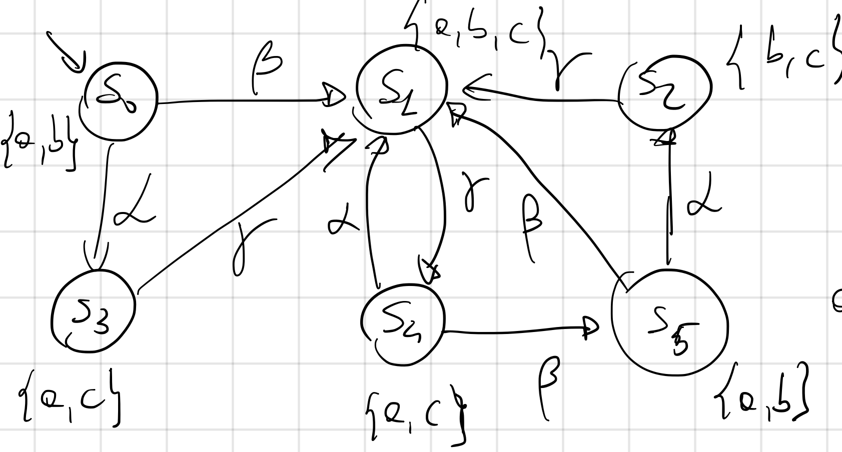
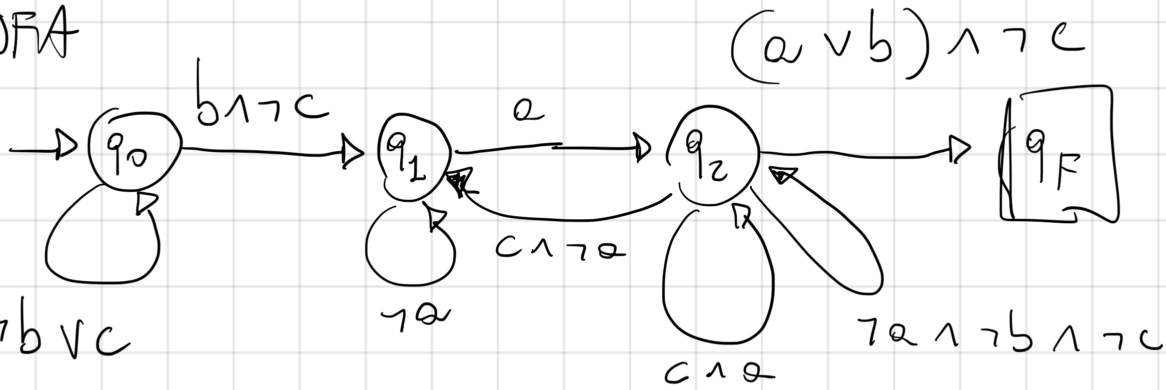


P_{safe} = "always if a is valid and $b \land \neg c$ was valid somewhere before then a and b do not hold thereafter at least until c holds"

NFA

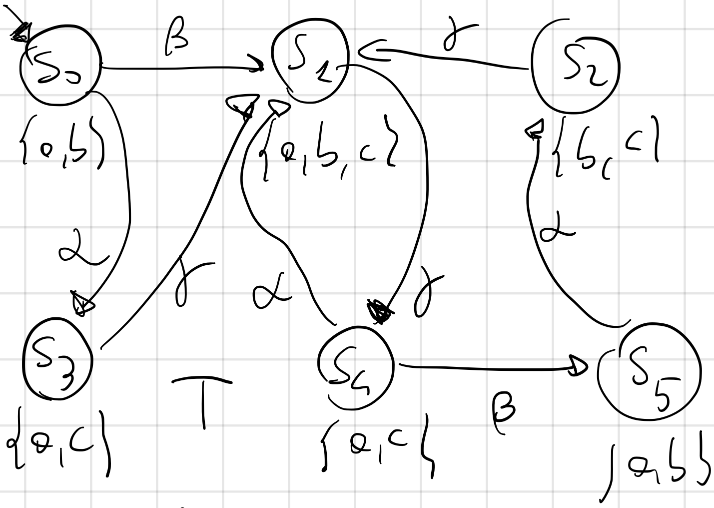


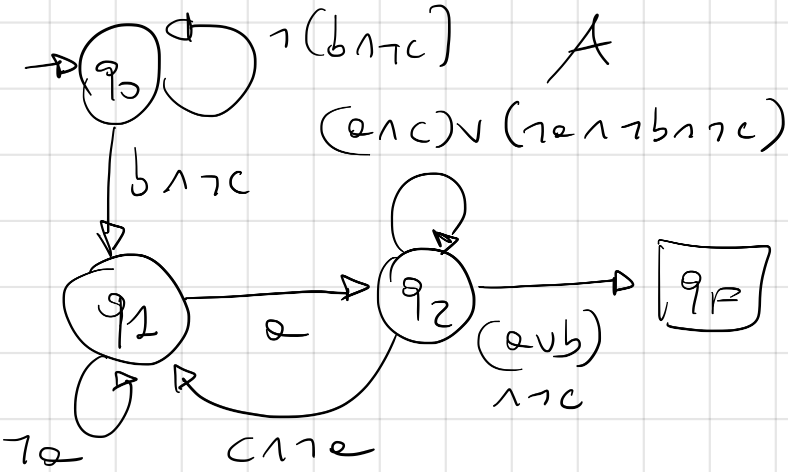
$$Set((a \lor b) \land \neg c) = Set(a \lor b) \cap Set(\neg c) = (Set(a) \cup Set(b))$$
$$\cap \left(2^{AP} \setminus Set(c)\right) = \{\{a\}, \{a,b\}, \{a,b,c\}, \{a,c\}, \{b\}, \{b,c\}\}$$
$$\cap \{2^{AP} \setminus \{\{c\}, \{a,c\}, \{b,c\}, \{a,b,c\}\} = \ldots \cap$$
$$\{\{\}, \{a\}, \{b\}, \{a,b\}\} = \{\{a\}, \{a,b\}, \{b\}\}$$

$$Set(c \land a) = Set(c) \cap Set(a) = Set(c) \cap \{\{a\}, \{a,b\}, \{a,c\}, \{a,b,c\}\} =$$
$$= \{\{a,c\}, \{a,b,c\}\}$$

$$Set(c \land \neg a) = Set(c) \cap \left(2^{AP} \setminus Set(a)\right) = Set(c) \cap \{\{\}, \{b\}, \{c\}, \{b,c\}\} = \{\{c\}, \{b,c\}\}$$

$$Set(\neg a \land \neg b \land c) = \{\{\}\}$$





$T \otimes \mathcal{A}$

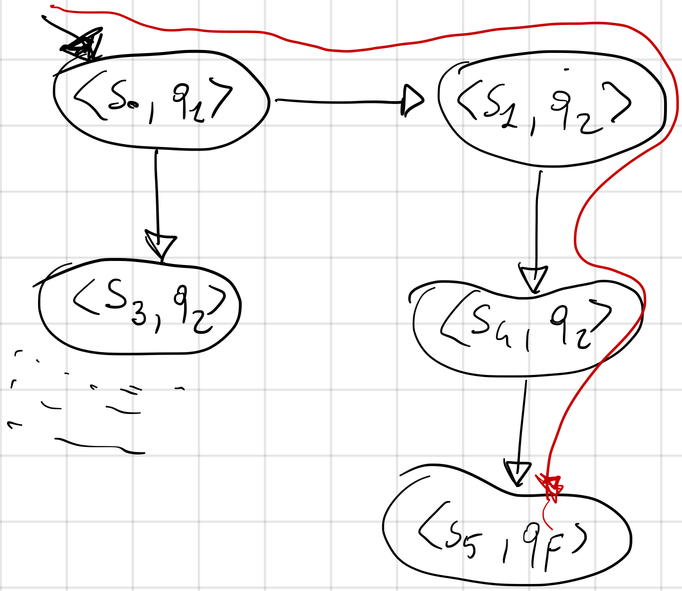
$\delta(q_0, L(s_0)) = \delta(q_0, \{a,b\}) = \{q_1\}$

$s_0 \xrightarrow{\beta} s_1 \quad \delta(q_1, L(s_1)) = \delta(q_1, \{a,b,c\})$
$= \{q_2\}$

$s_0 \xrightarrow{\alpha} s_3 \quad \delta(q_1, L(s_3)) = \{q_2\}$

$s_1 \xrightarrow{\gamma} s_4 \quad \delta(q_2, L(s_4)) = \{q_2\}$

$s_4 \xrightarrow{\beta} s_5 \quad \delta(q_2, L(s_5)) = \{q_F\}$



$T \not\models P_{safe}$ because the state q_F can be reached

The counterexample is given by the finite run $s_0 s_1 s_4 s_5$

corresponding to the finite trace $\{a,b\}\{a,b,c\}\{a,c\}\{a,b\} \in MinBadPref(P_{safe})$

$$L^* = \bigcup_{i=0}^{\infty} L^i$$

$$L = \{ab, c\}$$

$$L^* = \{\varepsilon, c, ab, abab, abc, cab, cc, \ldots\}$$

$$L^0 = \{\varepsilon\}$$

$$L^{i+1} = L \cdot L^i$$

$$L^2 = L \cdot L = \{ab, c\} \cdot \{ab, c\} = \{abab, abc, cab, cc\}$$

$$L^3 = L \cdot L^2 = \{ababab, ababc, abcab, abcc, cabab, cabc, ccab, ccc\}$$

$$\mathcal{L}((A+B)^*) = (\mathcal{L}(A+B))^* = (\mathcal{L}(A) \cup \mathcal{L}(B))^*$$

$$= (\{A\} \cup \{B\})^* = \{A, B\}^* =$$ set of all <u>finite</u> words over A and B, including ε