

Modeling Concurrent and Probabilistic Systems

Winter Term 07/08

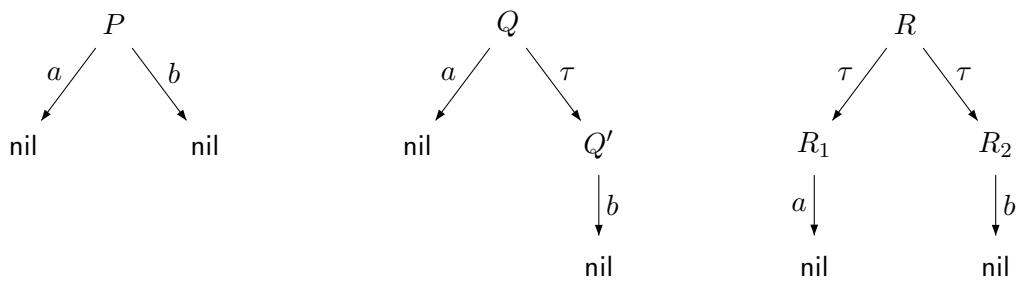
– Series 6 –

Hand in until November 30 before the exercise class.

Exercise 1

(4 points)

Consider the following three process definitions with their respective LTS:



$$P(a, b) = a.\text{nil} + b.\text{nil}$$

$$Q(a, b) = a.\text{nil} + \tau.b.\text{nil}$$

$$R(a, b) = \tau.a.\text{nil} + \tau.b.\text{nil}$$

Prove that no weak bisimulation can contain (P, R) or (Q, R) !

Exercise 2

(6 points)

Prove that weak bisimulation is preserved under the CCS operations prefixing, parallel composition and restriction: if $P_1, P_2, Q \in \text{Proc}$ such that $P_1 \approx P_2$, then

- a) $a.P_1 \approx a.P_2$ for every $a \in \text{Act}$,
- b) $P_1 \parallel Q \approx P_2 \parallel Q$ and
- c) $\text{new } a \ P_1 \approx \text{new } a \ P_2$ for every $a \in N$.

Exercise 3

(4 points)

Prove or disprove the following propositions:

- a) $P \parallel \tau.Q \approx P \parallel Q$,
- b) $P \parallel \tau.Q \simeq P \parallel Q$ and
- c) $P \parallel \tau.Q \simeq \tau.(P \parallel Q)$.