

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION (S), FEBRUARY 2024 COMPUTER SCIENCE AND ENGINEERING (2020 SCHEME)

Course Code : 20CST401

Course Name: Artificial Intelligence

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Describe in detail the four categories under which AI is classified with.
2. Describe the ways to represent states and the transitions between components in agent programs.
3. How do you evaluate the performance of a search algorithm?
4. Differentiate between informed and uninformed search strategies.
5. Illustrate the use of alpha beta pruning in games.
6. Illustrate the components of a Constraint Satisfaction Problem with an example.
7. Explain the term Skolemization.
8. For the following pair of atomic sentences, give the most general unifier, if it exists:
Knows(Mother(y),y), Knows(Ria, x)
9. State and explain Ockham's razor principle.
10. Differentiate between generalization and overfitting.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Explain Turing Test approach and Cognitive modelling approach in terms of Artificial Intelligence. (7)
- b) For the following activities, give a PEAS description of the task environment and characterize in terms of the task environment properties. (7)
 - a) Interactive English Tutor
 - b) Medical Diagnosis system
 - c) Bidding on an item at an auction

OR

12. a) What are the properties of Task Environment? Explain. (6)

- b) Describe in detail about different types of Agent programs with suitable figures. (8)

MODULE II

13. a) Discuss A* Algorithm with help of pseudocode and suitable example. Is this algorithm optimal under all conditions? (10)
b) Define the heuristic function. Explain its role during a search procedure. (4)

OR

14. a) Discuss any two uninformed search strategies in intelligent systems with example. (9)
b) State and define the component of a well-defined AI problem. Write the standard formulation for 8-puzzle problem. (5)

MODULE III

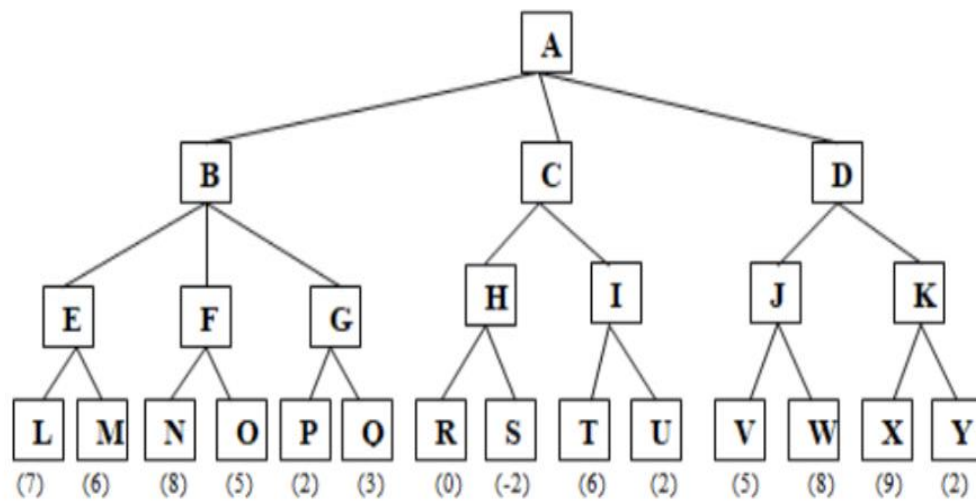
15. a) Solve the following Crypt arithmetic problem using constraints satisfaction search procedure. (9)
i) ONE ii) SEND
 ONE MORE

 TWO MONEY

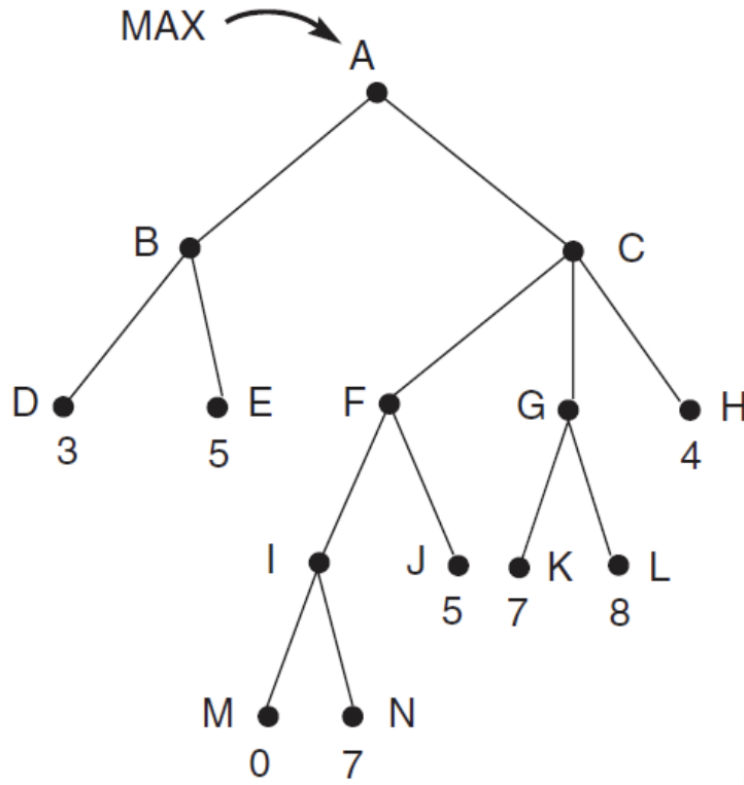
- b) Define node consistency with an example. (5)

OR

16. a) Consider the following game tree in which static evaluation score are all from the players point of view: static evaluation score range is (+10 to -10). Suppose the first player is the maximizing player. What move should be chosen? (6)



b) Consider the following figure.



(8)

- i) Perform minimax on the above tree
- ii) Perform a left to right alpha beta prune on the above tree

MODULE IV

17. a) Convert the following sentences into first order logic, FOL and corresponding Conjunctive Normal Form, CNF:
- a. John likes all kind of food. (9)
 - b. Apple and vegetable are food (9)
 - c. Anything anyone eats and not killed is food.
 - d. Anil eats peanuts and still alive
 - e. Harry eats everything that Anil eats.
- b) What is a knowledge-based agent? How does it work? (5)

OR

18. a) Differentiate Forward Chaining and Backward Chaining with their algorithms. (9)
- b) Prove, or find a counter example to, the following assertion: If $\alpha \models \gamma$ or $\beta \models \gamma$ (or both) then $(\alpha \wedge \beta) \models \gamma$ (5)

MODULE V

19. a) Give the significance of Learning from examples. Explain the various types of Learning in problem solving. (7)
- b) What is entropy? What is its significance in the decision tree learning? (7)

OR

20. a) Differentiate between classification and regression. Give three different scenarios each, where these can be used. (7)
- b) Consider the following data set comprised of three binary input attributes (A1 ,A2 , and A3) and one binary output.

Example	A1	A2	A3	Output y
x1	T	F	F	F
x2	T	F	T	F
x3	F	T	F	F
x4	T	T	T	T
x5	T	T	F	T

(7)

Use the DECISION-TREE-LEARNING algorithm to learn a decision tree for these data. Show the computations made to determine the attribute to split at each node.
