

Q3 for coin A $P(\text{head}) = \frac{22}{30}$

$$P(\text{tail}) = \frac{8}{30}$$

for coin B

$$P(\text{head}) = \frac{3}{10}$$

$$P(\text{tail}) = \frac{7}{10}$$

$$P(C_1 = \text{HHHTHTHHHT} \mid C_1 = A) \\ = \left(\frac{22}{30}\right)^7 \left(\frac{8}{30}\right)^3 \quad \text{--- (1)}$$

$$P(C_1 = \text{HHHTHTHHHT} \mid C_1 = B) \\ = \left(\frac{3}{10}\right)^7 \left(\frac{7}{10}\right)^3 \quad \text{--- (4)}$$

$$P(C_2 = \text{TTHHTHTTHT} \mid C_2 = A) \\ = \left(\frac{22}{30}\right)^3 \left(\frac{8}{30}\right)^7 \quad \text{--- (2)}$$

$$P(C_3 = \text{HHTHTHTTTT} \mid C_3 = A) \\ = \left(\frac{22}{30}\right)^4 \left(\frac{8}{30}\right)^6 \quad \text{--- (3)}$$

Applying bayes theorem on
eq (1) (2) & (3) & 4

$$P(C_1 = A | \text{HHHTHTH HHT})$$

$$= \frac{\left(\frac{22}{30}\right)^7 \left(\frac{8}{30}\right)^3}{\left(\frac{22}{30}\right)^7 \left(\frac{8}{30}\right)^3 + \left(\frac{3}{10}\right)^7 \left(\frac{7}{10}\right)^3}$$

$$P(C_2 = A | \text{TTTHTHTTTT})$$

$$= \frac{\left(\frac{22}{30}\right)^3 \left(\frac{8}{30}\right)^7}{\left(\frac{22}{30}\right)^3 \left(\frac{8}{30}\right)^7 + \left(\frac{3}{10}\right)^3 \left(\frac{7}{10}\right)^7}$$

$$P(C_3 = A | \text{HHTHTHTTTT})$$

$$= \frac{\left(\frac{22}{10}\right)^4 \left(\frac{8}{30}\right)^6}{\left(\frac{22}{30}\right)^4 \left(\frac{8}{30}\right)^6 + \left(\frac{3}{10}\right)^4 \left(\frac{7}{30}\right)^6}$$