

BE2-R3: AI AND APPLICATIONS

NOTE:

1. Answer question 1 and any FOUR questions from 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

Time: 3 Hours

Total Marks: 100

1.

- a) What do you mean by search and problem space? Explain with the help of a suitable example.
- b) Discuss the over estimation and under estimate.
- c) Differentiate between Breadth First Search and Depth First Search. Which is better when the memory is limited? Give reason.
- d) "Prolog is based on FOPL but uses a restricted version of the clausal form." Justify the statement.
- e) Does the Hill-Climbing search always move towards the goal? Justify. What are the advantages and disadvantages of it?
- f) What are the strengths and weaknesses of Predicate logic and resolution/unification as a form of automated reasoning?
- g) Which is more suited: rules, probabilities and rules or predicated logic to solve the following problems?
 - i) A diagnostic problem,
 - ii) Game playing

(7x4)

2.

- a) What are factors which decide the choice of reasoning forward or backward?
- b) Compare Procedural Vs Declarative knowledge.
- c) Will the following literals Unify? If yes, then write the most general unifier (mgu).
hate(x,y)
hate(Marcus,z)
- d) Production system and control strategies are two approaches of problem solving. Discuss the important characteristics of production system and control strategy.

(4+4+4+6)

3.

- a) Trace the execution of the constraint satisfaction procedure in solving the crypt arithmetic problem:

LOGIC
+
LOGIC

PROLOG

- b) Define frame based system as a knowledge representation technique.
- c) Explain the principal of means-end-analysis approach to problem solving.

(10+4+4)

4.

- a) Explain the Expert System development process. Draw the block diagram of a typical Expert System.
- b) Explain the term syntactic processing and semantic analysis in the context to NLP.
- c) What do you mean by grammar and parsing? Why natural language understanding is difficult problem?
- d) What do you mean by a script? Write a script for: Going to the movie.

(5+5+4+4)

5.

- a) What are the components of planning system? Compare Non-hierarchical Planning with Hierarchical Planning.
- b) Compare MLPs (Multi Layer Perceptron) with RBF (Radial Basis Function) networks.
- c) Draw the conceptual Dependency (CD) representation for the sentence: *John punched Bill*.
- d) Convert these sentences to predicate logic. Using the logical rules, prove by resolution that "whether John eats Kumquats or not".
 - i) John likes fruit.
 - ii) All fruits are not liked by John.
 - iii) Kumquats are fruits.
 - iv) John eats only those fruits, which he likes.

(5+3+3+7)

6.

- a) Write a prolog or LISP program for generating the sublists of the given list.
- b) Write a prolog or LISP program to add all elements of a given integer list.
- c) Write a prolog or LISP program to implement Tower of Hanoi problem.

(6+6+6)

7.

- a) How Goal stack planning is different from the planning of a system?
- b) What is Back-propagation error? How is it used for batch training and incremental training? What learning rate should be used for back-propagation?
- c) Bayesian network and fuzzy logic are concerned with modeling uncertainty of the world. Can Bayesian network and fuzzy logic be used interchangeably? Justify. What are the differences between the two?

(6+8+4)