ELEC 291 – Lab #2
Summer 2022

DC Motor

Description:
In this lab we control the movement and speed of a DC motor.

WARNING: Avoid touching any part of the circuit with bare hands once the power source is connected to the circuit.

WARNING: Be careful to not short-circuit the battery. In other words, be careful to not connect the two terminals of the battery directly to each other.

WARNING: Always power off the power sources before changing (connecting or disconnecting) anything (with the exception of the voltmeter) to your circuit.

NOTE: For safety reasons, you need to wear safety glasses at all times during the experiments.

PART A

- Make an H-Bridge to control the motor, using 2N3904 and 2N3906 transistors.
- Use two pushbuttons to toggle between the “forward”, “backward”, and “stop” modes. (One pushbutton for moving forward, one for moving backward, and stopping when both are pressed at the same time.)

PART B

- Connect a potentiometer as an input for the Arduino. Use this potentiometer to change the speed of the motor from zero to maximum and back.

PART C

- Use a 9V battery and a voltage regulator (LM317) to power the motor separately.
- Use a 1K-Ohm potentiometer to change the speed of the motor. Select the resistors connected to the voltage regulator so that the maximum voltage given to the motor is 7.5 V.

PART D

- Display the motor voltage and the potentiometer resistance on the LCD.
  Example: V = [ ] v, R2 = [ ] ohms.

Pre-Lab

- Connect the circuit and microcontroller for PART (A) and (B) on Tinkercad and submit the link(s) on Canvas.

Deliverables

Deliverables	Due Date	Percentage
Pre-Lab	Sunday May 29, 11:59 PM	3%
Lab Code	Tuesday May 31, 11:59 PM	2%
Live Demo	Wednesday June 1	10%
Answer to Questions	Wednesday June 1	5%
Total		20%