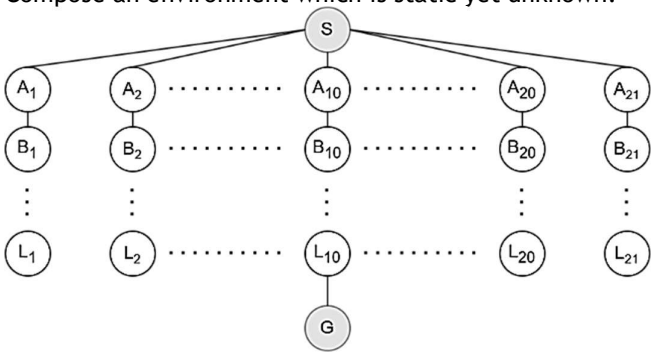
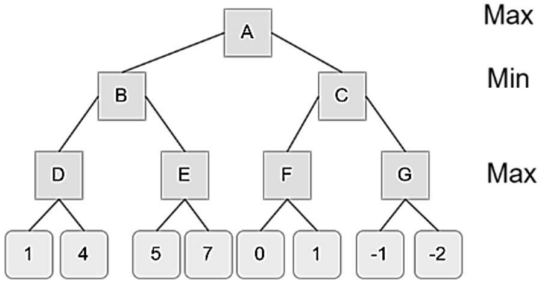
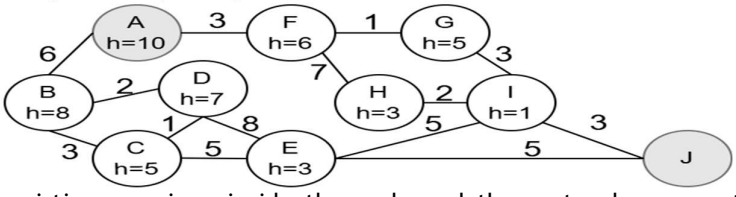
BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MTECH/PRE-PHD **SEMESTER : I**
BRANCH: CSE (AI/ML) **SESSION : MO/2025**

SUBJECT: AI501 ARTIFICIAL INTELLIGENCE CONCEPTS

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Describe an agent.	[2]	1	2
Q.1(b)	Explain the difference between search space and problem space with an Example.	[3]	1	2
Q.1(c)	Critically analyse the four foundational paradigms of AI.	[5]	1	4
Q.2(a)	Compose an environment which is static yet unknown.	[2]	2	5
Q.2(b)	 Let say a search algorithm tries to go from S node to G node. S node has 21 children as shown in the image. A_1 has a child B_1, B_1 has a child C_1, and by this way every depth has been to L_1 (except for the trail starting from A_{10}). A_{10} has a child B_{10}, B_{10} has a child C_{10}. By this way L_{10} has the child – G. Explain among BFS and DFS (DFS will choose from left to right) which algorithm will be the first to reach the node G if they start together from the node S.	[5]	2	4
Q.2(c)	In the above question if we use bidirectional search, explain whether it will be faster than BFS and DFS.	[3]	2	4
Q.3(a)	Describe the advantages of simulated annealing over the hill climbing algorithm	[2]	3	2
Q.3(b)	 Use alpha-beta pruning for the above diagram.	[3]	3	4
Q.3(c)	 Heuristics are given inside the node and the cost values are at the edges. Use A* algorithm to find the best path from A to J.	[5]	3	4

PTO

Q.4(a)	Define logical representations from the following sentences 1. Radha loves Krishna 2. Everyone loves someone 3. Anyone can love anyone 4. If someone loves someone, they don't let go 5. Humans not only love humans but also animals	[5]	4	4
Q.4(b)	Prove: Miss Marple is wealthy Given: Anyone who owns a dog is a pet lover. Any pet lover who owns a cat is wealthy. Miss Marple owns a dog. Miss Marple owns a cat.	[5]	4	4
Q.5(a)	Differentiate unsupervised and supervised learning	[2]	5	2
Q.5(b)	Describe Machine translation in NLP and its strategies.	[3]	5	1
Q.5(c)	Provide the outcome of morphological, syntactical and semantic operations on: "The dog is eating the meat happily."	[5]	5	4

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