

T-79.186

Spring 2004

Reactive Systems

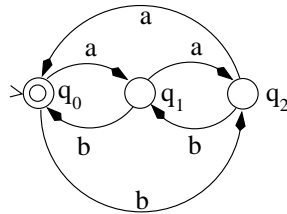
Home Exercise 1

Deadline 4.2 16.15

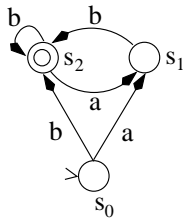
Return your answers by email to Timo.Latvala@hut.fi, or on paper to the lecture.

1. Consider the three following finite state automata, where $\Sigma_1 = \Sigma = \{a, b\}$.

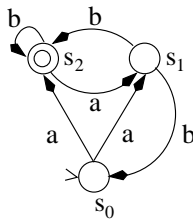
Automaton \mathcal{A}_1 :



Automaton \mathcal{A}_2 :



Automaton \mathcal{A}_3 :



- (a) Construct the finite state automaton $\mathcal{A}_a = \mathcal{A}_1 \cup \mathcal{A}_2$.
- (b) Construct the finite state automaton $\mathcal{A}_b = \mathcal{A}_1 \cap \mathcal{A}_2$.
- (c) Is the language accepted by \mathcal{A}_b non-empty? If not, give a word accepted by \mathcal{A}_b .

- (d) Complement the deterministic automaton \mathcal{A}_1 , and give the resulting automaton \mathcal{A}_d .
- (e) Give a deterministic finite state automaton \mathcal{A}_e , which accepts the same language as \mathcal{A}_3 .
- (f) Describe the language accepted by \mathcal{A}_1 as a function of the number of occurrences of a and b .