Module 2- Decision Tree Learning

Decision Tree Learning (Chapter 3)

1. Explain the following with examples:
   a. Decision Tree,
   b. Decision Tree Learning
   c. Decision Tree Representation.
2. What are appropriate problems for Decision tree learning. OR
   What are the characteristics of the problems suited for decision tree learning.
3. Explain the concepts of entropy and information gain.
4. Describe the ID3 algorithm for decision tree learning with example.

   OR

   What is the procedure of building Decision tree using ID3 with Gain and Entropy. Illustrate with example.

   OR

   What do you mean by Gain and Entropy? How is it used to build the Decision tree in algorithm? Illustrate using an example.
5. Give Decision trees to represent the Boolean Functions:
   a. A && - B
   b. A V [B && C]
   c. A XOR B
   d. [A&&B] V [C&&D]
6. Consider the following set of training examples.

Instance	Classification	A1	A2
1	+	T	T
2	+	T	T
3	-	T	F
4	+	F	F
5	-	F	T
6	-	F	T

   a. What is the entropy of this collection of training example with respect to the target function classification?
   b. What is the information gain of A2 relative to these training examples?
7. Discuss Hypothesis Space Search in Decision tree Learning.
8. Discuss Inductive Bias in Decision Tree Learning. Differentiate between two types of biases. Why prefer Short Hypotheses?
9. What are issues in decision tree learning? Explain briefly How are they overcome?
   a. Discuss the following issues in detail: a. Avoiding overfitting in Decision Trees
   b. Incorporating Continuous valued attributes
   c. Handling Training Examples with Missing attribute values.
   d. Handling Attributes with Different costs.