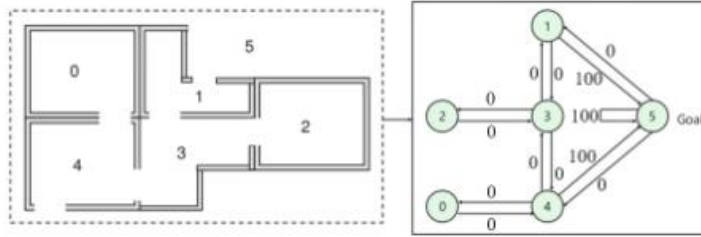


Practice Problems of Machine Learning

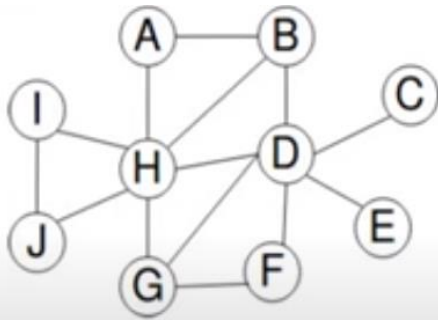
Note: ETE is based on your entire syllabus. Here are some practice questions on after MTE syllabus

SL No	Questions
1	Discuss about Roulette Wheel Selection algorithm and Rank based Selection?
2	Explain how locally weighted regression is different from linear regression
3	Discuss about Markov Decision Process (MDP) and Q-Learning.
4	Explain Bagging and boosting
5	Evaluate the performance of a Case-Based Learning system with an suitable example. What are the parameters to assess the effectiveness of case based learning system
6	Discuss different components of Genetic algorithm
7	Give an detail comparison among k-means, hirerchichal and density based clustering methods
8	Explain the various steps involved in Partitional clustering algorithm. Use this algorithm to develop a model for a real life problem.
9	State various types of artificial neural network with their advantages and disadvantages
10	Illustrate the steps of Agglomerative Hierarchical Clustering and solve the following dataset. Points: A (12, 13) B (15, 14) C (19, 16) D (18, 12) E (17, 15)
11	Construct a detailed explanation of the simple model of an Artificial Neuron and its functions. Develop an understanding of the role of weights and biases in an artificial neuron. Analyze how weights and biases influence the neuron's response to input signals, and discuss the mechanisms by which they contribute to the overall behavior of the neuron
12	Identify and classify the various methods used for dimensionality reduction. Choose one method and provide a detailed explanation of its working principles, advantages, and limitations.
13	Develop a comprehensive analysis of the computational complexity of linear regression and nonlinear regression models. How does the complexity of the model affect the training and inference time? Discuss the key differences in terms of their assumptions, functional forms, and interpretability.
14	Differentiate between discriminative learning algorithms and generative learning algorithms.
15	How Gaussian Discriminant Analysis is related to Logistic Regression? Describe it in detail.
16	How does Singular Value Decomposition (SVD) work to decompose a matrix?
17	Examine the Expectation-Maximization (EM) algorithm and its iterative optimization method that combines various unsupervised machine learning algorithms
18	Suppose, we have 5 rooms in a building connected by doors as shown in the figure below. We shall number each room 0 through 4. The outside of the building can be thought of as one big room i.e. number 5. Notice that doors 1 and 4 lead into the building to room 5 (goal point). Show what will be the Q matrix after 2 episodes.



Consider the following Markov Random Field.

Justify your answer which of the following nodes will have no effect on D given the Markov Blanket of D.



19

The dataset of win or loss in a sport of 5 players is given in the table. Use logistic regression as classifier to answer the following questions:

Hours played	win(1)/ loss(0)
20	0
12	1
30	0
22	0
35	1

Calculate the probability of win for the player who played 39 hours.

20

Develop a solution using the Weighted k-NN algorithm to determine the class of a test instance (7.6, 60, 8) based on a provided training dataset in a table. Set the value of K to 3 and apply the algorithm to calculate the weighted class by considering the distances and weights of the nearest neighbors.

S.No.	CGPA	Assessment	Project Submitted	Result
1	9.2	85	8	Pass
2	8	80	7	Pass
3	8.5	81	8	Pass
4	6	45	5	Fail
5	6.5	50	4	Fail
6	8.2	72	7	Pass
7	5.8	38	5	Fail
8	8.9	91	9	Pass

21

22 Discuss about deep Q-learning