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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science and Engineering

Mid-term Examination, Spring-2026

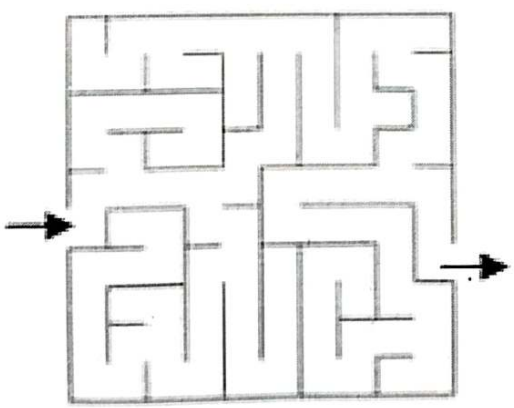
Course Code: CSE316, Course Title: Artificial Intelligence

Level: 3 Term: 3 Batch: 65

Time: 01:30 Hours **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	***a)***	The playground of DIU is covered by beautiful green grasses. Growth rate of the grasses are very high, and it needs to be cut every week to keep the field clean and usable. It becomes very difficult for DIU to apply manual process to keep the field clean. In this situation, CSE department of DIU has assigned you to design an autonomous agent to solve the problem. Define intelligent Agent. For the above scenario, describe strategy, planning, and type of the designed intelligent Agent. Justify your answer.	**5**	**CO1**
2.	***a)***	Classify the task environment and describe the problem solving steps for an intelligent system solving the maze given below.  **Figure 2(a):** Example puzzle game board	**5**	**CO2**
	b)	Figure 2(b) shows a grid based environment where an Agent needs to move from source 'S' to Goal 'G'. The cost of each move (dot to dot) ($g(n_1)$) is uniformed as 1. The agent needs to modify the grid with diagonal motion before applying any algorithm to find its shortest route.	**5**	

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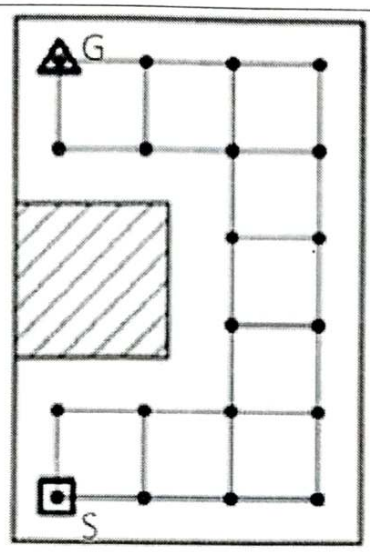

Figure 2(b): Example environment for robot navigation

Update the grid with diagonal movement and calculate the diagonal-step ($g(n_2)$) cost. Extract a search tree based on the modified environment of Figure 2(b) and determine the best possible path for 5 steps only by applying Uniform Cost Search (UCS) algorithm.

3.	***a)***	Illustrate two types of heuristic cost ($h(n)$) estimation methods with examples for the modified grid environment as shown in Figure 2(b) and discuss the appropriateness.	**5**	**CO3**
	b)	A conventional Chat-bot answers basic customer queries and routine requests with scanned responses. But these bots cannot recognize more nuanced questions. Nowadays, support bots are equipped with artificial intelligence and machine learning technologies to overcome these limitations. In addition to understanding and comparing user inputs, they can generate answers to questions on their own without pre-written responses. By examining the above case study, classify the described system with appropriate characteristics, limitations, components, and participants in developing such expert agent.	**5**	