1. Consider the following LTSs L_1 to L_8.

$L_1:$ $\Sigma_1 = \{a,b,c\}$

$L_2:$ $\Sigma_2 = \{a,b,c\}$

$L_3:$ $\Sigma_3 = \emptyset$

$L_4:$ $\Sigma_4 = \emptyset$

$L_5:$ $\Sigma_5 = \{a\}$

$L_6:$ $\Sigma_6 = \{a\}$

$L_7:$ $\Sigma_7 = \{a,b,c\}$

$L_8:$ $\Sigma_8 = \{a,b,c\}$
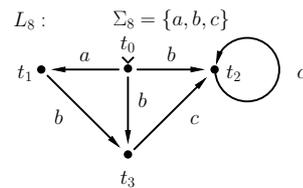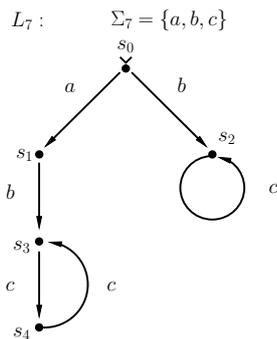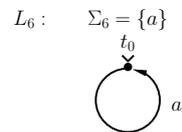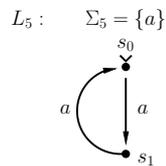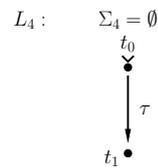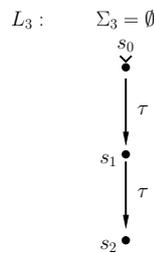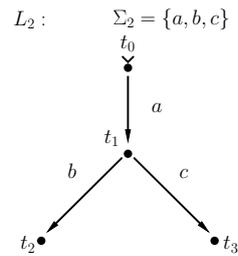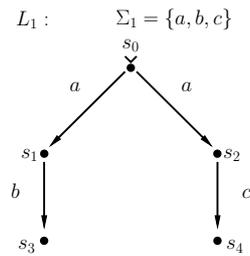
   a) Is it the case that $L_1 \sim L_2$?

   b) Is it the case that $L_3 \sim L_4$?

   c) Is it the case that $L_5 \sim L_6$?

   d) Is it the case that $L_7 \sim L_8$?

(In each case, either find a bisimulation relation to show that the two LTSs are bisimilar, or show that no such bisimulation relation exists.)

2. Find two LTSs L and L' such that $L \leq_{sim} L'$ and $L' \leq_{sim} L$ hold, but $L \not\sim L'$ does not hold (L and L' are not bisimilar).

3. Find two LTSs L and L' such that $L \leq_{tr} L'$ holds, but it is not the case that $L \leq_{sim} L'$ holds.