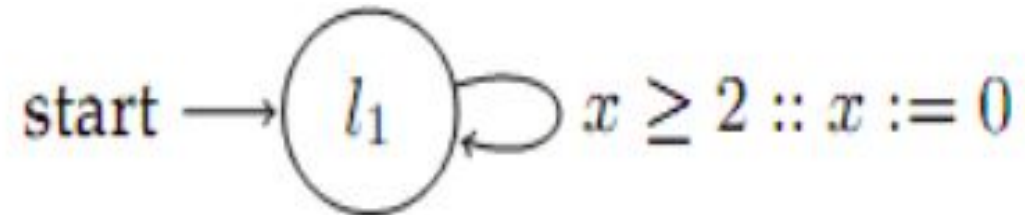
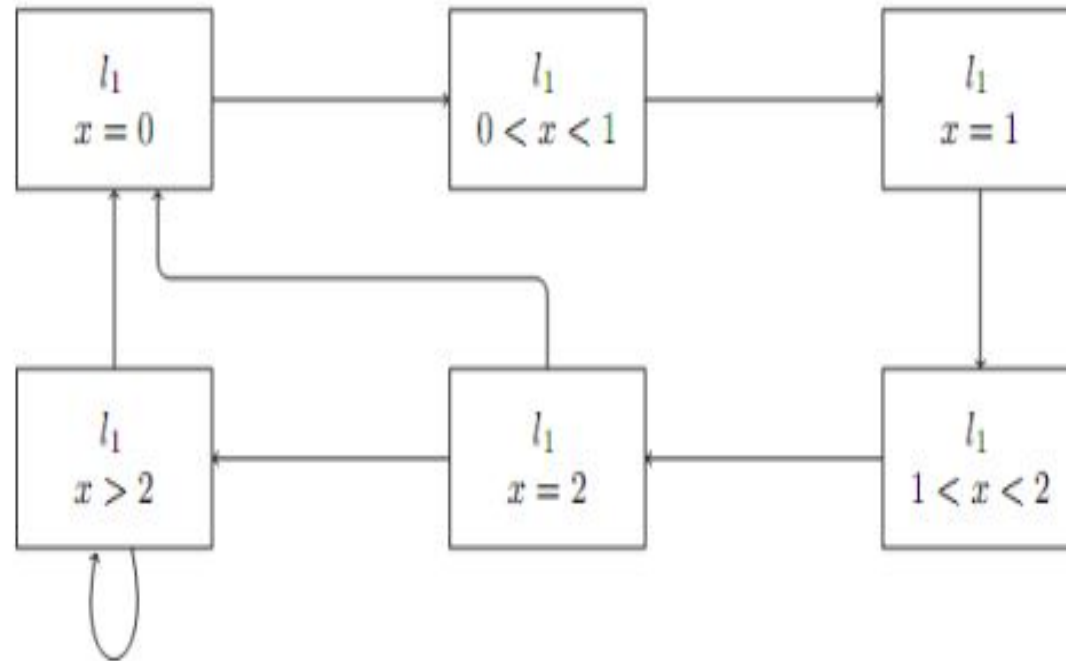


Region Graph For Timed Automata

Draw a region graph of the following timed automata.



SOLUTIONS

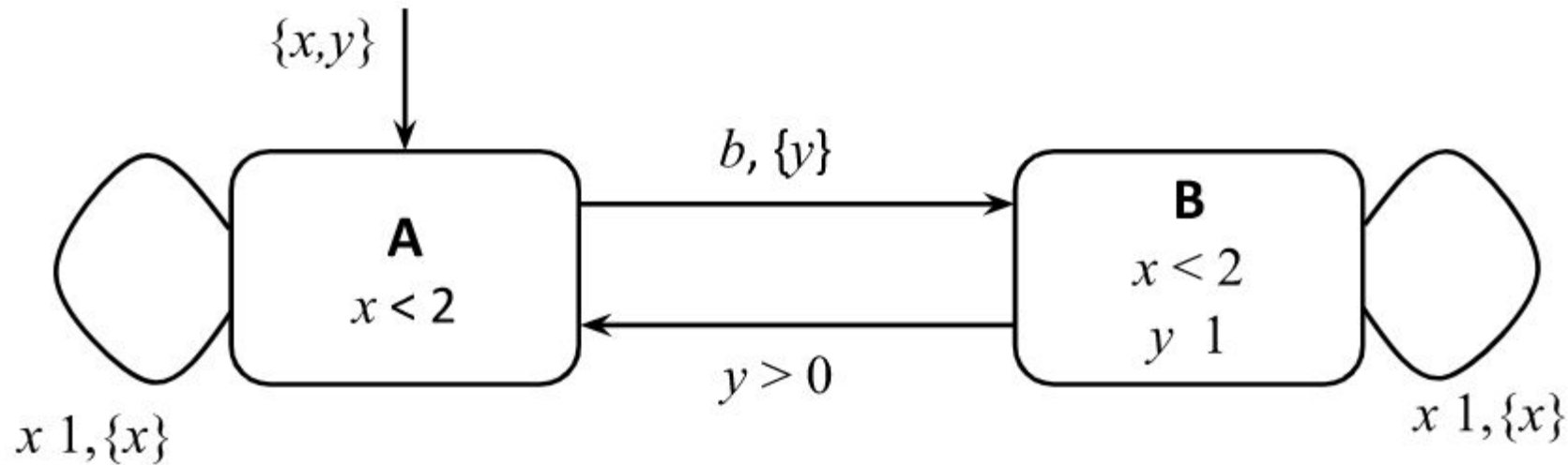


TIMED AUTOMATA STANDARD TIME REGIONS

For the timed automaton shown below, draw the standard time regions

List all possible regions that are successors of the region $\langle A, x=0, y > 1 \rangle$ in this timed automaton

List all possible regions that are successors of the region $\langle B, 0 < x = y < 1 \rangle$ in this timed automaton.



MODELING TIMED AUTOMATA

When the door of a refrigerator is opened, the light inside the refrigerator turns ON. If the door is kept open for more than one minute, then a beeper is activated. The beeper, when activated produces a beep, and then repeats the beep at least once in every 30 seconds. When the door is closed, the light goes OFF and the beeper (if active) is deactivated.

(a) Draw a timed automaton for the door controller which controls the light and the beeper.

(b) Write the following properties in TCTL

- 1) The beeper never sounds when the light is OFF
- 2) Whenever the beeper is active, a beep is heard within 30 seconds.
- 3) When the light turns ON, it remains ON for at least 30 seconds

(c) Which of the properties of part (b) are true in your timed automaton?

(d) Explain the steps in constructing a region automaton from your timed automaton. Note that you do not have to construct the full region automaton – you have to state and explain the steps of the procedure, preferably showing a few regions only.