

Consider a garage door system with possibly many doors, where each door is controlled with its own 2 button remote: one button labelled *up* and the other labelled *down*. In general we consider a garage door to be open, closed or in some state in between.

- When the garage system is activated all doors are closed.
- When a door is closed, clicking the up button results in the door moving upward (i.e. opening), but if the down button is clicked nothing happens. Similarly when a door is open, clicking the down button causes the door to move downward (i.e. closing), but if the up button is clicked nothing happens.
- When a door is opening, clicking the down button causes the door to pause where it is. Then while the door is paused, if the up button is clicked the door resumes opening, but if the down button is clicked the door starts closing.
- When a door is opening, clicking the up button has no effect – the door continues opening.
- When a door is closing, clicking the up button causes the door to pause where it is. Then while the door is paused, if the up button is clicked the door starts opening, but if the down button is clicked the door resumes closing.
- When a door is closing, clicking the down button has no effect – the door continues closing.
- There are sensors that detect when a door is fully open or fully closed.

Consider that a door has methods `getState()`, `setState()`, `open()`, `close()`, and `pause()`. When a door receives an `open()`, `close()`, or `pause()` the door will start (or resume) opening, start (or resume) closing, or pause respectively.

- a) Show with a statechart diagram the operation of a garage door.
- b) Show the class diagram that results when you represent the garage door system (just one door) using the State design pattern.

Submit the diagrams as pdf files via email to 3913-001@acs.uwinnipeg.ca