MAT-42106 Applied Logics.
Partial examination 1. 17.11.2010 in Lectur room SJ202.
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Problem 1.

Assume we are observing children who have an allergic reaction to, say, tomato, apple, orange, cheese or milk. These observations are presented in the following table:

Child	Tomato	Apple	Orange	Cheese	Milk
Anna	1	1	0	1	1
Aina	1	1	1	0	0
Naima	1	1	1	1	1
Rauha	0	1	1	0	1
Kai	0	1	0	1	1
Kille	1	1	0	0	1
Lempi	0	1	1	1	1
Ville	1	0	0	0	0
Ulle	1	1	0	1	1
Dulle	1	0	1	0	0
Dof	1	0	1	0	1
Kinge	0	1	1	0	1
Laade	0	1	0	1	1
Koff	1	1	0	0	1
Olvi	0	1	1	1	1

Construct the 4–ft contingency table for $\phi =$ Apple and $\psi =$ Cheese. Is

$$v(\phi \approx \psi) = \texttt{TRUE}$$

in this model, where $\approx$ is basic implication, $p = 0.7$ and base $= 6$?

Problem 2.

Let M and N be two models that generate the following two four–fold tables.

M	ψ	$\neg\psi$
ϕ	a_1	b_1
$\neg\phi$	c_1	d_1

N	ψ	$\neg\psi$
ϕ	a_2	b_2
$\neg\phi$	c_2	d_2

Under which conditions N is (a) associationally (b) implicationally better than M? (c) Define the truth condition of Basic equivalence quantifiers.

Problem 3.

Is ϕ a logical consequences of a set $\{\neg\psi \vee \phi, \psi \wedge \phi\}$?

Problem 4.

Prove that Σ–double implication quantifiers are associational.

Problem 5.

(a) Why are rules of inference useful in GUHA–logic framework? (b) Let $\phi(x)$, $\psi(x)$, $\chi(x)$ be formulae, and let $\approx$ be an implicational quantifier. Prove that

$$\frac{[\phi \wedge \neg\chi] \approx \psi}{\phi \approx [\chi \vee \psi]}$$

is a sound rule of inference.