

$$1.) |X| = 14$$

$$2.) |X^{(4)}| = 9$$

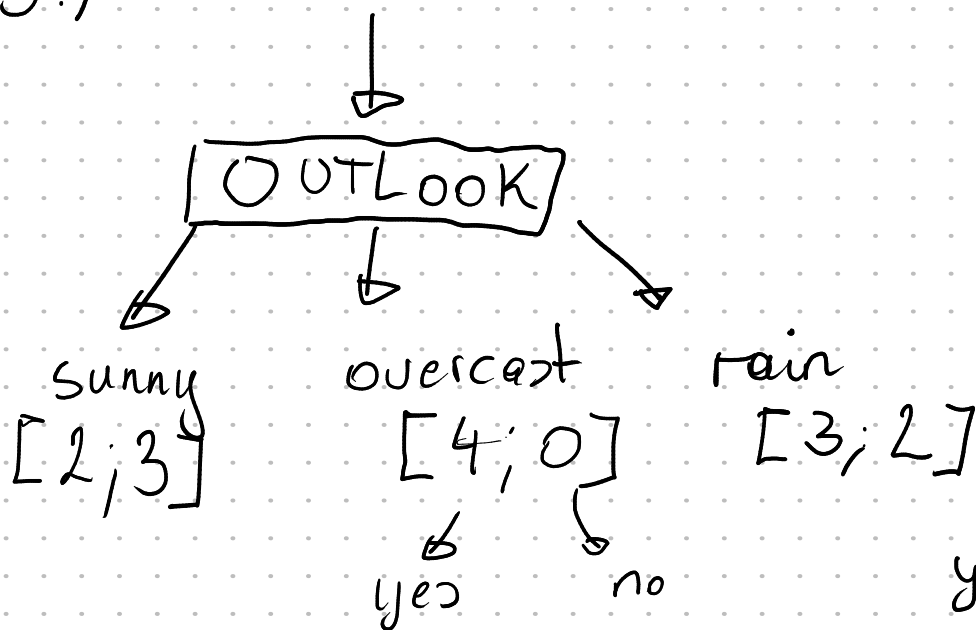
$$3.) |X^{(5)}| = 5$$

$$4.) H(X) = \sum_{v \in V_X} p_v \cdot -\log_2(p_v)$$

$$= -\frac{9}{14} \cdot \log_2\left(\frac{9}{14}\right) - \frac{5}{14} \cdot \log_2\left(\frac{5}{14}\right)$$

$$= \underline{0.94}$$

5.)



$$H(\text{"outlook"}, \text{"sunny"}) = -\frac{2}{5} \cdot \log_2\left(\frac{2}{5}\right) - \frac{3}{5} \cdot \log_2\left(\frac{3}{5}\right)$$

$$H(\text{"outlook"}, \text{"rain"}) = 0.97$$

$$H(\text{"outlook"}, \text{"overcast"}) = 0$$

$$\begin{aligned}
 \text{Gain}(X, \text{"outlook"}) &= H(X) - \sum_l p_l \cdot H(\text{"outlook"}, l) \\
 &= H(X) - \frac{5}{14} \cdot H(\text{"outlook"}, \text{"sunny"}) \\
 &\quad - \frac{4}{14} \cdot H(\text{"outlook"}, \text{"overcast"}) \\
 &\quad - \frac{5}{14} \cdot H(\text{"outlook"}, \text{"rain"}) \\
 &= \underline{\underline{0.246}}
 \end{aligned}$$

$$\text{Gain}(X, \text{"temp"}) = \underline{\underline{0.029}}$$

