

ENMT201 - Elevator Project

Lab Assessment 1

1 Moving the Carriage

The main objective of this lab is to demonstrate your software correctly operating the elevator doors. However, to do this, you will need to be able to move the elevator carriage up and down to get the carriage lined up with a floor. At the moment, this movement doesn't need to be automated, just manually using pushbuttons will be sufficient. So:

- Implement some method of moving the carriage up and down using pushbuttons. One pushbutton should move the carriage up, another pushbutton should move it down. When neither pushbutton is being pressed, the carriage should not move.
- You will need to select an appropriate DAC value to select the speeds the carriage moves up and down at. About 50% of FSD is a good choice for manual positioning.

2 Operating the Doors

Now that the carriage can be moved manually, the operation of your carriage doors can be tested. There are a number of basic functions that your software will need to implement. The TA's will want to see each of these demonstrated:

- When the carriage is not located at a floor, the doors should not open, even if someone presses the 'open doors' button.
- If the carriage is moving past a floor without stopping there, the doors should not attempt to open, even if the 'open doors' button happens to be held down.
- When the carriage first arrives at a floor, the carriage doors should open. When the doors have been open for a while (3-5 seconds will be fine), the doors should close again, unless the 'open doors' button is being held down.
- When the carriage is sitting idle on a floor, the 'open doors' button should cause the doors to open, and the 'close doors' button should cause the doors to close.
- When opening and closing the doors, the door motor should only be activated for as long as it takes to move the door to the required position. The door motor should not be kept powered once the doors have reached the stops.
- When the doors are open, the carriage should be unable to try to move up and down, even if one was to press the buttons you have temporarily rigged for moving the carriage.

Note that it *is* possible to ‘trick’ the MCU supervisor if you try to open the doors whilst the elevator carriage is moving at speed past a floor, which can result in actual damage to the elevator rig (the doors jam the carriage in the shaft). You should be *very careful* that your software behaves sensibly to avoid such situations, which will be extremely inconvenient.