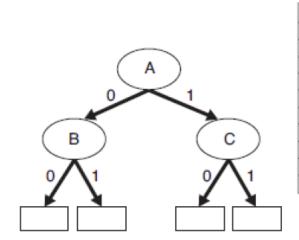
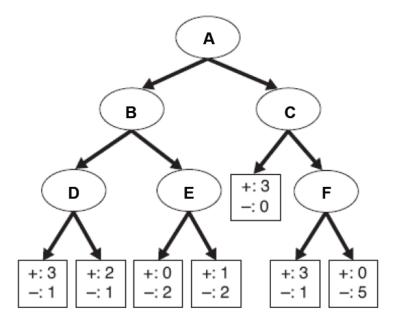
1. Consider the decision tree shown in the following figure:



Training:				
Instance	Α	В	С	Class
1	0	0	0	+
3	0	0	1	+
3	0	1	0	+
	0	1	1	_
5 6	1	0	0	+
6	1	0	0	+
7	1	1	0	_
8	1	0	1	+
9	1	1	0	_
10	1	1	0	_

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