

# Fundamentals of Data Science

Semester B 20-21

## Tutorial 4

- 1 Explain why there are  $2^{S-1}-1$  ways of creating a binary partition for a nominal attribute with  $S$  attribute values.
2. We consider the training examples shown in the following table for a binary classification problem.

Instance	$a_1$	$a_2$	$a_3$	Target Class
1	T	T	1	+
2	T	T	6	+
3	T	F	5	-
4	F	F	4	+
5	F	T	7	-
6	F	T	3	-
7	F	F	8	-
8	T	F	7	+
9	F	T	5	-

- (a) What is the original entropy of this set of training instances?
  - (b) What are the information gains when  $a_1$  and  $a_2$  are used for partitioning the training set respectively?
3. Apply the decision tree construction algorithm to verify the selection order of the attributes for the example in the lecture notes, and complete the construction of the decision tree.