MACHINE INTELLIGENCE AND EXPERT SYSTEMS

AUTUMN SEMESTER - 2021

TEST-1

Please answer in pen and paper and submit the scanned copy within one hour. All the answers should be brief and to the point. All the parts of a question should be in one place. If you answer the same question multiple times and do not pen through them, only one of them will be considered for the correction and marking. Unfair answer scripts and unfair practices will be penalized.

Q1. Consider the given training dataset. There are 5 attributes for each of the example given in the instance space below. Target variable 'Buy' specifies whether a person will buy a book or not.

Serial	Citations	Size	InLibrary	Price	Editions	Buy(target)
1	some	small	no	affordable	many	no
2	many	big	no	expensive	one	yes
3	some	big	always	expensive	few	no
4	many	medium	no	expensive	many	yes
5	many	small	no	affordable	many	yes

A) How many concepts are possible for this instance space?
B) How many hypotheses are there in this hypothesis language ? How many of them are semantically distinct?
C) Apply Find-S algorithm on the given training set . Consider the examples in the specified order and write down your hypothesis each time after observing an example. 1+2+7=10

Q2. A teacher uses the following data to build a decision tree to decide whether to promote the students or fail them.

Sl no	Class Participation (A1)	Class Performance (A2)	Attendance (A3)	Exam marks out of 80 (A4)	Result
1	High	Good	High	73	Pass
2	High	Fair	Low	60	Fail
3	Low	Good	High	64	Pass
4	Low	Good	Low	57	Fail
5	High	Fair	High	66	Pass
6	Low	Fair	High	59	Fail

a. Create a discrete attribute ‘Exam marks<=65?’ to replace the continuous attribute ‘Exam marks out of 80’.

b. Train a decision tree on the dataset (using the created discrete attribute) with the grade as the target attribute and information gain as the splitting criterion. Resolve ties by preferring the attribute with the lower attribute number.

2+8=10