0'748

* Relacion EDIP - N° 41

① $P(A) = 0'6 \quad P(B) = 0'3 \quad P(C) = 0'1$

Probabilidad de que al menos 1 de en el blanco:

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap C) - P(A \cap B) - P(B \cap C) + P(A \cap B \cap C) = \cancel{0'6 + 0'3 + 0'1 - 0'3 \cdot 0'1 - 0'6 \cdot 0'3 - 0'3 \cdot 0'1 = 0'76 + 0'3 \cdot 0'6 \cdot 0'1 =}$$

$$0'6 + 0'3 + 0'1 - 0'6 \cdot 0'3 - 0'6 \cdot 0'1 - 0'3 \cdot 0'1 + 0'6 \cdot 0'3 \cdot 0'1 = 0'748$$

② Por el teorema de la probabilidad compuesta, sabemos que:

$$P\left[\bigcap_{i=1}^{5} A_i\right] = \prod_{i=1}^{5} \frac{1}{7-i} = \frac{1}{6} \cdot \frac{1}{5} \cdot \frac{1}{4} \cdot \frac{1}{3} \cdot \frac{1}{2} = \frac{1}{720}$$

③ 40% → Pelo rubio → $P(A) = 0'4$

25% → Ojos azules → $P(B) = 0'25$

5% → Pelo rubio y ojos azules. → $P(A \cap B) = 0'05$

a) $P(A/B) = \dfrac{P(A \cap B)}{P(B)} = \dfrac{0'05}{0'25} = 0'2$

b) $P(B/A) = \dfrac{P(A \cap B)}{P(A)} = \dfrac{0'05}{0'4} = 0'125$

c) $1 - P(A \cup B) = 1 - P(A) \cancel{+} P(B) + P(A \cap B) = 0'4$

d) $\cancel{(P(A - P(B)) \cup (P(B - P(\bar{A})) \neq}$

$\cancel{P(B/\bar{A}) \cup P(A/\bar{B}) \neq \frac{P(\bar{A} \cap B)}{P(\bar{A})} + \frac{P(A \cap \bar{B})}{P(\bar{B})}}$

Prob. de al menos uno $= P(A \cup B) - P(A \cap B) =$

$= P(A) + P(B) - P(A \cap B) - P(A \cap B) = 0'4 + 0'25 - 2 \cdot 0'05 =$

$= \underline{0'55}$

4

25% → Mutación ojos → $P(A) = 0'25$

50% → Mutación alas → $P(B) = 0'5$

40% de mutación ojos → mutación alas.

a) P(Al menos una).

$P(A \cap B) = 40\%$ de $25\% = 0'25 \cdot 0'4 = 0'1$

$P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0'25 + 0'5 - 0'1 = 0'65$

b) Mutación ojos pero no alas:

$P(\text{ojos} \cap \overline{\text{Alas}}) = P(\text{ojos}) - P(\text{ojos} \cap \text{Alas}) = 0'25 - 0'1 = 0'15$

5) $P(\text{usar } A) = 0{,}2$

$P(\text{usar } B) = P(\text{no usar } A) = 1 - 0{,}2 = 0{,}8$

$P(\text{comprar} \mid A) = \frac{2}{3} \Longrightarrow P(\text{comprar} \mid A) = \frac{P(\text{comprar} \cap A)}{P(A)} \Longrightarrow P(\text{comprar} \cap A) = \frac{2}{15}$

$P(\text{comprar} \mid B) = \frac{2}{5} \Longrightarrow P(\text{comprar} \mid B) = \frac{P(\text{comprar} \cap B)}{P(B)} \Longrightarrow P(\text{comprar} \cap B) = \frac{8}{25}$

$P(\text{vender}) = \frac{2}{15} + \frac{8}{25} = \frac{10}{75} + \frac{24}{75} = \frac{34}{75} = 0{,}45\widehat{33}$

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6) $1 \to 18B$ y $2N$

$2 \to 9B$ y $1N$

Se extrae una de la segunda y se deposita en la primera

$P(\text{sea blanca} \mid \text{sacar de la urna}) = \frac{9}{10} \cdot \frac{19}{21} + \frac{1}{10} \cdot \frac{18}{21} =$

$= \frac{9 \cdot 19 + 18}{210} = 0{,}9$

7) $U_1: 5B$ y $5N$ $\quad U_2: 6B$ y $4N$ $\quad U_3: 7B$ y $3N$.

a)

$P(\text{cuatro blancas}) = \cancel{1 - P(\text{ninguna } \text{blanca})}$ negra

$\cancel{= 1 - \frac{1}{4} \left(\frac{5}{10} \cdot \frac{4}{9} \right.}$

$= \frac{1}{3} \cdot \left(\frac{5}{10} \cdot \frac{4}{9} \cdot \frac{3}{8} \cdot \frac{2}{7} \right) + \frac{1}{3} \cdot \left(\frac{6}{10} \cdot \frac{5}{9} \cdot \frac{4}{8} \cdot \frac{3}{7} \right) +$

$+ \frac{1}{3} \cdot \left(\frac{7}{10} \cdot \frac{6}{9} \cdot \frac{5}{8} \cdot \frac{4}{7} \right) = \cancel{0{,}0655}\ 0{,}0873$

b)

$P(\text{sólo } U_2 \mid \text{sólo una negra}) = \frac{P(\text{sólo una negra} \cap U_2)}{P(\text{sólo una negra})} =$

$$= \frac{\frac{1}{3}\left(\frac{4}{10} \cdot \frac{6}{9} \cdot \frac{5}{8} \cdot \frac{4}{7} + \frac{6}{10} \cdot \frac{4}{9} \cdot \frac{5}{8} \cdot \frac{4}{7} + \frac{6}{10} \cdot \frac{5}{9} \cdot \frac{4}{8} \cdot \frac{4}{7} + \frac{6}{10} \cdot \frac{5}{9} \cdot \frac{4}{8} \cdot \frac{4}{7} \right)}{\frac{1}{3}\left(4 \cdot \left(\frac{5}{10} \cdot \frac{5}{9} \cdot \frac{4}{8} \cdot \frac{3}{7} \right)\right) + \frac{1}{3}\left(4 \cdot \left(\frac{4}{10} \cdot \frac{6}{9} \cdot \frac{5}{8} \cdot \frac{4}{7} \right)\right) + \frac{1}{3}\left(4 \cdot \left(\frac{3}{10} \cdot \frac{7}{9} \cdot \frac{6}{8} \cdot \frac{5}{7} \right)\right)} =$$

$$= \frac{\frac{1}{3} \cdot \left(\frac{1920}{5040} \right)}{\frac{4}{3} \cdot \left(\frac{1410}{5040} \right)} = 0{,}3404$$

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8)

$P(\overline{\text{inyectar}}) = \frac{2}{3} \Longrightarrow P(\text{inyectar}) = \frac{1}{3}$

$P(\text{mejorar} \mid \text{inyecta}) = P(\overline{\text{mejorar}} \mid \text{inyecta}) = 0{,}5$

$P(\text{mejorar} \mid \overline{\text{inyecta}}) = 0{,}25$

$$P(\overline{\text{inyectar}} \mid \text{empeorado}) = \frac{P(\overline{\text{inyectar}} \cap \text{empeorado})}{P(\text{empeorado})} =$$

$$= \frac{P(\overline{\text{inyectar}} \cap \text{empeorado})}{P(\text{inyectar} \cap \text{empeorado}) + P(\overline{\text{inyectar}} \cap \text{empeorado})} = \frac{3}{4}$$

$\frac{1}{4} \cdot (P(\overline{\text{inyectar}})) = P(\text{mejorar} \cap \overline{\text{inyectada}}) = \frac{1}{4} \cdot \frac{2}{3} = \frac{2}{12} = \frac{1}{6}$

$\frac{1}{2} \cdot \frac{1}{3} = P(\text{mejorar} \cap \text{inyectar}) = \frac{1}{6} = P(\overline{\text{mejorar}} \cap \text{inyectar})$

$P(\overline{\text{inyectar}}) - P(\text{mejorar} \cap \overline{\text{inyectar}}) = P(\text{empeorar} \cap \overline{\text{inyectar}}) =$

$= \frac{2}{3} - \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$

$$\frac{\frac{1}{2}}{\frac{1}{6} + \frac{1}{2}} = \frac{\frac{1}{2}}{\frac{4}{6}} = \frac{6}{8} = \frac{3}{4}$$

9. Urna 1 4 bolas blancas
6 bolas negras

Urna 2 5 bolas blancas
5 bolas negras

U_1 - elegir urnas tipo 1

U_2 - elegir ~~una~~ urna tipo 2

N - Sacar dos bolas negras sin reemplazamieto

$P(U_1) = \frac{N}{N+1}$ $P(U_2) = \frac{1}{N+1}$ $N = ?$ $P(U_2 | N) = 1/7$

$$P(U_1 \cap N) = \frac{N}{N+1} \cdot \frac{6}{10} \cdot \frac{5}{9} = \frac{30}{90} \cdot \frac{N}{N+1} = \frac{N}{3(N+1)}$$

$$P(U_2 \cap N) = \frac{1}{N+1} \cdot \frac{5}{10} \cdot \frac{4}{9} = \frac{20}{90} \cdot \frac{1}{N+1} = \frac{2}{9(N+1)}$$

$$P(N) = P(U_1 \cap N) + P(U_2 \cap N) = \frac{N}{3(N+1)} + \frac{2}{9(N+1)} = \frac{3N+2}{9(N+1)}$$

$$P(U_2 | N) = \frac{P(U_2 \cap N)}{P(N)} = \frac{2/9(N+1)}{\frac{3N+2}{9(N+1)}} = \frac{2}{3N+2} = \frac{1}{7} \iff 14 = 3N+2 \iff \boxed{N = 4}$$

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10) 1 Cajas $\longrightarrow$ 8B 4D

2 Cajas $\longrightarrow$ 6B 6D

3 Cajas $\longrightarrow$ 4B 8D.

$$P(6B6D \mid 2B\ 1D) = \frac{P(6B6D \cap 2B\ 1D)}{P(2B\ 1D)} =$$

$$= \frac{\frac{2}{6}\cdot\left(\frac{6^3}{12^3}\right)}{\frac{1}{6}\cdot\left(\frac{8}{12}\cdot\frac{8}{12}\cdot\frac{4}{12}\right)+\frac{2}{6}\cdot\left(\frac{6}{12}\cdot\frac{6}{12}\cdot\frac{6}{12}\right)+\frac{3}{6}\left(\frac{4}{12}\cdot\frac{4}{12}\cdot\frac{8}{12}\right)} = \frac{\frac{432}{\cancel{10368}}}{\cancel{\frac{1}{6}\cdot\left(\frac{1072}{1728}\right)}} = 0{,}40299$$

11:

$2\ 1\ 1 \quad 1\ 2\ 1$

$2\ 1\ 1$

~~[illegible]~~ A_i: lanzar dados B: sacar suma de 4

$P(A_1) = \frac{1}{2}$ $P(A_2) = \frac{1}{4}$ $P(A_3) = \frac{1}{8}$ $P(A_4) = \frac{1}{16}$

$$P(A_1 \cap B) = \frac{1}{2} \cdot \frac{1}{6} = \frac{1}{12}$$

$$P(A_2 \cap B) = \frac{1}{4}\left(\frac{1}{6} \cdot \frac{1}{6} + \frac{1}{6} \cdot \frac{1}{6} + \frac{1}{6} \cdot \frac{1}{6}\right) = \frac{1}{4} \cdot \frac{3}{36} = \frac{1}{48}$$

$$P(A_3 \cap B) = \frac{1}{8}\left(\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} + \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} + \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6}\right) = \frac{1}{8} \cdot \frac{3}{216} = \frac{1}{576}$$

$$P(A_4 \cap B) = \frac{1}{16}\left(\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6}\right) = \frac{1}{20736}$$

$$P(A_4 | B) = \frac{1/20736}{1/12 + 1/48 + 1/576 + 1/20736} = \frac{1/20736}{2197/20736} = \frac{1}{2197}$$

12)

1° Moneda:

C $\rightarrow$ k blancas

X $\rightarrow$ 2k blancas

2° Moneda:

C $\rightarrow$ h ~~blancas~~ negras

X $\rightarrow$ 2h ~~blancas~~ negras

$$P(\text{negra}) = \frac{1}{4}\cdot\left(\frac{h}{k+h}\right) + \frac{1}{4}\cdot\left(\frac{h}{2k+h}\right) + \frac{1}{4}\cdot\left(\frac{2h}{k+2h}\right) + \frac{1}{4}\cdot\left(\frac{2h}{2k+2h}\right)$$