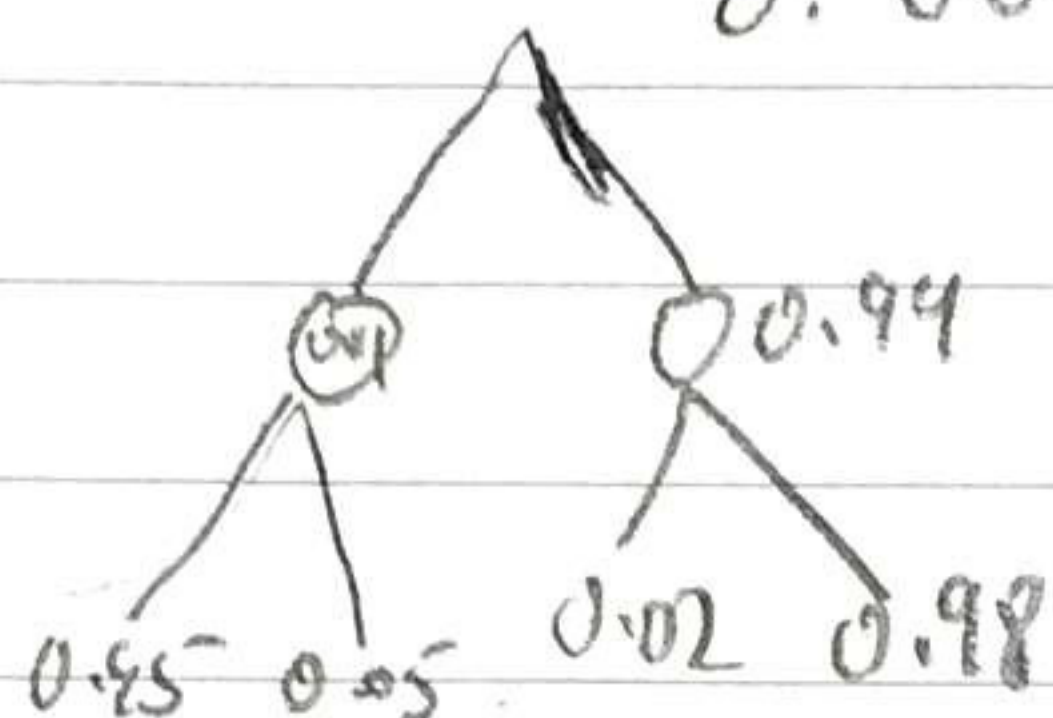


$$1) 0.5^n + \sum_{1 \leq m < n} 0.5^m \times (1-0.5)^{(n-m)} = (n+1)0.5^n$$

$$2) 0.01 \times 0.95 + 0.99 \times 0.02 = 0.0095 + 0.0198 = 0.0293$$

$$0.0095 / 0.0293 \approx 0.324 = 32.4\%$$



$$3a) 0.45 \times 0.7 \times 0.78 \times 0.5 \times 0.2 \times 0.5 \times 0.37 \approx 0.00463$$

$$b) P(D=T, A=\bar{F}, B=\bar{T}) = 0.15 \times 0.5 \times 0.2 = 0.015$$

$$c) P(C=T, D=T) = P(C=T, D=T, A=T, B=T) + P(C=T, D=T, A=\bar{F}, B=\bar{T}) + P(C=T, D=T, A=T, B=\bar{T}) + P(C=T, D=T, A=\bar{F}, B=T) = 0.5 \times 0.375 \times 0.5 \times 0.2 + 0.412 \times 0.277 \times 0.5 \times 0.8 + 0.412 \times 0.277 \times 0.5 \times 0.2 + 0.412 \times 0.9 \times 0.5 \times 0.8 + 0.15 \times 0.37 \times 0.5 \times 0.2 = 0.2184746$$

$$4a) \text{Yes } P(A) \cap P(B) = P(A) \times P(B) = P(AB) = 0.16$$

$$b) P(A \cup B) = P(A) + P(B) - P(AB) = 1 - 0.16 = 0.84$$

$$5. \frac{1}{10} \cdot \frac{5}{10} + \frac{1}{10} \cdot \frac{5}{10} + \frac{1}{10} \times \frac{6}{10} + \frac{1}{10} \times \frac{3}{10} + \frac{1}{10} \cdot \frac{2}{10} + \frac{1}{10} \cdot \frac{1}{10} \times 2 = \frac{21}{50}$$

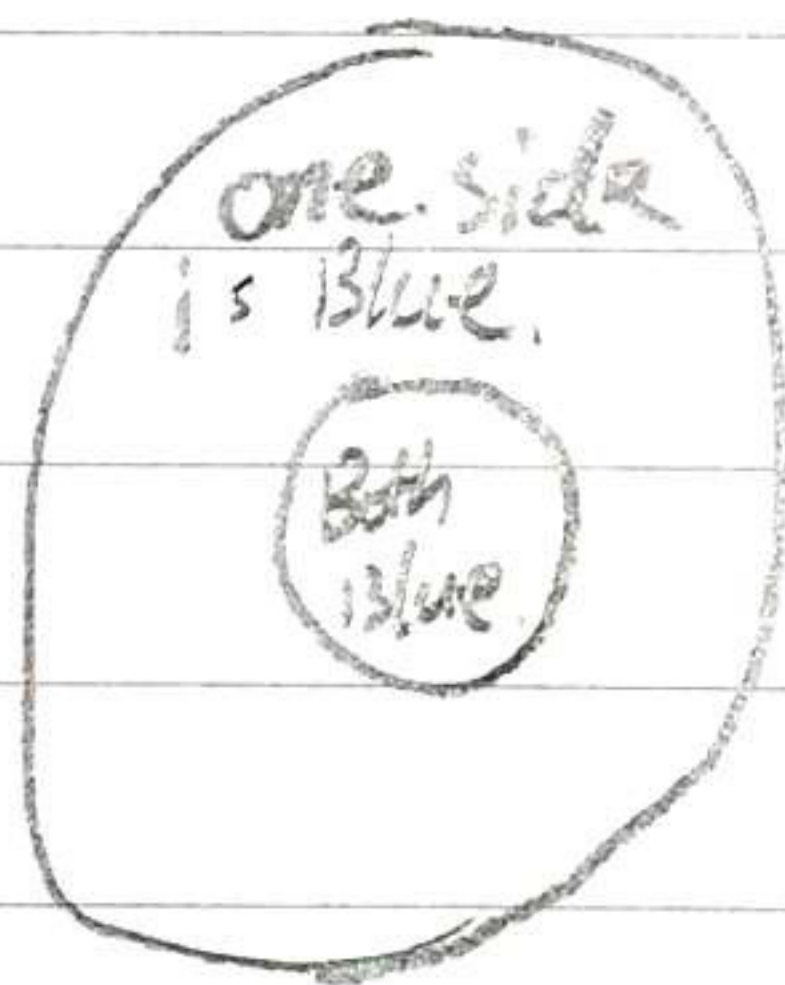
because 1: $\frac{1}{10}$ more than 5: $\frac{6}{10}$; 2: $\frac{1}{10}$ more than 6: $\frac{5}{10}$...

10: $\frac{1}{10}$ less than 6: $\frac{6}{10}$; 9: $\frac{1}{10}$ less than 5: $\frac{5}{10}$...

$$6 \frac{4C^1_5}{\binom{52}{5}} = 0.198\%$$

$$7 \text{ a) } \frac{4}{52} = \frac{1}{13} \quad \text{b) } \frac{4}{52} = \frac{1}{13}$$

$$8 \text{ } P(\text{other side is blue} \mid \text{one side is blue}) \sim P(B|A) \\ = \frac{P(B \cap A)}{P(A)} \quad \Downarrow$$



$$\Rightarrow P(B \cap A) = P(B)$$

$$= \frac{P(B)}{P(A)} = \frac{\frac{3}{10}}{\frac{6}{10}} = \frac{1}{2}$$