VTES - TD 2

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TIMED AUTOMATA 2

Exercise 1   Standard regions

1. Recall the definition of standard regions.

2. Represent the standard regions for 2 clocks. What are the shapes of these regions?

3. For each region from question 2 give the next region reached when time elapses, when first clock is reseted, when second clock is reseted, and when both clocks are reseted.

Exercise 2   Region automaton

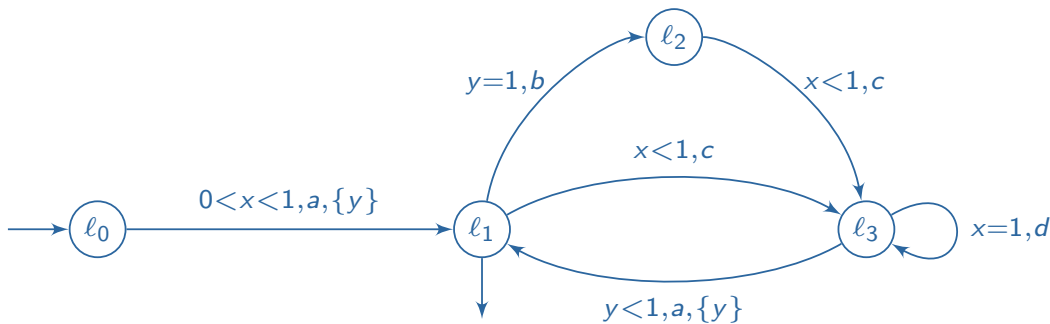**1.** What are the standards regions corresponding to the automaton of Figure 1?

FIGURE 1 – A timed automaton

2. Draw the corresponding region automaton.

3. Does there exist an accepted timed word containing action b in the automaton of Figure 1? Justify your answer using the region automaton.

4. Does there exist timed word with arbitrary size in the automaton of Figure 1? Does there exist such words which are accepted? Justify your answers using the region automaton.

Exercise 3   Untimed language

1. Recall the automaton constructed in last TD for language $\mathcal{L}_3 = \{((abc)^*, \tau) \mid \sigma_i = a \Rightarrow t_{i+3} - t_i \leq 3, \sigma_i = b \Rightarrow t_{i+3} - t_i \geq 2, \sigma_i = c \Rightarrow t_{i+3} - t_i = 4\}$.

2. Draw the corresponding region automaton using standard regions.

3. Give the language $Untime(\mathcal{L}_3)$.