

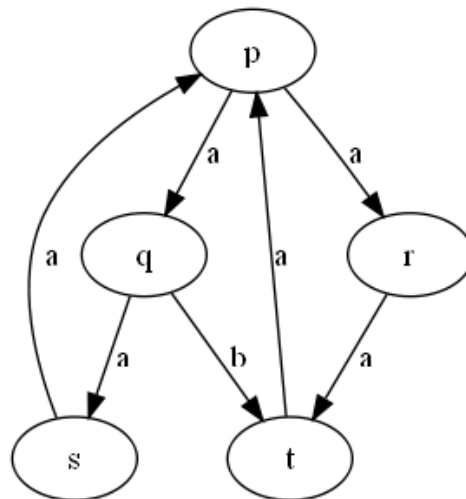
The following exercises will be discussed on July 18th.

**Exercise 9-1** Trace Equivalence, Similarity and Bisimilarity

- Let us assume that  $P$  and  $Q$  are doubly similar, i.e.  $P \sqsubseteq Q$  and  $Q \sqsubseteq P$ . Are then  $P$  and  $Q$  also strongly bisimilar?
- Show that  $P$  and  $Q$  are trace equivalent, if they are strongly bisimilar.

**Exercise 9-2** HML Formulas and Labelled Transition Systems

Consider the following LTS:



Prove or disprove the following statements:

- $p \models [a]\langle b \rangle tt$
- $p \models \langle a \rangle \langle b \rangle tt$
- $p \models [a](\langle a \rangle tt \vee \langle b \rangle tt)$
- $p \models [a]\langle a \rangle [a][b]ff$
- $p \models \langle a \rangle ([a](\langle a \rangle tt \wedge [b]ff) \wedge \langle b \rangle ff)$

**Exercise 9-3****Bisimulation and HML Formulas**

Prove by structural induction over  $\phi$

$$\forall \phi, \phi \text{ HML formula } \forall s, t \left( s \sim t \Rightarrow (s \models \phi \Leftrightarrow t \models \phi) \right)$$