Review Q & A - Mar. 3

Written Test 1

LTS: Deadlock Freedom

Q. Formulate **deadlock freedom**:

From any state, it is always possible to make progress.

→ for reactive systems, for each state, it's always possible to make some progress transition

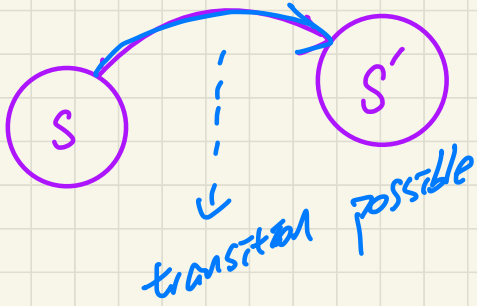
$\forall s \cdot s \in S \Rightarrow (\exists s' \cdot s' \in S \wedge$ ① $(s, s') \in \longrightarrow$ ② $s' \in \longrightarrow[\{s\}])$

② $s' \in \mathrm{ran}(\{s\} \lhd \longrightarrow)$

④ use range restriction

$\mathcal{L}(S_1) =$

$\mathcal{L}(S_2)$

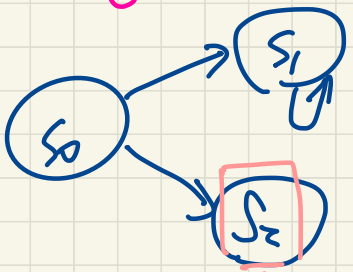


$\longrightarrow = \{ \ldots (s, s'), \ldots \}$

$\longrightarrow = \{ (S_0, S_1), (S_0, S_2), (S_1, S_1) \}$

$s' \in \mathrm{ran}(\{S_0\} \lhd \longrightarrow)$

relation



another relation whose domain is just $\{S_0\}$

$\{(S_0, S_1), (S_0, S_2)\}$

no progress can be made.

$\mathrm{ran}(\{(S_0, S_1), (S_0, S_2)\}) = \{S_1, S_2\}$