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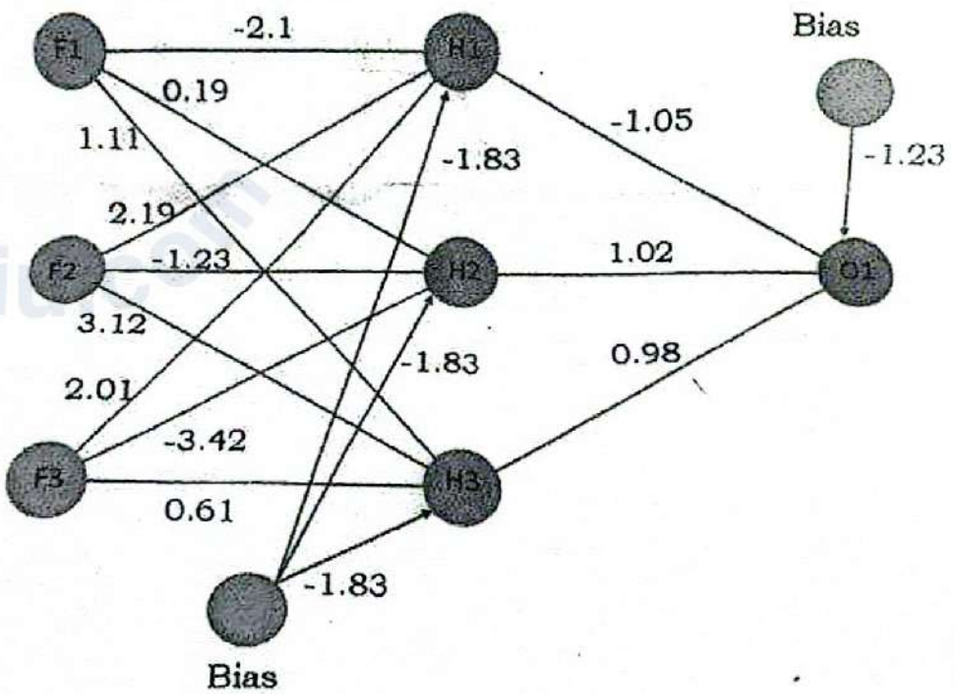
Final Examination | Semester: Spring 2023 | Section: All

Course Code: CSE321 | Course Title: Data Mining and Machine Learning

Time– 1.5 hours | **Full Marks – 40**

[N.B. Answer all questions. Marks of all questions have been indicated on the right side of the question paper.]

1. An artificial neural network has been trained on a binary classification dataset, whose target variables are red and green, encoded as 0 and 1, respectively, prior to training the network. In this network, the hidden nodes are activated using Rectified Linear Units (ReLU), and the last node is activated using Sigmoid. The trained network is shown below. Classify the data shown in Table 1 using this network. CO4 **10**



Input Units | Hidden Units | Output Unit

F1	F2	F3
2.1	1.9	1.02
3.4	.04	1.2

Table 1: Test data

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2. Below is a dataset with three features: **Age**, **Annual Income**, and **Spending Score**. Using a clustering approach, identify the number of clusters, boundary points, and outliers in the dataset. CO2 5+5+5

Age	Annual Income	Spending Score
19	15	39
21	15	81
23	16	77
31	17	40
21	600	1

3. Consider the transaction database shown in the following table. CO3 15

ID	Items
1	A, B, C, D
2	G, B, C, D
3	A, C, D, G
4	A, B, F, H
5	B, D, N, E

Let minimum support be 50% and minimum confidence be 65%. Predict all frequent item sets and the association rules.

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