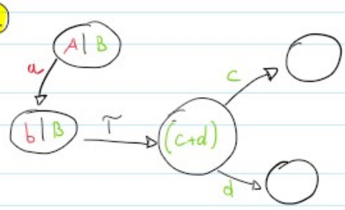
Homework 5

Friday, 16 April 2021

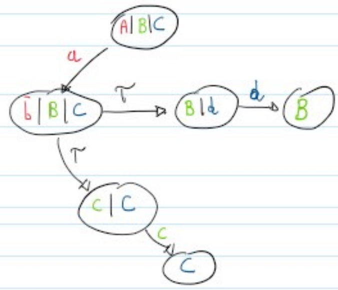
$P = (\underset{A}{a.\bar{b}} \mid \underset{B}{b.(c+d)})/b$

$Q = (\underset{A}{a.\bar{b}} \mid \underset{B}{b.c} \mid \underset{C}{b.d})/b$

1

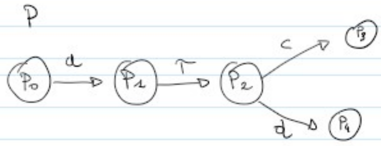


2



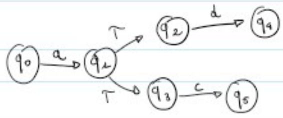
P

1



$\mathcal{L}(P) = a.\tau(c+d)$

2



$\mathcal{L}(Q) = a.(\tau.c)+(\tau.d)$

The languages are equivalent $\mathcal{L}(P) = \mathcal{L}(Q)$

They aren't bisimilar:

q_0 is simulated by p_0

$S = \{(q_0,p_0),(q_1,p_1),(q_2,p_2),(q_3,p_2),(q_4,p_4)(q_5,p_3)\}$

p_0 is not simulated by p_0:

$S^{-1} = \{(p_0,q_0),(p_1,q_1),\underline{(p_2,q_2)},\underline{(p_2,q_3)}(p_4,q_4),(p_3,q_5)\}$

IMPOSSIBLE

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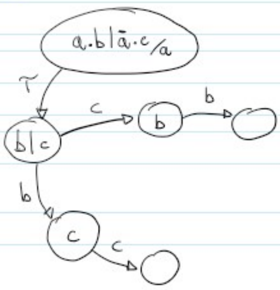
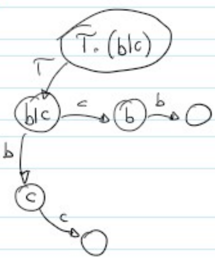
2)

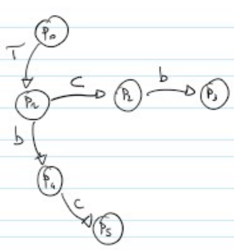
1 $(a.b \mid \bar{a}.c)/a$

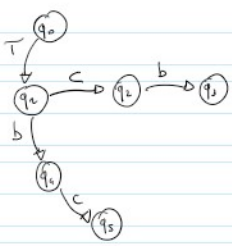


2



Relabelling of the states:





$S = \{(p_i,q_i) \mid i \in [0,5]\}$

$S^{-1} = \{(q_i,p_i) \mid i \in [0,5]\}$

BISIMULATION

3) WITHOUT PARAMETRIC PROCESS DEFINITION

Stack of 2 bits:

$S_\varepsilon = \Sigma_{i\in\{0,1\}} in_i . S_i$

$S_i = \Sigma_{j\in\{0,1\}} in_j . S_{ij} + out_i . B_\varepsilon$

$S_{ij} = out_j . S_i$

WITH PARAMETRIC PROCESS DEFINITION

Stack of 2 bits:

$S_\varepsilon = \Sigma_{i\in\{0,1\}} in_i . S'(out_i)$

$S'(x) = \Sigma_{j\in\{0,1\}} in_j . S''(x, out_j) + x . S_\varepsilon$

$S''(x,y) = y . S'(x)$

Stack of 3 bits:

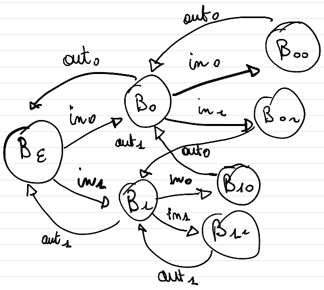
$S_\varepsilon = \Sigma_{i\in\{0,1\}} in_i . S(out_i)$

$S'(x) = \Sigma_{j\in\{0,1\}} in_j . S''(x, out_j) + x . S_\varepsilon$

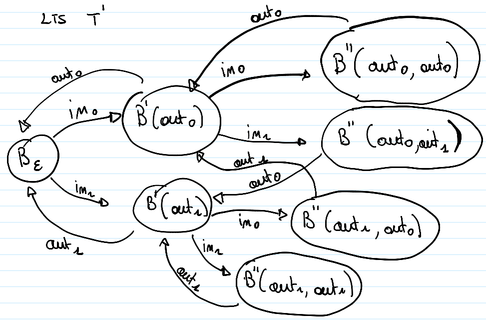
$S''(x,y) = \Sigma_{k\in\{0,1\}} in_k . S'''(x,y,out_k) + y . S'(x)$

$S'''(x,y,z) = z . S''(x,y)$

4) LTS T



LTS T'



WITHOUT PARAMETRIC DEFINITIONS

Let $T = (S, A, \rightarrow, B_\varepsilon)$

WITH PARAMETRIC DEFINITIONS

Let $T' = (S', A', \rightarrow', B_\varepsilon)$

There exist f bijective : $f: S \rightarrow S'$ s.t. $f(B_\varepsilon) = B_\varepsilon$ and $s_1 \rightarrow s_2$ for some $s_1, s_2 \in S$ i.i.f. $f(s_1) \rightarrow' f(s_2)$