06425

MCA (Revised)

Term-End Examination

June, 2009

MCSE-003 : ARTIFICIAL INTELLIGENCE AND KNOWLEDGE MANAGEMENT

Time : 3 hours *Maximum Marks : 100*

Note : *Question **number 1** is **compulsory**. Attempt **any three** questions from the rest.*

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1. (a) State and justify the validity of following inference rules **40**

(i) Chain rule

(ii) Simplification

(b) Transform the FOPL statement given below into equivalent conceptual graph.

$\forall_x$ (Has wings (x) Λ Layseggs $(x) \rightarrow$ l$\leq$Blrd(x))

(c) Determine whether each of the following sentences are satisfactory, contradictory or valid

(i) $(P \Lambda Q)$ V ~ $(P \Lambda Q)$

(ii) $(P \rightarrow Q) \rightarrow \sim P$

(d) Transform the following conceptual graph in to FOPL statement[PERSON: Anita] ← (AGENT)←[DRINK] → (OBJECT) → [Food: Milk] →←(Instrument Glass)

(e) Describe 'Means-ends Analysis' as problem solving technique.

(f) Write a recursive program in LISP to find factorial of a number given by the user ?

(g) How languages for artificial intelligence differs from normal programming languages? Give name of three languages frequently used as programming language for developing Expert Systems ?

2. (a) Transform the following in to CNF (Any two) 5

(i) $\sim (C \rightarrow D) \vee (C \wedge D)$

(ii) $\sim (X \rightarrow Y) \rightarrow Z$

(iii) $P \rightarrow (\sim CQ \rightarrow R))$

(b) With the help of a suitable example, describe the "member" function of PROLOG. How the same can be explored to perform searching of a data in a list, recursively. 6

(c) Compare and contrast ***any three*** of the following : 9

(i) Monotonic and Non Monotonic reasoning

(ii) Predicate and Prepositional logic

(iii) DFS and BFS

(iv) Conceptual graph and Conceptual Dependency

3. (a) Translate the following axioms in to WFF's 5

(i) Every person has a mother

(ii) There is a woman and she is mother of EVE

(b) Write a PROLOG program for the following relations. 8

(i) grandfather (X,Y)

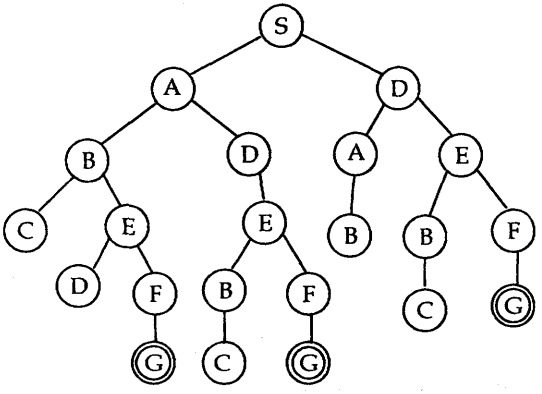
(ii) Cousin brother (X,Y)

How do rules in PROLOG differ from general production systems rules?

(c) Enumerate the various knowledge representation schemes alongwith brief description of each scheme. 7

4. (a) What is Turing Test ? If the machine passes Turing Test, does it mean that the system is intelligent ? What are the associated problems with Turing Test ? What are required improvements/advances to overcome these problems ? 10

(b) Using the search tree given below, list the elements of the Queue just before the next node is expanded. Use DFS to search for Goal node (G) Also write the algorithm for DFS. 10



5. (a) Compare and contrast the following : 10

(i) Frames and scripts

(ii) Informed search and uniformed search

(iii) Abductive inference and Analogical inference

(iv) A* algorithm and AO* algorithm

(b) What is an Expert system ? Explain its architecture. Create an expert system to infer whether a student has secured poor, good, average or excellent marks in his/her MCA exam. 10

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