SUML

Blatt 11

11.1

1) $H_{syn} = \{ (\emptyset, \emptyset), (\emptyset, yes), (\emptyset, no), (\emptyset, ?),$
$(yes, \emptyset), (yes, yes), (yes, no), (yes, ?),$
$(no, \emptyset), (no, yes), (no, no), (no, ?),$
$(?, \emptyset), (?, yes), (?, no), (?, ?) \}$

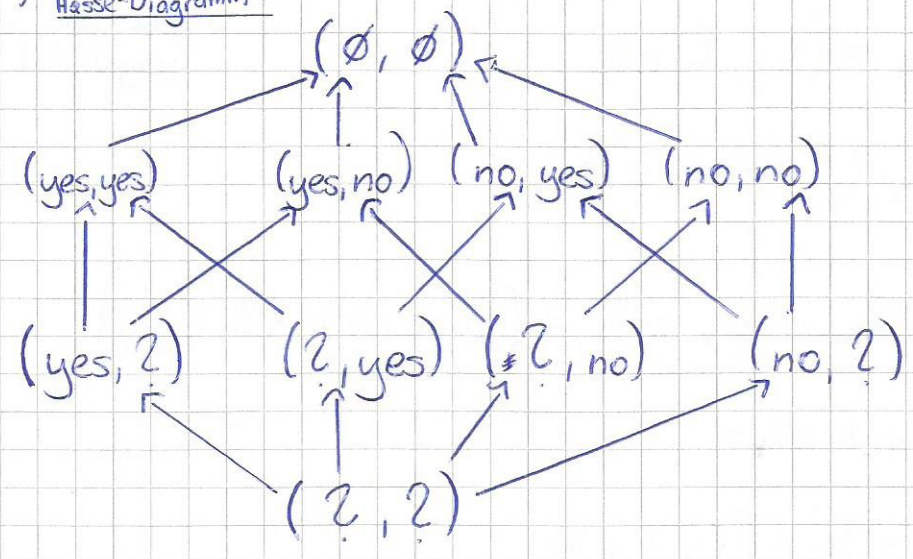
2) $\hat{=}$ semantisch identisch

3) a) $|I| = \prod_{i=1}^{n} k_i$

b) $|H_{syn}| = \prod_{i=1}^{n} (k_i + 2)$

c) $|H_{sem}| = \prod_{i=1}^{n} (k_i + 1) + 1$

4) Hasse-Diagramm:



11.2

Init: $S_0 = \{\langle \emptyset, \emptyset, \emptyset \rangle\}$

$G_0 = \{\langle ?, ?, ? \rangle\}$

$\langle n, s, (\rangle, -$ $\quad S_1 = S_0$

$G_1 = \{\langle y, ?, ? \rangle, \langle ?, n, ? \rangle, \langle ?, a, ? \rangle, \langle ?, ?, e \rangle\}$

$\langle y, s, e \rangle, +$ $\quad S_2 = \{\langle y, s, e \rangle\}$

$G_2 = \{\langle y, ?, ? \rangle, \langle ?, ?, e \rangle\}$

$\langle y, n, (\rangle, -$ $\quad S_3 = S_2$

* fällt weg wegen $\langle y, s, e \rangle \in S_3$

generischer →

$G_3 = \{\langle y, a, ? \rangle, \langle y, s, ? \rangle, \langle y, ?, e \rangle, \langle ?, ?, e \rangle\}$

$\langle y, a, e \rangle, +$ $\quad S_4 = \{\langle y, ?, e \rangle\}$

$G_4 = \{\langle ?, ?, e \rangle\}$

* es muss ein Pfeil im Diagramm geben, dass zu einer der spezifischen in S zeigt/führt

2. $VS_{HD} = G_4 \cup S_4 = \{\langle y, ?, e \rangle, \langle ?, ?, e \rangle\}$

3. $\langle n, a, e \rangle, -$

$\Rightarrow$ $S_5 = S_4 = \{\langle y, ?, e \rangle\}$

$G_5 = \{\langle y, ?, e \rangle, \langle ?, s, e \rangle, \langle ?, n, e \rangle\}$

11.3

1) $S(D) = -\sum_{i \in \{+,-\}} p_i \cdot \log_2(p_i) = -\frac{4}{9} \cdot \log(\frac{4}{9}) - \frac{5}{9} \cdot \log_2(\frac{5}{9}) =$

$= 0,991$

VisitLecture:

$S(D_{VL,y}) = -\frac{4}{6} \cdot \log_2(\frac{4}{6}) - \frac{2}{6} \cdot \log_2(\frac{2}{6}) = 0,918$

$S(D_{VL,n}) = -\frac{0}{3} \cdot \log_2(\frac{0}{3}) - \frac{3}{3} \cdot \log_2(\frac{3}{3}) = 0$

$\Rightarrow Gain(D, VL) = S(D) - \frac{|D_{VL,y}|}{D} \cdot S(D_{VL,y}) - \frac{|D_{VL,n}|}{D} \cdot S(D_{VL,n}) =$

$= 0,991 - \frac{6}{9} \cdot 0,918 - \frac{3}{9} \cdot 0 = 0,379$

DoExercises:

$S(D_{DE,a}) = -\frac{3}{4} \cdot \log_2(\frac{3}{4}) - \frac{1}{4} \cdot \log_2(\frac{1}{4}) = 0,811$

$S(D_{DE,s}) = -\frac{1}{3} \cdot \log_2(\frac{1}{3}) - \frac{2}{3} \cdot \log_2(\frac{2}{3}) = 0,918$

$S(D_{DE,n}) = -\frac{0}{2} \cdot \log_2(\frac{0}{2}) - \frac{2}{2} \cdot \log_2(\frac{2}{2}) = 0$

$\Rightarrow Gain(D, DE) = S(D) - \frac{|D_{DE,a}|}{D} \cdot S(D_{DE,a}) - \frac{|D_{DE,s}|}{D} \cdot S(D_{DE,s}) -$

$- \frac{|D_{DE,n}|}{D} \cdot S(D_{DE,n}) =$

$= 0,991 - \frac{4}{9} \cdot 0,811 - \frac{3}{9} \cdot 0,918 - \frac{2}{9} \cdot 0 =$

$= 0,325$

Preparation:

$S(D_{P,e}) = -\frac{2}{6} \cdot \log_2(\frac{2}{6}) - \frac{4}{6} \cdot \log_2(\frac{4}{6}) = 0,918$

$S(D_{P,l}) = -\frac{2}{3} \cdot \log_2(\frac{2}{3}) - \frac{1}{3} \cdot \log_2(\frac{1}{3}) = 0,918$

$\Rightarrow Gain(D, P) = S(D) - \frac{|D_{P,e}|}{D} \cdot S(D_{P,e}) - \frac{|D_{P,l}|}{D} \cdot S(D_{P,l}) =$

$= 0,991 - \frac{6}{9} \cdot 0,918 - \frac{3}{9} \cdot 0,918 = 0,073$

$\Rightarrow$ Man splittet zuerst nach VisitLecture

$$S(D^1) = -\frac{4}{6} \cdot \log_2\left(\frac{4}{6}\right) - \frac{2}{6} \cdot \log_2\left(\frac{2}{6}\right) = 0{,}918$$

DoExercise:

$$S(D^1_{DE,a}) = -\frac{3}{3} \cdot \log_2\left(\frac{3}{3}\right) - \frac{0}{3} \cdot \log_2\left(\frac{0}{3}\right) = 0$$

$$S(D^1_{DE,s}) = -\frac{1}{2} \cdot \log_2\left(\frac{1}{2}\right) - \frac{1}{2} \cdot \log_2\left(\frac{1}{2}\right) = 1$$

$$S(D^1_{DE,n}) = -\frac{1}{1} \cdot \log\left(\frac{1}{1}\right) = 0$$

$$\Rightarrow Gain(D^1, DE) = S(D^1) - \frac{|D^1_{DE,a}|}{D^1} \cdot S(D^1_{DE,a}) - \frac{|D^1_{DE,s}|}{D^1} \cdot S(D^1_{DE,s}) - \frac{|D^1_{DE,n}|}{D^1} \cdot S(D^1_{DE,n}) =$$

$$= 0{,}918 - \frac{3}{6} \cdot 0 - \frac{2}{6} \cdot 1 - \frac{1}{6} \cdot 0 =$$

$$= 0{,}585$$

Preparation:

$$S(D^1_{P,e}) = -\frac{2}{3} \cdot \log_2\left(\frac{2}{3}\right) - \frac{1}{3} \cdot \log_2\left(\frac{1}{3}\right) = 0{,}918$$

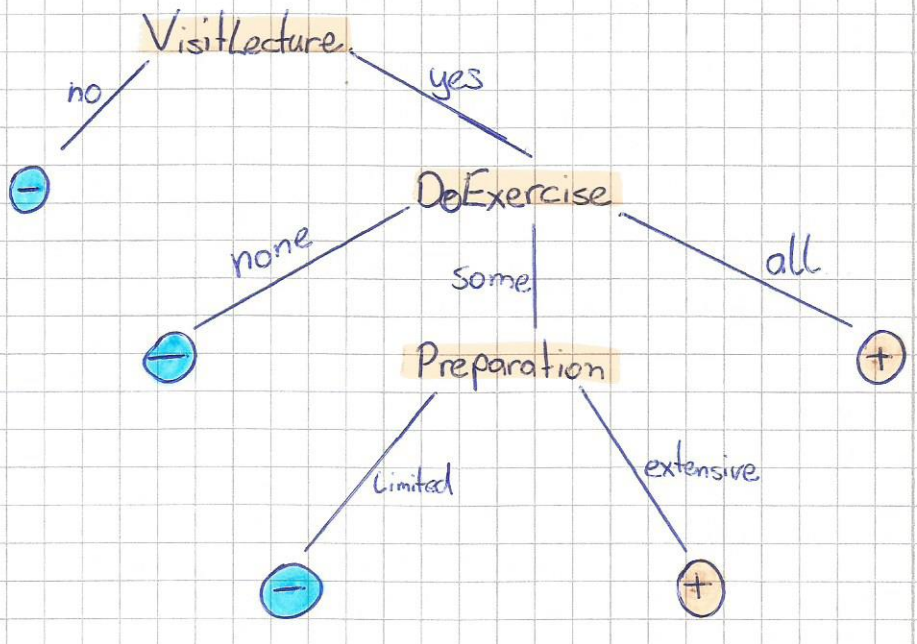
$$S(D^1_{P,L}) = -\frac{1}{3} \cdot \log_2\left(\frac{1}{3}\right) - \frac{2}{3} \cdot \log_2\left(\frac{2}{3}\right) = 0{,}918$$

$$\Rightarrow Gain(D^1, P) = S(D^1) - \frac{|D^1_{P,e}|}{D^1} \cdot S(D^1_{P,e}) - \frac{|D^1_{P,L}|}{D^1} \cdot S(D^1_{P,L}) =$$

$$= 0{,}918 - \frac{3}{6} \cdot 0{,}918 - \frac{3}{6} \cdot 0{,}918 = 0$$

$\Rightarrow$ Splittet mit DoExercise

2.


VisitLecture
no
yes
−
DoExercise
none
some
all
−
Preparation
+
limited
extensive
−
+