**KUMARAGURU**
college of technology
character is life

## B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Fifth Semester

## COMPUTER SCIENCE AND ENGINEERING

### U18CSE0003: Artificial Intelligence

**COURSE OUTCOMES**

**CO1:** Develop solutions for problems using various Artificial Intelligence concepts. [K5,S3]

**CO2:** Design applications using PROLOG for making inferences [K4,S2]

**CO3:** Demonstrate usage of planning and decision making. [K3]

**CO4:** Apply the concepts of learning using Tensor Flow and any other programming language [K4,S2]

**Time: Three Hours**                                                                          **Maximum Marks: 100**

### Answer all the Questions:-
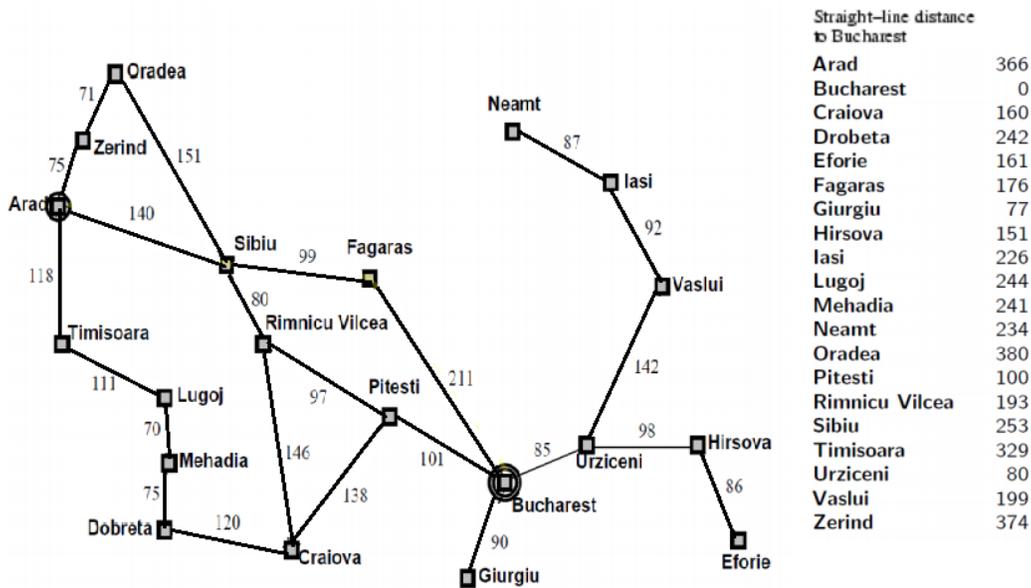### PART A (10 x 2 = 20 Marks)
### (Answer not more than 40 words)

| | | | |
|---|---|---|---|
| 1. | List out the properties of intelligent agent's task environment? | CO1 | [$K_1$] |
| 2. | State the PEAS description of the task environment for an Internet shopping agent. | CO1 | [$K_1$] |
| 3. | Define agent with an example. | CO1 | [$K_1$] |
| 4. | List the steps involved in knowledge engineering process | CO2 | [$K_1$] |
| 5. | State the limitations of propositional logic when it is used for knowledge representation | CO2 | [$K_1$] |
| 6. | Find the MGU of Q(a, g(x, a), f(y)), Q(a, g(f(b), a), x)} | CO3 | [$K_3$] |
| 7. | Summarize the algorithm used for evaluating decision networks. | CO3 | [$K_2$] |
| 8. | List down the applications of Bayesian Network | CO3 | [$K_1$] |
| 9. | What is a multilayer perceptron? | CO4 | [$K_1$] |
| 10. | Outline the role of activation function in a neural network? | CO4 | [$K_2$] |

### Answer any FIVE Questions:-
### PART B (5 x 16 = 80 Marks)
### (Answer not more than 400 words)

| | | | | | |
|---|---|---|---|---|---|
| 11. | a) | Explain the structure of a goal based agent | 6 | CO1 | [$K_2$] |
| | b) | Analyze the greedy best first and A* heuristic search strategies for the given graph to find an optimal search path between "Arad to Bucharest". | 10 | CO1 | [$K_4$] |

Straight-line distance to Bucharest

| | |
|---|---|
| Arad | 366 |
| Bucharest | 0 |
| Craiova | 160 |
| Drobeta | 242 |
| Eforie | 161 |
| Fagaras | 176 |
| Giurgiu | 77 |
| Hirsova | 151 |
| Iasi | 226 |
| Lugoj | 244 |
| Mehadia | 241 |
| Neamt | 234 |
| Oradea | 380 |
| Pitesti | 100 |
| Rimnicu Vilcea | 193 |
| Sibiu | 253 |
| Timisoara | 329 |
| Urziceni | 80 |
| Vaslui | 199 |
| Zerind | 374 |

| | | | | | |
|---|---|---|---|---|---|
| 12. | a) | Express the resolution steps to convert FOL statement to Conjunctive Normal Form (CNF)? | 4 | CO1 | [K₃] |
| | b) | From the given facts, "It is crime for an American to sell weapons to hostile nations. The country Nano, an enemy of America, has some missiles, and all of its missiles were sold to it by Colonel West, who is American". Convert the facts to First Order Logic(FOL) and prove "West is a Criminal" using forward chaining and backward chaining algorithm. | 12 | CO1 | [K₃] |
| 13. | a) | Model the problem formulation and possible solution for Missionaries and Cannibals Toy Problem? | 8 | CO2 | [K₃] |
| | b) | List the planning steps in Air cargo transport problem and apply ADL to describe the problem domain. | 8 | CO2 | [K₃] |
| 14. | a) | Explain how Bayesian network useful to represent knowledge in uncertain domain using burglary alarm problem? | 12 | CO3 | [K₂] |
| | b) | List the steps for creating decision theoretic expert systems? | 4 | CO3 | [K₁] |
| 15. | a) | Explain Bayes Rule and its use | 10 | CO3 | [K₂] |
| | b) | List the basic axioms of probability theory | 6 | CO3 | [K₁] |
| 16. | a) | Illustrate back propagation algorithm for neural nets. | 10 | CO4 | [K₂] |
| | b) | Differentiate between forward propagation and backward propagation in neural networks. | 6 | CO4 | [K₂] |

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