CK0031/CK0248: AP-02 (30 de novembro de 2018)

You are given four random variables A, B, C and D with $\text{dom}(A) = \{a_1, a_2\}$, $\text{dom}(B) = \{b_1, b_2\}$, $\text{dom}(C) = \{c_1, c_2\}$ and $\text{dom}(D) = \{d_1, d_2\}$. Moreover, you are given a belief network respecting their joint probability distribution and a set of conditional probability distributions

$P(A)$	a_1	a_2		$P(B\|A)$	a_1	a_2		$P(C\|B)$	b_1	b_2		$P(D\|C)$	c_1	c_2	
	1	0	;	b_1	1/2	1/2	;	c_1	1/3	2/3	;	d_1	1/4	3/4	.
				b_2	1/2	1/2		c_2	2/3	1/3		d_2	3/4	1/4	

Questão 01. (40%)

- 20%) Write the probability distribution $p(A, B, C, D)$;
- 10%) Compute $P(A = a_1, B = b_1, C = c_1, D = d_1)$;
- 10%) Compute $P(A = a_1, B = b_2, C = c_1, D = d_2)$.

Questão 02. (60%)

- 30%) Write the probability distribution $P(B, C|A, D)$ and its tables when $(A = a_1, D = d_1)$.
- 30%) Write the probability distribution $P(D|A)$ and its tables when $A = a_0$ and $A = a_1$;