Nirma University

Institute of Technology

Semester End Examination (IR/RPR) / SPE, February - 2022

B. Tech. in Computer Science and Engineering, Semester-VII

2CSDE85 Artificial Intelligence

Roll / Exam No. [ ] Supervisor's Initial with Date [ ]

Time: 2 Hours Max Marks: 50

Instructions:
1. Attempt all the questions.
2. Figures to right indicate full marks.
3. Draw neat sketches wherever necessary.

Q-1 Do as directed **[18]**

a) CO1 When would breadth first search works better than best first search? Justify your answer by suitable example. [4]

b) CO1 A farmer wants to get a lion, a fox, a goose, and some corn across a river. There is a boat, but he can only take one in addition to himself on each trip, or else both the goose and the corn , or both the fox and the corn. The corn cannot be left with goose as it will eat the corn; similarly the fox can eat goose if left together and also lion cannot be left with the fox. How does everything get across the river? Assume animals do not wander off when left alone. [8]

1. Give the start and goal states along with constraints.
2. Prepare the production rules
3. Draw state space search tree using depth first search to find first solution

c) CO2 Solve the following crypt arithmetic problem step-by-step: [6]
SEND + MORE = MONEY

Q-2 Do as directed **[16]**

a) CO2 Discuss various categories of production systems and their standard examples. For each example, give a suitable reason for its inclusion under a particular category. [6]

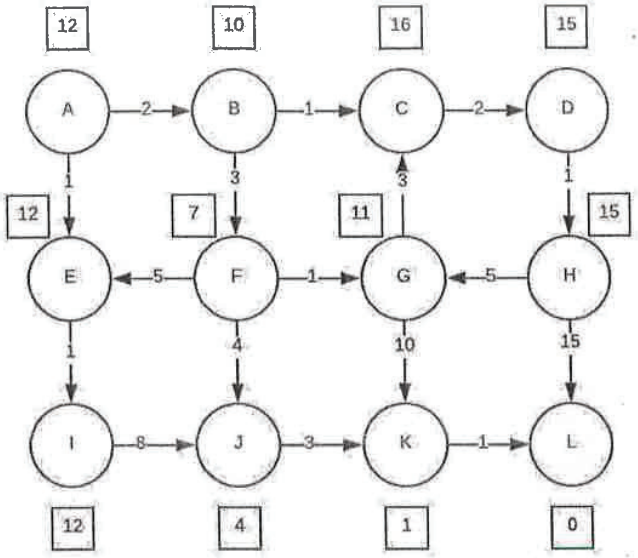
b) CO2 What is operator's subgoaling? Discuss the algorithm where concept of operator's subgoaling is used. [6]

c) CO1 Which four questions need to be addressed/discussed before embarking on the study of any specific AI problem? [4]

Q-3 Do as directed **[16]**

a) CO3 Consider the following search space. In this state space A is the starting state. The values written in square box are heuristic values of that respective state. The value written on arrow is the cost of moving from one state to another state. Trace A* algorithm and find [7]

out optimal path. Cleary maintain open and closed queue.



OR

a) CO3 What are Alpha-Beta cutoffs in the context of Minimax search algorithm? What are its significance? How are they beneficial? Discuss with a suitable example. [7]

b) CO4 What is Dempster Shafer Theory? Apply the theory to the real-life example and justify its usefulness. [6]

OR

b) CO4 Explain in detail: Certainty Factors And Rule-Base Systems. [6]

c) CO1 Write a PROLOG program to generate all permutations of a given list. [3]