

IV B.Tech I Semester Regular Examinations, November 2008
ARTIFICIAL INTELLIGENCE
(Common to Computer Science & Engineering and Electronics & Computer Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. What is AI? Explain any four approaches to AI. [16]
2. Explain various blind search strategies. [16]
3. Explain each of the following with an example:
 - (a) Constraint graph
 - (b) Constraint satisfaction problem
 - (c) Cryptarithmic puzzle. [4+6+6]
4. Explain Alpha-Beta cutoffs during minimax search. [16]
5. (a) Show that the following sentences are inconsistent using propositional logic
 - i. If Jack misses many classes through illness, then he fails high school
 - ii. If Jack fails high school, then he is uneducated
 - iii. If Jack reads a lot of books, then he is not uneducated
 - iv. Jack misses many classes through illness and reads a lot of books(b) Some agents make inferences as soon as they are told a new sentence, while other wait until they are asked before they do any inferencing. What difference does this make at the knowledge level, the logical level, and the implementation level. [10+6]
6. (a) Comment on propositional Vs first-order inference
(b) How can resolution be used to show that a sentence is
 - i. valid
 - ii. unsatisfiableFor each of the following pairs of atomic sentences, give the most general unifier if it exists
 - i. $P(A,B,B), P(X,Y,Z)$
 - ii. $Q(Y, G(A,B)), Q(G(X,X),Y)$ [6+6+4]
7. Define the operator schemata for the problem of putting on shoes and socks and a hat and coat; assuming that there are no pre-conditions for putting on the hat and coat. Give a partial-order plan that is a solution, and show that there are 180 different linearizations of this solution. [16]

Code No: R05410505

Set No. 1

8. (a) Explain supervised learning, reinforcement learning, and unsupervised learning
(b) Comment on the expressiveness of decision trees
(c) What do you mean by incremental learning. [6+6+4]

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1. Compare a computer and human brain and also explain how human brain process the information. [16]
2. How breadth first search works? What are the features and applications of breadth first search? [16]
3. (a) Explain difference between simple hill climbing and steepest ascent hill climbing.
(b) Explain difference between best first search and steepest ascent hill climbing. [8+8]
4. Explain the following with respect to minimax procedure.
 - (a) Static evaluation function.
 - (b) Maximizing ply, Maximizing player
 - (c) Manimizing ply, Manimizing player
 - (d) Minimax procedure. [3+3+3+7]
5. Jones, Smith, and Clark hold the jobs of programmer, knowledge engineer, and manager. Jones owes the programmer \$10. The manager's spouse prohibits borrowing money. Smith is not married. Your task is to figure out which person has which job. Solve the problem using propositional logic. [16]
6. (a) Give the steps for conversion to implicative normal form
(b) For each of the following pairs of atomic sentences, give the most general unifier if it exists
 - i. older(father(y),y), older(father(x),john)
 - ii. knows(father(y),y), knows(x,x)
 - iii. f(Marcus,g(x,y)) and f(x,g(Caesar,Marcus)) [10+6]
7. (a) Distinguish between simple planning agent and problem solving agent
(b) Explain forward state space search with an example
(c) What do you mean by partial order planning. [6+6+4]
8. What are decision trees? Draw a decision tree for the problem of deciding whether or not to move forward at a road intersection given that the light has just turned green. [16]

Code No: R05410505

Set No. 2

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1. Explain the Neuron and a simulated neuron with a diagram and compare. [16]
2. What is a greedy best first search? Explain with example and diagram. [16]
3. Explain simulated annealing algorithm with an example. [16]
4. Explain the following with respect to minimax procedure.
 - (a) Static evaluation function.
 - (b) Maximizing ply, Maximizing player
 - (c) Manimizing ply, Manimizing player
 - (d) Minimax procedure. [3+3+3+7]
5.
 - (a) Describe a generic knowledge based agent.
 - (b) What are the problems with propositional logic?
 - (c) How can a knowledge-based agent be made fully autonomous. [6+6+4]
6.
 - (a) Give the steps for conversion to implicative normal form
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 - i. older(father(y),y), older(father(x),john)
 - ii. knows(father(y),y), knows(x,x)
 - iii. f(Marcus,g(x,y)) and f(x,g(Caeser,Marcus)) [10+6]
7. Let us consider a version of the milk/banana/drill shopping problem
 - (a) Let CC denote a credit card that the agent can use to buy any object. Write the description of Buy so that the agent has to have its credit card in order to buy any thing.
 - (b) Write a Pick-Up operator that enables the agent to have an object if it is portable and at the same location as the agent.
 - (c) Assume that the credit card is at home, but Have(CC) is initially false. Construct a partially ordered plan that achieves the goal, showing both ordering constraints and causal links
 - (d) Explain in detail what happens during the planning process when the agent explores a partial plan in which it leaves home without the card. [4+4+4+4]

8. (a) Explain the major issues that affect the design of the learning element.
(b) Explain various forms of learning [8+8]

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1. What is an agent? Explain the vacuum cleaner world example? [16]
2. What is iterative deepening depth first search? Explain with an algorithm and diagram. [16]
3. Explain why it is a good heuristic to choose the variable that is most constrained, but the value that is least constraining in a CSP search. [16]
4. Explain the following:
 - (a) Waiting for quiescence
 - (b) Secondary search. [8+8]
5. Jones, Smith, and Clark hold the jobs of programmer, knowledge engineer, and manager. Jones owes the programmer \$10. The manager's spouse prohibits borrowing money. Smith is not married. Your task is to figure out which person has which job. Solve the problem using propositional logic. [16]
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[16]
