

# Lecture 17 Assignment

John Hudson  
2/17/2019  
EEL4930

1.) U → Unfair coin  
F → Fair coin  
H → heads  
T → tails

$$P(U|H) = \frac{P(H|U) \cdot P(U)}{P(H)}$$
$$= \frac{1 \cdot \frac{1}{3}}{\frac{2}{3}}$$

2 fair coins, 1 unfair

$$P(H) = 1 \cdot \frac{1}{3} + \frac{1}{2} \cdot \frac{2}{3} = \frac{2}{3}$$
$$= \frac{1}{3} \cdot \frac{2}{2} = \left(\frac{1}{2}\right)$$

2.) U → unfair coin  
F → fair coin  
ZH → 2 heads  
2 fair coins, 1 unfair

$$P(U|ZH) = \frac{P(ZH|U) \cdot P(U)}{P(ZH)}$$
$$= \frac{1 \cdot \frac{1}{3}}{\frac{1}{2}}$$
$$= \frac{1}{3} \cdot \frac{2}{1} = \frac{2}{3}$$
$$P(ZH) = P(ZH|U) \cdot P(U) + P(ZH|F) \cdot P(F)$$
$$= 1 \cdot \frac{1}{3} + \frac{1}{4} \cdot \frac{2}{3} = \frac{1}{3} + \frac{1}{6} = \frac{1}{2}$$
$$P(ZH|U) = 1$$

$$P(ZH|F) = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$