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Question Paper Code : 70449

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2023.

Sixth/Seventh/Eighth Semester

Computer Science and Engineering

CS 8691 — ARTIFICIAL INTELLIGENCE

(Common to Mechatronics Engineering/Computer Science and Business Systems)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the characteristics of Intelligent Agents.
2. Give the structure of an Agent in an environment.
3. Compare and contrast between admissible and consistent Heuristics.
4. Distinguish between uninformed and informed search strategies.
5. Define resolution principle.
6. Prove by Forward Chaining that the triangle ABC,

   Equilateral (ABC) → Isosceles (ABC)

   Isosceles (ABC) → Equal (AB, AC)

   Equal (AB, AC) → Equal (B, C)

   Equilateral (ABC) is true
7. Discuss the collaborative agents and give example applications.
8. What is Information Retrieval and Extraction?
9. Write the impact of Ambiguity in Natural Language Processing.
10. List the applications of natural language processing.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Discuss the properties of Intelligent Agents in detail. (7)

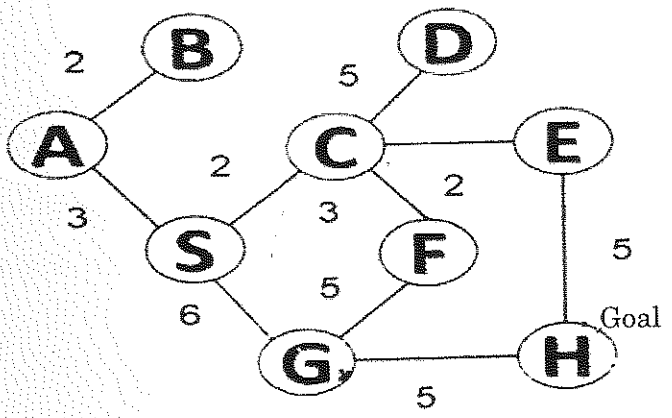
(ii) Discuss the types and future of Artificial Intelligence. (6)

Or

(b) (i) Consider the water jug problem: You are given two jugs, a 4-gallon one and 3-gallon one. Neither has any measuring marker on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallon of water from the 4-gallon jug? (6)

(ii) Explain the state space representation and apply an optimal sequence of actions to solve it. (7)

12. (a) Perform BFS, DFS, Uniform cost search strategies on the following graph and also formulate the algorithm for the 3 strategies.



Or

(b) Discuss the Problem solving methods associated for Game playing in detail.

13. (a) (i) Brief on Knowledge representation. (5)

(ii) Design Ontology Engineering for Health care applications. (8)

Or

(b) (i) Give the rules of inferences in Propositional Logic. (8)

(ii) Which rule of inference is used in each argument below? (5)

(1) Alice is a Math major. Therefore, Alice is either a Math major or a CSI major.

(2) Jerry is a Math major and a CSI major. Therefore, Jerry is a Math major.

(3) If it is rainy, then the pool will be closed. It is rainy. Therefore, the pool is closed.

(4) If it snows today, the university will close. The university is not closed today. Therefore, it did not snow today.

(5) If I go swimming, then I will stay in the sun too long. If I stay in the sun too long, then I will sunburn. Therefore, if I go swimming, then I will sunburn.

14. (a) (i) Briefly explain the different types of Agents. (5)

(ii) Create and design the architecture of intelligence agent with an example. (8)

Or

(b) Explain Trust and Reputation in Multi-agent systems.

15. (a) Explain :

(i) N-gram character models and (6)

(ii) Machine Translation. (7)

Or

(b) Briefly explain on Robotic Perception, Planning and Movement in detail.

PART C — (1 × 15 = 15 marks)

16. (a) Brief on the concept of Resolution and explain the Propositional Resolution Algorithm. Prove the following axioms using the Resolution Algorithm.

(i) Every boy or girl is a child. (3)

(ii) Every child gets a doll or a train or a lump of coal. (3)

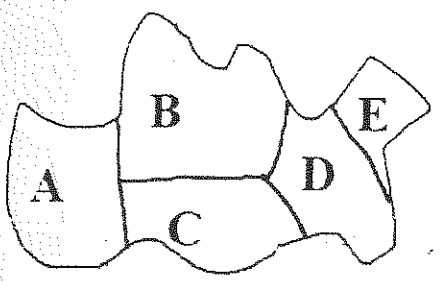
(iii) No boy gets any doll. (3)

(iv) No child who is good gets any lump of coal. (3)

(v) (Conclusion) if no child gets a train, then no boy is good. (3)

Or

(b) Consider the map-cabling problem. In map-coloring, the aim to colour countries on a map using a given set of colors, such that no two adjacent countries are the same color.



(i) Design this as constraint Satisfaction Problem for the given map. (5)

(ii) Illustrate any 2 strategies to colour the states using backtracking strategies. (5)

(iii) Illustrate structured Constraint Satisfaction Problem in detail. (5)