B.E. Computer Sem VII (CBGS)

Artificial Intelligence. 4/12/15

Q.P.Code No. : **5942**

(3 Hrs) Maximum Marks – 80

Note:

(i) Each question carry 20 marks
(ii) Question 1 is compulsory
(iii) Attempt any three (3) from the remaining questions
(iv) Assume suitable data wherever required

Q1. Attempt any four (4) questions from the following [20]

(a) Define heuristic function. Give an example heuristics function for Blocks World Problem.
(b) Find the heuristics value for a particular state of the Blocks World Problem.
(c) Define Rationality and Rational Agent. Give an example of rational action performed by any intelligent agent
(d) Compare and Contrast problem solving agent and planning agent
(e) Represent the following statement into FOPL.
  (i) Anyone who kills an animal is loved by no one
  (ii) A square is breezy if and only if there is a pit in a neighboring square (Assume the wumpus world environment).
  (iii) Give the PEAS description for an Internet shopping agent. Characterize its environment

Q2. (a) Consider the graph given in Figure 1 below. Assume that the initial state is S and the goal state is 7. Find a path from the initial state to the goal state using A* Search. Also report the solution cost. The straight line distance heuristic estimates for the nodes are as follows: h(1) = 14, h(2) = 10, h(3) = 8, h(4) = 12, h(5) = 10, h(6) = 10, h(S) = 15. [10]

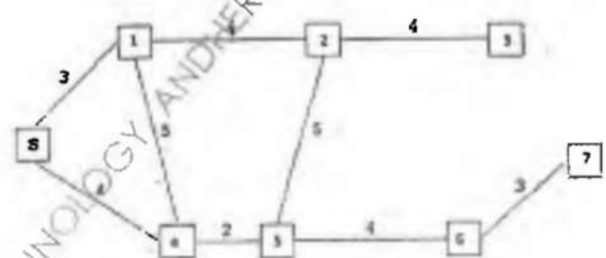

Figure 1.

(b) Draw and describe the architecture of expert system. [6]

(c) Convert the following propositional logic statement into CNF [4]

$A \rightarrow (B \leftrightarrow C)$

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Q3. (a) Consider the following axioms: [4+4+4]

All people who are graduating are happy.
All happy people smile.
Someone is graduating.

(i) Represent these axioms in first order predicate logic.
(ii) Convert each formula to clause form
(iii)Prove that **"Is someone smiling?"** using resolution technique. Draw the resolution tree.

(b) What are the basic building blocks of Learning Agent? Explain each of them with a neat block diagram. [8]

Q4. (a) Construct a decision tree for the following set of samples. Write any two decision rules obtained from the tree. Classify a new sample with (gender = " Female", height = " 1.92m") [6+2+2]

Person ID	Gender	Height	Class
1	Female	1.6m	Short
2	Male	2m	Tall
3	Female	1.9m	Medium
4	Female	2.1m	Tall
5	Female	1.7m	Short
6	Male	1.85m	Medium
7	Female	1.6m	Short
8	Male	1.9m	Short
9	Male	2.2m	Tall

(b)What are the problems/frustrations that occur in hill climbing technique? Illustrate with an example. [6]

(c) Draw a game tree for a Tic-Tac-Toe problem. [4]

Q5. (a) Write a short note on genetic algorithm. [8]

(b) It is known that whether or not a person has cancer is directly influenced by whether she is exposed to second-hand smoke and whether she smokes. Both of these things are affected by whether her parents smoke. Cancer reduces a person's life expectancy. [6]

(i) Draw the Bayesian Belief Network for the above situation
(ii) Associate a conditional probability table for each node

(c) Explain a partial order planner with an example [6]

Q6 (a) Write a PROLOG program to find Fibonacci series [10]

(b) What are the levels of knowledge used in language understanding? Also write down the techniques used in NLP. [10]