

## Tutorial 10

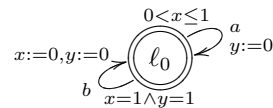
### Exercise 1

Let  $C = \{x, y\}$  be a set of clocks such that  $c_x = 2$  and  $c_y = 2$ .

- Draw a picture with all regions for the clocks  $x$  and  $y$ .
- How many different regions there are on the picture?
- Select four different regions (corner point, line, two areas) and describe them via clock constraints.
- Try to find a general formula which describes a number of regions for two clocks and arbitrary maximal constants  $c_x$  and  $c_y$ .

### Exercise 2\*

Draw a region graph of the following timed automaton.



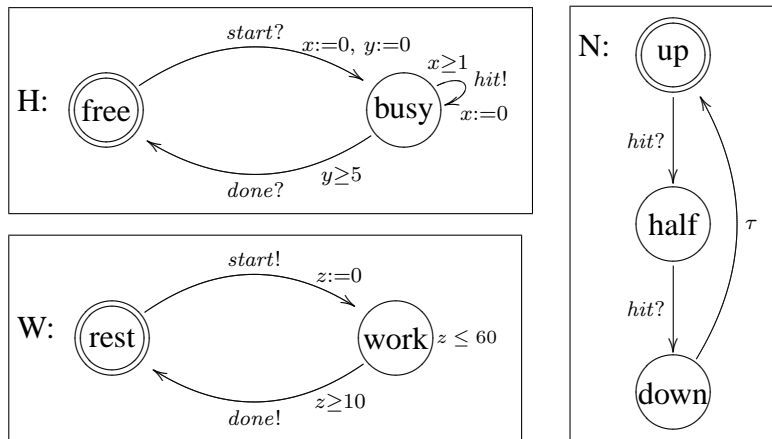
Using the region graph decide whether the following configurations

- $(l_0, v)$  where  $v(x) = 0.7$  and  $v(y) = 0.61$
- $(l_0, v)$  where  $v(x) = 0.2$  and  $v(y) = 0.41$

are reachable from the initial configuration.

### Exercise 3

Consider the following network of timed automata from the lecture.



- Give an example of a timed trace in the network above.
- Which of the following properties are true?
  - $A \Box (W.rest \vee z \leq 100)$
  - $E \langle \rangle (W.rest \wedge H.busy)$
  - $A \langle \rangle W.rest$
  - $E \Box H.busy$
  - $W.work \dashv\dashv > W.rest$