Lab 5 – Data Logging

Team:
Vijay Pillai (vp296), Eric Nguyen (en274), Anish Kumar (ak2399)

Part A – Writing to the Serial Monitor

a) Based on the readings from the serial monitor, what is the range of the analog values being read?

The range is 0-1023.

b) How many bits of resolution does the analog to digital converter (ADC) on the Arduino have? How many are you using with the range of values you're seeing?

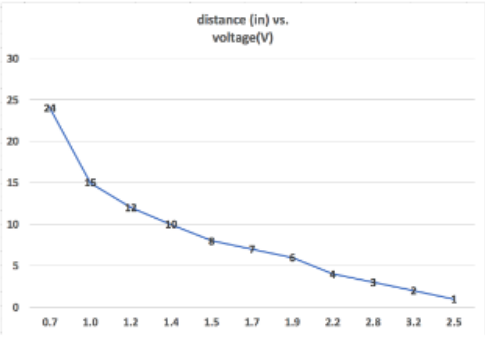
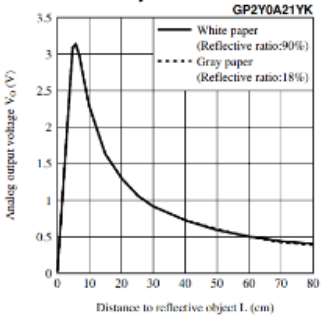
The ADC on the Arduino has 10 bits of resolution. As we were almost the full range of analog values, all 10 bits were being used.

Part B – Voltage Varying Sensors

1. IR Distance Sensor

a) Describe the voltage change over the sensing range of the sensor. A sketch of voltage vs. distance would work also. Did it match up with what you expect from the datasheet?

The observed and expected graphs of voltage vs. distance roughly match.

Observed	Expected
The voltage drops as distance increases.  *Graph by Eric Nguyen*	**Fig.5 Analog Output Voltage vs. Distance to Reflective Object**  Source: datasheet

2. Accelerometer

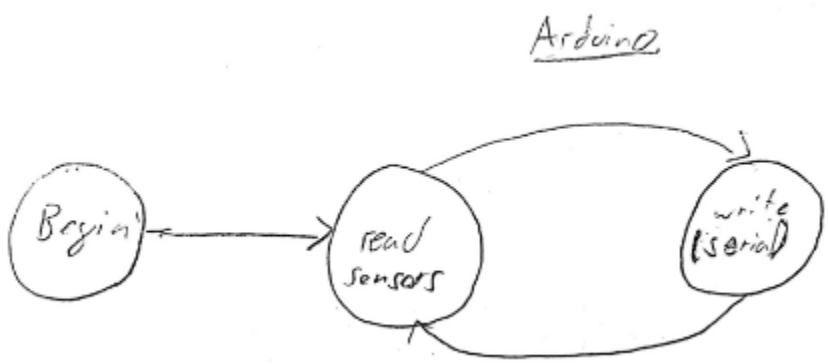
a) Include your accelerometer read-out code in your write-up.

```
#include <LiquidCrystal.h>

const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

const int xPin = A3;
const int yPin = A2;
const int zPin = A1;

void setup()
{
 Serial.begin(9600);
 lcd.begin(16,2);


}

void loop()
{
 lcd.clear();
 lcd.setCursor(0,0);
 lcd.print("X= ");
 lcd.print(analogRead(xPin));
 lcd.setCursor(10,0);
 lcd.print("Y= ");
 lcd.print(analogRead(yPin));
 lcd.setCursor(5,1);
 lcd.print("Z= ");
 lcd.print(analogRead(zPin));
 delay(100);
}
```

Part D – Logging values to the EEPROM and reading them back

1. Design your logger

a) Turn in a copy of your final state diagram.



2. Reading and writing values to the Arduino EEPROM

a) How many byte-sized data samples can you store on the Atmega328?

The Atmega328 can store up to 1024 byte-sized data sampled.

b) How would you get your analog data from the ADC to be byte-sized?

The analog inputs range from 0 to 1023. One byte contains 8 bits and therefore we need to map the initial data that was in the range 0 – 1023 to 0 – 255.

4. Create your Data Logger!

a) Use the lab camera or your own camera/cell phone to record and upload a short demo video of your logger in action.

Data Logger!