

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

M.A./M.Sc. FIRST SEMESTER EXAMINATION, MARCH 2022

FIRST YEAR [BATCH 2021-23]

Computer Science & Machine Intelligence

Paper : I [CC1]

Date : 16/03/2022

Time : 11 am – 1 pm

Full Marks : 50

Answer **any five** questions of the following:

[5×10]

1. a) For each of the following activities, give a PEAS description of the task environment:

i) Practicing tennis against a wall.

ii) Installing software in multiple computers concurrently through remote access.

b) Write a short note on stochastic hill climb search.

2. a) Solve the given problem. Describe the operators involved in it.

Consider a water-jug problem. You are given two jugs: a 5-gallon one and a 7-gallon one. Neither has any measuring marker in it. There is a pump that can be used to fill the jugs with water. How you measure exactly 1 gallon of water in one of the jugs. Explicit assumptions: A jug can be filled from the pump, water can be poured out of a jug onto the ground, water can be poured from one jug to another and there are no other measuring devices available.

b) Explain the three criteria to evaluate a search strategy.

[6+4]

3. a) Try to solve the 8 puzzle using hill climbing. Use any applicable heuristic function as per your choice:

Start:

1	2	3
8	5	6
4	7	

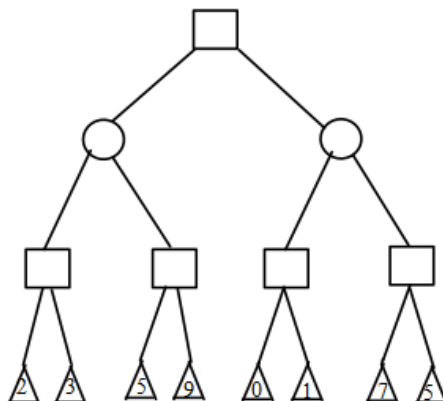
Goal:

1	2	3
4	5	6
7	8	

b) With an example show that A* underestimates the heuristic.

[6+4]

4. a) Perform alpha-beta pruning on the following tree, and show intermediate steps:



- b) What do you mean by meta-heuristic?
- c) Consider graph colouring problem and represent the problem as constraint satisfaction problem. Write down the variables, domains and constraints if three colours namely R, G and B are used. You may consider any graph for your explanation with having at least six vertices and eight edges and without an isolated vertex. [4+2+4]
5. a) What is the completeness issue in Modus Ponens?
- b) Consider the following hypothesis:
- If it rains, Joe brings his umbrella
 - If Joe has an umbrella, he doesn't get wet.
 - If it doesn't rain, Joe doesn't get wet.
- Through resolution prove that Joe never gets wet.
- c) What is unification? [3+5+2]
6. a) Given the following initial and goal states for Block world problem, construct a set of operators (Rules) and hence generate a plan to search the goal state from the initial state.
Initial State: On (C, A), Clear (C), On (B, Table), Clear (B).
Goal State: On (B, A), On (C, B).
- b) State differences between STRIPS and ADL.
- c) What do you mean by partial order planning? [5+2+3]
7. a) Explain the inheritance property of semantic network with an example.
- b) Represent the following sentences using semantic network:
- Puss is a calico.
 - Herb is a tuna.
 - Charlie is a tuna.
 - All tunas are fishes.
 - All calicos are cats.
- c) Explain the basics components of an expert system in brief. [3+3+4]

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