Total No. of Questions : 10] [Total No. of Printed Pages : 4

Roll No. .....

MCA–401(N)

M. C. A. (Fourth Semester) EXAMINATION, June, 2008

(New Course)

ARTIFICIAL INTELLIGENCE AND APPLICATIONS

[MCA – 401(N)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt *one* question from each Unit. All questions carry equal marks.

Unit – I

1. (a) Write a LISP program to convert centigrade temperatures to Fahrenheit.

   (b) Find a good state space representation for the Missionaries and Cannibals problem.

Or

2. (a) Describe your own criteria for computer software to be considered intelligent.

   (b) Define a function called intersection in LISP which takes two lists as arguments. The function should return a list containing single occurrences of all elements which appear in both input lists.

   For example :

   (intersection (a b e g k l)), (a c e g x y)) should return

   (a e g).

P. T. O.

Unit–II

3. (a) (i) Given a 3 gallon jug and a 5 gallon jug (without any markings). Is it possible to get exactly 1 gallon of water from a well ? If so, how ? If not, why not ?

   (ii) What if we have only a 4 gallon and a 6 gallon jug ? Is it possible to get 1 gallon of water ? If so how ? If not, why not ?

   (b) What are the problems in Hill Climbing Techniques ? How to overcome these problems ? Explain with example.

Or

4. (a) Trace the constrain satisfaction procedure for solving the following cryptarithmetic problem :

$$\begin{array}{r} C\ O\ C\ A \\ C\ O\ L\ A \\ \hline O\ A\ S\ I\ S \end{array}$$

   (b) Why Heuristic search techniques are considered to be more powerful that the traditional search techniques ?

Unit–III

5. (a) Consider the following sentences :

   (i) Any one passing their history exams and winning the lottery is happy.

   (ii) Any one who studies or is lucky can pass all their exams.

   (iii) John did not study but he is lucky.

   (iv) Any one who is lucky wins the lottery.

Translate the above sentences into a clause form and show that 'Is John Happy' using resolution.

(b) Construst a script for going to a examination using conceptual dependency.

Or

6. (a) Explain the semantic nets and make the partitioned semantic net for the following sentence :

"Every dog in town has bitten the constable."

(b) Show a conceptual dependency representation of the following sentence :

"John prevent Mary from giving a book to bill".

Unit—IV

7. (a) Describe a Parse Tree for the sentence :

'The green cow munched the grass' using the natural language grammar.

(b) Write down the minimax algorithm and explain with the help of an example.

Or

8. (a) What are the components of a planning system ? Differentiate between goal-state and non-linear planning.

(b) Make the augmented transition network for the following sentence :

"Every cloud has a silver lining."

Unit—V

9. (a) Consider a bulb manufacturing unit. Here machines M_1, M_2 and M_3 make 30%, 30% and 40% of total bulbs. Of their output, let's assume that 2%, 3% and

4% are defective. A bulb is drawn at random and is found defective. What is the probability that the bulb is made by machine M_1 or M_2 or M_3 ?

(b) Sketch the architecture of an expert system, showing the major components and interrelationships between these components and briefly describe the role of each component.

Or

10. (a) Would it be reasonable to apply Samuel's role learning procedure to chess ? Why (not) ?

(b) "A pigeon walking on the ground spots a piece of bread, knowing where the bread it, is picks it up its beak and eats it." Is it the case of learning ? Justify your answer.

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MCA–401(N)

M. C. A. (Fourth Semester)
EXAMINATION, Nov.-Dec., 2007

(New Course)

ARTIFICIAL INTELLIGENCE AND APPLICATIONS

[MCA—401(N)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt *one* question from each Unit. All questions carry equal marks.

Unit—I

1. (a) Define Artificial Intelligence. What are the characteristics of AI program ? 6

   (b) Differentiate between lisp and other conventional programming languages. 6

   (c) Develop a function in lisp that will sum the first five elements of the following three series : 8

   1 2 3 4 5 6 .....

   2 4 6 8 10 12 .....

   3 6 9 12 15 18 .....

2. (a) Explain "AI techniques explicitly attempt to move the reasoning process into program". 7

   (b) What are the disadvantages of AI approach ? 6

P. T. O.

(c) Write a recursive function in lisp to generate the factorial of given number. 7

Unit–II

3. (a) Explain state space representation. Give a state space representation for the following water jug problem : You are given two jugs, 4 gallon and a 3 gallon one. Neither has measuring markers on it. There is a pump that can be used to fill jugs with water. How can you get exactly 2 gallons of water into 4 gallon jug ? 10

(b) Explain hill climbing technique with example. Also compare it with best first search techniques. 10

4. (a) Explain A* Algorithm. 10

(b) Describe a problem for which means end analysis could be successfully applied. 10

Unit–III

5. (a) Consider the following sentences : 10

(i) John likes all kinds of food.

(ii) Apples are food.

(iii) Chicken is food.

(iv) Any thing anyone eats and isn't killed by its food.

(v) Bill eats peanuts and is still alive.

(vi) Sue eats every thing Bill eats.

(1) Translate these sentences into formulas in predicate logic.

(2) Prove that John likes peanuts using backward chaining.

(b) Explain resolution. For Q. 5 (a) prove that 'John likes peanuts' using resolution. 10

6. (a) Explain the unification algorithm in predicate logic. 12

(b) Consider the following facts : 8

(i) The members of the Elm St. Bridge Club are Joe, Sally, Bill and Ellen.

(ii) Jue is married to Sally.

(iii) Bill is Ellens brother.

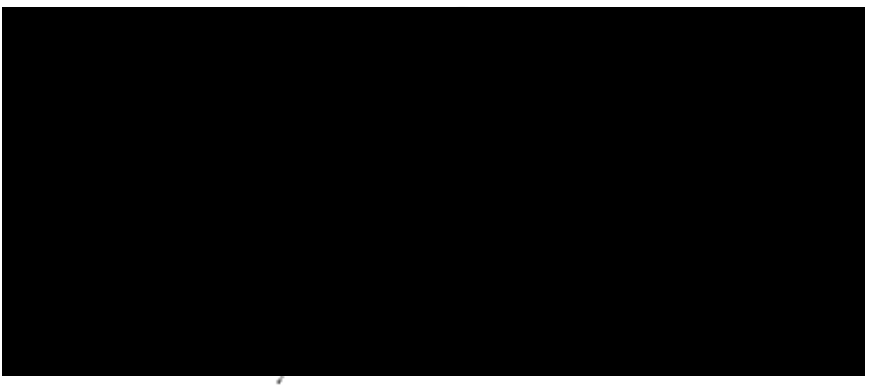
(iv) The spouse of every married person in the club is also in club.

(v) The last meeting of the club was at Joe's house.

Represent the facts in predicate logic.

Unit–IV

7. (a) Perform left to right and right to left $\alpha - \beta$ cut-off on the following game tree : 10



(b) Explain Parsing and types of Parsing. Parse the following sentences : 10

(i) The file was printed by Susan

(ii) Sumit likes reading

8. (a) Explain minimax strategy of game playing technique. 10

(b) Explain recursive transition nets with example. 10

Unit—V

9. (a) What are the major application areas of expert system ? What is the importance of expert system ? 10

   (b) Explain expert system shells. Give and explain an example of such a shell. 10

10. (a) Explain Rote learning. Would it be reasonable to apply Samuel's rote learning procedure to chess ? Why (not) ? 10

    (b) Explain with examples explanation based learning. 10