

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VIII • EXAMINATION – SUMMER 2014

Subject Code: 180703**Date: 27-05-2014****Subject Name: Artificial Intelligence****Time: 10:30 am TO 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Explain depth first search (DFS) and breadth first search (BFS) with suitable examples. Why is 'depth limited search' necessary in DFS? **07**

(b) What do you mean by state space representation of a problem? Illustrate how you can represent following water jug problem as a state space search: There are two jugs (without any measuring marks on them) of 4 and 3 liters capacity, respectively. There is a tap of water to fill the jugs. The objective is to fill the 4-liter jug with exactly 2 liter of water. **07**

Q.2 (a) Translate these sentences into formulas in predicate logic. **07**

1. John likes all kinds of food.
2. Apples are food.
3. Chicken is food.
4. Anything anyone eats and isn't killed-by is food.
5. Bill eats peanuts and is still alive.
6. Sue eats everything Bill eats.

(b) Convert the formulas derived in Q2(a) into clauses. Prove that John likes peanuts using resolution. **07**

OR

(b) Using the formulas derived in Q2(a) prove John likes peanuts using forward chaining as well as backward chaining. **07**

Q.3 (a) Answer following questions:

1. What do you mean by the problem of plateau occurring in hill climbing? How can it be solved? **02**
2. Differentiate between declarative and procedural representation of knowledge. **02**
3. What do you mean by admissibility of an algorithm? Is A* algorithm an admissible one? When? **03**

(b) Consider the game tree of Fig. 1 in which the static scores are from first player's point of view. Suppose the first player is maximizing player. Applying mini-max search, show the backed-up values in the tree. What move will the MAX choose? If the nodes are expanded from left to right, what nodes would not be visited using alpha-beta pruning. **07**

OR

- Q.3 (a)** Answer the following questions:
1. 'Minimax is not good for game playing when the opponent is not playing optimally.' Justify using suitable example. **02**
 2. Explain AND-OR graphs. **03**
 3. Represent following sentence using semantic net: 'Sita gave the pearl garland to Hanuman.' **02**
- (b)** Explain Goal Stack planning using suitable example. **07**
- Q.4 (a)** Answer following questions:
1. Explain abductive reasoning using example. **02**
 2. Justify using an example that Prolog uses Backward chaining to prove or answer any given goal. **02**
 3. Describe any one conflict resolution approach used in rule based systems. **03**
- (b)** Explain simulated annealing algorithm. **07**
- OR**
- Q.4 (a)** Explain how list is used in Prolog. Discuss how following list-functions can be implemented in Prolog: **07**
 Checking membership of an item in a given list, concatenating two lists, and deleting an item in a given list.
- Q.4 (b)** What do you mean by constraint satisfaction problems? Explain constraint propagation algorithm using suitable example. **07**
- Q.5 (a)** Explain Hopfield networks. **07**
- (b)** Explain Bayesian networks with example. **07**
- OR**
- Q.5 (a)** List various components of natural language understanding process. Describe syntactic analysis and semantic analysis in brief. **07**
- (b)** Describe the expert system development procedure. **07**

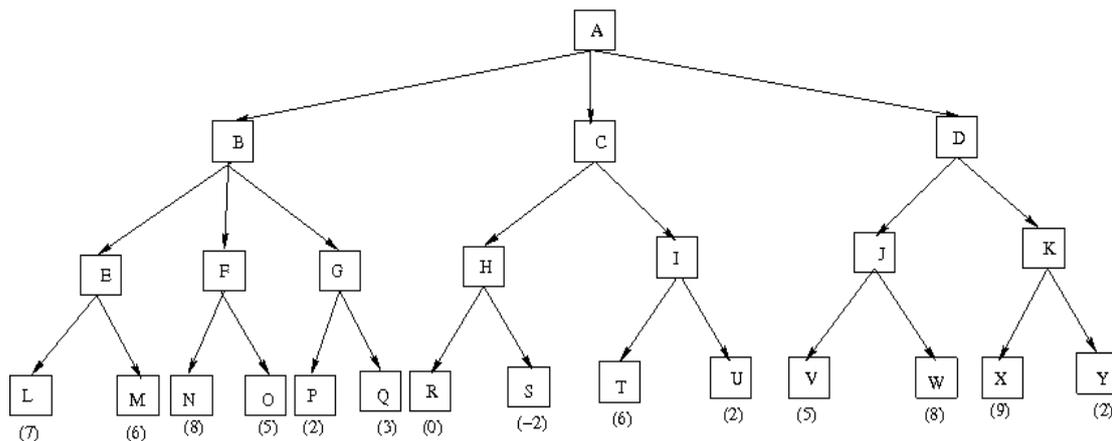


Fig. 1 (Game tree for Question 3(b))
