

Quantitative Verification 4

Ex 1: Zone Construction

Draw the zone automaton simulating the timed automaton in Fig. 1.

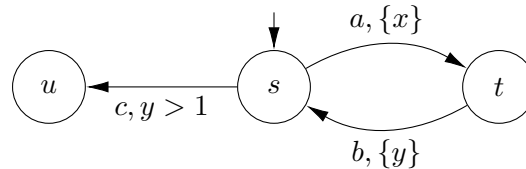


Figure 1: A Timed Automaton

Ex 2: TCTL

Let $AP = \{\text{request}, \text{grant}, \text{error}, \text{idle}\}$ be atomic propositions and $C = \{x, y\}$ clocks. Express the following properties in TCTL:

- **error** is reachable within 100 time units.
- The system is **idle** in time units five to ten.
- For the first 1000 time units, whenever there is a **request**, a **grant** will follow in at most five time steps.
- The system is never **idle** on an **error** within the first 1000 time units.
- Whenever $y > 10$ within the first 1000 time units, the system is in **error** within 10 steps.
- At any state reachable within 1000 time units, **error** is reachable within 30 time units.
- Within the first 1000 time units, if a **request** can't be **granted** within three time units, then $x > 4$ and **error** will be reached within ten time units.

Important: In the tutorial, we discussed a different possible definition of TCTL than the one from the lecture.