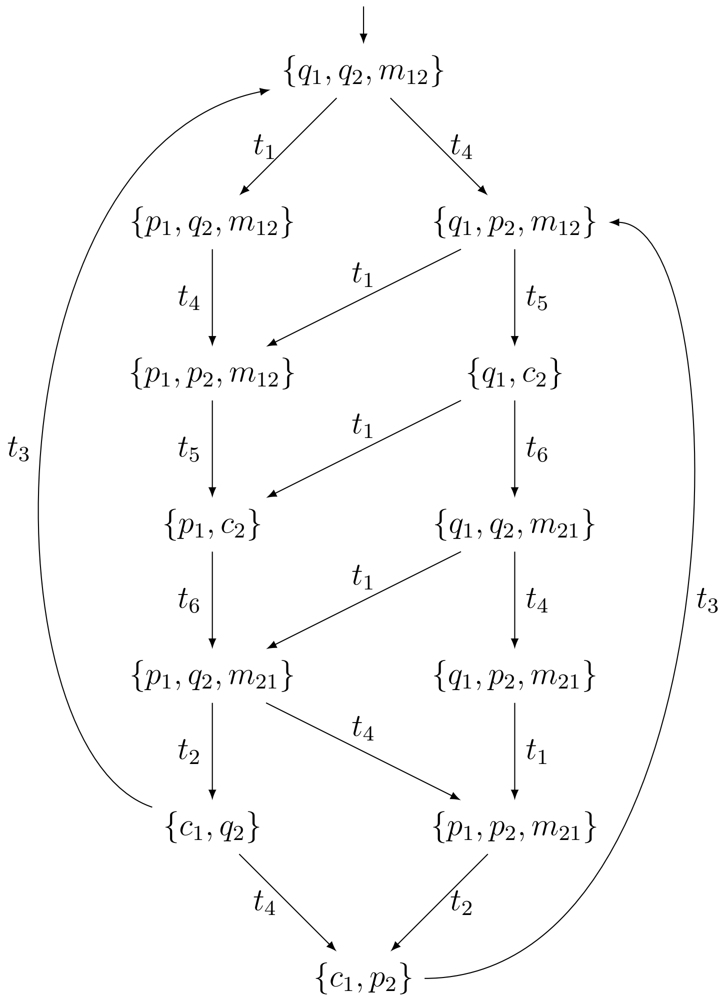
D. Nowotka Winter Term 2008/09

Networks and Processes

Sample Solutions to Exercise 6

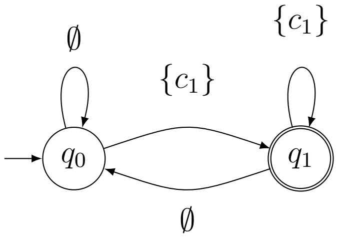
Discussion on – 22.1.2009, 15h45 (submissions of solutions are highly recommended, either before or after the exercise session)

1. (i) The reachability graph:



(ii) a) $\neg f_a \equiv \mathbf{G}\,\mathbf{F}\, c_1$

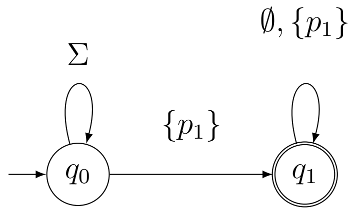
$\mathcal{B}_{\neg f_a}$:



please turn overleaf

b) $\neg f_b \equiv \mathbf{F}\,(p_1 \wedge \mathbf{G}\,\neg c_1)$

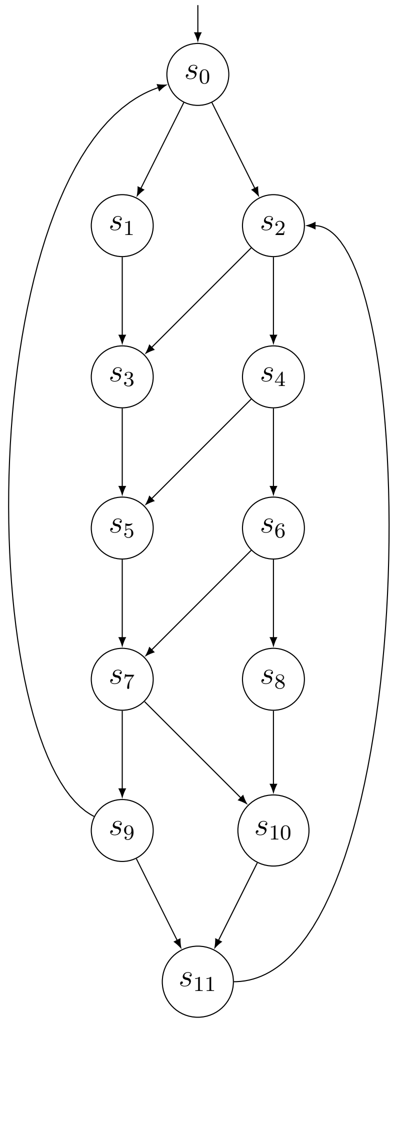
$\mathcal{B}_{\neg f_b}$:



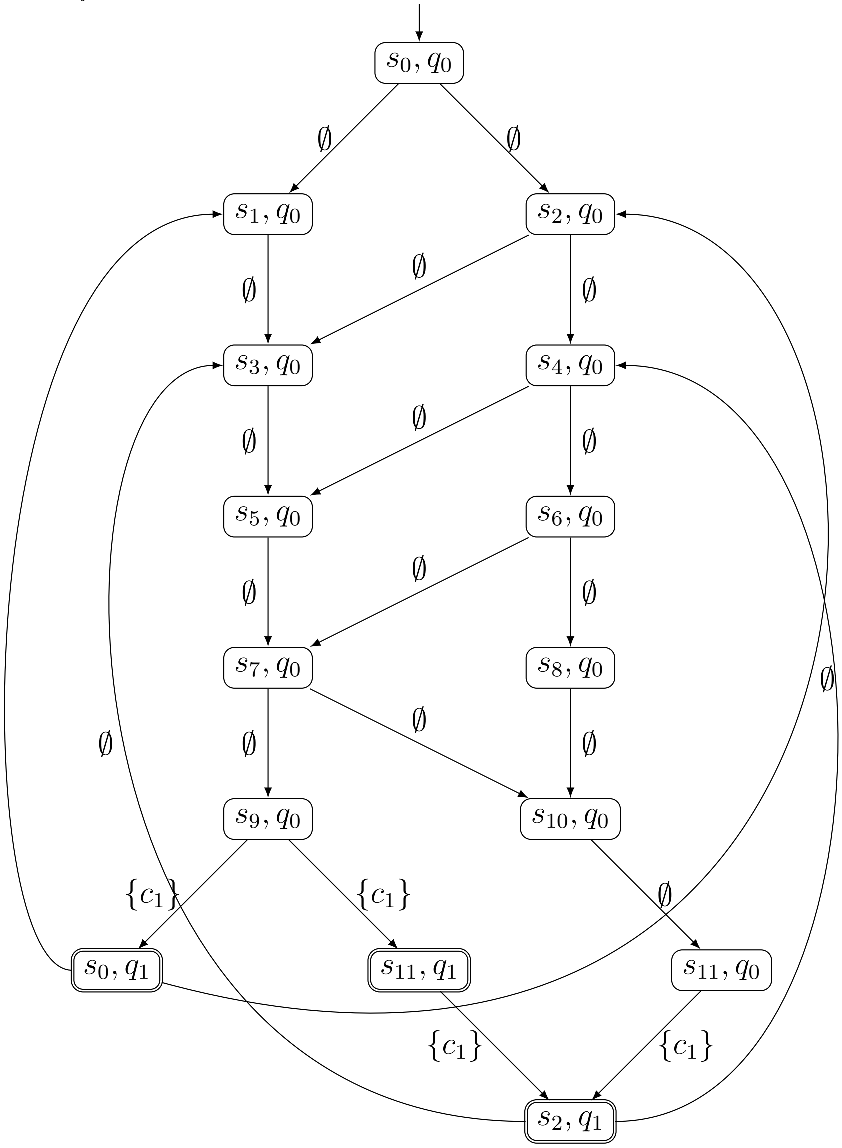
(iii) $\mathcal{K} = \langle S, \rightarrow, s_0, AP, \nu \rangle$, where

a) $\nu = \{s \mapsto \{c_1\} \mid s \in \{s_9, s_{11}\}\} \cup \{s \mapsto \emptyset \mid s \in S \setminus \{s_9, s_{11}\}\}$,

b) $\nu = \{s \mapsto \{c_1\} \mid s \in \{s_9, s_{11}\}\} \cup \{s \mapsto \{p_1\} \mid s \in \{s_1, s_3, s_5, s_7, s_{10}\} \cup \{s \mapsto \emptyset \mid s \in \{s_0, s_2, s_4, s_6, s_8\}$.



a) $\mathcal{B}_{\mathcal{K}} \times \mathcal{B}_{\neg f_a}$:



b) No solution available.

(iv) a) $\mathcal{L}(\mathcal{B}_{\mathcal{K}} \times \mathcal{B}_{\neg f_a}) \neq \emptyset$. A counterexample: $(s_0 s_1 s_3 s_5 s_7 s_9)^{\omega}$.

b) $\mathcal{L}(\mathcal{B}_{\mathcal{K}} \times \mathcal{B}_{\neg f_b}) = \emptyset$.

2. a) a and d as well as a and c depend on each other.

b) a, b, c are visible.

c) $\mathit{red}(4) = \{e\}$, otherwise $\mathit{red}(s) = \mathit{en}(s)$ for all $s \in S \setminus \{4\}$. Thus, we obtain $\mathit{red}(\mathcal{K})$ with 1 state and 3 transitions less than $\mathcal{K}$.