

2. a:

$$\begin{aligned} H(\text{Penny}) &= H(4/6, 2/6) \\ &= -(4/6 * \log_2(4/6) + 2/6 * \log_2(2/6)) \\ &= 0.91829633 \end{aligned}$$

b.

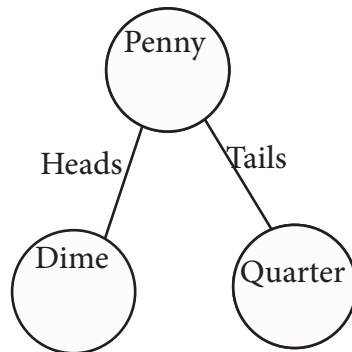
$$\begin{aligned} H(P | Q) &= -4/6 H(4/4, 0/4) + 2/6 H(1/2, 1/2) \\ &= 2/3(0) + 1/3(1) \\ &= 0.33333333 \end{aligned}$$

$$\begin{aligned} I(\text{Penny, Quarter}) &= H(\text{Penny}) - H(\text{Penny} | \text{Quarter}) \\ &= 0.91829633 - 0.33333333 \\ &= 0.5849629967 \end{aligned}$$

$$\begin{aligned} H(P | D) &= -4/6 H(0/4, 4/4) + 2/6 H(0/2, 2/2) \\ &= 2/3(0) + 1/3(0) \\ &= 0 \end{aligned}$$

$$\begin{aligned} I(\text{Penny, Dime}) &= H(\text{Penny}) - H(\text{Penny} | \text{Dime}) \\ &= 0.91829633 - 0 \\ &= 0.91829633 \end{aligned}$$

c.



d. = 0.75162966335