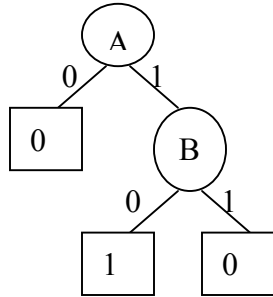


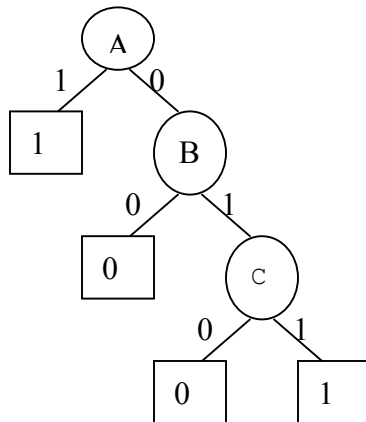
Sample Answers

3.1

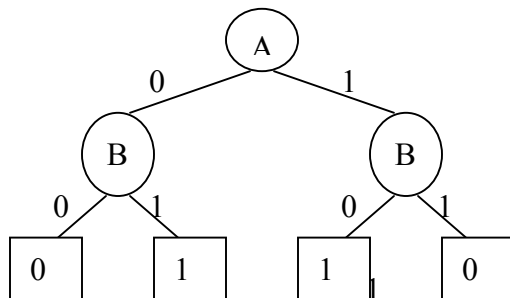
(a) $A \wedge \neg B$



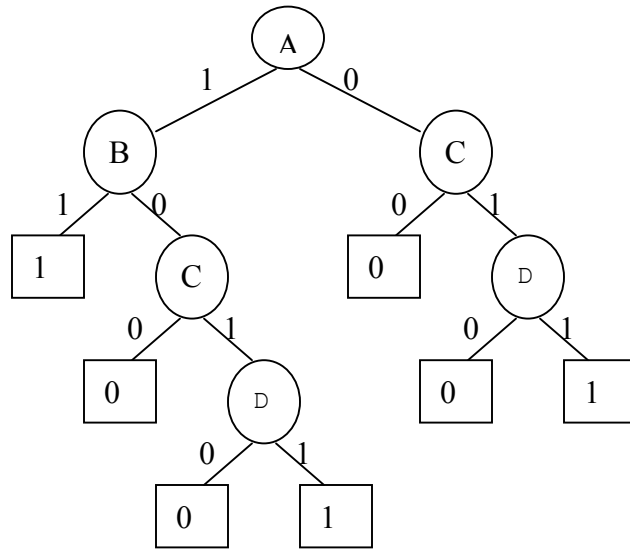
(b) $A \vee [B \wedge C]$



(c) $A \text{ XOR } B$



(d) $[A \wedge B] \vee [C \wedge D]$



3.2

- (a) There are altogether 6 training examples. Three are positive, and the other three are negative. So the entropy of this collection of training examples with respect to the target function classification is,

$$\text{Entropy}(S) = -(3/6) \cdot \log(3/6) - (3/6) \cdot \log(3/6) = 1$$

- (b) $N_{a_2=T} = 4$ $N_{a_2=F} = 2$
 $N_{a_2=T, c=+} = 2$ $N_{a_2=T, c=-} = 2$ $N_{a_2=F, c=+} = 1$ $N_{a_2=F, c=-} = 1$
 $\text{Info_Gain}(S, a_2) = \text{Entropy}(S) - \left\{ (4/6) \cdot [-(2/4) \cdot \log(2/4) - (2/4) \cdot \log(2/4)] + (2/6) \cdot [-(1/2) \cdot \log(1/2) - (1/2) \cdot \log(1/2)] \right\} = 0$