
Question 1.

Let X contain all real numbers from $[0; 1]$ which can be represented using 256 bits. Let $\mathcal{H} = X$, and let the decision be given by $H \in \mathcal{H}$ as

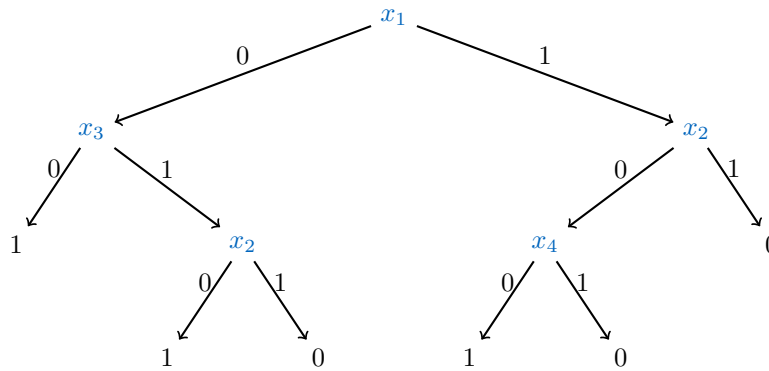
$$h(x) = 1 \text{ iff } x > H$$

Determine an m such that with probability at least 0.9, $\text{err}(h) < 0.1$, where h is an arbitrary hypothesis from \mathcal{H} consistent with m i.i.d. examples from X . Estimate it

- (a) without using any upper bounds seen in the lecture
- (b) using the upper bound with $\ln |\mathcal{H}|$
- (c) using the upper bound with $\text{VC}(\mathcal{H})$

Question 2.

Consider the following decision tree:



- (a) Express the tree as a 3-DNF.
- (b) Express the tree as a 3-CNF.
- (c) How can we use (modify) the generalization algorithm to learn k -decision trees in the PAC learning model?