



VIT

Vellore Institute of Technology
CHENNAI

Reg. Number:

22BA14266

Continuous Assessment Test (CAT-2) - OCTOBER 2024

Programme	:	B.Tech (CSE with Specialization)	Semester	:	FALL 2024-25
Course Code & Course Title	:	BCSE306L Artificial Intelligence	Slot	:	C1+TC1
Faculty	:	Dr. VERGIN RAJA SAROBIN M Dr. RABINDRA KUMAR SINGH Dr. VIJAYAKUMAR KP Dr. KAVITHA J C Dr. VIJAYAPRABAKARAN K Dr. ABIRAMI S Dr. POONKODI Dr. SANKAR P	Class Number	:	CH2024250102604 CH2024250101681 CH2024250101698 CH2024250101692 CH2024250101686 CH2024250102608 CH2024250101034 CH2024250100578
Duration	:	1 ½ hours	Max. Mark	:	50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.

Answer all questions

Q. No	Sub Sec.	Description	Marks
1		<p>Consider two players, Player 1 and Player 2, competing in a turn-based strategy game. The game is played on a grid with 3 rows and 3 columns, and each player takes turns moving their token across the grid. The objective is to reach the opposite corner of the grid while collecting the maximum number of points from cells along the way and add those points to the shared score. Consider the initial score as 1.</p> <ul style="list-style-type: none">● Player 1 starts at the top-left corner (0,0) and has to reach (2,2).● Player 2 starts at the bottom-right corner (2,2) and has to reach (0,0).	15

Both players aim to optimize a shared score:

- When Player 1 moves (only right or down), they add the value of the cell they move to, increasing the score.
- When Player 2 moves (only left or up), they subtract the value of the cell they move to, decreasing the score.
- Players cannot move diagonally and only one move is allowed at each step.

1	2	3
4	5	6
7	8	9

Player 1 starts the game with an initial score of 1 at position (0,0), and Player 2 continues from position (2,2) with the shared score.

The game ends when one of the players reaches the opposite corner from where they started, and no further moves are possible.

- Construct the game tree representing all possible moves for Player 1 and Player 2. (10 marks)
- Apply the Minimax algorithm to determine the optimal path for Player 1 to maximize the score. (5 marks)

(i) Translate the following Propositional Logic to English sentences. (3 marks)

Let: p: Umama is eating
q: Umama is hungry

- $p \Rightarrow \neg q$
- $p \wedge \neg q$
- $\neg(p \Rightarrow \neg q)$

(ii) Consider the following scenario.

When asked for the three children's ages of Mrs. Deboeah, she says that Aaron is her youngest child if Bosco is not her youngest child, and that Aaron is not her youngest child if Carl is not her youngest child. Also, only one of the three children can be her youngest child. Write down a knowledge base that describes the above scenario.

Show with resolution that Bosco is her youngest child. (7 marks)

For the below set of statements, prove by resolution whether Aditya loves Munna.

- Every parrot is a bird.
- Every bird that is oviparous is warm-blooded.
- Aditya is the owner of Munna.
- Every parrot that has an owner is a pet.
- There exists a parrot that has an owner.
- If an owner hates a parrot, he does not love it.
- If some bird loves their owner and that person owns it, the owner does not hate it.
- Munna is a parrot and an oviparous.

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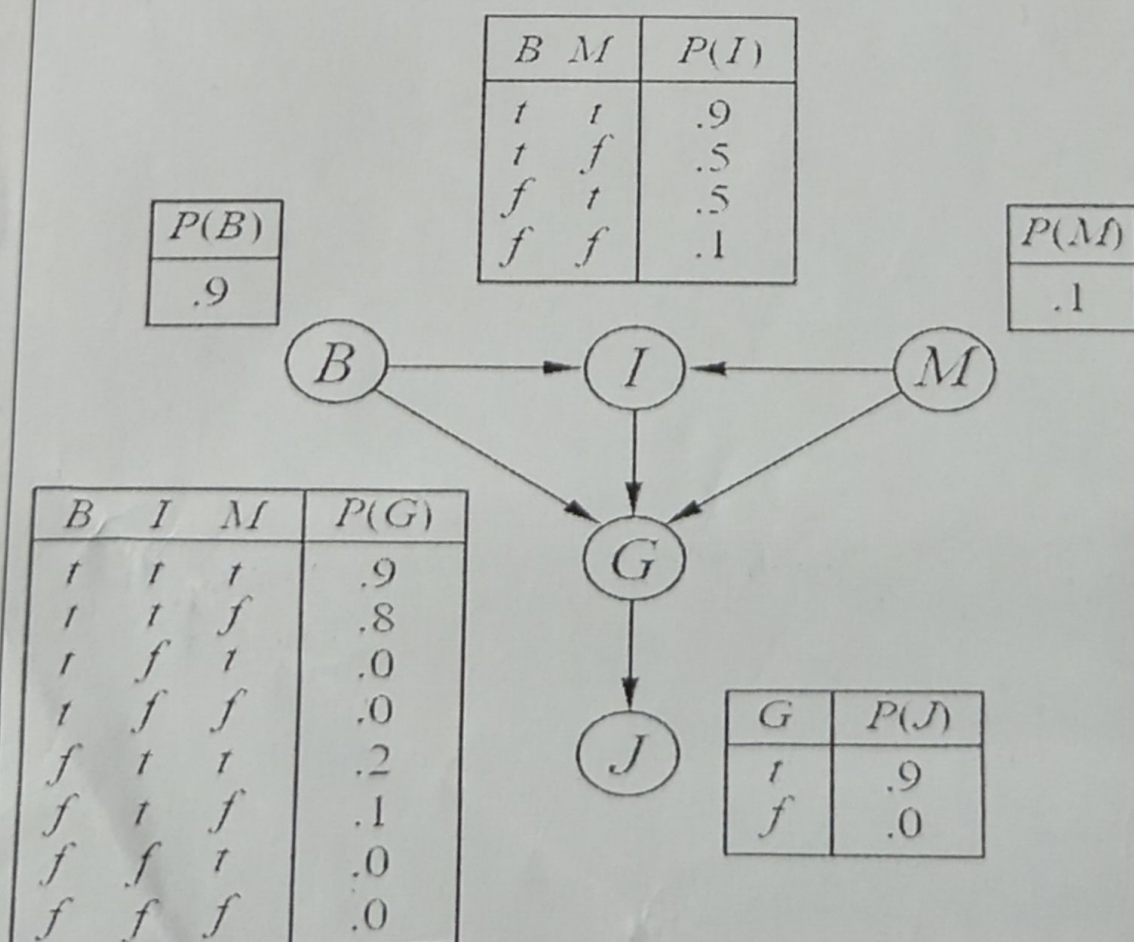
Consider the Bayes net (shown in figure) with boolean variables: B = Broke Election Law, I = Indicted, M = Politically Motivated Prosecutor, G = Found Guilty and J = Jailed.

a. Analyse which of the following are supported by the network structure. Give reasons. (4 marks)

- $P(B, I, M) = P(B)P(I)P(M)$
- $P(J|G) = P(J|G, I)$

b. Calculate the value of $P(B, I, \neg M, G, J)$ (3 marks)

c. Calculate the probability that someone goes to jail given that they broke the law, have been indicted, and face a politically motivated prosecutor. (8 marks)



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