

## Lab 7: Arduino & Breadboard

31st October 2019

### Abstract

Based on the Materials learned in Lab 5, this lab is meant to go more in-depth to the Arduino hardware and coding by designing a sample display with the kit provided, and code to allow the display to have certain functions. Students will be expected to read and understand how to put together a working circuit on a breadboard, troubleshoot, and code simple commands for buttons and dials to allow text to be displayed and manipulated on the LCD.

### Materials and Methods

Using the Arduino Board, Breadboard, LCD Display, a button, and potentiometer, assemble a circuit with the wires in the kit using the picture explanation provided in the lab instructions. Measure the voltage to make sure that the circuit is assembled correctly: It should be 5 volts. Plug the Arduino into the computer and using the Arduino(IDE) software, upload the code provided to the Arduino and press the button on the breadboard. Measure the voltage at the VSS when the potentiometer is turned to the highest and lowest LCD screen visibility.

### Results

Contrast of Screen	Voltage at VSS pin of the LCD (Volts)
MIN (you will NOT see any message on the LCD)	5 volts
MAX (you will see "Hello World" on the LCD)	0 volts



### Discussion

1. When the button is pressed, the system displays the message after waiting for 2 seconds.

Write down the new code:

//The first part of the code remains the same.

```
void loop() {  
    switchState = digitalRead(switchPin); //Sense if the button is pressed  
    if (switchState){ // When the button is pressed  
        delay (2000) // Wait 2 seconds (2000 ms)  
        lcd.display(); // Display the message  
    }  
    else{ // When the button is released  
        lcd.noDisplay(); // Don't Display the message  
    }  
}
```

2. If the power supply changes from 5V to 3.3V, what will happen to the contrast of the screen? Can you briefly explain why?

The contrast of the screen will decrease because it wouldn't have as much current running through it and current is directly related to voltage.

3. Draw a picture showing how the 2 probes of the multimeter should be connected to the circuit on the left of Fig. 10, if we want to measure the current in the resistor?

