CSCI U509 – Introduction to Internet of Things

Homework-2, Weights: 35 points

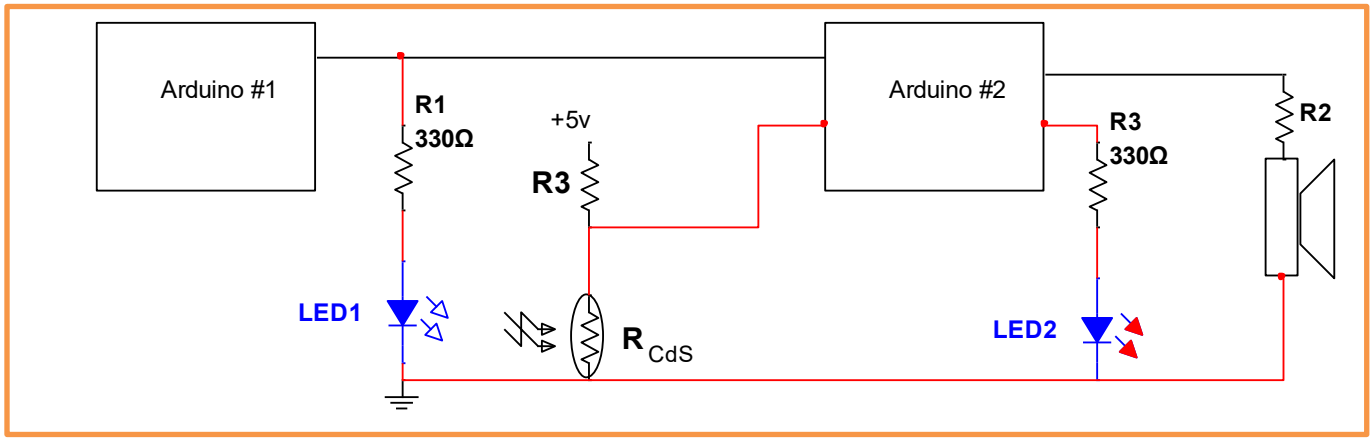
Due on Tuesday, February 11, 2020

A hard copy at the beginning of the class and code problem 3 at Blackboard by 5PM

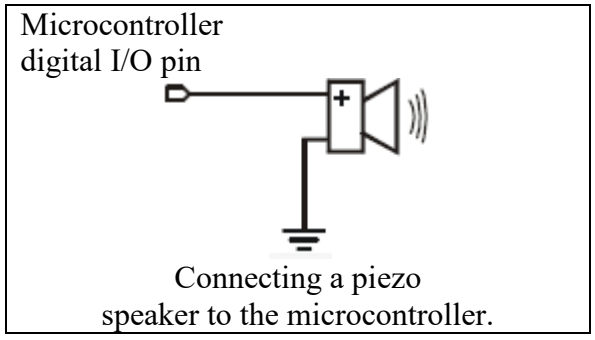
Q1. (5 pts.) Which device on the Rasberry Pi board serves as the hard disk of the Raspberry Pi computer? Explain.

Q2. (10 pts.) Compare the transmit current of WiFi, Zigbee, and Bluetooth. Why do you think Zigbee takes less current than WiFi?

Q3. (20 pts.) Your goal is to monitor when cars drive into a parking lot by placing a blinking LED on one side of the entrance and a LDR on the other side. As cars drive through they will break the beam and you will generate a 300Hz tone to alert the parking lot. Note that this device must work in both day light and night light. That is why the LED is blinking.



Test a piezo speaker. Hook the speaker up to a digital I/O pin, as shown in Figure below. You can use any of the digital I/O pins **except pins 0 and 1** (pins 0 and 1 cannot be used while serial communications are active, and it's useful to continue using the Serial.println() command to check the input voltage). Write a program to test the speaker by generating a 300 Hz tone with the tone() function. (To learn how to play a song, see the "see also" links at the bottom of the tone() function page.). To turn off the speaker, use the noTone() function.



Connecting a piezo speaker to the microcontroller.

Starting Point for the Arduino #2 Program

```
/*

Reads an analog input on pin A0, converts it to voltage, and prints the
result to the serial monitor.  Graphical representation is available using
serial plotter (Tools > Serial Plotter menu)

*/

 const int control=13;

 int sensorValue1 =0;

 int sensorValue2 =0;

 float voltage2 =0;

 float voltage1 =0;


// the setup routine runs once when you press reset:

void setup() {

  // initialize serial communication at 9600 bits per second:

  Serial.begin(9600);

  pinMode(control, INPUT);

}

// the loop routine runs over and over again forever:

void loop() {

   while(digitalRead(control)==HIGH)   // (read Voltage when input is HIGH)

   {sensorValue1 = analogRead(A0);

    voltage1 = sensorValue1 * (5.0 / 1023.0);  // Calculate voltage

   }

   Serial.println(voltage1);  //print out result

   while(digitalRead(control)==LOW)   // (read Voltage when input is LOW

   {sensorValue2 = analogRead(A0);

    voltage2 = sensorValue2 * (5.0 / 1023.0);  //Calculate voltage

   }

  Serial.println(voltage2);  //print out result

}
```