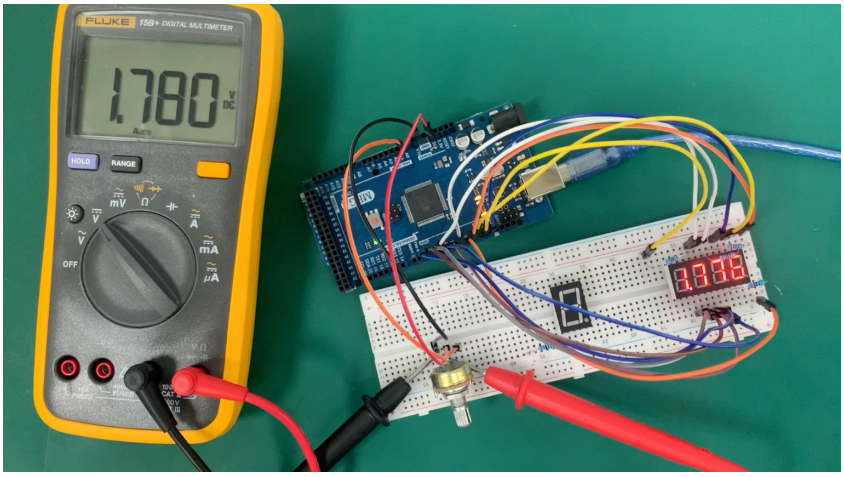
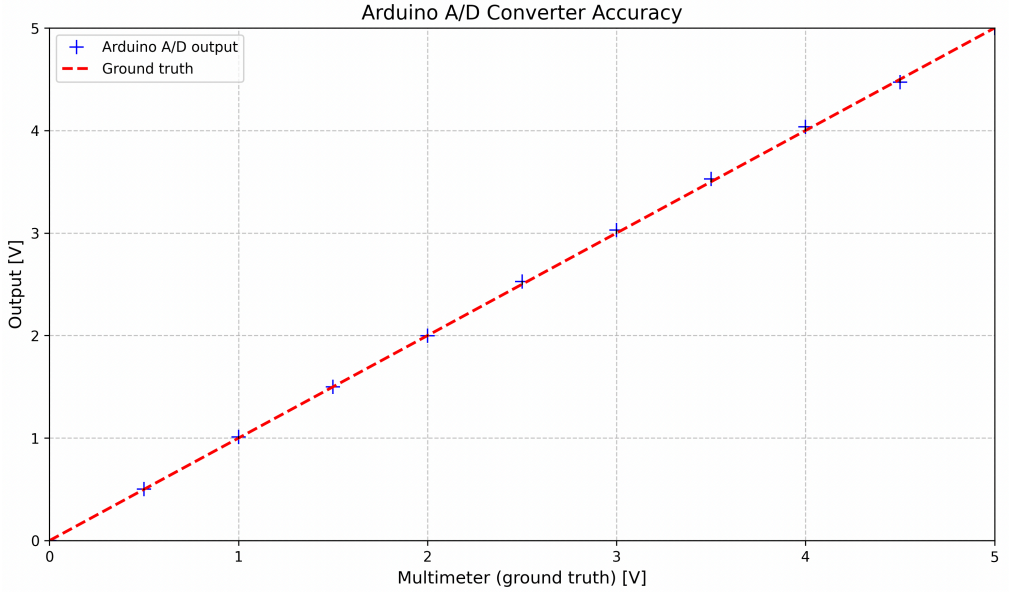
Homework format rules: Please shoot three videos for all three problems to demonstrate. Name them Problem1, Problem2, and Problem3 respectively. Also copy and paste all code into a Word file and save it as pdf format. Put those four files into one folder with your name as the folder name. Zip the folder (not rar format) and upload it to Moodle.

1. Voltage meter with four-digit display

The Arduino provide analog pins and can convert 0-5 V voltage to digits ranging 0-1023. Please use this function to achieve analog input measurement and digital display using 4-digits LED segment display. Fill out the following table to show its accuracy. Please also draw to compare the difference (the example is shown below).

Multimeter (V)	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
LED (V)	0	0.53	1.01	1.5	1.99	2.526	3.03	3.528	4.03	4.472	5.00





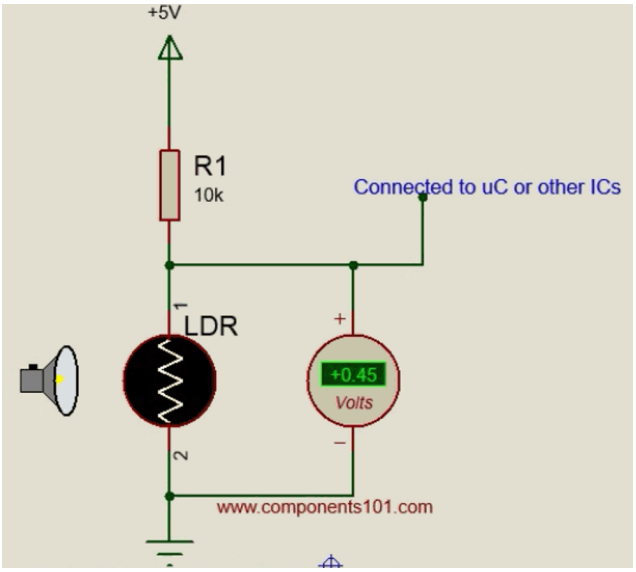
this is the figure based on my data

(This is the result I obtained and for your reference. Please follow the format (with legends, clear x and y labels, with units, *etc*.) Please update the figure with your data.)

2. Brightness alarm enabled by photoresistor.

Photoresistor can be used to sense light intensity. Please use a photoresistor and a beeper to achieve light alarm when it is too bright or too dim. (The rules for bright and dark are as follows. When you block the photoresistor with your palm, it is considered dark, and then the beep outputs 100 Hz square wave beep. When you use your smartphone flashlight shine on it, it is considered bright. Then the beep outputs 250 Hz square wave beep.)

Hint: The following setup can be used to divide voltage according to the resistance change in the photoresistor.



3. **Position follower**

Using the potential meter and the servo motor to achieve an exact rotation position follower.

Hint: The basic working principle of the servo motor is a close-loop feedback system enabled by voltage comparison. However, this servo motor uses PWM to control position. It is more complicated but more precise and can be controlled by digital output. I would like to recommend you to refer to the files in "Arduino/4.升级版例程/19.舵机控制" to find out more details.