



Verteilte Algorithmen

Wintersemester 2007/08

Serie 8

12. Dezember 2007

Thema: Asynchrones Modell

Ausgabetermin: 12. Dezember 2007

Abgabe: 21. Dezember 2007 (12:00)

Aufgabe 1 (4 Punkte) Consider the following two I/O-automata. Note that they are not written using precondition-effect notation, but just using a brute force listing of all the components.

- Automaton A :
$$\begin{aligned} in(A) &= int(A) = \emptyset, out(A) = \{go\}, \\ states(A) &= \{s, t\}, \\ start(A) &= \{s\}, \\ trans(A) &= \{(s, go, t)\}, \text{ and} \\ tasks(A) &= \{\{go\}\}. \end{aligned}$$

- Automaton B :
$$\begin{aligned} in(B) &= \{go\}, out(B) = \{ack\}, int(B) = \{inc\}, \\ states(B) &= \{on, off\} \times \mathbb{N}, \\ start(B) &= \{(on, 0)\}, \\ trans(B) &= \{((on, i), inc, (on, i + 1)) \mid i \in \mathbb{N}\} \cup \\ &\quad \{((on, i), go, (off, i)) \mid i \in \mathbb{N}\} \cup \\ &\quad \{((off, i), go, (off, 0)) \mid i \in \mathbb{N}\} \cup \\ &\quad \{((off, i), ack, (off, i - 1)) \mid i \in \mathbb{N} \setminus \{0\}\}, \text{ and} \\ tasks(B) &= \{\{inc\}, \{ack\}\}. \end{aligned}$$

For each of the three automata A , B , and $A \times B$, describe the sets of traces and fair traces. (Aufgabe 8.4)

Aufgabe 2 (4 Punkte) If P is a safety property, prove that the following three are equivalent statements about an I/O-automaton A :

- $traces(A) \subseteq traces(P)$.
- $fairtraces(A) \subseteq traces(P)$.
- The finite traces of A are all in $traces(P)$.

(Aufgabe 8.12)