

Homework 3 Part 1

1. Describe the required steps for calibration of a continuous rotation servo. In particular, explain the signal used for calibration and the technique used to calibrate the servo. What additional step is required to verify that the calibration signal generated by the Raspberry Pi is indeed the correct signal for calibration (hint: how would you check that the signal from the Pi is correct?)
2. Describe continuous rotation servo control; What are the parameters used for calibration (motor is still), full speed clockwise rotation and full speed counter-clockwise rotation? Express these parameters in terms that would work with RPi.GPIO calls (hint: frequency and duty cycle)
3. What is the best way to power the servo motors and the RaspberryPi. Show a sketch of the circuit indicating power and ground for two servos, the microprocessor plus control line connection for the PWM to servos.
4. With the servos attached to the robot frame, the robot and Raspberry Pi, become elements of a mobile embedded system. Suppose you want the robot to travel in a straight line for a specific distance. Describe one possible method for achieving straight-path travel, over some specific distance. What other considerations might you have to keep in mind (hint: think robot physical safety)?
5. One solution for displaying the right and left logs for the `rolling_control.py` program from lab three would be to use a python dictionary. The dictionary for the left log might be organized as:

```
Left_log = { stop:(80,140), clockwise:(80,160), counter_clock:(80,180) }
```

Where the keys represent the log event and the values represent the position of the log on the screen in an (x,y) coordinate tuple. Describe the flaw when using this structure and suggest one method to correct it.