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Question Paper Code : 11157

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Seventh Semester

Computer Science and Engineering

080230042 — ARTIFICIAL INTELLIGENCE

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish: Performance and Utility Function with respect to measuring an agent behavior.

2. Develop a PEAS description of the task environment of Mobile Dictionary Agent.

3. Define: Recursive best first search.

4. How will you learn heuristics from experience?

5. Decide whether the following sentence is valid, unsatisfiable or neither: Fire => Smoke.

6. Represent the following sentence in first-order logic: Only one student took Greek in spring 2001.

7. Define: Pure inductive inference.

8. State the properties of a training set.

9. Distinguish between top-down and bottom-up parsing.

10. Why do you want to augment the rules of a grammar?

PART B — (5 × 16 = 80 marks)

11. (a) Develop the characteristics (observable, deterministic, episodic, static, discrete) of task environments for

(i) Crossword Puzzle agent.

(ii) Taxi driving agent.

(iii) Medical diagnosis.

(iv) Interactive English Tutor. (4 × 4 = 16)

Or

(b) Does a finite state space always lead to a finite search tree? How about a finite state space that is a tree? Can you be more precise about what types of state spaces always lead to finite search frees? (16)

12. (a) Modify the hill climbing algorithm so that instead of doing a depth-1 search, to decide where to go next, it does a depth-k search. It should find the best k-step path and do one step along it, and then repeat the process. (16)

Or

(b) Suppose that a graph has a cycle cutest of no more than k nodes. Describe a simple algorithm for finding a minimal cycle cutest whose runtime isn't much more than $O(n)^k$ for a CSP with n variables. (16)

13. (a) (i) Write a logical sentence such that every world in which it is true contains exactly one object. (4)

(ii) Represent the following in first-order logic :

There is an agent who sells policies only to people who are not insured. (4)

(iii). Write a general set of facts and axioms to represent the assertion "Wellington heard about Napoleans death" and to correctly answer the question "Did Napolean hear about Wellington's death?". (8)

Or

(b) A popular children's riddle is "Brothers and sisters have l none, but that man's father is my father's son". Use the rules of the family domain to show who that man is. (16)

14. (a) In the recursive construction of decision trees, it sometimes happens that a mixed set of positive and negative examples remains at a leaf node, even after all the attributes have been used. Suppose that we have p positive examples and in negative examples, show that the solution by DECISION-TREE LEARNING, which picks the majority classification, minimizes the absolute error over the set of examples at the leaf. (16)

Or

(b) Explain why the EM algorithm would not work if there were just two attributes in the model rather than three. (16)

15. (a) Obtain a parse tree for "Every student who takes French passes it". (16)

Or

(b) Write short notes on (i) Intelligent Software Agents (ii) Natural Language Processing Applications. (16)
