National Institute of Technology Silchar

(PG/ PhD Coursework) End Semester Examination, Jan 2022

Subject Code: CS 5202   Subject: Artificial Intelligence

Semester: 1ˢᵗ   Department: Computer Science & Engineering

Duration: 1 hour 15 minutes   Total Marks: 30

Figure in the right-hand margin indicates full marks for the question.

Question No 1 is compulsory and Answer any 4 (four) questions from Question No 2 to 6.

1.	(a)	Suppose you were the interrogator in a Turing test. Compose three questions that would ask of X and/or Y to determine which is a human and which is not.	1	
	(b)	Most game-playing programs do not save search results from one move to the next. Instead, they usually start completely over whenever it is the machine's turn to move. Why?	1	CO1
	(c)	Explain why we can't represent in First Order Logic of the following statement: "*You must not pass a college bus when its red lights are blinking.*"	1	
	(d)	Explain how knowledge can be represented using declarative and procedural representations.	1	
	(e)	Indicate whether the following is "True" or "False": "*Bayesian Networks can represent every probability distribution.*"	1	
	(f)	Some AI researchers have argued that the goal of AI should be to build machines that help people in their intellectual tasks rather than to do those tasks. Loosely speaking, "helping" is sometimes called weak AI, and "doing" is sometimes called strong AI. What is your opinion and why?	1	

2. (a) Find optimal path if any by using A* Algorithm: Zerind (Start Node) and Bucharest (Goal Node) from Figure I.   3

Straight−line distance to Bucharest

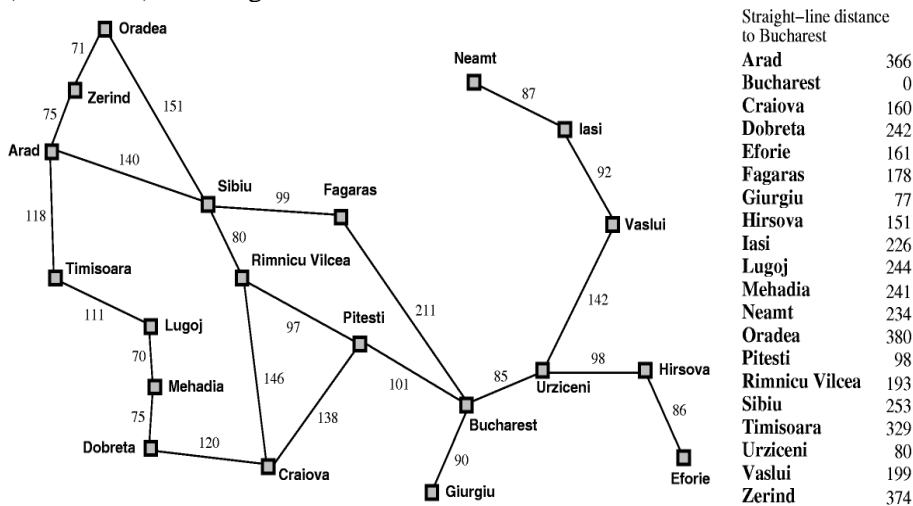|	
Arad	366
Bucharest	0
Craiova	160
Dobreta	242
Eforie	161
Fagaras	178
Giurgiu	77
Hirsova	151
Iasi	226
Lugoj	244
Mehadia	241
Neamt	234
Oradea	380
Pitesti	98
Rimnicu Vilcea	193
Sibiu	253
Timisoara	329
Urziceni	80
Vaslui	199
Zerind	374

Figure I: Map

(b) You are faced with a path search problem with a very large branching factor, but where the answers always involve a relative short sequence of actions (whose exact length is unknown). These actions, however, have widely varying costs. What search algorithm would you use to find the optimal answer? Indicate under what conditions, if any, a visited or expanded list would be good idea.   2

(c) What do you mean "Rational Agent"?   1

CO3

3. (a) Draw a semantic network representation the following knowledge: 3

"*Dr. Sumit, a human being, own four pieces of furniture – a table, two chairs and a bookshelf in his office. All four pieces of furniture are made of wood. The table and chairs have four legs. The colours of the table, chairs and book self are blue, brown and white respectively and Sumit is sitting on one of the chairs. Priyanka, Sumit's secretary, is sitting on another chair.*"

CO3

(b) Differentiate between monotonic and non-monotonic reasoning with example.   2
(c) Write advantages and disadvantages of Semantic Nets.   1

4. (a) Use the Minimax algorithm to compute the utility values for other nodes in the given   2
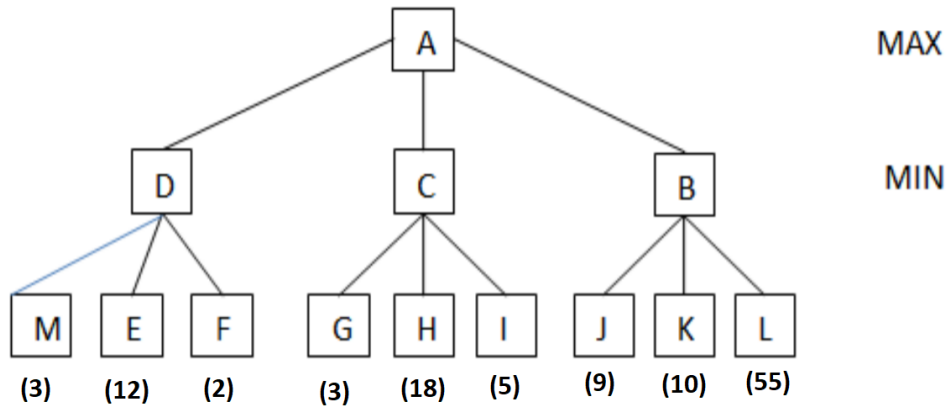game tree.

Figure II: two-ply game tree

CO2

(b) Explain the utility of alpha and beta cuts in Minimax problem in Figure II.   2
(c) Explain hill climbing algorithm with example.   2

5. (a) When to use Forward Chaining and Backward Chaining? Explain with an example.   3
(b) Why does the search in game playing always proceeds forward from the current   2
position rather that backward from goal state?

CO1

(c) Can a system engaged in purely numeric computation be called a non-intelligent   1
system? Explain with suitable arguments.

6. (a) Discuss about Bayesian Theory and Bayesian Network with example.   4
(b) Why PEAS is important? Explain with an example.   2

CO2

[End]