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Code: XXY

CSE 440: Artificial Intelligence, North South University

Quiz-1, Fall 2022 06/11/2022

Full Marks: 20 Time: 25 mins

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For **Questions 1-3**, consider an intelligent **carom-playing robot** (a robot, **NOT just a software**). For this robot and its task environment, answer the following questions and justify your answers.

1. Is this a **fully observable** or **partially observable** environment? Justify your answer. 2

For each step of throwing coin, the calculations require force of throwing, angle of throwing, friction in between carom coins and with carom board. The only uncertainty is when a sudden wind (from an open window etc) blows, causing more than ~~their~~ average air resistance. ~~So outcome is uncertain,~~ partially observable

2. Is this a **static** or **dynamic** environment? Justify your answer. 2

The environment is static. Because all of the other coins are stationary, except the throwing coins and coins that are pushed by throwing coin.

3. Is this an **episodic** or **sequential** environment? Justify your answer. 2

The environment is episodic. The consequence of throwing coin impacts from one step to another. The outcome of the previous step affects next step. ~~and [redacted]~~

Question 4: Give an example of a **goal-based agents.** 2

A goal-based agent can be a simple AI map that uses ~~[redacted]~~ appropriate search approaches to find shortest possible distance to destination, avoiding traffic and other obstacles.

Question 5: Is A* search optimal? If so, under what condition? 2

Yes, A* is optimal.

A* is optimal ~~if~~ only if the heuristic cost, h(n), is less than actual cost.

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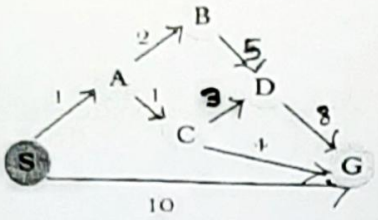
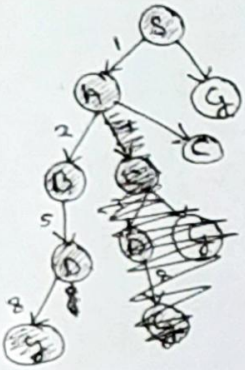
For **Questions 6 and 7**: Suppose that you need to find a path between **'S'** and **'G'** in the given graph. The number attached to each edge in the graph represents the **actual cost** of traversing the edge. The heuristic cost from each node to G is given in the table.



State	h(n)
S	5
A	3
B	4
C	2
D	6
G	0

6. Simulate **Depth First Search** for this task. Clearly **show your work** including the resulting **tree**, the **order** of visiting the nodes. Finally calculate the total **path cost**. 4

S → A → B → D → G

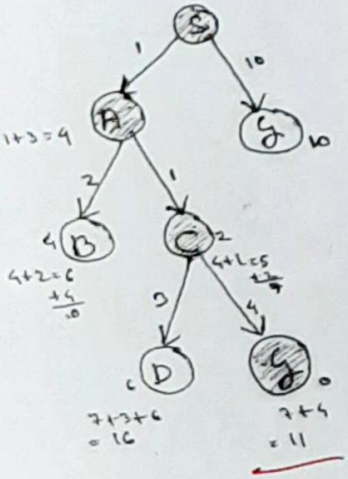


path cost = 1 + 2 + 5 + 8

= 16

7. Simulate **A* Search** for this task. Clearly **show your work** including the resulting **tree**, the **order** of visiting the nodes. Finally calculate the total **path cost**. 6

S → A → C → G



path cost = 11