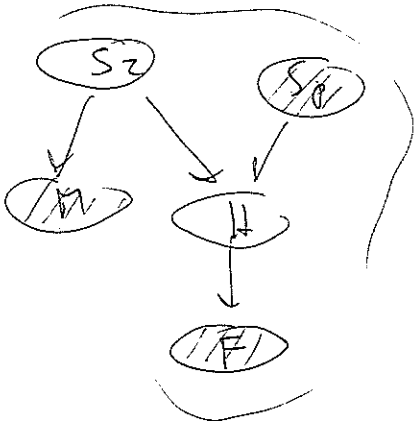
A9



$$P(F|M,S_p) = \alpha\, P(F M S_p) = \alpha \sum_{h,sz} P(F M S_p h sz) =$$

$$= \alpha \sum_{h,sz} P(F|h)\, P(h|sz,S_p)\, P(M|sz)\, P(sz) P(S_p)$$

$$= .7 \times .9 \times .9 \times .8 \times .2 + .1 \times .1 \times .9 \times .8 \times .2$$

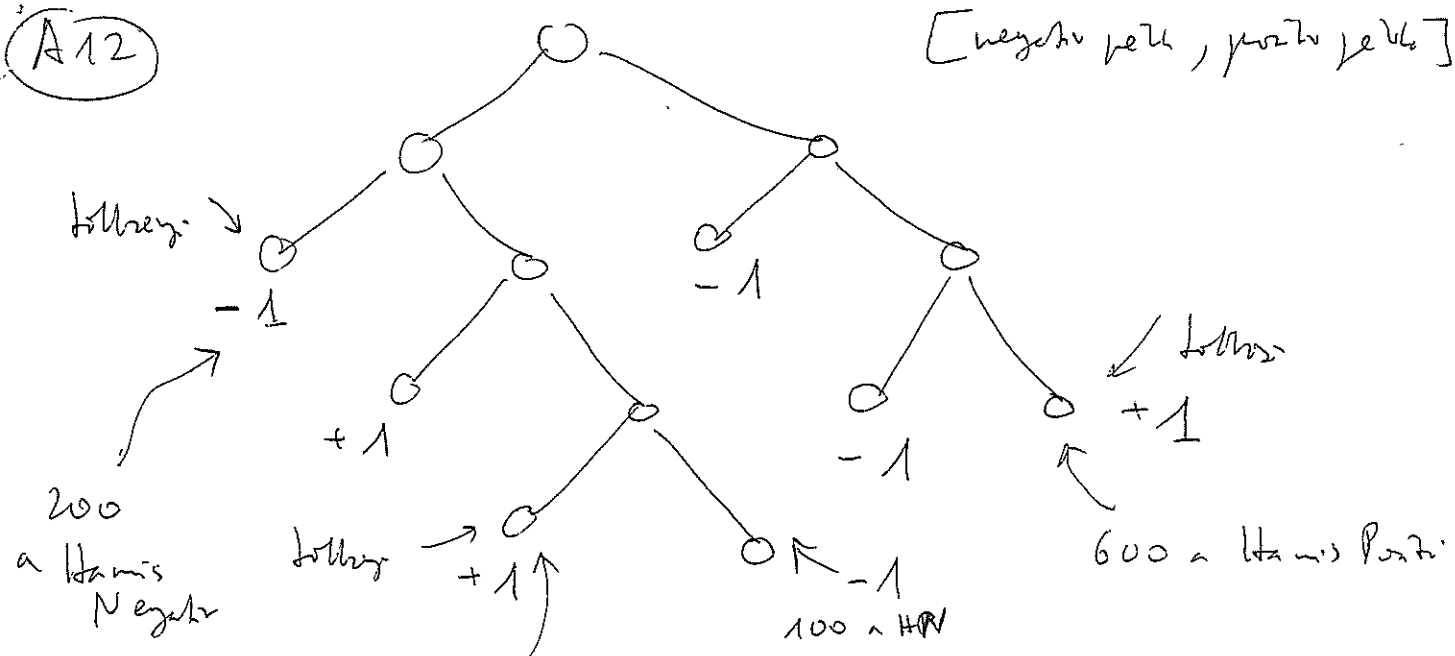
$$+ .7 \times .9 \times .01 \times .2 \times .2 + .1 \times .1 \times .01 \times .2 \times .2$$

$$P(\bar{F}|M,S_p) = \alpha \sum_{h,sz} \cdots = e_2 \qquad = \cdots e_1$$

$$\alpha = e_1 + e_2 = 1 \qquad P(F|M,S_p) = \frac{e_1}{e_1 + e_2}$$

A12

[negativ pozitiv]



Hamis Negativ arány = $\frac{300}{5000}$

Hamis Pozitiv ---- = $\frac{700}{5000}$

A11

$$S = 3 \qquad \pi^* = \max_a \left(\sum P(s \to s' | a)\, U(s') \right)$$

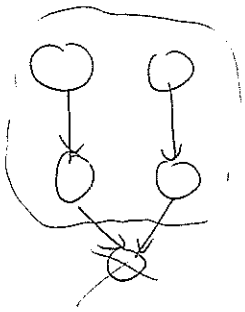
$$a_1: \quad 0.5\,U(1) + 0.1\,U(2) + 0.2\,U(4) + 0.2\,U(6) = 2.5$$

$$a_2: \quad 0.1\,U(1) + 0.4\,U(2) + 0.5\,U(4) = 2.9$$

$$\pi^*(3) = a_2$$

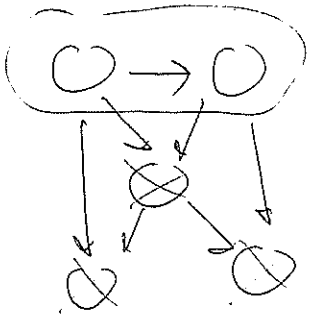
A7

A



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

B



$$P(M_1 | M_2) = \frac{P(M_2 | M_1)\, P(M_1)}{P(M_2 | M_1)\, P(M_1) + P(M_2 | \bar{M}_1)\, P(\bar{M}_1)}$$

(A3)

Az ítéletlogikai állítás kielégíthetőségi vizsgálata a korlátozás kielégítési probléma egy speciális esete, ha minden változó 2 értékű és a korlátokat logikai függvényekkel írják fel.

(A5) $U(100) \gtrless (.1\, U(0) + .9\, U(200))$?

$U(0) = \phi$

$$R(1-e^{-\frac{100}{R}}) \gtrless R \times .9\,(1-e^{-\frac{200}{R}})$$

$$10 - 10e^{-\frac{100}{R}} \gtrless 9 - 9e^{-\frac{200}{R}} \qquad e^{-\frac{100}{R}} = x$$

$$1 - 10x \gtrless -9x^2$$

$$9x^2 - 10x + 1 \gtrless \phi \qquad \Delta = 100 - 36 = 64$$

$$x_{1,2} = \frac{10 \pm 8}{18} = \begin{cases} 1 \\ 1/9 \end{cases} \quad R \to \infty \quad \emptyset$$

$$x < \frac{1}{9} \qquad e^{-\frac{100}{R}} < \frac{1}{9} \qquad R < \frac{100}{\ln 9}$$

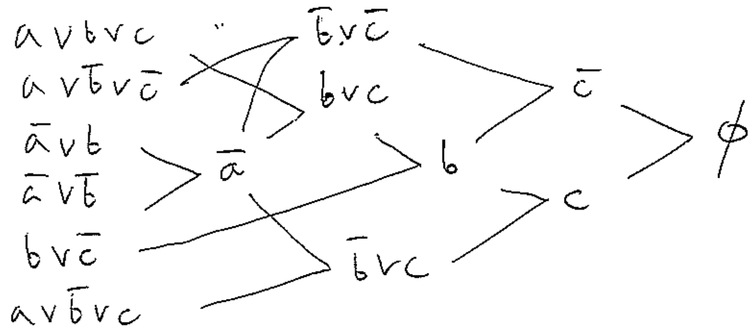
(B2)

α) Kielégíthetőség vizsgálat, modellkeresés

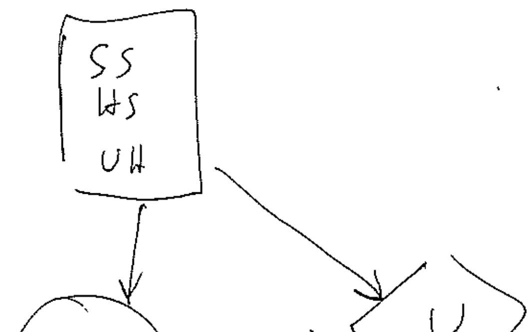
	a=1	a=0	b=1	b=∅
$a \vee b \vee c$	1	$b \vee c$	1	c
$a \vee \bar{b} \vee \bar{c}$	1	$\bar{b} \vee \bar{c}$	$\bar{c}$	1 → ∅
$\bar{a} \vee b$	b →	1	1 →	1
$\bar{a} \vee \bar{b}$	$\bar{b}$	1	1	1
$b \vee \bar{c}$	$b \vee \bar{c}$	$b \vee \bar{c}$	1	$\bar{c}$
$a \vee \bar{b} \vee c$	$\bar{b} \vee c$	$\bar{b} \vee c$	c	1

nincs egyetlen érték

β) Rezolúció → ∅ ha ellentmondásos, azaz ha kielégíthető



(B8)



$U = 8000\, P(\text{fizet}) - \text{költség}$

SS: $8000 \times .6 - \emptyset = 4800$

HS: $8000 \times .85 - 1000 \approx 5400$ ⟶

UH: $8000 \times .95 - 10000 \approx -2....$

(A10) $Q(a,s) \leftarrow Q(a,s) + \alpha\left[R(s) + \gamma \max_{a'} Q(a',s') - Q(a,s)\right]$

I. $s = s1$, $s' = s2$, $R = 10$, $a = a1$ $\quad Q(a_1, s_1) = \phi$

$\max_{a'} Q(a', s_2) = \phi$

$Q(a_1,s_1) \leftarrow \phi + \frac{1}{2}(10 + \phi \cdot \frac{1}{2} - \phi) = 5$

II. $s = s2$, $s' = s1$, $R = -10$, $a = a2$ $\quad Q(a_2, s_2) = \phi$

$\max_{a'} Q(a', s1) = 5$

$Q(a_2, s_2) \leftarrow \phi + \frac{1}{2}(-10 + \frac{1}{2}(5) - \phi) = -3.25$

...

III. $s = s1$, $s' = s_1$, $R = 10$, $a = a2$ $\quad Q(a_2, s_1) = \phi$

$Q(a_2,s_1) \leftarrow \phi + \frac{1}{2}(10 + \frac{1}{2} 5 - \phi) = 7.5$

IV. $Q(a_1,s1) \leftarrow 5 + \frac{1}{2}(10 + \frac{1}{2} 7.5 - 5) = 9.375$

(A10) De elfogadható lenne a SARSA jelleg, ugyanis:

$$Q(a,s) \leftarrow Q(a,s) + \alpha\left(R(s) + \gamma\, Q(a',s') - Q(a,s)\right)$$

ahol a' valahogy választott, pl.

I. $0 + \frac{1}{2}(10 + \frac{1}{2} \cdot 0 - 0) = 5$

II. $0 + \frac{1}{2}(-10 + \frac{1}{2}(\frac{5}{0}) - 0) < \begin{matrix} -2.5 \\ -5 \end{matrix}$

III. $0 + \frac{1}{2}(10 + \frac{1}{2}(\frac{5}{0}) - 0) < \begin{matrix} 7.5 \\ 5 \end{matrix}$

IV. $5 + \frac{1}{2}(10 + \frac{1}{2}(\frac{7.5}{5}) - 5) < \begin{matrix} 9.375 \\ 8.25 \end{matrix}$