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Total Number of Pages: 2

B.TECH
PCS3D001

3rd Semester Regular Examination 2016-17

ARTIFICIAL INTELLIGENCE

BRANCH (Honours): CSE

Time: 3 Hours

Max Marks: 100

Q.CODE: Y776

**Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.**

Part – A (Answer all the questions)

Q1 Answer the following questions: *fill up blank* (2 x 10)

- a) _____ is a flat area of the search space in which a whole set of neighbouring states(nodes) have the same value.
- b) The Recursive process of merging two or more predicates with constants or with some variables is known as _____.
- c) A set of all possible states of a given problem is known as
i)State ii)Space Search iii)State Space iv)None of the Above
- d) The learning approach that is based on observations is known as_____.
- e) Mean-End-Analysis(MEA) allows i)Backward Searching ii)Forward Searching
iii)Both (i) and (ii) iv)None of the above
- f) The Expert System that was developed to aid the physicians in diagnosis and treatment of meningitis and bacterial infections is known as_____.
- g) _____is a search method that exploits DFS and BFS, switching between both to get the benefits of both using heuristic.
- h) Which module creates the possible solutions in Generate-And-Test Algorithm? i)OS module ii)Kernel Module iii)Generator Module iv)None of the above
- i) _____ are the computational models ,based on biological evolution that are used to solve optimisation problems.
- j) _____ is a search space at higher altitude than the surrounding that cannot be traversed by a single move.

Q2 Answer the following questions: *Short answer type* (2 x 10)

- a) What is the basic difference between A* and AO* algorithm?
- b) What is futility cutoff in game playing?
- c) Differentiate between Declarative and Procedural representation of knowledge.
- d) State the significance of using Heuristic functions.
- e) What do you mean by local maxima with respect to search technique?
- f) What is a Horn Clause?
- g) What are the differences and similarities between Problem Solving and Planning?
- h) 'Minimax is not good for game playing when the opponent is not playing optimally.' Justify using suitable example.
- i) When and why Nonmonotonic Reasoning is used?
- j) Distinguish between Supervised learning and Unsupervised learning.

Part – B (Answer any four questions)

- Q3** a) Briefly explain about semantic network with its advantages and disadvantages. Construct a semantic net representation for the following. **(10)**
-Ram gives Lucy a gift
-Every dog has bitten a mail carrier.
- b) What are the disadvantages of Steepest Hill Climbing Search Procedure? Using a suitable search tree, illustrate that these drawbacks are eliminated in Best First Search. **(5)**
- Q4** a) Using a suitable example, illustrate the steps of A* search. Why is A* search better than Best-First Search? **(10)**
- b) What are the main differences between scripts and frame structures? Explain with an example. **(5)**
- Q5** a) Describe the Minimax algorithm for searching game tree. Explain the effect of addition of alpha-beta cutoffs to this search algorithm. **(10)**
- b) Write a short note on Natural Language Processing. **(5)**
- Q6** a) Draw and Explain the Architecture of Expert System. **(10)**
- b) What are the different types of grammars used in Natural Language Processing? Explain each with examples. **(5)**
- Q7** a) Assume the following facts **(10)**
1. Ram likes only easy courses.
2. Engg. Courses are hard.
3. All courses in Arts are easy.
4. AR04 is an Arts course.
Use Resolution to answer the question, "What courses would Ram like?"
- b) Explain Forward and Backward Reasoning with the help of examples. **(5)**
- Q8** a) Trace the constraint satisfaction procedure solving the following cryptarithmic problem. **(10)**
- $$\begin{array}{r} \text{CROSS} \\ + \text{ROADS} \\ \hline \text{DANGER} \end{array}$$
- b) What do you mean by State Space representation of a problem? Illustrate how you can represent following water jug problem as a state space search: There are two jugs (without any measuring marks on them) of 4 and 3 liters capacity, respectively. There is a tap of water to fill the jugs. The objective is to fill the 4-liter jug with exactly 2 liter of water. **(5)**
- Q9** a) Briefly explain about Explanation based learning and Learning by Analogy. **(10)**
- b) Explain Goal Stack planning using suitable example. **(5)**