B7

$$\begin{tikzcd} B \arrow[dr] & & A \arrow[dl] \\ & R & \end{tikzcd}$$

$$P(R|B) = \alpha \sum_a P(RBa)$$

$$= \alpha\, P(B) \times .75 \times .1$$

$$P(\bar{R}|B) = \alpha \sum_a P(\bar{R}Ba)$$

$$= \alpha P(B) \left[1 \times .9 + .25 \times .1 \right]$$

$$\alpha = \frac{1}{P(B)}$$

$$P(R|B) = \underline{0.075}$$

A11

$$U_0 = \phi + \gamma \max \left\{ \tfrac{1}{2}U_0 + \tfrac{1}{2}U_1 ,\ U_1,\ 0.8U_0 + 0.2U_2 \right\}$$

$$U_1 = +1$$

$$U_2 = +100$$

$$U_0 = \phi + \gamma \max \left\{ \tfrac{1}{2}U_0 + \tfrac{1}{2},\ 1,\ 0.8U_0 + 20 \right\}$$

$U_0 \gtrsim -19$ vellett

$$U_0 = 0.9\,(0.8U_0 + 20)$$

ok.

$$U_0 = \frac{0.9 \times 20}{0.28} \simeq \underline{64.3}$$

(B2)

$TB = M \wedge \overline{K}$ kérdések $TB \overset{?}{\models} (M \to \overline{K})$

$(\overline{K} \to \overline{M})$

$(M \to K)$

M	K	TB	$M \to \overline{K}$	$\overline{K} \to \overline{M}$	$M \to K$
0	0	0	1	1	1
0	1	0	1	1	1
1	0	$\boxed{1}$	1	0	0
1	1	0	0	1	1
			IGEN	NEM	NEM

$M(TB) \subset M(M \to \overline{K})$

többi nem!

(B5)

$U(L_1) = 80 - 30 = 50$

$U(L_2) = -60 + 175 = 115$

$U(L_3) = 0.6\,(75 - 70) - 100 = -97$

$U(L_4) = \frac{1}{2}(70 - \underset{45}{\cancel{85}}) + \frac{1}{2}(60 - 35) = 25$

$U(L_2) > U(L_1) > U(L_4) > U(L_3)$

A12

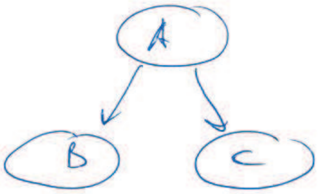
$Olvas \Leftarrow ((Hozna = R) \wedge (Téma = Új)) \vee$
$((Hozna = R) \wedge (Téma = Fogl) \wedge (Szoni = Ismert))$

X1. Helyes Pozitív

X2. Hamis Pozitív

X3. Hamis Negatív

A10



$P(C)\big|_{Döntés} = \sum_{a} P(C\,a\,B) = \sum_{a} P(B|a)P(C|a)P(a)$

adott Döntés mellett

D = 0: $P(C) = .9 \times .1 \times .3 + .1 \times .1 \times .7 = 0{,}034$

D = 1: $P(C) = .9 \times .4 \times .3 + .1 \times .3 \times .7 = 0{,}129$

U, D=0: $3.4 + 0 = 3.4$

U, D=1: $12.9 + 50 = \underline{62.9}$

(B9)

$$P(B|L) = \alpha \sum_t P(B\,L\,t)$$

$$= \alpha \sum_t P(L|t)\,P(t|B)\,P(B)$$

$$= \alpha \left[\tfrac{1}{2}\tfrac{1}{2}\tfrac{1}{2} + \tfrac{1}{10}\tfrac{1}{2}\tfrac{1}{2} \right]$$

$$B(\bar{B}|L) = \alpha \left[\tfrac{1}{2}\tfrac{1}{10}\;\tfrac{1}{2} + \tfrac{1}{10}\tfrac{9}{10}\tfrac{1}{2} \right]$$

$$B(B|L) = \frac{1/2\;1/2\;1/2 + 1/2\;\tfrac{1}{2}\tfrac{1}{10}}{\tfrac{1}{2}\tfrac{1}{2}\tfrac{1}{2} + \tfrac{1}{2}\tfrac{1}{2}\tfrac{1}{10} + \tfrac{1}{2}\tfrac{1}{2}\tfrac{1}{10} + \tfrac{1}{10}\tfrac{9}{10}\tfrac{1}{2}} = \frac{30}{44}$$

$$\frac{.15}{\begin{array}{r} .15 \\ +.07 \\ \hline .22 \end{array}} \qquad \frac{15}{22} \quad \frac{75}{11}$$

(B12)

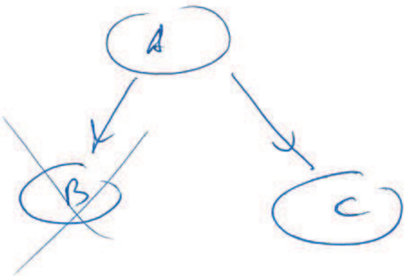
Török $\Leftarrow$ ((Hova = H)) $\lor$
((Hova = R) $\land$ (Téma = Tagt) $\land$ (Szerző = 1>ezetten))

X1. Helyes Negatív

X2. Hamis Negatív

X3. Hamis Pozitív

B10



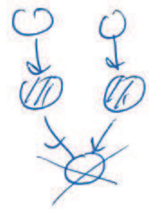
$P(C)\big|_{\text{Doubles}} = P(C|A)P(A) + P(C|\bar{A})P(\bar{A})$

$P(C)$: $D=N$: $.2 \times .3 + .1 \times .7 = .13$; $D=I$: $.4 \times .3 + .3 \cdot .7 = .33$

U: $D=N$: $100 \times .13 + \phi = 13$; $D=I$: $100 \times .33 + 50 = \underline{83}$

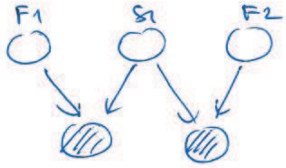
A7

A)



$P(M_1|M_2) = P(M_2)$

B)

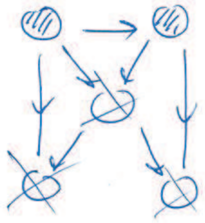


$$P(M_1|M_2) = \alpha \sum_{f_1 f_2 s_1} P(M_1 M_2 f_1 f_2 s_1)$$

$$= \alpha \sum_{f_1 f_2 s_1} P(M_1|f_1, s_1) P(M_2|f_2, s_1) P(f_1) P(f_2) P(s_1)$$

s16.

c)



$P(M_1|M_2) = \alpha P(M_2|M_1) P(M_1)$

$P(\bar{M_1}|M_2) = \alpha P(M_2|\bar{M_1}) P(\bar{M_1})$

$\alpha = \dots$, 16.

A5

$U(L_1) = 70 - 50 = 20$

$U(L_2) = 75 - 140 = -65$

$U(L_3) = 0{,}6\,(40 + 120) - 80 = 96 - 80 = 16$

$U(L_4) = 0{,}5\,(40 + 60) + 0{,}5\,(40 - 90) = 50 - 25 = 25$

$U(L_4) > U(L_1) > U(L_3) > U(L_2)$

A8

$\overline{N_y}(x_1) \vee \overline{G_y}(x_1) \vee M_y(x_1) \xrightarrow{x_1/\xi} \overline{G_y}(\xi)\ M_y(\xi)$

$N_y(\xi)$

$G_y(\xi)$ (Stufen) $\longrightarrow M_y(\xi)$

$\overline{M_y}(x_2) \xrightarrow{x_2/\xi} \emptyset$

(A9)

$$P(S) = P(S|G)P(G) + P(S|\bar{G})P(\bar{G}) = x \cdot z$$

$$\left.\begin{aligned} P(C|S) &= \alpha \sum_g P(C|g)P(S|g)P(g) = \alpha \cdot y x z \\ P(\bar{C}|S) &= \alpha \sum_g P(\bar{C}|g) \ldots\ldots = (1-y)xz \end{aligned}\right\} P(C|S) = y$$

$$P(C|\bar{S}) = \alpha \sum_g P(C\bar{S}g) = \alpha \sum_g P(C|g)P(\bar{S}|g)P(g) = \alpha\, yz(1-x)$$

$$P(\bar{C}|\bar{S}) = \alpha \sum_g P(\bar{C}\bar{S}g) = \ldots = \alpha\left[(1-y)(1-x)z + (1-z)\right]$$

$$\alpha = \frac{1}{1-xz}$$

$$x, z = \frac{1}{2}$$

$$y = 1/2$$

$$\frac{yz(1-x)}{1-xz} = \frac{1}{5}$$

$$\left.\begin{aligned} x &= 5/7 \\ y &= 1/2 \\ z &= 7/10 \end{aligned}\right.$$

(B8)

$H(\text{Peter})$

$H(\text{Susan})$

$H(\text{Tamás})$

$\bar{H}(x_1) \vee S(x_1) \vee M(x_1)$

$\bar{S}(x_2) \vee K(x_2, \text{Ilo})$

$\bar{M}(x_3) \vee \bar{K}(x_3, \text{Erzsi})$

$\bar{K}(\text{Peter}, x_4) \vee \bar{K}(\text{Tamás}, x_4)$

$\bar{K}(\text{Tamás}, x_5) \vee \bar{K}(\text{Peter}, x_5)$

$K(P, \text{Erzsi})$

$K(P, \text{Ilo})$

$\bar{M}(\text{Tamás}) \vee S(\text{Tamás})$

$x_1/\text{Tamás}$: $S(\text{Tamás}) \vee M(\text{Tamás})$

$x_2/\text{Tamás}$: $\bar{S}(\text{Tamás})$

x_5/Ilo: $\bar{K}(\text{Tamás}, \text{Ilo})$

$S(\text{Tamás})$

$\emptyset$