U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

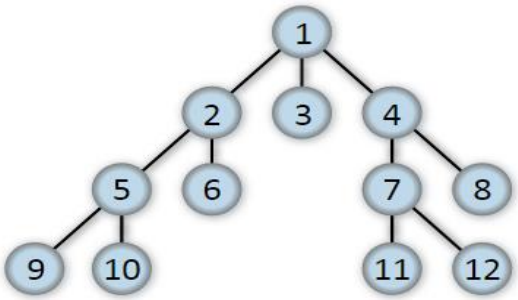
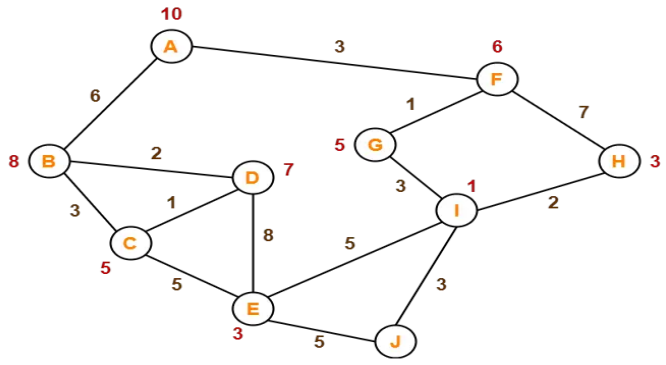
Autonomous Institute Affiliated to VTU

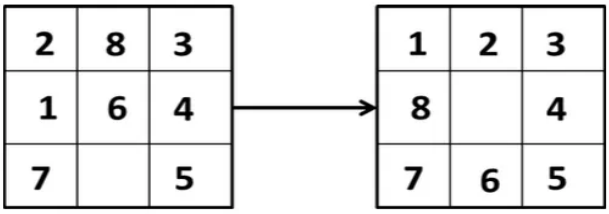
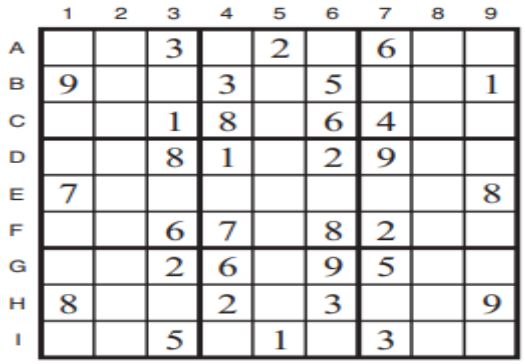
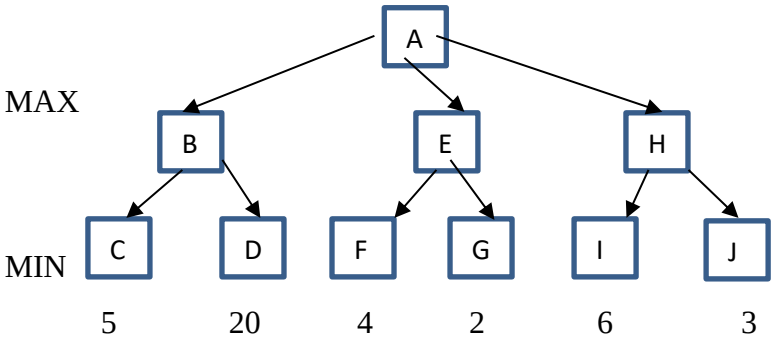
April 2024 Semester End Main Examinations

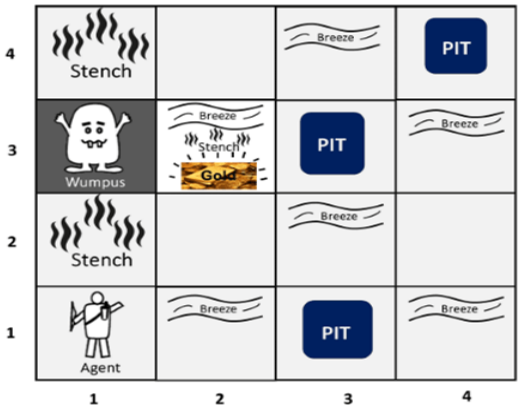
Programme: B.E. **Semester: III**
Branch: Artificial Intelligence & Data Science **Duration: 3 hrs.**
Course Code: 23AI3PCIAI **Max Marks: 100**
Course: Introduction to Artificial Intelligence

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Discuss the PEAS description of the task environment for an automated taxi.	CO1	PO1	**06**
	b)	Write an algorithm for MODEL-BASED-REFLEX-AGENT	CO1	PO1	**06**
	c)	Apply depth first search and breadth first search algorithm for the given graph to search the node 8. Discuss time and space complexity of these algorithms. Which algorithm functions more effectively? Justify your answer. 	CO1	PO3	**08**
		UNIT - II			
2	a)	Consider the following graph:  Find the cost-effective path to reach from start state A to final state J using A* Algorithm.	CO2	PO2	**06**

		b)	Solve the following using 8 puzzle problem to reach a goal.  	CO2	PO2	**06**
		c)	Give a complete problem formulation for each of the following. Choose a formulation that is precise enough to be implemented. a. Using only four colors, you have to color a planar map in such a way that no two adjacent regions have the same color. b. You have three jugs, measuring 12 gallons, 8 gallons, and 3 gallons, and a water faucet. You can fill the jugs up or empty them out from one to another or onto the ground. You need to measure out exactly one gallon.	CO2	PO2	**08**
			UNIT - III			
	3	a)	Solve the SUDOKU puzzle using constraint propagation. 	CO2	PO2	**08**
		b)	Write the MIN-CONFLICTS algorithm for solving CSPs by local search	CO1	PO3	**06**
		c)	Discuss Node consistency and Arc consistency	CO1	PO1	**06**
			OR			
	4	a)	Solve the crypt arithmetic problem SEND + MORE = MONEY	CO3	PO4	**10**
		b)	Consider the game tree shown below. Calculate the value at the root of the tree using minimax algorithm. Perform alpha beta pruning to show which nodes will be pruned.  	CO3	PO4	**10**

			UNIT - IV			
	5	a)	A simple Wumpus world is shown in Fig 5a. Give the complete PEAS description and the LOGICAL REASONING such that the AGENT gets the GOLD and comes back safely.  Fig. 5a	CO3	PO3	**10**
		b)	Explain the DPLL algorithm for checking the satisfiability of a sentence in propositional logic.	CO3	PO3	**05**
		c)	Discuss Models for First-order logic.	CO1	PO1	**05**
			OR			
	6	a)	Consider the Problem Statement: 1. Ravi likes all kind of food. 2. Apples and chicken are food 3. Anything anyone eats and is not killed is food 4. Ajay eats peanuts and is still alive 5. Rita eats everything that Ajay eats Prove by resolution that Ravi likes peanuts using resolution.	CO3	PO3	**10**
		b)	Explain the forward-chaining algorithm for propositional logic	CO2	PO1	**05**
		c)	Discuss Inference rules for quantifiers.	CO1	PO1	**05**
			UNIT - V			
	7	a)	It is estimated that 50% of emails are spam emails. Some software has been applied to filter these spam emails before they reach your inbox. A certain brand of software claims that it can detect 99% of spam emails, and the probability for a false positive (a non-spam email detected as spam) is 5%. If an email is detected as spam, then what is the probability that it is in fact a non-spam email?	CO3	PO4	**08**
		b)	Illustrate the Bayes rule and its use with an example.	CO3	PO3	**07**

		c)	The joint probabilities for rain and wind are given in the following table: i) What is the marginal probability of no rain? ii) What is the marginal probability of Strong wind? iii) What is the conditional probability of Light rain given Strong wind? What is the conditional probability of little wind given no rain?	CO3	PO3	**05**

	No Wind	Little Wind	Strong Wind	Storm
No rain	0.1	0.05	0.2	0.01
Light rain	0.05	0.1	0.15	0.04
Heavy rain	0.05	0.1	0.1	0.05

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