

## United International University (UIU)

## Dept. of Computer Science & Engineering (CSE)

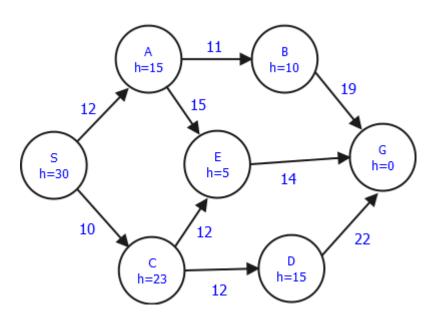
Mid Exam: Fall 2020

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



Consider the state-space graph of Question 1. Provide heuristic values for each state for two admissible heuristic functions h1 and h2 such that in A\* tree search, using - i) h1 produces the maximum number of nodes and ii) h2 produces the minimum number of nodes.

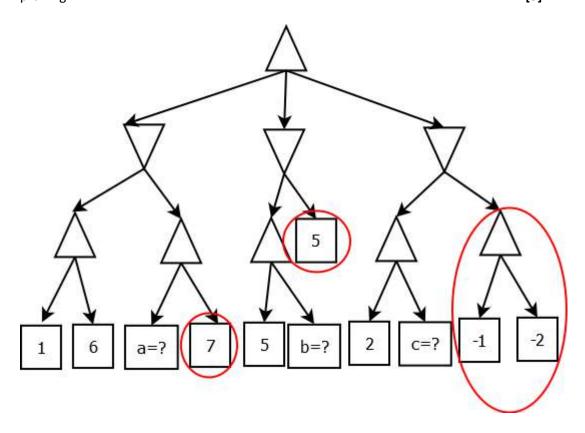
- i. Greedy hill climbing search has very low memory requirements.
- ii. As T approaches zero, simulated annealing starts behaving like first choice hill climbing search.
- iii. The mutation step in genetic algorithm increases diversification.

<ol><li>Consider the following game tr</li></ol>	ree	game	owing	foll	the	sider	Cor	5.
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∕Max	Min	Terminal node
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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. ]