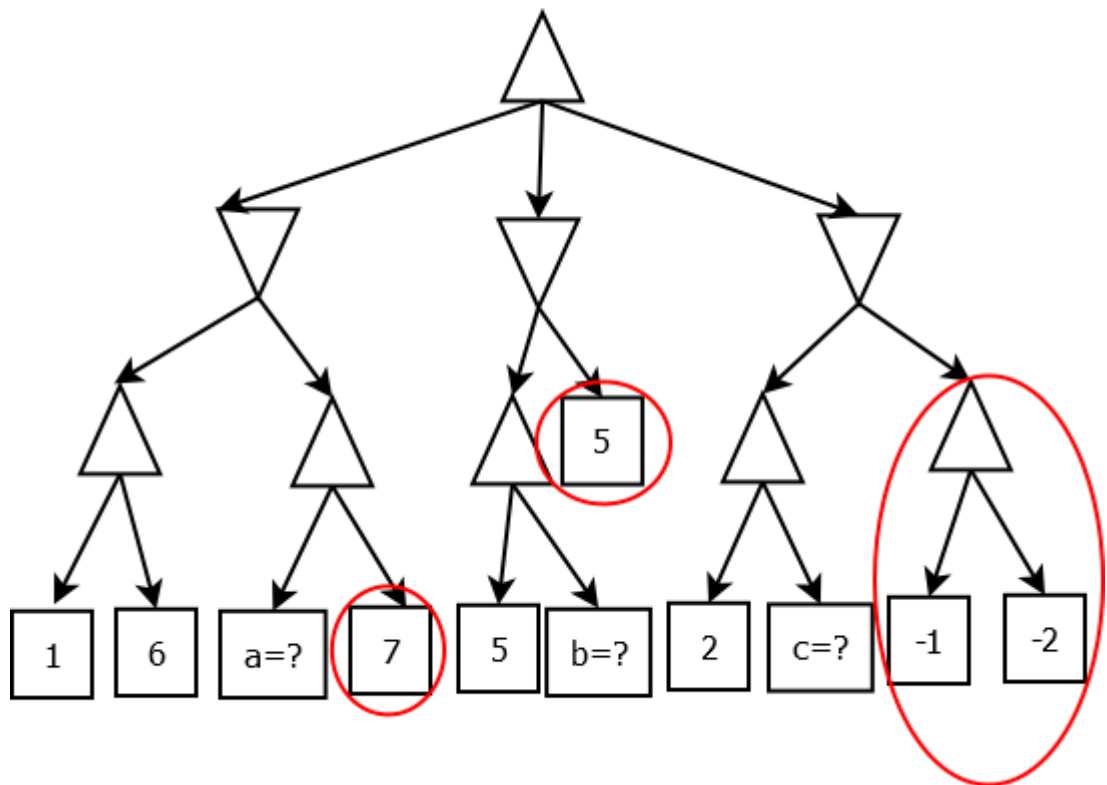
[3]

- i. Greedy hill climbing search has very low memory requirements.
- ii. As T approaches zero, simulated annealing starts behaving like first choice hill climbing search.
- iii. The mutation step in genetic algorithm increases diversification.

5. Consider the following game tree.

△ Max ▽ Min □ Terminal node

Notice that three terminal nodes marked a, b and c have no values assigned (? marked). Suppose that the red circled nodes are pruned when you apply minimax search algorithm with alpha-beta pruning. Assign appropriate values to a, b, and c that will result in such a pruning. [3]



[Note: Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules.]