Exercise 13

Is relation \{ (1,A), (1,C), (2,B), (3,B), (3,C) \} a strong bisimulation over the LTS shown on the right? Justify your answer.

Exercise 14

Given LTS A and B as shown on the right, . . .

a) . . . compute the maximal strong simulation \( \preceq \) over \( A \cup B \).

b) . . . compute the maximal strong bisimulation \( \approx \) over \( A \cup B \).

c) Check whether \( 1 \preceq 4, 4 \preceq 1 \) and \( 1 \approx 4 \).

d) Is \( L(A) = L(B) \)?

Exercise 15

Compute the maximal weak simulation \( \preceq \) over the LTS shown on the right.
Exercise 16

Let $L := (S, I, \Sigma, T)$ be an LTS with states $S$. Let $\Psi : \mathcal{P}(S \times S) \rightarrow \mathcal{P}(S \times S)$ be the operator defined on slide 38, i.e. $\Psi(\lesseqqgtr) := \{(r, t) \in (S \times S) \mid r \lesseqqgtr t \text{ or } \exists s \in S : [r \lesseqqgtr s \text{ and } s \lesseqqgtr t]\}$ for relation $\lesseqqgtr \subseteq S \times S$.

a) Prove that if $\lesseqqgtr$ is a simulation then $\Psi(\lesseqqgtr)$ is also a simulation.

b) Given a relation $\lesseqqgtr \subseteq S \times S$, is $\Psi(\lesseqqgtr)$ always a transitive relation? Justify your answer.