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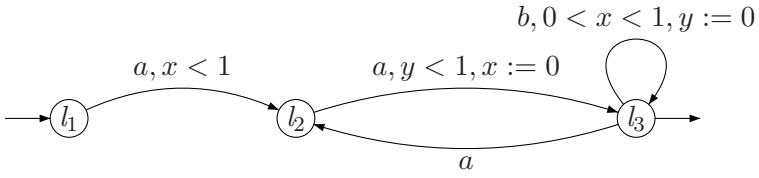
SS 2014
Institut für Informatik

„Real-Timed Automata“
Exercise 3

The following exercises must be submitted 02.06.2014 *before* the lecture.

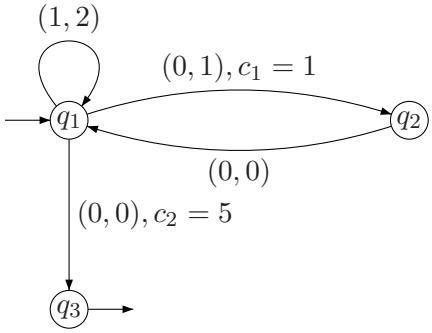
1. Construct the region automaton for the following timed automaton:



2. Let (ψ, t) be a subset-sum game, where $\psi = \forall\{2,5\}\exists\{3,1\}\forall\{1,0\}\exists\{0,2\}\forall\{3,1\}\exists\{0,2\}$, and $t = 9$.
   (a) Give a play that is winning for the existential player.
   (b) Does the existential player have a winning strategy? If yes, give this strategy. Otherwise, give a counterexample.

3. Prove Lemma 3.13:
   If there exists a successful run in $\mathcal{A}_\mathcal{B}$, then there exists a computation in $\mathcal{B}$ ending in q_f.

4. Consider the following counter automaton $\mathcal{B}$:



   (a) $\mathcal{B}$ is not a bounded counter-stack automaton. Why not?
   (b) Add to $\mathcal{B}$ the missing information in such a way that there is some computation in $\mathcal{B}$ ending in q_3.
   (c) Construct a BOCA $\mathcal{B}'$ that is reachability-equivalent to $\mathcal{B}$. *Hint: By reachability-equivalent we (informally) mean that for all states q of $\mathcal{B}$, $\mathcal{B}$ has a computation ending in q if, and only if, $\mathcal{B}'$ has a computation ending in q.*