

**Elective in Software and Services**

*(Complementi di software e servizi per la società dell'informazione)*

2008/09

11/02/2009

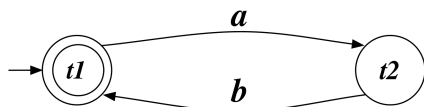
Time to complete the assignment: 2 hours

**Part 1 (Composition Synthesis)**

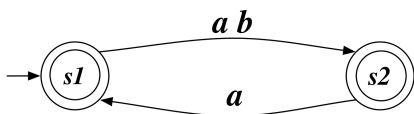
Given the following target **T** service and available services **A<sub>1</sub>**, **A<sub>2</sub>**, check whether a composition exists. If it does exist, produce the output relation of orchestrator generator. If not, single out the target state that cannot be simulated (ND-simulated), and propose a change to the available services so as to guarantee the composition.

(Notice: to check for composition existence, build asynchronous product of available services and check simulation/ND-simulation as appropriate.)

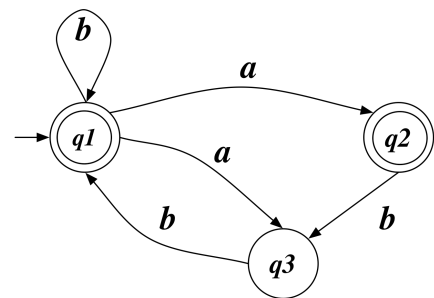
**T**



**A<sub>1</sub>**



**A<sub>2</sub>**



**Part 2 (Theoretical Question)**

Prove that the following claim holds.

**Theorem:** If two states  $s, t$  of two finite deterministic transition systems are bisimilar then  $s$  is simulated  $t$ .

Prove also that the converse does not hold by showing a counterexample.