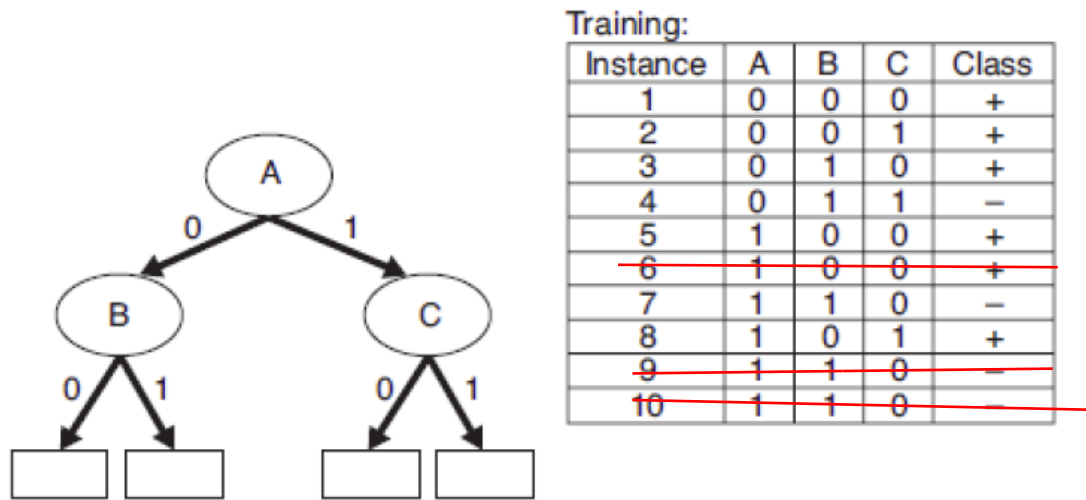


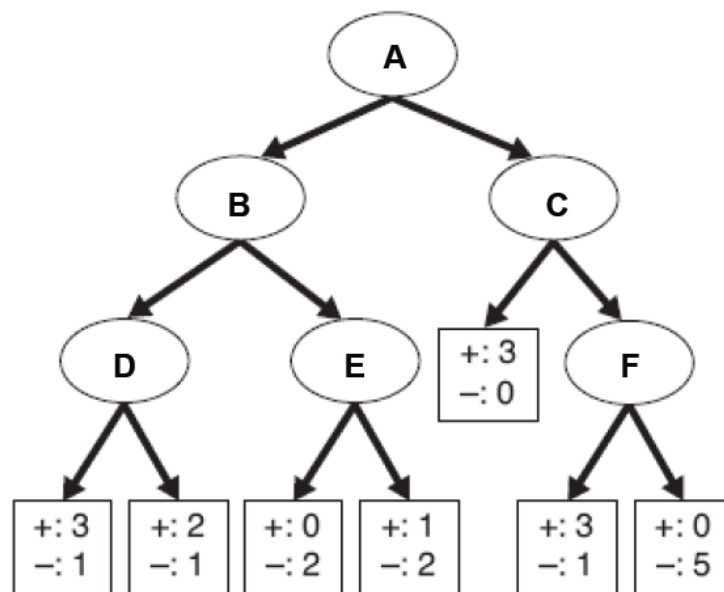
1. Consider the decision tree shown in the following figure:



- Estimate the training error of the tree.
- Estimate the generalization error by using a penalty term of 0.5 for each leaf node.

2. We consider the following decision tree example in the lecture notes.

Suppose a penalty term of 1.5 is assigned to each leaf node.



- a) Estimate the generalization error if the sub-tree associated with node F is pruned and replaced with a leaf node.
- b) Estimate the generalization error if the sub-trees associated with nodes D and E are pruned and replaced with leaf nodes.
- c) Estimate the generalization error if the above operations are performed together.