

Model Answer for AV 8255: Dec 2015

Department of CSIT

MSc (Computer Science) Semester: III Year: 2015 Paper Title: Artificial Intelligence and Expert Systems
Max Marks: 60

Section A: (All 10 questions are compulsory)

10X2=20

Model Answers:

Note Pl. see Lecture notes LN (http://www.ggu.ac.in/CSIT_LectureNotes14-15.html) for details. These are expected answers.

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. Write an example of agent programs that keep track of the world.

The program considers the left-right front rear movement of any car passing nearby for example. Thus not only the simple case of reflex where immediate action is required car also looks at other possible sides to avoid collision.

2. What is the importance of Artificial Intelligence in computing

The hard computing is the traditional function of a computer. But sometimes uncertain decisions have to be taken. And normal computing cannot perform such task e.g. it will rain today, given certain symptoms, whether patient has a definite disease etc. AI attempts to consider all such factors which are uncertain in nature and requires common sense or intelligence.

3. What is the meaning of the term state space search?

See Page 19 of LN.

4. In a water jug problem, what is the meaning of rule: $(x, y):\{ \text{if } x + y \geq 4, y > 0 \} \rightarrow (4, y - (4 - x))$

When the sum of waters in 4 lt and 3 lt jugs is ≥ 4 then pour water from 3 lt jug into 4 lt jug until it is full (4 lt). The remaining water in 3 lt jug will be $y - (4 - x)$, take an example also.

5. Draw a semantic net for the sentence 'John is taller than Mary'.

See Page 73 of LN.

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

See Page 51 of LN.

7. Define unsupervised classification with an example.

When the class of a pattern is not known in advance then such type of classification is called unsupervised classification. Draw a table, See Page 85-87 of LN.

8. Define the terms features and class with an example in a pattern.

Features represent the properties (or columns) of a table and class represents that where this pattern should be grouped. Draw any table with features and class.

9. Unify (i) $P(a,a)$ and $P(a,c)$ (ii) $Q(m,n)$ and $Q(p,p)$

(i) Substitute c/a to get $P(c/c)$ and $P(c/c)$ (ii) Substitute p/m to get $Q(m,n)$ and $Q(m,m)$ then substitute n/m to get $Q(n,n)$ and $Q(n,n)$

10. Write any four applications of expert systems.

See Page 92 of LN.

Section B: (Attempt any 4 questions out of 7 questions)

4X10=40

Descriptive Questions:

1. Write short notes on (a) intelligent agents (b) Natural Language Processing.

(a) See notes circulated in class

(b) NLP: We know that we are able to understand a language in any form. People speak differently but we can understand the spirit of any sentence. NLP is the study of all formats of a language which could be spoken by any person. This is a huge task as people not only speak differently but grammatically wrong also. A traditional programming language requires syntax and semantics for every language besides an alphabet. AI experts are working hard to design a system which can understand language of every person. Such type of study comes under Natural Language Processing NLP. Pl. explain predicate, semantics, syntactic, forms of language under NLP from LN.

2. Describe a water jug problem, its production rules and solution.

See Page 20-22 of LN.

3. Explain the best first search with example by taking cities network of your choice.

Refer page 32-33 of LN or take any problem of your choice.

4. What is meant by resolution? Convert sentence 'all Romans who know Marcus either hate Caesar or think that anyone who hates anyone is crazy' to clause form.

See Page 59-61 of LN.

5. Describe k-means clustering technique with example for classification.

See Page 87-88 of LN.

6. Describe the expert systems with their importance and limitations.

See Page 89-94 of LN.

7. Explain semantic nets and partitioned semantic nets. Draw partitioned semantic nets for the sentences (a) Every dog has bitten a postman (b) Every dog has bitten every postman.

See Page 72-76 of LN.