

Pralolemen 7

	Kategori	Planta	Dept	Tamany	Pimama
1	Profesor/a	4a	CC	Mitja	Si
2	Becani/a	4a	ELC	Gran	Si
3	PAS	5a	CC	Mitja	No
4	Becani/a	3a	ELC	Petit	Si
5	PAS	4a	CC	Mitja	No

a) $X = \langle \text{Becani}, 4a, \text{CC}, \text{petit} \rangle$ Pimama?

$$P(\text{Kategori} = \text{Prof} | \text{Si}) = 1/3$$

$$P(\text{Kategori} = \text{Prof} | \text{No}) = 0$$

$$P(\text{Cat} = \text{Becani} | \text{Si}) = 2/3$$

$$P(\text{Cat} = \text{Becani} | \text{No}) = 0$$

$$P(\text{Cat} = \text{PAS} | \text{Si}) = 0$$

$$P(\text{Cat} = \text{PAS} | \text{No}) = 1$$

$$P(\text{Planta} = 4 | \text{Si}) = 2/3$$

$$P(\text{Planta} = 4 | \text{No}) = 1/2$$

$$P(\text{Planta} = 5 | \text{Si}) = 0$$

$$P(\text{Planta} = 5 | \text{No}) = 1/2$$

$$P(\text{Planta} = 3 | \text{Si}) = 1/3$$

$$P(\text{Planta} = 3 | \text{No}) = 0$$

$$P(\text{Dept} = \text{CC} | \text{Si}) = 1/3$$

$$P(\text{Dept} = \text{CC} | \text{No}) = 1$$

$$P(\text{Dept} = \text{ELC} | \text{Si}) = 2/3$$

$$P(\text{Dept} = \text{ELC} | \text{No}) = 0$$

$$P(\text{Tam} = \text{Gran} | \text{Si}) = 1/3$$

$$P(\text{Tam} = \text{Gran} | \text{No}) = 0$$

$$P(\text{Tam} = \text{Mitja} | \text{Si}) = 1/3$$

$$P(\text{Tam} = \text{Mitja} | \text{No}) = 1$$

$$P(\text{Tam} = \text{Petit} | \text{Si}) = 1/3$$

$$P(\text{Tam} = \text{Petit} | \text{No}) = 0$$

$$P(\text{Pimama} = \text{Si}) = 3/5$$

$$P(\text{Pimama} = \text{No}) = 2/5$$

$$P(X | \text{Pimama} = \text{NO}) \rightarrow P(\text{Cat} = \text{Becani} | \text{Pimama} = \text{NO}) \cdot P(\text{Planta} = 4a | \text{Pimama} = \text{NO}) \cdot P(\text{Dept} = \text{CC} | \text{Pim} = \text{NO}) \cdot P(\text{Tamany} = \text{Petit} | \text{Pim} = \text{NO}) = 0 \cdot 0.5 \cdot 1 \cdot 0 = 0$$

$$P(X | \text{Pimama} = \text{SI}) \rightarrow P(\text{Cat} = \text{Becani} | \text{Pimama} = \text{SI}) \cdot P(\text{Planta} = 4a | \text{Pimama} = \text{SI}) \cdot P(\text{Dept} = \text{CC} | \text{Pim} = \text{SI}) \cdot P(\text{Tamany} = \text{Petit} | \text{Pim} = \text{SI}) = 2/3 \cdot 2/3 \cdot 1/3 \cdot 1/3 = 0.049$$

$$P(X | \text{NO}) < P(X | \text{SI}) \rightarrow \text{Pimama} = \text{SI}$$

$$P(\text{SI} | X) = 1$$

b) $X = \langle \text{Becari}, \text{Sa}, \text{CC}, \text{mitja} \rangle$ Pimama?

$$P(X | \text{Pimama} = \text{No}) \rightarrow P(\text{Becari} | \text{No}) \cdot P(\text{Sa} | \text{No}) \cdot P(\text{CC} | \text{No}) \cdot P(\text{mitja} | \text{No}) = 0 \cdot 1 \cdot 1 \cdot 1 = 0$$

$$P(X | \text{Pimama} = \text{Si}) \rightarrow P(\text{Becari} | \text{Si}) \cdot P(\text{Sa} | \text{Si}) \cdot P(\text{CC} | \text{Si}) \cdot P(\text{mitja} | \text{Si}) = 2/3 \cdot 0 \cdot 1/3 \cdot 1/3 = 0$$

Com que la probabilitat del 2 és 0, aplicarem Laplace per introduir una probabilitat imaginària

$$P(X | \text{Pimama} = \text{No}) \rightarrow P(\text{Becari} | \text{No}) \cdot P(\text{Sa} | \text{No}) \cdot P(\text{CC} | \text{No}) \cdot P(\text{mitja} | \text{No}) = \frac{1}{5} \cdot \frac{2}{5} \cdot \frac{3}{4} \cdot \frac{3}{5} = 0'036$$

$$P(X | \text{Pimama} = \text{Si}) \rightarrow P(\text{Becari} | \text{Si}) \cdot P(\text{Sa} | \text{Si}) \cdot P(\text{CC} | \text{Si}) \cdot P(\text{mitja} | \text{Si}) = \frac{3}{6} \cdot \frac{1}{6} \cdot \frac{2}{5} \cdot \frac{2}{6} = 0'01$$

$$P(X | \text{No}) > P(X | \text{Si}) \rightarrow \text{Pimama} = \text{No}$$

$$P(\text{No} | X) = \frac{P(X | \text{No})}{P(X | \text{No}) + P(X | \text{Si})} = \frac{0'036}{0'036 + 0'01} = 0'78$$