Group: ____________________	Assignment 9
Name: ____________________	**Formal Models**
Matr.Nr.: ____________________	Summer Semester 2010
Points: ____________________	**Due: 10.06.2010 08:30**

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Exercise 33

a) Define the semantics of the boolean operators $\neg$, $\wedge$, $\vee$, $\rightarrow$, and $\leftrightarrow$ in HML analogously to the semantical definitions of the modal operators and boolean constants (see lecture slide 53).

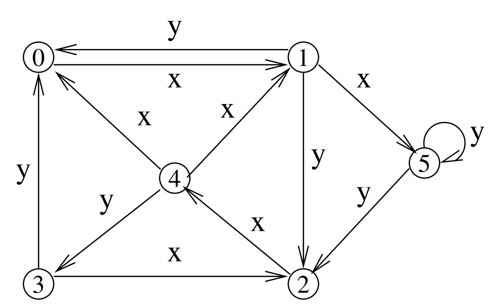
b) Referring to the semantical rules of HML, explain in detail why formula $[a]\,1$ is always true and formula $\langle a\rangle\,0$ is always false.

c) Draw an LTS L sucht that $L \models \langle a\rangle(\langle a\rangle\,1 \rightarrow \langle a\rangle\,\langle a\rangle\,1)$ but $L \not\models \langle a\rangle\,\langle a\rangle\,\langle a\rangle\,1$.

Exercise 34

Given LTS L as shown below. For each state s of L, determine which of the following formulae hold in s.

1. $\langle y\rangle\,1$
2. $[x]\,0$
3. $[y]\,[y]\,0$
4. $[y]\,\langle x\rangle\,1$
5. $\langle x\rangle([y]\,0 \wedge \langle x\rangle\,1)$



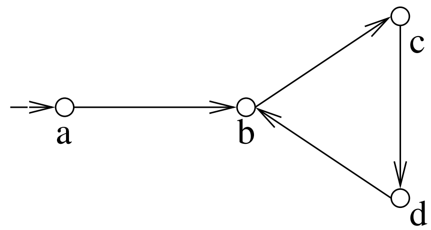
Exercise 35

Same as Exercise 34, but with the following formulae:

1. $((\langle x\rangle\,\langle x\rangle\,1) \vee (\langle x\rangle\,[y]\,0))$
2. $((\langle y\rangle\,1) \;\rightarrow\; (\langle x\rangle\,\langle y\rangle\,1))$
3. $((\langle y\rangle\,\langle y\rangle\,1) \leftrightarrow (\langle x\rangle\,[x]\,0))$
4. $[y]\,[x]\,\langle y\rangle\,1$

Exercise 36

Given LTS L as shown on the right.



a) List all different infinite traces in L, using ω-notation, e.g. $ababab\cdots = (ab)^{\omega}$.

b) Find 6 equivalences between traces from part a), using notation π^i, e.g. $\pi_2 = \pi_1^1$ for $\pi_1 = xyz$ and $\pi_2 = yz$.