

Implement a system with a remote control that operates a garage door and a light where the door and light are receivers connected to command objects. Use the Command design pattern. Use Holub's techniques to manage undo/redo stacks.

Consider the statechart diagrams below. The first is a sample solution for Assignment 3, and the second is a statechart diagram for a light controlled via a single button. Implement the rules controlling the door and light using the State design pattern.

The remote control has 5 buttons: garage door open, garage door close, light on/off, undo, redo. The remote is initialized with the required command objects to open a door, close a door, and switch a light on and off.

It must be possible to undo/redo any number of commands.

Test your system with the following remote loader:

```
Door door = new Door("my door");
Light light = new Light("my light");
RemoteControl rc = new RemoteControl(door, light);

// arrange for the door to go through a cycle of states:
//   closed → opening → open → closing → closed
rc.upPushed();           // up button on remote pushed
door.fullyOpen();       // the sensors detect the door is fully open
rc.downPushed();       // down button on remote pushed
door.fullyClosed();    // the sensors detect the door is fully closed
System.out.println(door); // the door's state is displayed

// arrange for the light to go through its states:
//   off → on → off
rc.lightButtonPushed(); // the light button is pushed
rc.lightButtonPushed(); // the light button is pushed
System.out.println(light); // the light's state is displayed

rc.undo(); rc.undo(); rc.redo(); rc.redo();
```

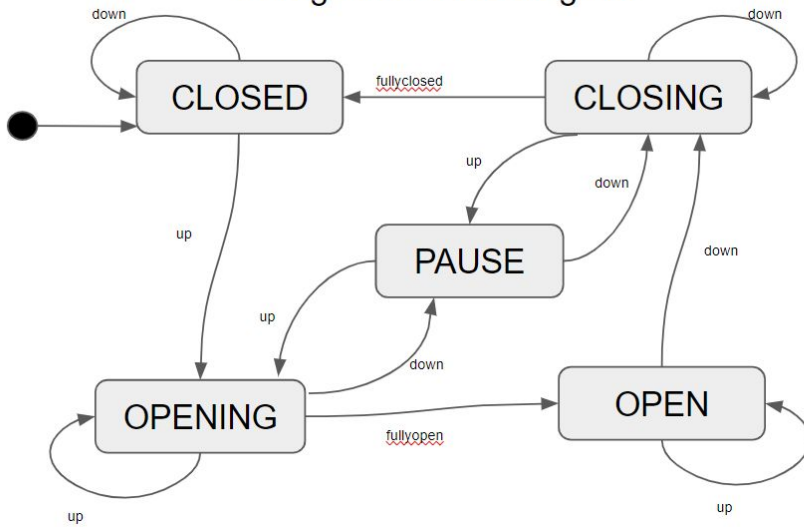
The TA will test your system with the above and with other sequences.

Submit

- a class diagram showing class names, methods, associations, navigability as a pdf file, and
- Java source files

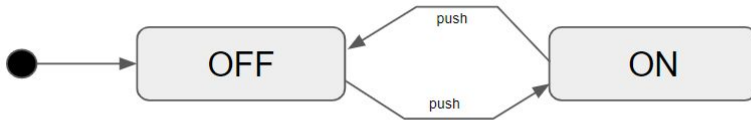
to 3913-001@acs.uwinnipeg.ca

Garage door state diagram



The door's initial state is closed.  
If the door is closed and the up button is pressed, the door will be opening.  
If the door is opening and the up button is pressed, the door is still opening,  
If the door is opening and it becomes fully open, then it is open.  
etc.

Light state diagram



There is one button controlling the light.  
The light's initial state is off.  
If the light is off and the button is pressed, then the light is on.  
If the light is on and the button is pressed, then the light is off.