

IV B.Tech I Semester Regular Examinations, November 2005
ARTIFICIAL INTELLIGENCE
(Information Technology)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Describe with necessary diagrams, a suitable state space representation for 8 puzzle problem and explain how the problem can be solved by state space search. Show how heuristic can improve the efficiency of search. [2+6+4+4]
2. (a) Explain with example AND / OR graphs.
 (b) Write down the algorithm for generate and test search. [12+4]
3. (a) What are Normal forms in Propositional logic? Explain the procedure for converting a propositional logic into normal form. [4+6]
 (b) Convert the formula $(A \rightarrow ((B \& C) \rightarrow D))$ into Disjunctive Normal form Convert the formula $((A \rightarrow B) \rightarrow C)$ into Conjunctive Normal form. [3+3]
4. Write short notes on:
 - (a) Semantic net
 - (b) Frames
 - (c) Conceptual dependency
 - (d) Scripts [4+4+4+4]
5. (a) Compare the conventional reasoning system with non-conventional reasoning system.
 (b) Discuss the different key issues with respect to non-monotonic reasoning system. [8+8]
6. (a) What is hierarchical planning?
 (b) Explain with relevant examples.
 (c) What is constraint satisfaction? [5+6+5]
7. (a) Differentiate between language understanding and language generation.
 (b) Discuss the problems in developing a program which is capable of carrying on a dialog with a group of people. [8+8]
8. Discuss in a comparative manner (in detail) the important characteristics of
 - (a) Deterministic Decision function approach
 - (b) probabilistic Decision function approach in pattern Recognition problems. Give examples where each approach is more appropriate. [8+8]

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1. (a) Write down the state space representation, production rules, and any two solutions for the water jug problem. [2+4+2]
(b) Explain problem characteristics with examples. [6+2]
2. Discuss in detail about the A* algorithm. Using a suitable example. [10+6]
3. (a) What are the uses of combining forward and backward reasoning? Justify your answer [4+4].
(b) What is meant by matching? Explain complex and approximate matching. [2+3+3]
4. (a) Discuss the relation between Semantic network and Predicate logic with an example. [6+2]
(b) Construct a Script for a trip to Park from the viewpoint of a child. [8]
5. (a) What is CWA? What are the merits of CWA? Explain with example, the disadvantages of CWA. [2+2+4]
(b) Describe the differences between the JTMS and LTMS. [4]
(c) Write short note on circumscription. [4]
6. (a) Under what circumstances , would it be good idea to use search graph than a tree search in Minimax procedure?
(b) How would the minimax procedure is to be modified for a program playing a three person game than a two person game? [8+8]
7. (a) What is natural language processing?
(b) Write Production rules necessary to check the syntax of an English noun. The Grammar shall include both proper and common nouns? [6+10]
8. (a) Define and Explain “Learning” . Describe in detail, the range of activities covered by the concept “Learning”. Justify the statement -that “Learning is the most important characteristic of Intelligence” [2+2+4].
(b) Describe and discuss in detail, the important aspects of
 - i. Rote Learning
 - ii. Learning by taking advice. Illustrate answer with the help of relevant examples. [4+4]

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1. (a) Show that the **Tower of Hanoi** problem can be classified under the area of AI. Give a state space representation of the problem. [4+4]
(b) What are the characteristics of a production system? [8]
2. State the traveling salesman problem and explain: Combinatorial Explosion, Branch and Bound Technique and Nearest Neighbour Heuristic. [5+6+5]
3. Consider the following sentences:
Ramesh likes all kinds of sports
Cricket is a sport
Hockey is a sport
Anything that is played according to rules and in a stadium is a sport
Harish plays tennis in a stadium, according to rules
Geetha likes everything that Ramesh likes.
 - (a) Translate these sentences into predicate logic
 - (b) Convert the formulae into clause form
 - (c) Prove that Ramesh likes Tennis
 - (d) Prove that Geetha likes tennis [6+6+2+2]
4. Write short notes on:
 - (a) Semantic net
 - (b) Frames
 - (c) Conceptual dependency
 - (d) Scripts [4+4+4+4]
5. (a) With neat diagram, explain the justification based truth maintenance system [2+6]
(b) Explain the logic based truth maintenance system with an example [6+2]
6. (a) Illustrate the minimax search for the tic-tac-toe game, with initial position.
(b) How Alpha-Beta method helps greatest pruning improvement in the above game? [8+8]
7. (a) Differentiate between language understanding and language generation.

- (b) Discuss the problems in developing a program which is capable of carrying on a dialog with a group of people. [8+8]
8. Define and explain the concept of “Learning” Describe the features of the following methods of Learning. [2+4]
- (a) Memorization (Rote learning)
- (b) Direct Instruction (Taking advice)
- (c) Analogy (By example)
- (d) Induction
- (e) Deduction. [4X4]

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2. (a) Explain with example AND / OR graphs.
(b) Write down the algorithm for generate and test search. [12+4]
3. (a) Explain how knowledge can be represented using declarative and procedural representations. Give examples. [2+3+3]
(b) Compare Forward Vs Backward reasoning. [8]
4. (a) Explain how a link generates a hierarchical structure in a network? Explain with suitable example. [6+2]
(b) How will you represent variables in Semantic net? Explain. [2+6]
5. (a) Compare the conventional reasoning system with non-conventional reasoning system.
(b) Discuss the different key issues with respect to non-monotonic reasoning system. [8+8]
6. (a) Illustrate the minimax search for the tic-tac-toe game, with initial position.
(b) How Alpha-Beta method helps greatest pruning improvement in the above game? [8+8]
7. (a) Explain in detail, the technique of "Intermediate - level processing" of visual data (in machine vision) and discuss its use. [6+2]
(b) Discuss the role of "describing and labelling of objects" in machine vision. Explain the role and use of filtering with constraints. [4+4]
8. Describe and discuss in detail, the techniques of
 - (a) Parameter adjustment
 - (b) Macro-operations
 - (c) chunking used in problem- solving method of "Learning". Explain the nature of utility problem. [5+5+6]
