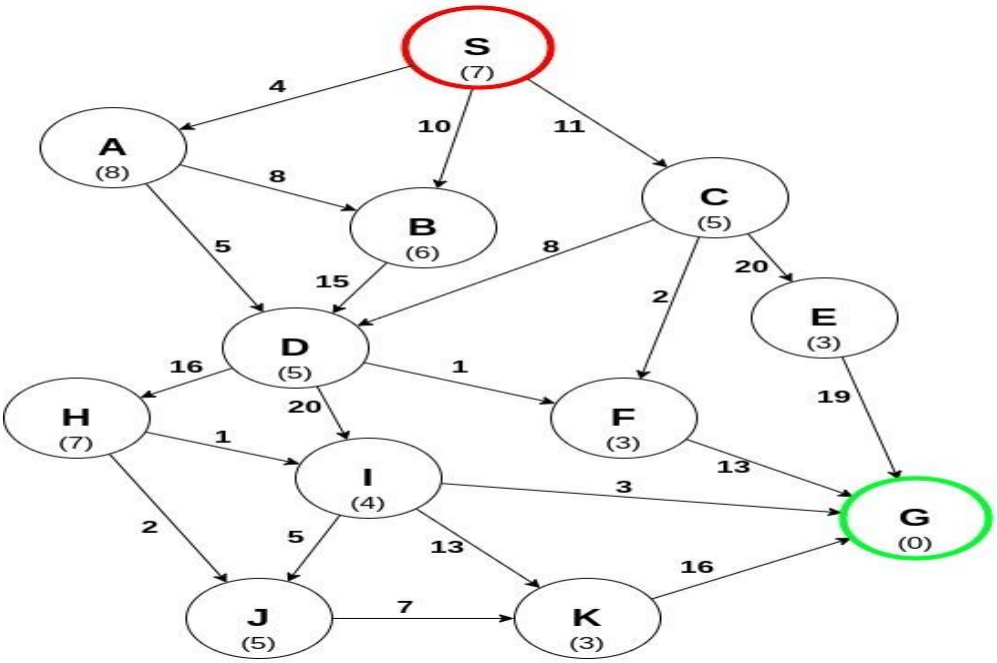
Artificial Intelligence and Machine learning

Question Bank:

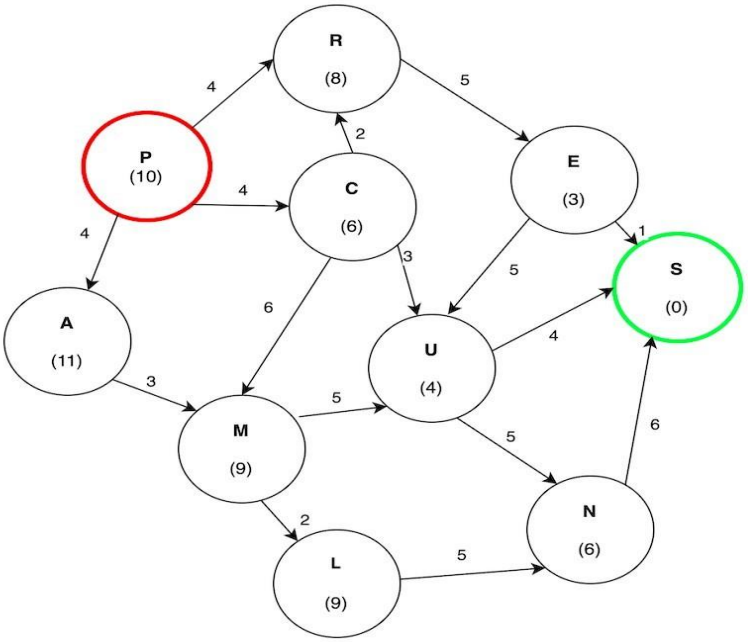
Unit-I

1. Consider the following example of trying to find the shortest path from **S** to **G** using **A*search algorithm** for the following graph:

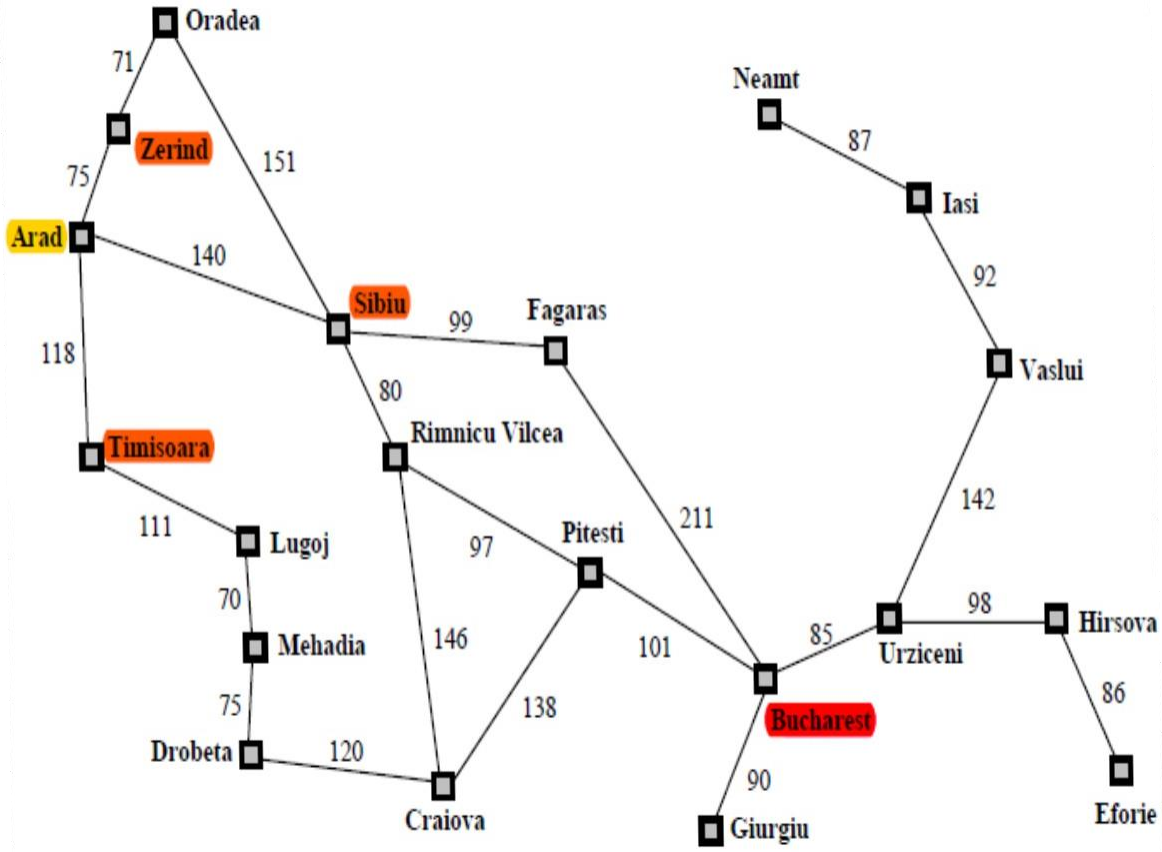


Each edge has an associated weight, and each node has a heuristic cost (in parentheses).

2. Consider finding the path from **P** to **S** in the following graph using **Greedy best-first search**



3. For the following state space diagram and h_{sld}- Give all the stages of reaching to Bucharest from Arad using A* search alorithm ---------- 8M



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

Figure 3.22 Values of h_{SLD}—straight-line distances to Bucharest.

3. Give the PEAS (Performance, Environment, Actuator, Sensor) description for

i) Medical diagnosis system
ii) Satellite image analysis system
iii) Refinery controller 6M

4. Give the PEAS(Performance, Environment, Activs
i) Satellite Image Analysis System
ii) Part Picking Robot 4M

5. Explain how you formulate the 8 puzzle problem with 5 components --- 6 M

6. Explain in detail the Depth Limited Search algorithm with an example, analyze why it is called as un-informed search---------- 8M

7. Consider the simple Vacuum-Cleaner agent that cleans a square if it is dirty and movies to the other square if not. Its agent function is tabulated as below with proper assumptions explain how this agent can be Irrational?---------- 6M

8. Write a function TABLE-DRIVEN-AGE NT and explain the same----------4M

9. Deffertiate between informed and un-informed search algorithms 6M

10.

Greedy Best First Search tries to expand a node that is closest to the goal, on the grounds that this is likely to lead to lead to a solution quickly, whereas the A* search algorithm tries to minimize the total estimated solution cost. Using the tree given in Figure 1(a), which depicts the scenario of the travelling salesperson starts from city 1 and should reach city 8. The value on edges represent the cost of reaching form one city to another. Analyze the steps to reach the goal node and find the final cost using Greedy Best First Search and A* Search algorithms. Use heuristic value provided in Table 1(a) suitably.

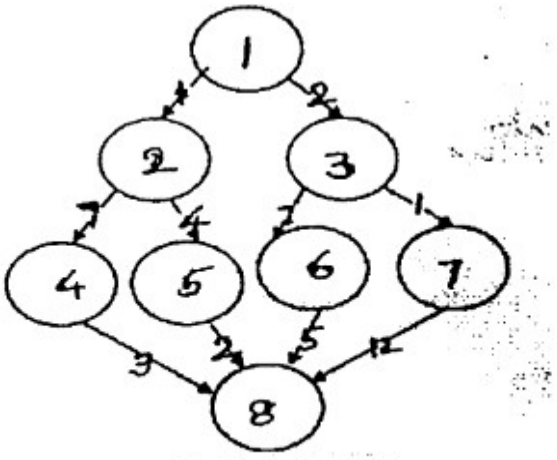


Fig 1(a): Game Tree

Node	H(n)
1	10
2	5
3	6
4	4
5	15
6	5
7	8
8	0

Table 1(a): Heuristic Values

11.

Give the PEAS (Performance, Environment,Actuator,Sensor) description for
i. Automated Taxi Driver
ii. Medical Diagnosis System

12. Give the properties of following Task environment:
a) Chess game
b) Crossword puzzle
c) Part picking robot

12. You are asked to develop an agent which gives the direction of any location in a park. The visitor must enter the location and the agent will guide by providing path from current location to the location entered by the visitor. Identify the category of the agent, give schematic diagram for the agent. 08

13. Discuss iterative deeping DFS algorithm with an example. Analyze why it is called as un-informed search. 08

14. Differentiate and analyse between the following properties of Task Environments 04
   i. Fully Observable v/s Partially Obsevable
   ii. Deterministic v/s Stochartic

15. What is Greedy Best First Search? Explain with an example the different stages of Greedy Best First Search----------10M

16. What is A' Search? Explain various stages of A* search with example—10M

17. What are the factors that a rational agent should depend on at any given time.....10M

18. Differentiate and Analyze between the following properties of Task Environment
   i) Single Agent v/s Multi Agent
   ii) Episodic v/s Sequential
   iii) Fully observable v/s Partially observable
   06 Marks

19. Describe with neat diagram a Simple reflex agent and a SIMPLE-REFLEX-AGENT function, which acts according to a rule whose condition matches the current state, as defined by the percept. 06 Marks

20. Explain in detail, the Depth-Limited-Search Algorithm with an example. Analyze why it is called as Un-informed search. 08 Marks

21. Give the definition of artificial intelligence in the dimension of thinking and acting humanly. 2
   Write pseudo~~podia~~ code for simple reflex agent. 2