Assignment 1 Question 12

Hien Tu - tun1

October 1, 2021

Question 12

a. Show $P_2 \approx P_3$, i.e., P_2 and P_3 are *bisimilar*.

Clearly, $p_0 \approx s_0$ as only a and b come out of both p_0 and s_0. After trace a, in P_2, p_0 goes to state p_1; in P_3, s_0 goes to state s_1. $p_1 \approx s_1$ since only a comes out of both p_1 and s_1. $p_2 \approx s_2$ since a, b and c can be executed from both states. $p_3 \approx s_3$ since only a and c can come out of both p_3 and s_3. $p_4 \approx s_4$ since only a and b come out of both p_4 and s_4. $p_5 \approx s_5$ since only c can be executed from both states and both lead back to the starting states. $p_5 \approx s_6$ since only c can be executed from both states and both lead back to the starting states as well. Hence $P_2 \approx P_3$.

b. Show that $P_1 \not\approx P_2$, i.e., P_1 and P_2 are not *bisimilar*.

Clearly, $q_0 \approx p_0$ since only transition a can be executed from both q_0 and p_0. Then $q_1 \approx p_1$ since only a comes out of both p_1 and q_1. After this trace a, in P_1, q_1 goes to either q_2 or q_3 while p_1 goes to p_2 in P_2. However, $q_2 \not\approx p_2$ since at state p_2, a, b, and c can be executed but from state q_2, only a and c can be executed. $q_3 \not\approx p_2$ either since only a and b can be executed from q_3. Therefore, $P_1 \not\approx P_2$