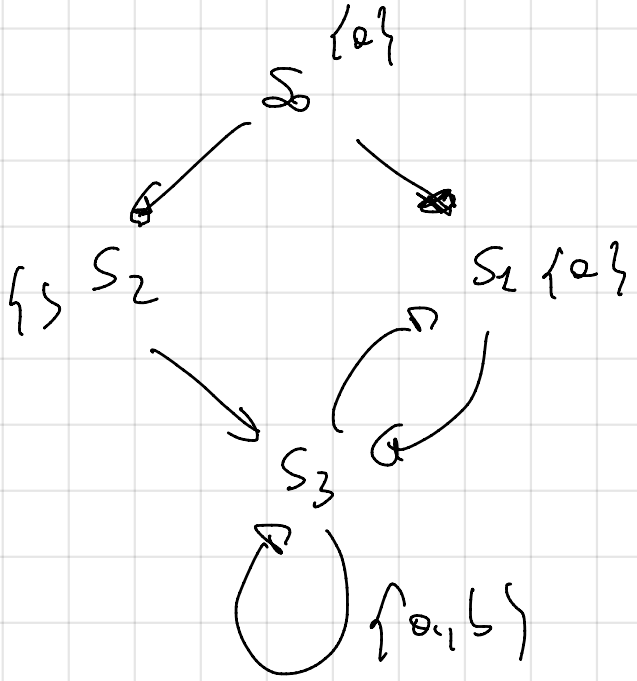


Traces

$\{e\}\{a\}(\{a,b\}\{e\})^{\omega}$

$\Uparrow$

$S_0\ S_2\ (S_3\ S_1)^{\omega}$

$\Downarrow$

$\{a\}(\{e\}\{eb\})^{\omega}$

$S_0\ (S_1\ S_3)^{\omega}$

$S_0\ S_2(S_3\ S_2)^{\omega} \Rightarrow \{a\}\{\}(\{a,b\}\{e\})^{\omega}$

$\pi_0\ S_0\ (S_1|S_2)\ S_3\ (S_3^{+} \mid (S_1\ S_3)^{+})^{+}\ S_3^{\omega}$

$\pi_1\ S_0\ (S_2|S_2)\ S_3\ (S^{+} \mid (S_2\ S_3)^{+})^{+}\ (S_2\ S_3)^{\omega}$

$\pi_2\ S_0\ (S_1|S_2)\ S_3\ (S^{+} \mid (S_2\ S_3)^{+})^{\omega}$

Traces = $\{ \{a\}(\{a\}|\{\})\{a,b\}(\{a,b\}^{+} \mid (\{e\}\{a,b\})^{+}$

$\ldots)^{+}\{a,b\}^{\omega},\ \{a\}(\{a\}|\{\})\{a,b\}($

$\{a,b\}^{+} \mid (\{a\}\{a,b\})^{+})^{+}\{a,b\}^{\omega},$

$\ldots \}$

1) initially a holds and b does not hold $AP = \{a, b, c\}$

$$E = \{ A_0 A_1 A_2 \cdots \in (2^{AP})^\omega \mid a \in A_0 \wedge b \notin A_0 \}$$

SAFETY LimBad Refixes = $\{\{\}, \{b\}, \{a,b\}, \{c\}, \{b,c\}, \{a,b,c\}\}$

correct "prefixes" = $\{\{a\}, \{a,c\}\}$

$$2^{AP} = \{\{\}, \{a\}, \{b\}, \{c\}, \{a,b\}, \{a,c\}, \{b,c\}, \{a,b,c\}\}$$

2) c holds only finitely many times

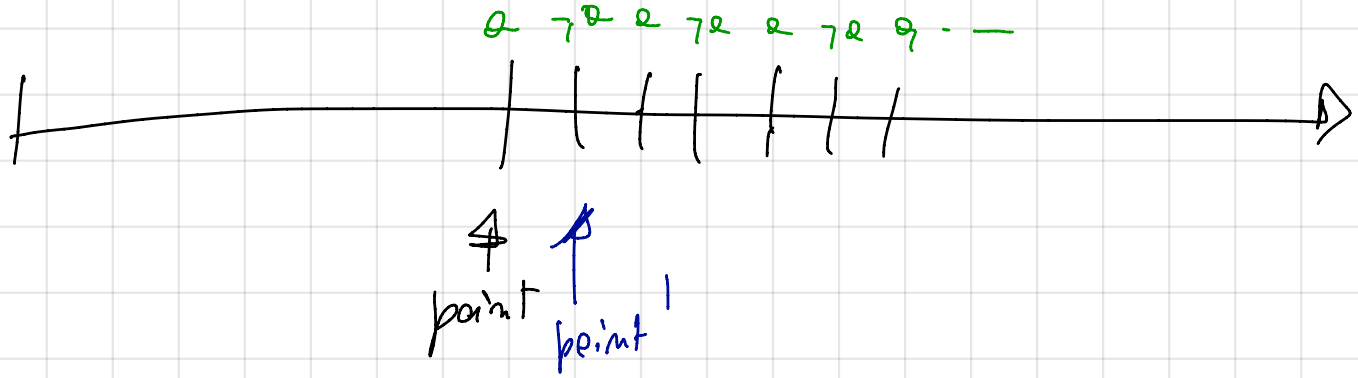
$$E = \{ A_0 A_1 A_2 \cdots \in (2^{AP})^\omega \mid \overset{\infty}{\forall} i \in \mathbb{N} \; c \notin A_i \}$$

$$\exists k \in \mathbb{N} : \forall i \in \mathbb{N}. \; i > k \Rightarrow c \notin A_i$$

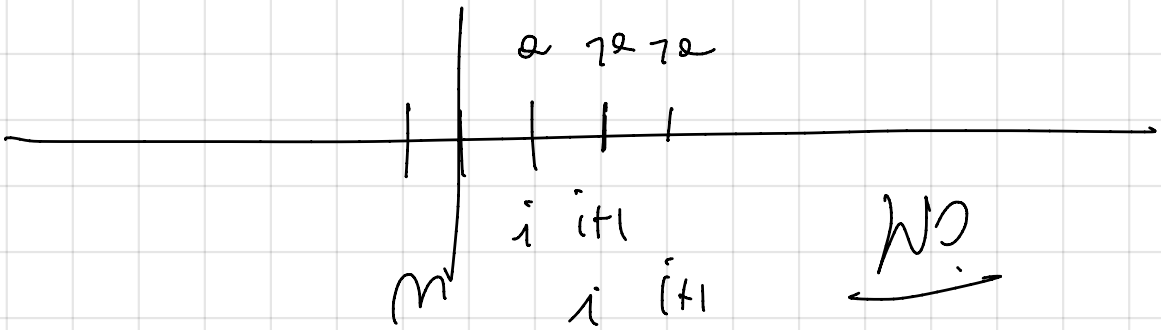
LIVENESS

ex $\{a\}\{c\}\{b\}\{\}$ can be completed to $\{a\}\{c\}\{b\}\{\}(\{a\})^\omega$

3) from some point on the truth value of a alternates between true and false



$$E = \{ A_0 A_1 \cdots \in (2^{AP})^\omega \mid \exists n \in \mathbb{N} : \forall i \in \mathbb{N}. \; i > n \Rightarrow (a \in A_i \Rightarrow a \notin A_{i+1}) \}$$



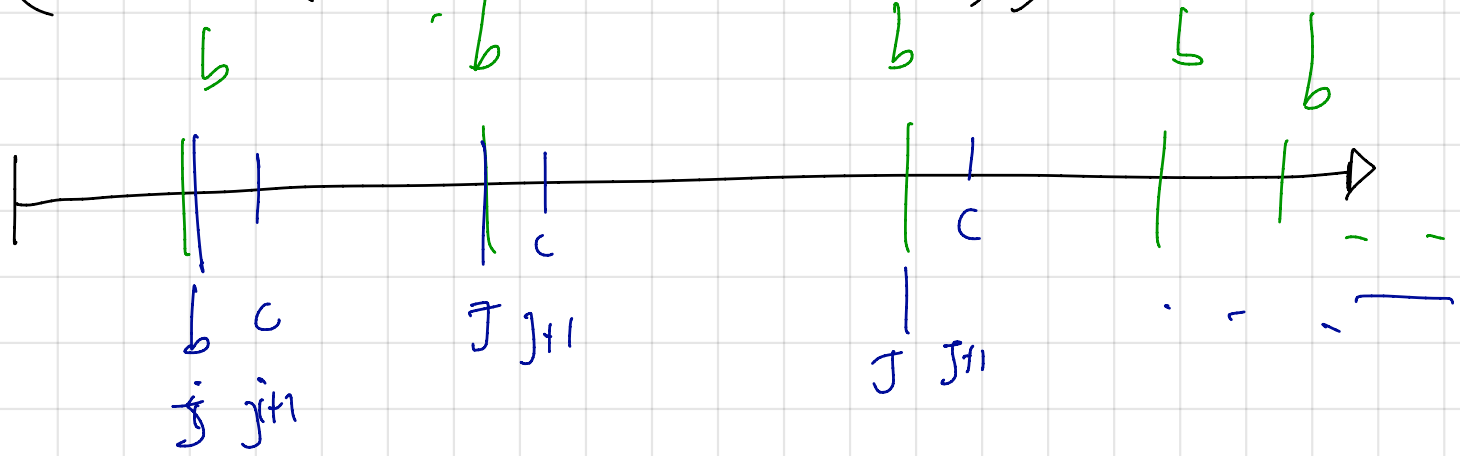
$$E = \{ A_0 A_1 \cdots \in (2^{AP})^\omega \mid \exists n \in \mathbb{N} : \forall i \in \mathbb{N}. \; i > n \Rightarrow ((a \in A_i \Rightarrow a \notin A_{i+1}) \wedge (a \notin A_i \Rightarrow a \in A_{i+1})) \}$$

LIVENESS

$A_0 \cdots A_n$ ⟨ extend to R

G) b holds infinitely many times and whenever b holds then c holds immediately afterwards

$$E = \{ A_0 A_1 \cdots \in (2^{AP})^\omega \mid (\overset{\infty}{\exists} i \in \mathbb{N} : b \in A_i) \wedge (\forall j \in \mathbb{N} . (b \in A_j \Rightarrow c \in A_{j+1})) \}$$



MIXED = SAFE $\cap$ LIVE

$$LIVE = \{ A_0 \cdots \mid \overset{\infty}{\exists} i \in \mathbb{N} : b \in A_i \} \cap$$

$$SAFE \{ A_0 \cdots \mid \forall j \in \mathbb{N} . b \in A_j \Rightarrow c \in A_{j+1} \}$$