ENPM809T Assignment #5

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Course code: ENPM809T Autonomous Robotics

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HW#5 Goals

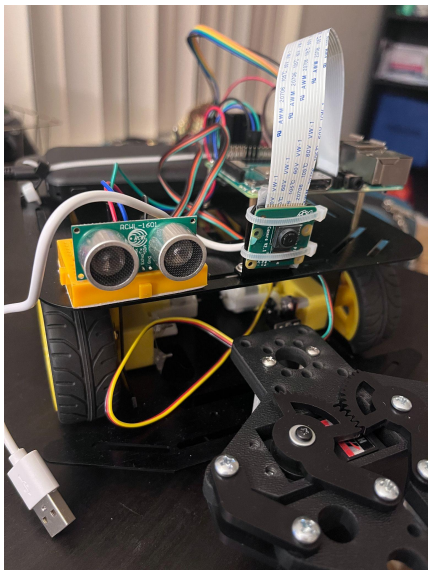
HW#5 involves the electrical and mechanical assembly of the ground vehicle and successfully tele-operating the robot in forward, reverse ,pivot right and pivot left movements.

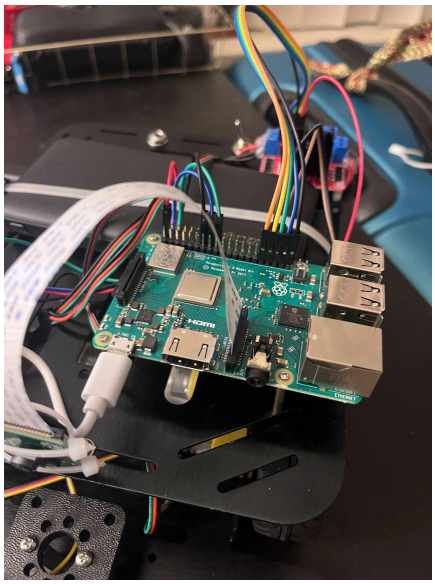
Question 1: (No submission)

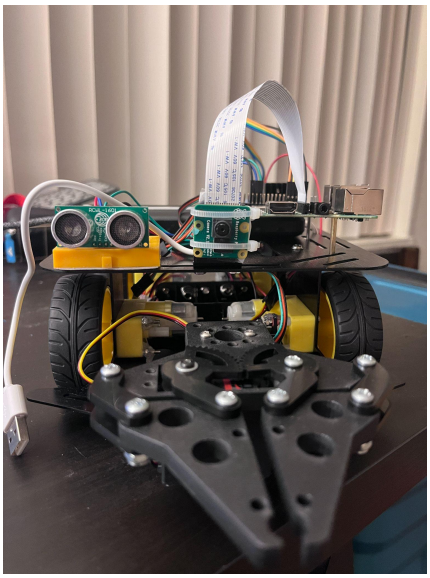
Question 2: (No submission)

Question 3: Teleoperating

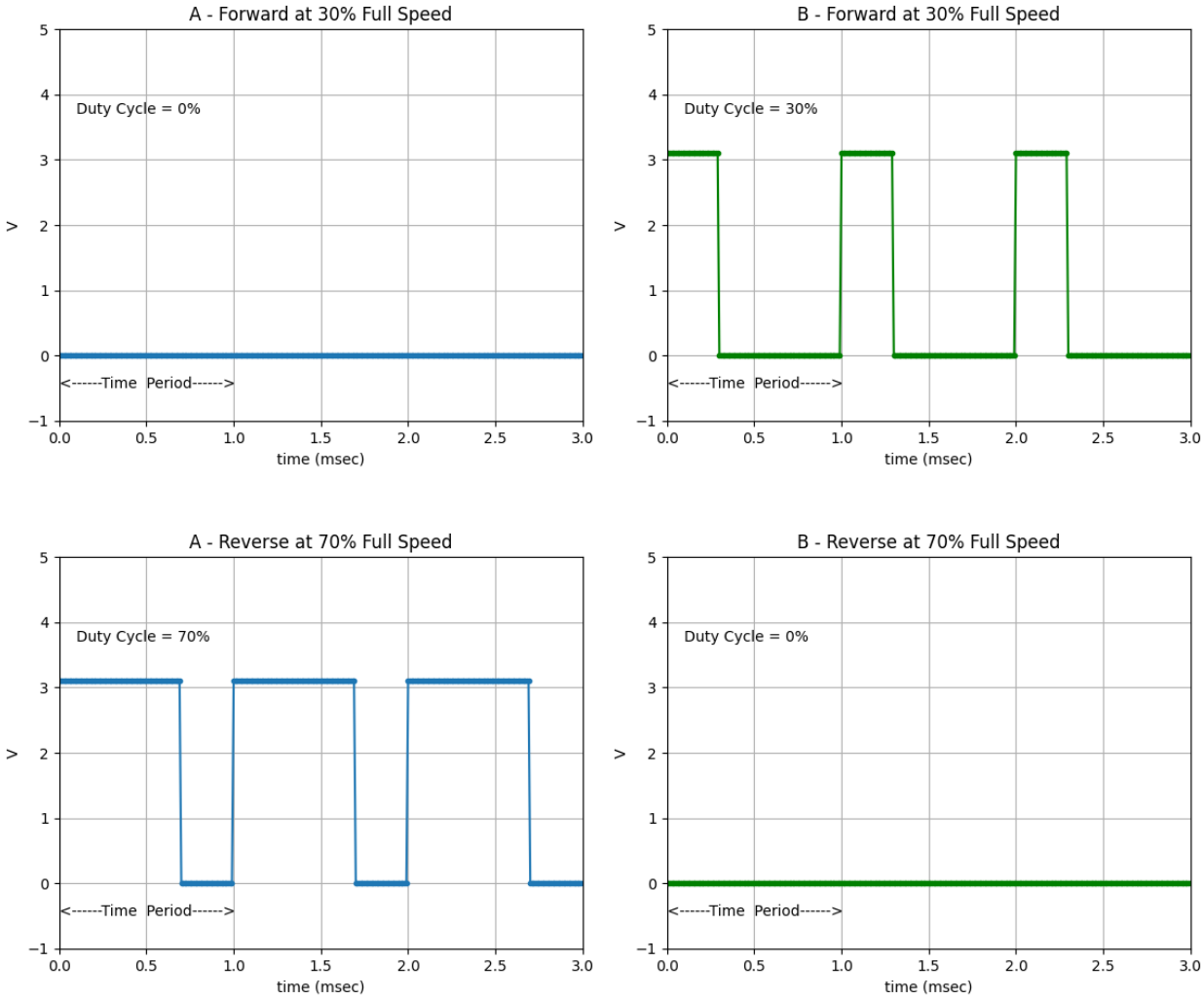
1: Mechanical and Electrical Assembly

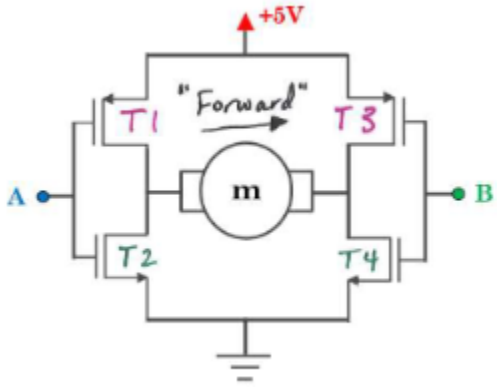






2: 'Using circuit below….'





Since T1 and T3 are PNP Transistors, they are closed/act as short circuit when voltage at base is 0V and they are open/act as open circuit when voltage at base is above threshold voltage which is 3V. T2 and T4 are NPN transistors which act as short circuit when voltage at base is above threshold(3V) and act as open circuit when voltage at base is 0V.

For motor to spin in forward direction, current should flow through T1->Motor->T4. To make T1 and T4 closed and T2 and T3 opem, the signal at A should be 0V(GND) and at B should be 3V. To make the motor spin at 30% full speed, the duty cycle of signal B should be 30%(since speed is assumed to be proportional to voltage) which means that the signal is HIGH for 30% of the time period(1ms), which effectively delivers 30% of the 5V supply(1.5V)

Similarly for the motor to spin in reverse direction, current should flow through T3->Motor->T2. To make T2,T3 closed and T1,T4 copen, the signal at A should be 3V and at B should be 0V(GND). The duty cycle of the signal A is 70% so that the motor spins at 70% of full speed(70% of 5V = 3.5V)

3: (Nothing to submit)

4: Created openmotors.py and made it run every time the Rpi boots up

5: Link to Video File

Link to youtube video: https://youtu.be/6zzQ2MJKvEM