Universität Koblenz-Landau

FB 4 Informatik

Prof. Dr. Viorica Sofronie-Stokkermans **January 8, 2014**

Exercises for "Non-Classical Logics"
Exercise sheet 10

In the next exercise we will discuss in more detail the proof by simultaneous structural induction of the equivalence on page 18 of the slides from January 8, 2014:

Exercise 10.1: *(4 P)*
Let $\mathcal{K} = (S, R, I)$ be a Kripke structure. We construct a Kripke structure $\mathcal{K}^* = (S^*, R^*, I^*)$ as follows:

For every $s \in S$ let $s^1, s^2 \notin S$ (different).

- $S^* = \{s^i \mid s \in S, i \in \{1, 2\}\}$;
- For every propositional variable P, $I^*(s^i, P) = I(s, P)$ for $i \in \{1, 2\}$;
- $R^*(s^i, u^j)$ iff $R(s, u)$ for all $i, j \in \{1, 2\}$ if $s \neq u$.
  $R^*(s^i, s^j)$ iff $R(s, s)$ for all $i, j \in \{1, 2\}$, $i \neq j$.

Show that for every formula F and every $s \in S$ the following are equivalent:

(1) $(\mathcal{K}, s) \models F$
(2) $(\mathcal{K}^*, s^1) \models F$
(3) $(\mathcal{K}^*, s^2) \models F$

Please submit your solution until Tuesday, January 14, 2014 at 16:00. Joint solutions prepared by up to three persons are allowed. Please do not forget to write your name(s) on your solution.

Submission possibilities:

- By e-mail to `sofronie@uni-koblenz.de` with the keyword "Homework Non-Classical Logics" in the subject.
- Put it in the box in front of Room B 222.