MCA (III Year)

Term-End Examination

December, 2007

CS-14 : INTELLIGENT SYSTEMS

Time : 3 hours   Maximum Marks : 75

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

1. (a) Explain the term "knowledge" with respect to knowlege-based systems. Distinguish between procedural and declarative knowledge.   *2+3=5*

   (b) Explain in brief the differences between propositional logic and FOPL as knowledge representation schemes. Show how will you represent the sentence "The sky is blue" in these two schemes.   *4+1=5*

   (c) Write two LISP functions max1( ) and max2( ) that obtain the maximum element of any list of integers. Note that max1 uses recursion, whereas max2 does not use any recursion.   *2+3=5*

   (d) What is an Object Oriented System ? Explain the terms class, encapsulation and polymorphism with respect to an OOS.   *2+3=5*

(e) Given propositions P, Q and R use Truth table method to prove that $2\frac{1}{2} \times 2 = 5$

- $(P \wedge P \Rightarrow Q) \Rightarrow Q$

- $(P \vee (Q \wedge R)) \equiv (P \vee Q) \wedge (P \vee R)$

(f) What do you mean by Conceptual Dependency ? Explain with examples the actions MTRANS, PTRANS and ATRANS with respect to Conceptual Dependency. $2+3=5$

2. (a) What is the difference between an informed search and an uninformed search ? Give examples of both types.

(b) Illustrate with example the breadth-first search algorithm.

(c) Explain the Branch and Bound search technique. What are the major advantages of this technique ? $4+5+6=15$

3. Suppose a storekeeper maintains two databases : item and customer. In item database he stores the names of the items he stores, their codes, and their unit prices. In customer database he stores the customer names and their Id-nos. The transaction records are written as triplets (customer Id-no., item code, no. of units), each record showing the number of units of a particular item that a particular customer has purchased. All transactions in a day are kept in a list.

(a) How will you design the above databases in Prolog ?

(b) Design data representation schemes for the two databases in LISP.

(c) Write a LISP function to calculate the daily bill of a given customer.

Note that in a single day a customer may purchase more than one item. But each purchase will have a corresponding transaction record. *4+4+7=15*

4. (a) What is the Frame problem in a dynamic environment ?

(b) Explain the importance of indexing in organizing knowledge.

(c) How is indexing done in LISP using property list ? Illustrate with examples.

(d) Write a short note on Indexed Organization of files.
4+4+2+5=15

5. (a) What is meant by "matching" ? Give three applications where matching is used.

(b) Give an algorithm to check whether a string A of characters is a substring of another string B.

(c) Explain the importance of unification in matching.
5+5+5=15