Universität Koblenz-Landau

FB 4 Informatik

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Exercises for "Formal Specification and Verification"
Exercise sheet 6

We use the following abbreviations in LTL:

- The future diamond $\Diamond\phi := \top \mathcal{U} \phi$
- The future box $\Box\phi := \neg\Diamond\neg\phi$

Exercise 6.1:
Let $TS = (S, \rightarrow, L)$ be a transition system and let $\pi = s_0 \rightarrow s_1 \rightarrow s_2 \rightarrow ...$ be a path in TS.

Show that:

(1) $\pi \models \bigcirc(\phi \rightarrow \psi) \rightarrow (\bigcirc\phi \rightarrow \bigcirc\psi)$

(2) $\pi \models \Box(\phi \rightarrow \psi) \rightarrow (\Box\phi \rightarrow \Box\psi)$

(3) $\pi \models \bigcirc\neg\phi \rightarrow \neg \bigcirc \phi$

(4) $\pi \models \neg \bigcirc \phi \rightarrow \bigcirc\neg\phi$

(5) $\pi \models \Box\phi \rightarrow \phi \wedge \bigcirc\Box\phi$

(6) $\pi \models \Box(\phi \rightarrow \bigcirc\phi) \rightarrow (\phi \rightarrow \Box\phi)$

(7) $\pi \models \phi \mathcal{U} \psi \rightarrow \psi \vee (\phi \wedge \bigcirc(\phi \mathcal{U} \psi))$

Exercise 6.2:
Show that there exists no transition system $TS = (S, \rightarrow, L)$ and no path $\pi = s_0 \rightarrow s_1 \rightarrow s_2 \rightarrow ...$ in TS with:

$$\pi \models p \wedge \Box(p \rightarrow \bigcirc p) \wedge \Diamond\neg p$$

Please submit your solution until Wednesday, June 20, 2012 at 11:00.

Submission possibilities:

- By e-mail to `sofronie@uni-koblenz.de` with the keyword "Homework FSV" in the subject.
- Hand it in to me (Room B225) or drop it in the box in front of Room B224.