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# TCS-706

B. TECH. (CSE)

(SEVENTH SEMESTER)

MID SEMESTER EXAMINATION, 2022

ARTIFICIAL INTELLIGENCE

Time : 1½ Hours

Maximum Marks : 50

- Note :** (i) Answer all the questions by choosing any *one* of the sub-questions.  
(ii) Each question carries 10 marks.

1. (a) What are the prominent research areas of Artificial Intelligence ? Justify your answer with suitable example. (CO1)

OR

- (b) Write short notes on the following : (CO1)  
(i) Strong AI  
(ii) Turing test  
(iii) MIN-MAX search procedure  
(iv) Computer vision

P. T. O.

2. (a) What are intelligent agents ? Write the characteristics of intelligent agents. Also draw the diagram for utility-based agents and explain its working. (CO1)

OR

- (b) Discuss the facts involved in designing of rule-based agents. What are the limitations of rule-based expert agents ? (CO1)

3. (a) Given branching factor  $b$ , maximum search tree depth  $m$ , and least cost solution depth  $d$ , write down the (worst-case) time and space complexity using Big-O notation for the (i) Depth-First Search (DFS), (ii) Breadth-First Search (BFS) and (iii) Iterative Deepening Search (IDS).

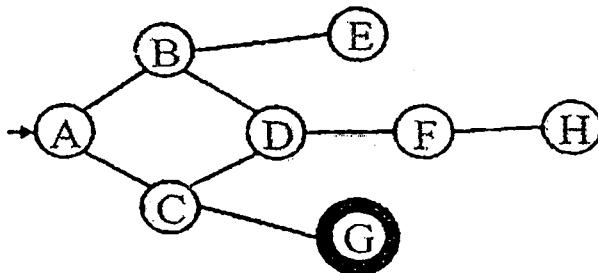
(CO2)

OR

- (b) Given a full 5-gallon jug and an empty 2-gallon jug, the goal is to fill the 2-gallon jug with exactly one gallon of water. You may use the following state space formulation : State =  $(x, y)$ , where  $x$  is the number of gallons of water in the 5-gallon

jug and  $y$  is # of gallons in the 2-gallon jug. Initial state =  $(5, 0)$ , Goal state =  $(*, 1)$ , where \* means any amount. Draw state transition diagram to reach goal state. Discuss which search strategy is appropriate for this problem. (CO2)

4. (a) Consider the following graph : (CO2)



Starting from state A, execute DFS and BFS. The goal node is G. Show the order in which the nodes are expanded. Assume that the alphabetically smaller node is expanded first to-break ties.

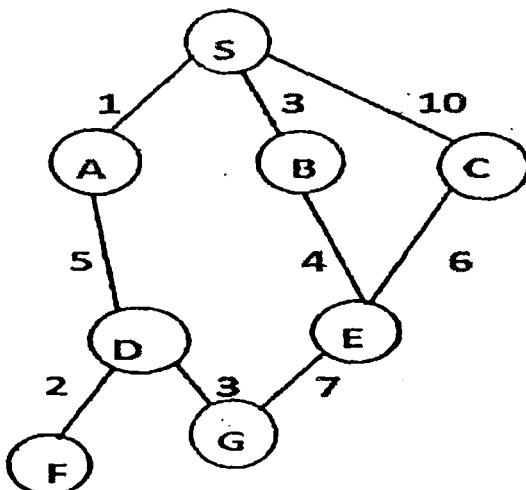
OR

- (b) Suppose you have to design a machine to pass the Turing test. What are the capabilities such a machine must have ?

(CO2)

*P. T. O.*

5. (a) Evaluate the given graph using A\* searching method and list out the possible solutions, where S is starting node and G is goal node. (CO2)



- (b) Write short notes on the following : (CO2)
- Parsing techniques
  - Context free
  - Fillmore's grammar
  - Transformational grammar