

BRAC UNIVERSITY

Department of Computer Science and Engineering

Examination: Midterm

Semester: Spring 2022

Duration: 1 Hour

Full Marks: 40

CSE 422: Artificial Intelligence

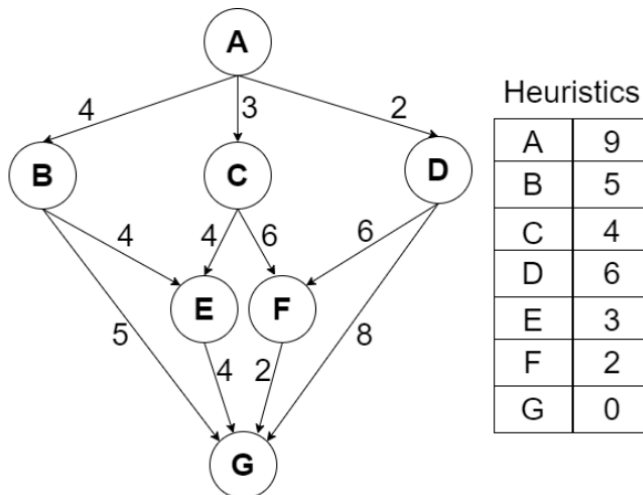
Answer **any 4 out of 5** from the following questions.

Figures in the right margin indicate marks.

Name:	ID:	Section:
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1. CO1 a) What is an intelligent agent and environment? 2
 b) **Describe** the sensors and actuators, and **Identify** the elements of the environment in case of an intelligent agent in a self-driving car. 5
 c) **Identify** differences between table-driven and goal oriented agents. Write them down. 3
2. CO2 a) **Introduce/define** the four criteria that we use to compare search techniques. 2
 b) **Analyze** the complexity, completeness and optimality for the following search techniques. Write the space and time complexity, whether the search technique is complete or not, and whether it is optimal or not. Give reasoning for your answer. 6
 i) Depth-First Search
 ii) Iterative Deepening Depth-First Search
 c) **Introduce** a scenario where breadth-first search may be suboptimal. 2

3. CO3



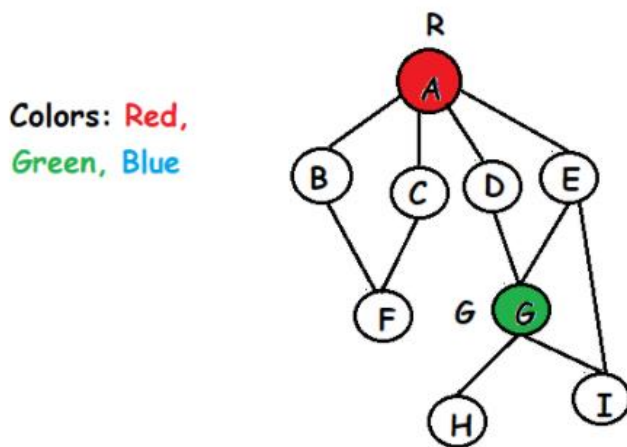
- a) **Predict** whether A* search algorithm will be able to provide an optimal path from the start node A to the goal node G for the above graph. Why or why not? 2
- b) Considering **A** as the start node and **G** as the goal node, **Apply** A* search algorithm for the given graph. Make sure to show each step. 8

4. CO4 a) **Analyze** the drawbacks of Hill Climbing Search along with the possible solutions. Now, **Select** one solution which can guarantee to find the global maxima and justify the reason. 7

b) **Compare** the greedy approaches of Greedy Best First Search and Hill Climbing Search. 3

5. CO5 a) **Explain** the concept of forward checking with an example. 5

b) Suppose, the following graph represents a map coloring CSP problem. You are trying to color the following graph with 3 colors: Red, Green and Blue such that no two adjacent node has the same color. Node A is already colored as **Red** (R) and node G is colored as **Green** (G).



Assess which node will be visited in the following map coloring example if

i) Degree heuristic is used. **Explain** your answer. 2.5

ii) According to Least constraining value heuristic, which color will be chosen for node B in the given graph? **Explain** your answer. 2.5