(i) Apply Greedy Best first search algorithm and list the nodes in the order in which they are expanded.

(ii) Apply A* search algorithm to the same graph and prove that it returns the optimal path.

Or

(b) (i) Consider the problem of achieving a chair and table of matching color paint. Make your assumption and apply the following planning approaches and derive the painting plan for the given scenario.

(1) Sensor-less planning

(2) Conditional planning

(3) Replanning

(4) Continuous planning

(ii) Discuss how Conditional planning differs concerning the environment with a suitable example.

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02/07/22 - FN.

Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20048

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Fourth Semester

Artificial Intelligence and Data Science

AD 8402 — ARTIFICIAL INTELLIGENCE I

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List down the characteristics of an Intelligent Agent.

2. Represent the structure of an agent in an environment with suitable PAGE factors.

3. State the significance of heuristic functions

4. Mention the factors that determine the selection of forward or backward reasoning approach for an Al problem.

5. The complexity of solving a CSP is strongly related to the structure of its constraint graph. Justify your answer.

6. Represent the advantages of Alpha-Beta search.

7. List out the limitations of propositional logic to represent the Knowledge Base (KB).

8. Mention the various features of First-order Logic.

9. Observe the function of Hierarchical Task Network planning.

10. Define Partial Order Planner (POP)

PART B — (5 × 13 = 65 marks)

11. (a) Discuss in detail the following AI-based agents with suitable sketch

(i) Model-based agents

(ii) Utility-based agents

(iii) Learning-based agents

Or

(b) (i) Distinguish between deterministic Vs stochastic strategies

(ii) Represent the various PEAS factors for the following scenario

(1) Automatic Taxi Driver

(2) Medical Diagnosis system

(3) Chess game

12. (a) Distinguish between the following searching techniques. Also, mention its advantages, and disadvantages with an example.

(i) Local Beam Search

(ii) Stochastic Beam Search

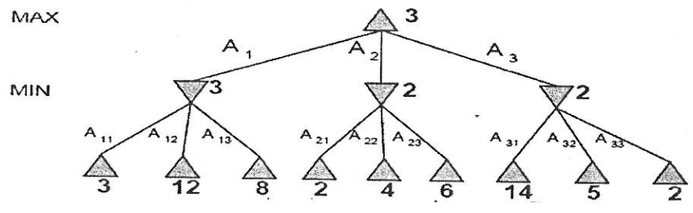
Or

(b) Explain the following informed search strategies with suitable examples

(i) A* search

(ii) Greedy Best First Search

13. (a) Explain Alpha-Beta pruning and apply the same for the following graph, show final result



Or

(b) Discuss in detail about constraint satisfaction problem with a suitable example.

14. (a) Knowledge Base: Every bird sleeps in some tree. Every loon is a bird, and every loon is aquatic. Every tree in which any aquatic bird sleeps besides some lake. Anything that sleeps in anything that besides any lake eats fish. Justify "Every loon does not eat fish". Convert the knowledge base to FOL and use the resolution technique (with and without contradiction) to answer the query.

Or

(b) Five friends have access to a chat room. Either Karthik or Hemanth, or both, are chatting. Either Rajesh or Vivek, but not both, are chatting. If Anbu is chatting, so is Rajesh. Vivek and Karthik are either both chatting and neither is. If Hemanth is chatting, then so are Anbu and Karthik. Is it possible to determine who is chatting if the following information is known? By applying Proposition Logic also apply Forward Chaining and Backward Chaining to prove that the derived statements are true/false?

15. (a) Mention ontology and its components. Also, construct the ontology for the following: (i) i-Care Home Portal

Or

(b) Write short notes on (i) Execution Monitoring & Replanning (ii) Continuous planning.

PART C — (1 × 15 = 15 marks)

16. (a) Consider the following graph with starting state S and goal state Z. The numbers on the edges indicate the cost of traversing the edge. Heuristic values are given near the corresponding node in the graph. (NOTE: If more than one node has a similar value use lexicographical order for tie-breaking)