Dr Dharmendra Prasad Mahato (61)

21/11/2023

National Institute of Technology Hamirpur
Himachal Pradesh-177 005, India
End Semester Theory Examination (November 2023)
Department of Computer Science and Engineering

21/11/2023

Time: 3 hour — *End Term Theory Examination* — Maximum Marks: 50

Degree Program: **B.Tech**
Course Title: **Artificial Intelligence**
Course Code: **CS-411**
Teacher's name: **Dr. D. P. Mahato**

Class: 4^{th} **Year**
Semester: 7^{th}
Session: **B**
Time Duration: **02.30 PM to 05.30 PM**

General Instructions: All the questions are compulsory.

Q.1) (a) How could Artificial Intelligence help the fight against COVID-19?

(b) We know that global warming is the prime reason for spreading unexpected outbreak of pandemic in the world. How and what measures can human beings adapt themselves while using AI? Why is the adaptation of AI in modern era regarded as a necessity and even a challenge?

(c) How can AI resolve the problems caused to human beings by scarcity of ground water as well as pollution of ground water?

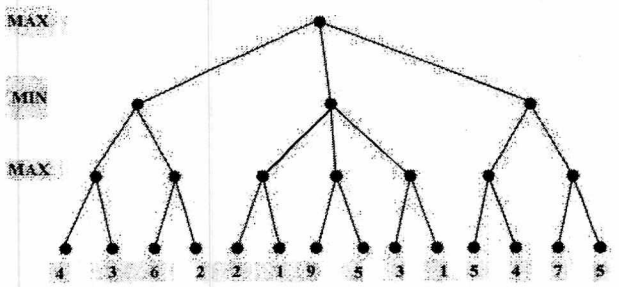
(d) Every year we see the natural disasters in the world. How can AI help to deal with the natural disasters without any big losses in the society?

[5+5+5+5=20 marks]

Q.2) How will we use the planning, learning, knowledge and reasoning for the problems in the Question 1 (a), 1 (b), 1 (c) and 1 (d). Explain.

$[2\frac{1}{2} + 2\frac{1}{2} + 2\frac{1}{2} + 2\frac{1}{2} = 10$ marks$]$

Q.3) In the given Figure, how can we solve the problem by using MIN-MAX and Alpha-Beta pruning algorithms. Explain the time and space complexities of these algorithms in details.



[5+5=10 marks]

Q.4) (a) How can DFS, BFS be used for minimum spanning tree for a given graph? How do these algorithms differ from Prim's and Kruskal's algorithms? Which algorithm is the best algorithm for finding the shortest path in graph?

(b) Suppose a network needs a static routing algorithm. The open problem in static routing starts with the possibility of achieving a competitive ratio of $O(1)$ in undirected graphs. How and which algorithms will be suitable so that the competitive ratio of $O(1)$ [1] can be achieved. Till now it is $O(log\ n)$.

[5+5=10 marks]

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[1] $Competitive\ Ratio = \frac{SelectedPath}{OptimalPath}$