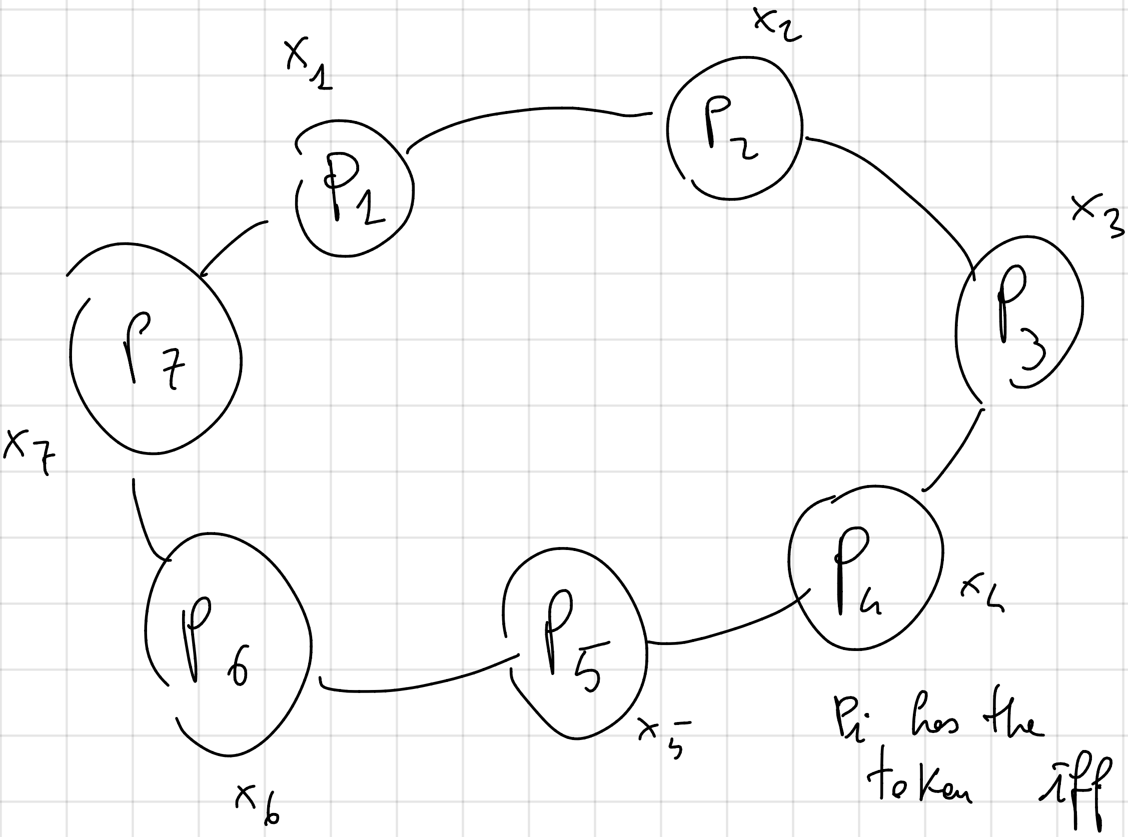
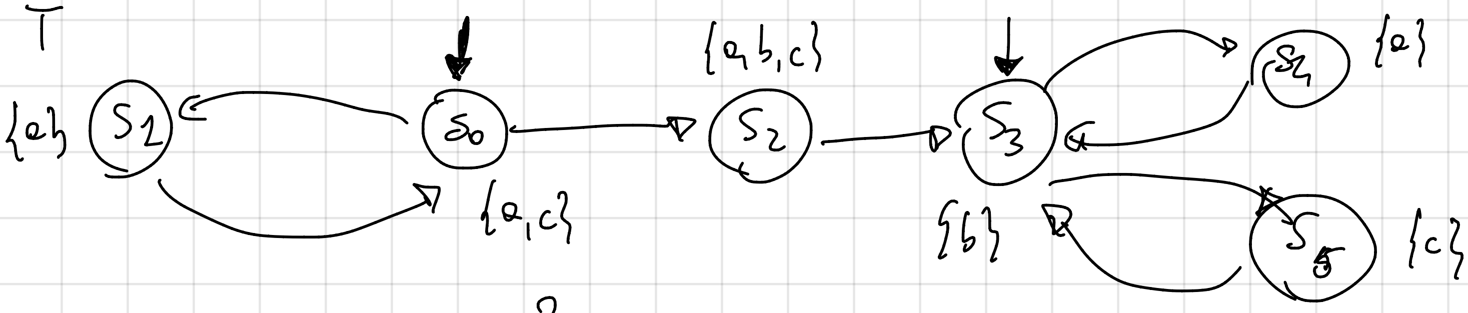


x_i : bool

2^7 conf

stable iff only one P_i has the token

P_i has the token iff $x_i = x_{i-1}$



$\varphi_1 = \Diamond b$ $\quad T \overset{?}{\models} \varphi_1$ $\quad$ NO $\quad$ Counterexample: $(s_0 s_1)^\omega = \pi_1$

$\downarrow$

$(\{a,c\}\{a\})^\omega$

$\varphi^1_{fair} = \Box\Diamond c \to \Box\Diamond b$

$T \overset{?}{\models}_{\varphi^1_{fair}} \varphi_1$ $\quad$ π_1 violates φ^1_{fair}, so it is excluded by fairness

Any other path is fair w.r.t. φ^1_{fair}

so $T \models_{\varphi^1_{fair}} \varphi_1$!

$\varphi_5 = (a \vee b)\, \mathcal{U}\, (a \vee c)$ $\quad T \models \varphi_5$ OK

Justification:

$T \not\models \varphi_6$ Counterexample is $(s_3 s_4)^\omega \rightsquigarrow (\{b\}\{a\})^\omega$

or

$s_0 s_2 (s_3 s_4)^\omega \rightsquigarrow \{a,c\}\{a,b,c\}(\{b\}\{a\})^\omega$

$$\varphi_2 \equiv \neg \underbrace{\Box (b \to (b\, \mathcal{U}\, (a \wedge \neg b)))}$$

PNF $\varphi ::= true \mid false \mid a \mid \neg a \mid \varphi_1 \wedge \varphi_2 \mid \varphi_1 \vee \varphi_2 \mid \bigcirc \varphi \mid$
$\varphi_1 \mathcal{U} \varphi_2 \mid \varphi_1 W \varphi_2$

$\Box \varphi = \neg \Diamond \neg \varphi$

$\Diamond \varphi = true\, \mathcal{U}\, \varphi$

$p \to q$
$\equiv$
$\neg p \vee q$

$$\varphi_1 \equiv \neg\neg \Diamond \neg (b \to (b\, \mathcal{U}\, (a \wedge \neg b)))$$
$$\equiv \Diamond \neg (\neg b \vee (b\, \mathcal{U} (a \wedge \neg b)))$$
$$\equiv true\, \mathcal{U}\, \neg (\neg b \vee (b\, \mathcal{U}\, (a \wedge \neg b)))$$
$$\equiv true\, \mathcal{U} (\neg\neg b \wedge \neg (b\, \mathcal{U}\, (a \wedge \neg b)))$$
$$\equiv true\, \mathcal{U} (b \wedge \neg (a \wedge \neg b)\, W\, (\neg b \wedge \neg (a \wedge \neg b)))$$
$$\equiv true\, \mathcal{U} (b \wedge (\neg a \vee \neg\neg b)\, W\, (\neg b \wedge (\neg a \vee \neg\neg b)))$$
$$\equiv true\, \mathcal{U} (b \wedge (\neg a \vee b)\, W ((\neg b \wedge \neg a) \vee (\neg b \vee b)))$$
$$\equiv true\, \mathcal{U} (b \wedge (\neg a \vee b)\, W ((\neg b \wedge \neg a) \vee true)$$
$$\equiv true\, \mathcal{U} (b \wedge (\neg a \vee b)\, W (\neg b \wedge \neg a))$$