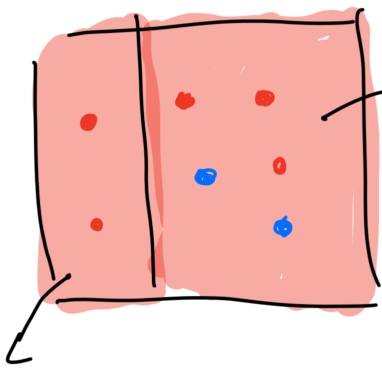
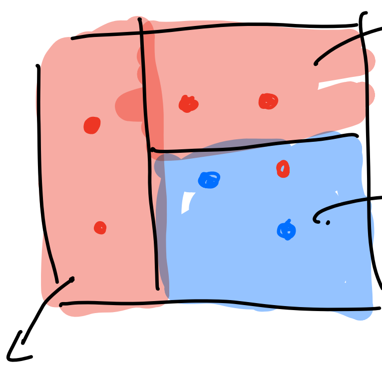


training error $= \frac{2}{5}$

$= 0.4$

training error = 0



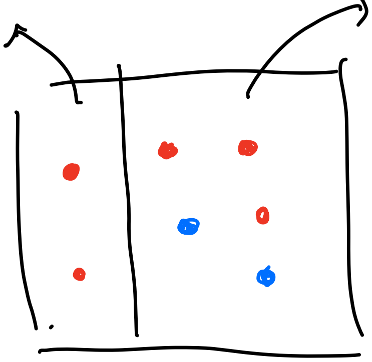
err = 0

err $= \frac{1}{3} = \frac{\text{1 orange}}{\text{2 lemons + 1 orange}}$

training error = 0

X = left

X = right



$Y = \{\text{orange}, \text{lemon}\}$

$$P(Y = \text{orange} \mid X = \text{right})$$

$$= \frac{P(Y = \text{orange}, X = \text{right})}{P(X = \text{right})}$$

$$= \frac{3}{5}$$

$$\mathbb{I}(A) = \begin{cases} 1 & \text{if } A \\ 0 & \text{o.w.} \end{cases}$$

$x \sim \text{unif}[0,1]$

$$t(x) = \begin{cases} 0 & \text{if } x < 0.5 \\ 1 & \text{if } x \geq 0.5 \end{cases}$$

$$p_{data}(x,t) = \begin{cases} 1 & \text{if } t = t(x) \text{ and } x \in [0,1] \\ 0 & \text{o.w.} \end{cases}$$

$$y(x) = \begin{cases} 0 & \text{if } x < 0.75 \\ 1 & \text{if } x \geq 0.75 \end{cases}$$

$$R[y] = \sum_{t \in \{0,1\}} \int_0^1 L_{0-1}(y(x), t)\, \mathbb{I}(t = t(x))\, dx$$

$$= \int_0^1 L_{0-1}(y(x), t(x))$$

$$= \int_0^1 \mathbb{I}(y(x) \neq t(x))$$

$$= \mathbb{E}_{p_{data}}[\mathbb{I}(y(x) \neq t)]$$

$$= \mathbb{P}(y(x) \neq t)$$

$$= P(0.5 \leq x \leq 0.75)$$

$$= \frac{1}{4}$$

$x < 0.5 \rightarrow y(x) = t$

$x > 0.75 \rightarrow y(x) = t$

$0.5 \leq x \leq 0.75 \rightarrow y(x) \neq t$

$$\mathbb{E}[\mathbb{I}(x \in B)] = \int p(x)\, \mathbb{I}(x \in B)\, dx$$

$$= \int_{x \in B} p(x)\, dx$$

$$= \mathbb{P}(x \in B)$$