GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2180703   **Date: 29/04/2017**

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)** Consider the following initial and goal configuration for 8-puzzle problem. **07**
Draw the search tree. Apply A* algorithm to reach from initial state to goal
state and show the solution. Consider Manhattan distance as a heuristic function
(i.e. sum of the distance that the tiles are out of place.).

Initial State

1	2	3
7	8	4
6		5

Goal State

1	2	3
8		4
7	6	5

(b) Explain non-monotonic reasoning in detail. **07**

Q.2 **(a)** Explain property inheritance algorithm with example. **07**
(b) Consider following facts. **07**
1. Every child loves Santa.
2. Every child loves every candy.
3. Anyone who loves some candy is not a nutrition fanatic.
4. Anyone who eats any pumpkin is a nutrition fanatic.
5. Anyone who buys any pumpkin either carves it or eats it.
6. John buys a pumpkin.
7. Lifesavers is a candy.

Use resolution and prove: If John is a child, then John carves some pumpkin.

OR

(b) Describe following facts into predicate logic. **07**
1. Every child loves Santa.
2. Everyone who loves Santa loves any reindeer.
3. Rudolph is a reindeer, and Rudolph has a red nose.
4. Anything which has a red nose is weird or is a clown.
5. No reindeer is a clown.
6. Scrooge does not love anything which is weird.

Q.3 **(a)** Explain difference between forwards reasoning and backward reasoning. **07**
(b) What do you understand by the term Fuzzy Logic? How is a fuzzy set denoted **07**
mathematically?

OR

Q.3 **(a)** Define Frames. Draw Semantic Net for following statements. **07**
a) Every kid likes candy.
b) Every school going kid likes candy.
(b) Explain Bayesian Network in detail. **07**

Q.4 **(a)** Define Scripts. Write conceptual dependency for following statements. **07**
a) John flew to New York.
b) John shot Mary.
c) John ate eggs.

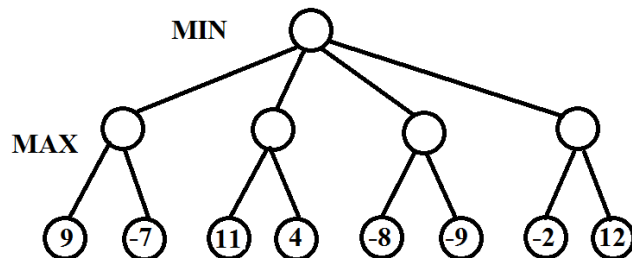**(b)** Explain syntax and semantic analysis of natural language processing in detail. **07**

OR

Q.4 (a) Explain connectionist models. What is perceptron? What is concept of back propagation for ANNs? **07**

(b) What is state space representation of a problem? Show the state space of the water jug problem. **07**

Q.5 (a) Write following prolog programs: **07**
    i. To find the sum of first n natural numbers.
    ii. To append List2 to List1 and bind the result to List3.

(b) We have two players: MIN who plays first and can make 4 moves, MAX who plays second and can make 2 moves. Suppose that after 1 turn, the values of the leaves are as in the figure : **07**

Compute (with the algorithm minimax) the value of the root of the tree, than say which is the most convenient move for MIN. Then tell with the reason, which parts of the tree are not generated if we perform an alpha-beta pruning.

OR

Q.5 (a) Write following prolog programs: **07**
    i. To find the factorial of a positive integer number.
    ii. To find the nth element of a given list.

(b) Discuss hill climbing search method. Also discuss limitations and ways to overcome these limitations. **07**

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