

Termin

" $A_m$ " : m biți, cel puțin o secvență 1111

$$\begin{aligned} P(A_m) &= P(A_m \cap \text{end}=1) + P(A_m \cap \text{end}=0) \\ &= P(A_m | \text{end}=1) \cdot \underbrace{P(\text{end}=1)}_{\frac{1}{2}} + P(A_m | \text{end}=0) \cdot \underbrace{P(\text{end}=0)}_{\frac{1}{2}} \end{aligned}$$

$$= \frac{1}{2} P(A_m | \text{end}=1) + \frac{1}{2} \cdot \underbrace{P(A_m | \text{end}=0)}_{P(A_{m-1})}$$

$$= \frac{1}{2} \cdot P(A_m | \text{end}=1) + \frac{1}{2} \cdot P(A_{m-1})$$

$$P(A_m | \text{end}=1) = P(A_m \cap \text{end}=01) + P(A_m \cap \text{end}=11)$$

$$P(A_m | \text{end}=1) = P(A_m \cap \text{end}=01 | \text{end}=1) + P(A_m \cap \text{end}=11 | \text{end}=1) + P(A_m \cap \text{end}=00 | \text{end}=1) + P(A_m \cap \text{end}=10 | \text{end}=1)$$

$$= \frac{P(A_m | \text{end}=01 \cap \text{end}=1)}{P(\text{end}=1)} \cdot P(\text{end}=01 \cap \text{end}=1) +$$

$$+ \frac{P(A_m | \text{end}=11 \cap \text{end}=1)}{P(\text{end}=1)} \cdot P(\text{end}=11 \cap \text{end}=1)$$

$$= \frac{P(A_m | \text{end}=01)}{\frac{1}{2}} \cdot P(\text{end}=01) + \frac{P(A_m | \text{end}=11)}{\frac{1}{2}} \cdot P$$

$$P(\text{end}=11) = 2 \cdot P(A_m | \text{end}=01) \cdot \frac{1}{4} + 2 \cdot P(A_m | \text{end}=11) \cdot \frac{1}{4}$$

$$= \frac{1}{2} P(A_m | \text{end}=01) + \frac{1}{2} P(A_m | \text{end}=11)$$

$$= \frac{1}{2} \cdot P(A_{m-2}) + \frac{1}{2} P(A_m | \text{end}=11)$$

$$P(A_m | \text{end}=11) = P(A_m \cap \text{end}=011 | \text{end}=11) + P(A_m \cap \text{end}=111 | \text{end}=11) \quad (\text{celelalte 2 dau 0})$$

$$= \frac{P(A_m | \text{end}=011 \cap \text{end}=11)}{P(\text{end}=11)} \cdot P(\text{end}=011 \cap \text{end}=11) +$$

$$\frac{P(A_m | \text{end}=111 \cap \text{end}=11)}{P(\text{end}=11)} \cdot P(\text{end}=111 \cap \text{end}=11)$$

$$= 2 \cdot P(A_m | \text{end}=011) \cdot \frac{1}{8} + 2 \cdot P(A_m | \text{end}=111) \cdot \frac{1}{8}$$

$$= \frac{1}{2} P(A_m | \text{end}=011) + \frac{1}{2} P(A_m | \text{end}=111)$$

$$\text{Analog } P(A_m | \text{end}=111) = \frac{1}{2} P(A_m | \text{end}=0111) +$$

$$\frac{1}{2} P(A_m | \text{end}=1111) = \frac{1}{2} \cdot P(A_{m-4}) + \frac{1}{2} \cdot 1$$

$$P(A_m) = \frac{1}{2} P(A_m | \text{end}=1) + \frac{1}{2} P(A_{m-1})$$

$$= \frac{1}{2} \left( \frac{1}{2} P(A_m | \text{end}=01) + \frac{1}{2} P \right)$$

$$P(A_m) = \frac{1}{2} P(A_{m-1}) + \frac{1}{2} P(A_m | \text{end}=1)$$

$$= \frac{1}{2} P(A_{m-1}) + \frac{1}{2} \left[ \frac{1}{2} P(A_{m-2}) + \frac{1}{2} P(A_m | \text{end}=11) \right]$$

$$= \frac{1}{2} P(A_{m-1}) + \frac{1}{4} P(A_{m-2}) + \frac{1}{4} P(A_m | \text{end}=11)$$

$$= \frac{1}{2} P(A_{m-1}) + \frac{1}{4} P(A_{m-2}) + \frac{1}{4} \left[ \frac{1}{2} P(A_{m-3}) + \frac{1}{2} P(A_m | \text{end}=111) \right]$$



$$+ \frac{1}{2} IP(A_n | \text{end} = 1111)]$$

$$= \frac{1}{2} IP(A_{n-1}) + \frac{1}{4} IP(A_{n-2}) + \frac{1}{8} IP(A_{n-3}) + \frac{1}{8} IP(A_n | \text{end} = 1111)$$

$$= \frac{1}{2} IP(A_{n-1}) + \frac{1}{4} IP(A_{n-2}) + \frac{1}{8} IP(A_{n-3}) + \frac{1}{8} \left[ \frac{1}{2} IP(A_{n-4}) + \frac{1}{2} \right]$$

$$= \frac{1}{2} IP(A_{n-1}) + \frac{1}{4} IP(A_{n-2}) + \frac{1}{8} IP(A_{n-3}) + \frac{1}{16} IP(A_{n-4}) + \frac{1}{16}$$

$$IP(A_0) = IP(A_1) = IP(A_2) = IP(A_3) = 0$$

$$IP(A_4) = \frac{1}{2} \cdot 0 + \frac{1}{4} \cdot 0 + \frac{1}{8} \cdot 0 + \frac{1}{16} \cdot 0 + \frac{1}{16} = \frac{1}{16} = 0,0625$$

$$IP(A_5) = \frac{1}{2} \cdot \frac{1}{16} + \frac{1}{4} \cdot 0 + \frac{1}{8} \cdot 0 + \frac{1}{16} \cdot 0 + \frac{1}{16} = \frac{3}{32} = 0,09375$$

$$IP(A_6) = \frac{1}{2} \cdot \frac{3}{32} + \frac{1}{4} \cdot \frac{1}{16} + \frac{1}{8} \cdot 0 + \frac{1}{16} \cdot 0 + \frac{1}{16} = \frac{3}{64} + \frac{1}{64} + \frac{4}{64} = \frac{8}{64} = \frac{1}{8} = 0,125$$

$$IP(A_7) = \frac{1}{2} \cdot \frac{1}{8} + \frac{1}{4} \cdot \frac{3}{32} + \frac{1}{8} \cdot \frac{1}{16} + \frac{1}{16} \cdot 0 + \frac{1}{16}$$

$$= \frac{8}{128} + \frac{3}{128} + \frac{1}{128} + \frac{8}{128} = \frac{20}{128} = 0,15625$$

$$IP(A_8) = \frac{1}{2} \cdot \frac{20}{128} + \frac{1}{4} \cdot \frac{1}{8} + \frac{1}{8} \cdot \frac{3}{32} + \frac{1}{16} \cdot \frac{1}{16} + \frac{1}{16}$$

$$= \frac{20}{256} + \frac{8}{256} + \frac{3}{256} + \frac{1}{256} + \frac{16}{256}$$

$$= \frac{20}{256} + \frac{8}{256} + \frac{3}{256} + \frac{1}{256} + \frac{16}{256} = \frac{48}{256} = 0,1875$$

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D:\Programming\Python\School\P&S\Teme>252_Neculae_Andrei-Fabian.py
n = 4
Metoda teoretica -> Probabilitatea este de 0.0625
Metoda practica -> Probabilitatea este de 0.0643

D:\Programming\Python\School\P&S\Teme>252_Neculae_Andrei-Fabian.py
n = 5
Metoda teoretica -> Probabilitatea este de 0.09375
Metoda practica -> Probabilitatea este de 0.093

D:\Programming\Python\School\P&S\Teme>252_Neculae_Andrei-Fabian.py
n = 6
Metoda teoretica -> Probabilitatea este de 0.125
Metoda practica -> Probabilitatea este de 0.1245

D:\Programming\Python\School\P&S\Teme>252_Neculae_Andrei-Fabian.py
n = 7
Metoda teoretica -> Probabilitatea este de 0.15625
Metoda practica -> Probabilitatea este de 0.1585

D:\Programming\Python\School\P&S\Teme>252_Neculae_Andrei-Fabian.py
n = 8
Metoda teoretica -> Probabilitatea este de 0.1875
Metoda practica -> Probabilitatea este de 0.1879

D:\Programming\Python\School\P&S\Teme>
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