

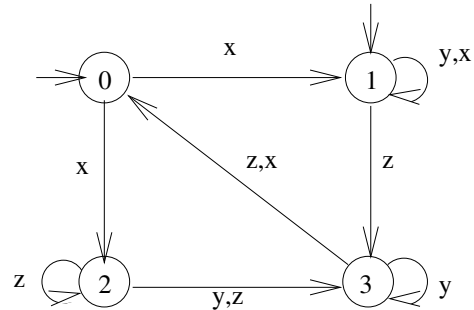
Formal Models SS 2015: Assignment 10

Institute for Formal Models and Verification, JKU Linz

Due 18.06.2015

Exercise 37

Dig up exercise 32 on sheet 8 (also pictured here). With all the vast knowledge you meanwhile acquired in the exercise lectures, try to solve it again. If you already solved it correctly before, enjoy the free points!

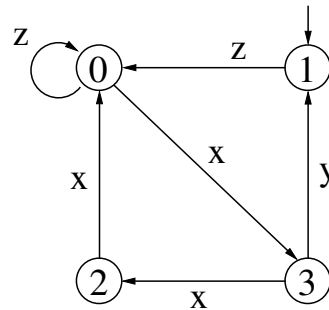


HML	State 0	State 1	State 2	State 3
$\langle x \rangle \langle z \rangle 1$				
$[x](\langle x \rangle 1 \wedge [y] 0)$				
$([x] \langle y \rangle 1) \leftrightarrow ([y] \langle x \rangle 1)$				
$([x \vee y] \langle \neg y \rangle 1) \rightarrow ([y] \langle x \rangle 1)$				

Exercise 38

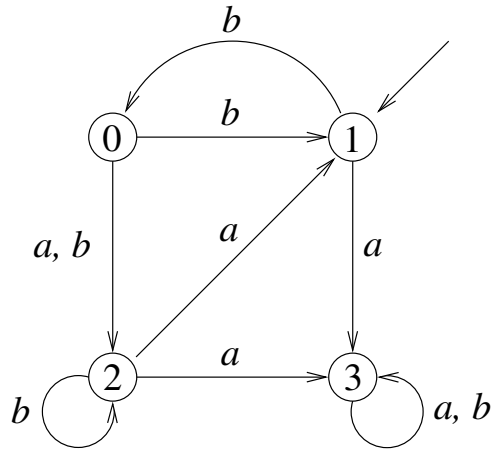
Given LTS L and CTL/HML formulae 1 to 6 as shown below. For each state s of L , determine which of formulae 1 to 6 hold in s .

1. $\mathbf{EX}(\langle x \rangle 1)$
2. $\mathbf{AX}([y] 0)$
3. $\mathbf{AG}(\langle z \rangle 1 \rightarrow \langle y \rangle 1)$
4. $\mathbf{E}[\langle x \rangle 1 \mathbf{U} \langle z \rangle 1]$
5. $\mathbf{EG}(\langle z \rangle 1)$
6. $\mathbf{EF}(\mathbf{EG} \langle x \rangle 1)$



Exercise 39

Draw the Kripke structure for the LTS shown below.



Exercise 40

Given the Kripke structure LTS K , and CTL formulae 1 to 6 as shown below. Determine which of formulae 1 to 6 hold in K .

- | | |
|-------------------------------------|---------------------------------|
| 1. $\mathbf{EX}p$ | 2. $\mathbf{AX}p$ |
| 3. $\mathbf{EF}q$ | 4. $\mathbf{AF}q$ |
| 5. $\mathbf{AF}p$ | 6. $\mathbf{EG}p$ |
| 7. $\mathbf{E}[q \mathbf{U} p]$ | 8. $\mathbf{E}[p \mathbf{U} q]$ |
| 9. $\mathbf{EX}(\mathbf{AG}\neg p)$ | 10. $\mathbf{EF}(\mathbf{EG}q)$ |

