



VIT[®]

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test – 1

D1+TD1

Programme Name & Branch: B. Tech (IT)

Course Name & code: Artificial Intelligence- BITE308L

Class Number (s): VL2024250103407, VL2024250103402, VL2024250103399, VL2024250103467

Faculty Name (s): Prof. SUBHASHINI R, Prof. JAYARAM REDDY A, Prof. HEMALATHA S,
Prof. TAPAN KUMAR DAS,

Exam Duration: 90 Min.

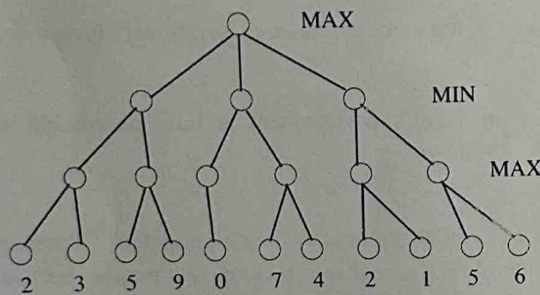
Maximum Marks: 50

Answer all the questions

(5X10=50)

1) A search tree for a two-player game is shown below.

- Apply the mini-max technique to determine the optimum move for the MAX player.
- Write the alpha-beta pruning search strategy and identifies non-searchable sections of the tree.



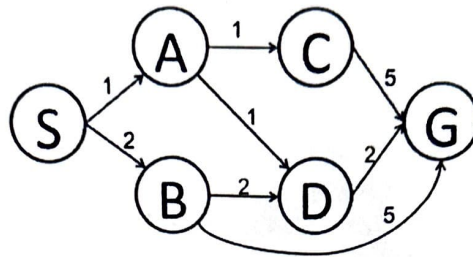
2) a) Give a PEAS description of the task environment for the following agents:

- A mobile drone that delivers books in a university campus
- Playing soccer
- Shopping for books on internet

b) The below diagram shows an ice-cream robot that prefers chocolate ice cream to strawberry, and prefers strawberry to butterscotch. Furthermore, the agent has no preference between a deterministic selection of strawberry or a lottery with 90% probability of chocolate and 10% likelihood of butterscotch. What are the utilities can identify the robot's preferences? Justify the answer for your preference



3) Answer the following questions about the search problem shown below. S is the start-state; G is the (only) goal-state.



- (i) What path would breadth-first graph search return for this search problem?
- (ii) What path would uniform cost graph search return for this search problem?
- (iii) What path would depth-first graph search return for this search problem?
- (iv) What path would A* graph search, using a consistent heuristic, return for this search problem?
- (v) Is applying $f(n) = g(n) + h(n)$ to calculate the f-cost for the A* algorithm a suitable solution for this problem? Explain your answer.

- 4) a. Can an agent who keeps no history of its percept sequence be rational? Justify your answer with an example.
- b. Why it is important to know if an agent's environment is fully observable or partially observable? Brief your answer with an example.

5)

Mr. Rahul is a cab driver. Rahul's cab can accommodate four passengers. Passengers pay a fixed rate for a ride to the airport, therefore the goal is to pick up four passengers and transport them to the airport in the fewest amount of miles. One way to model Rahul's world is as a map showing the distances between the places. Some, but not all, of the locations have passengers that Rahul can pick up.

- a) Describe the state space of the above search problem.
- b) What is the good cost function for this search problem?
- c) "Now, envisage a scenario in which passengers are required to pay based on the distance from the airport at the time of pickup". What is the cost function for the current version of the problem?
- d) Is uniform cost search guaranteed to find the optimal solution in either or both versions of the problem? Why or why not?