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Dr. Mitchell

ENPM701 Assignment 5

Robotic Control Command Identification

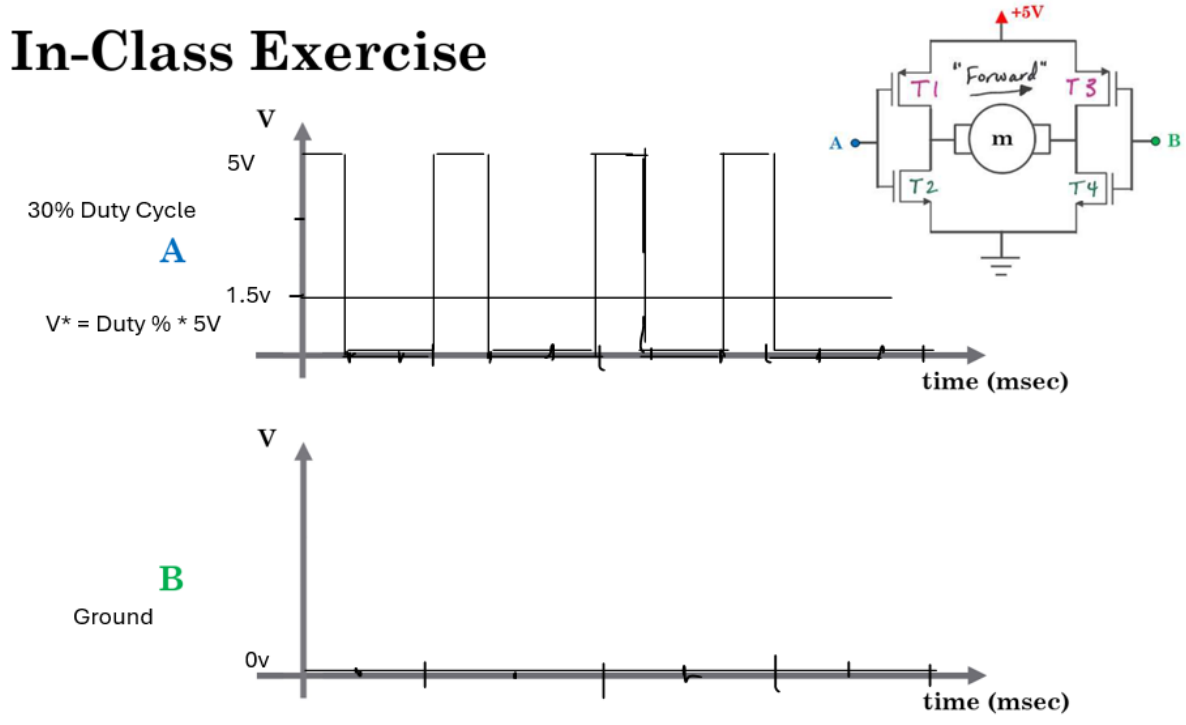
Assignment #5

Assembly of Course Robotic Ground Vehicle

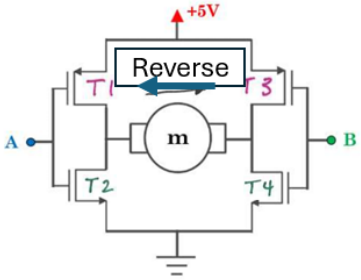
Question #3

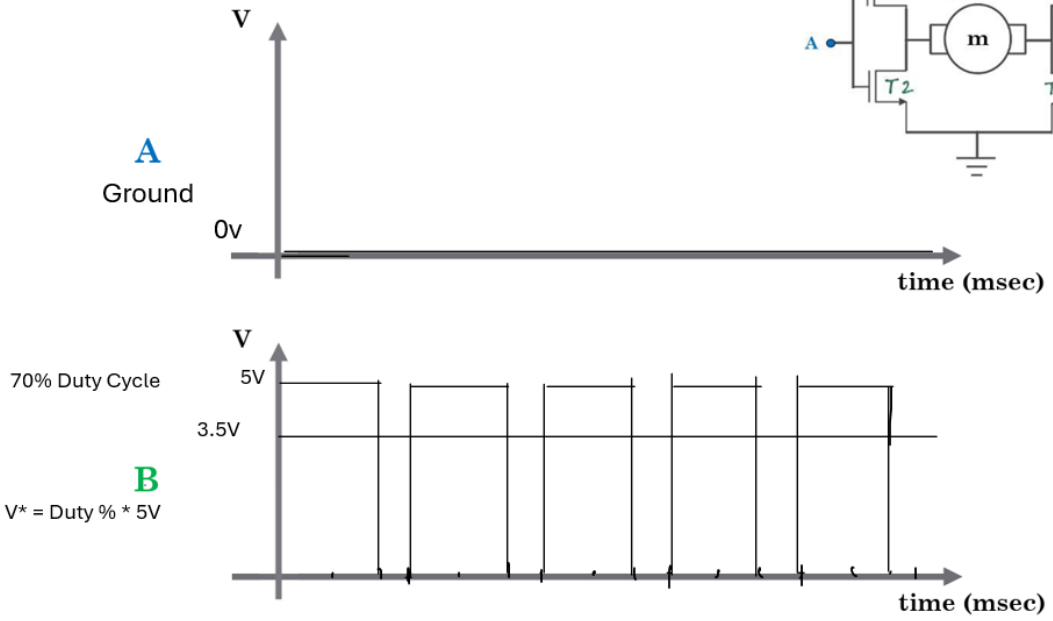
 # 2: Using the circuit below and a Raspberry Pi to drive the motor, sketch the time-domain signals required at A and B to turn forward at 30% full speed and reverse at 70% full speed. Assume speed is proportional to voltage, the threshold voltage for all transistors is 3V, and a V PWM period of 1 msec.

Answer: Duty cycle is calculated by the time where power is on divided by the period of a one full cycle. Thus for a period of 1msec, the Duty cycle of 30% will be 0.3msec on and the rest off. On the other hand, for Duty cycle of 70% the power will be on 0.7msec in a cycle. The resultant voltage, V*, is then computed by Duty Cycle * Vmotor, which will result in 1.5V for forward direction and 3.5 V for reverse. The transistors threshold voltage is assumed to be 3V and thus since the Raspberry Pi provides 3.3V output in addition to 5V, one can assume that the transistor gate stays open to grant such V PWM variability



In-Class Exercise





#5: Teleoperation Video Record

Video Recording: https://youtu.be/dyveMipU5QI?si=8A_2CPW2b0fHEUlo