Model Answer

Department of CSIT

MSc (Information Technology) Semester: III Year:2013 Paper Title: Artificial Intelligence   Max Marks: 60

Section A: **(All 10 questions are compulsory)**   **10X2=20**

Very Short Answer Questions: Write very short answers to following questions. Please attempt questions of Section A, together and write proper question number for each answer.

1. What are simple reflex agents?

   Simple Reflex Agent: When the actions of nearest object are clearly visible then what response has to be taken, e.g. If the car going ahead applies brake (as appears from brake lights of the front car), then car following it should also initiate brake. In other words, take a counter action against an action (reaction vs action)

2. What are intelligent agents?

   Agents which can transform percepts into actions rationally. Intelligent agents take input from environment through sensors, and acting upon through effectors.

3. Name any two uninformed and informed search techniques each.

   Uninformed searches: Depth First and Breadth First. Informed Searches: Best First, A^*

4. Write an example of a state space.

   A scenario / set of possible results during a process to achieve objectives. E.g in a tic tack toe game, any time the picture of moves by both players forms a state space.

5. Draw a truth table for the disjunction of propositions P and Q.

   Pl   see   lecture   notes   page   54   http://www.ggu.ac.in/download/Class-Note13/Artificial%20Intelligence%20and%20Expert%20System24.10.13.pdf

6. Draw a semantic net for the sentence ' John gave the book to Mary'.

   Pl. See page 77 of lecture notes

7. Draw k-nn figure with values of k=1 and 3.

   Figure by hand available on dept notice board.

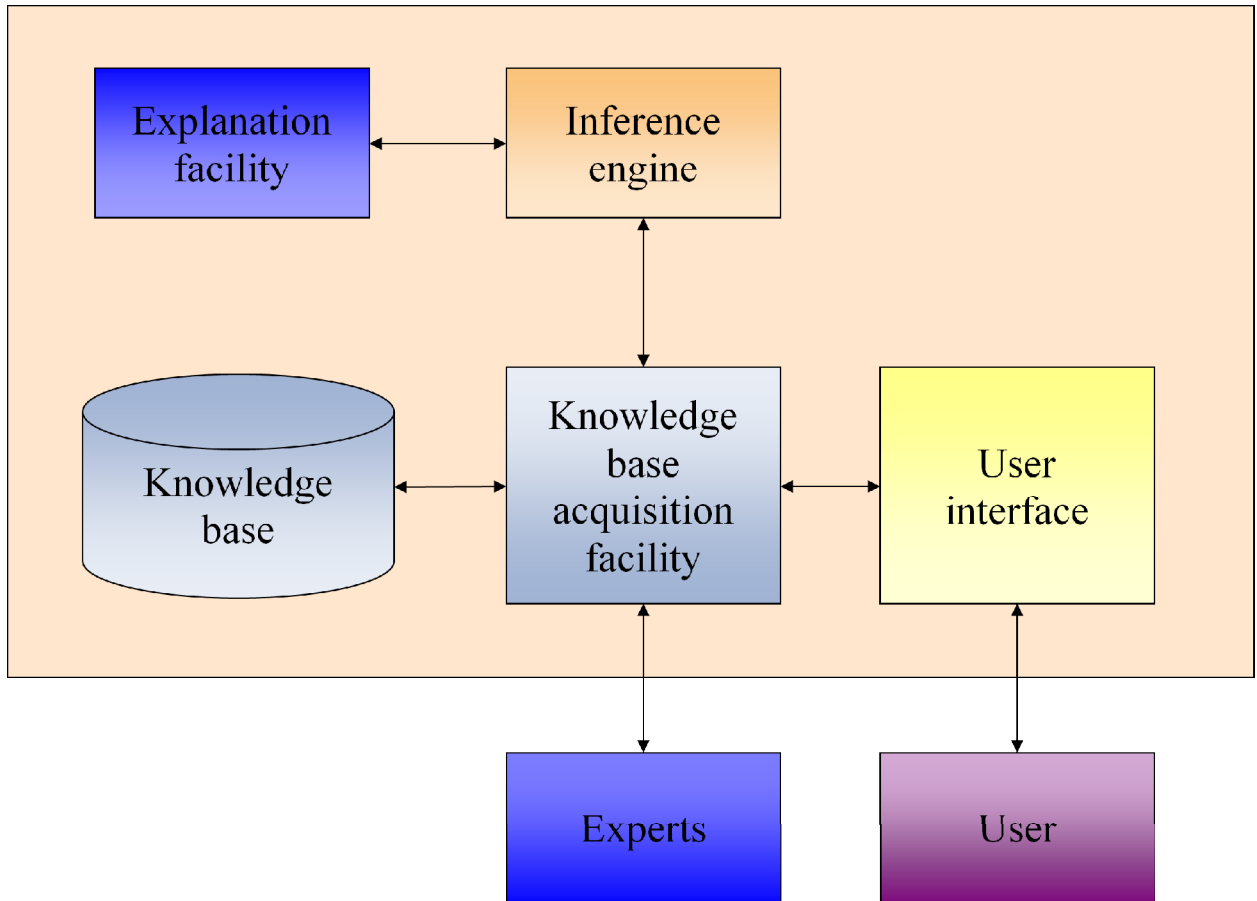8. Define supervised classification with an example.

   Pl. See page 83 of lecture notes

9. Draw a block diagram showing architecture of an expert system.

   Pl. see below,

10. Write in brief about any two advantages of an expert system.

    Availability, knowledge base update any time, consistency, un-biasness, pedagogy

facility

engine

acquisition

interface

Section B: **(Attempt any 4 questions out of 7 questions)**   **4X10=40**

Descriptive Questions:

1. Discuss the term artificial intelligence as defined by various scientists and researchers. How it is useful in computer science, explain.
   Pl. see page 4,5,6. The AI is useful mainly in computer science as the tool used by AI expert mainly use computers and peripherals can be interfaced with computers. For developing expert systems, intelligent agents, robots, a computer program is essential. The machine learning part of AI is based on computers basically.
2. Explain the meaning of a production system in Artificial Intelligence with example. What are the main components of a production system, write in details about each component?
3. Pl. see lecture notes, 18,20,21
4. Discuss the A* search with example, tree diagram and algorithm.
   Pl. see lecture notes, 34,35
5. Write short notes with examples on (a) Use of unification algorithm (b) Skolem function.
   Pl. see lecture notes, 64,65,66

6. Describe classification and its importance using suitable example.

Classification is a process to separate a given set of patterns into different classes. Sometimes the classes are given in advance (supervised), sometimes not(unsupervised). The first task in classification is to develop a classifier (which is usually an algorithm, knn, etc). The main role of a classifier is to decide the class of a new pattern. For various purposes in our life, society, classification of an instance is highly required. A doctor must know the class of the disease, owned by his/her patient, accordingly, the doctor will direct treatment. Given partial information about an object, can we still predict its class correctly. For a comprehensive discussion, see page 82 onwards in lecture notes.

7. How the functions are defined in LISP. Write suitable LISP statements to compute factorial of a positive integer using recursion.

Pl. see notes on LISP.

8. Explain the roles of a knowledge engineer, domain expert and an end user in an expert system

Knowledge Engineer (KE) is responsible for compilation of knowledge received from different sources. KE has to interface between domain expert and end user. A domain expert is the expert of the subject for which the expert system is being developed. The end user is one who uses the expert system. (write example of expert systems for doctors, lawyers, etc)