



University of Alexandria, Faculty of Engineering
Department of Computer and Systems Engineering

CSE233 Computer Organization
Arduino Lab 4

prepared by:

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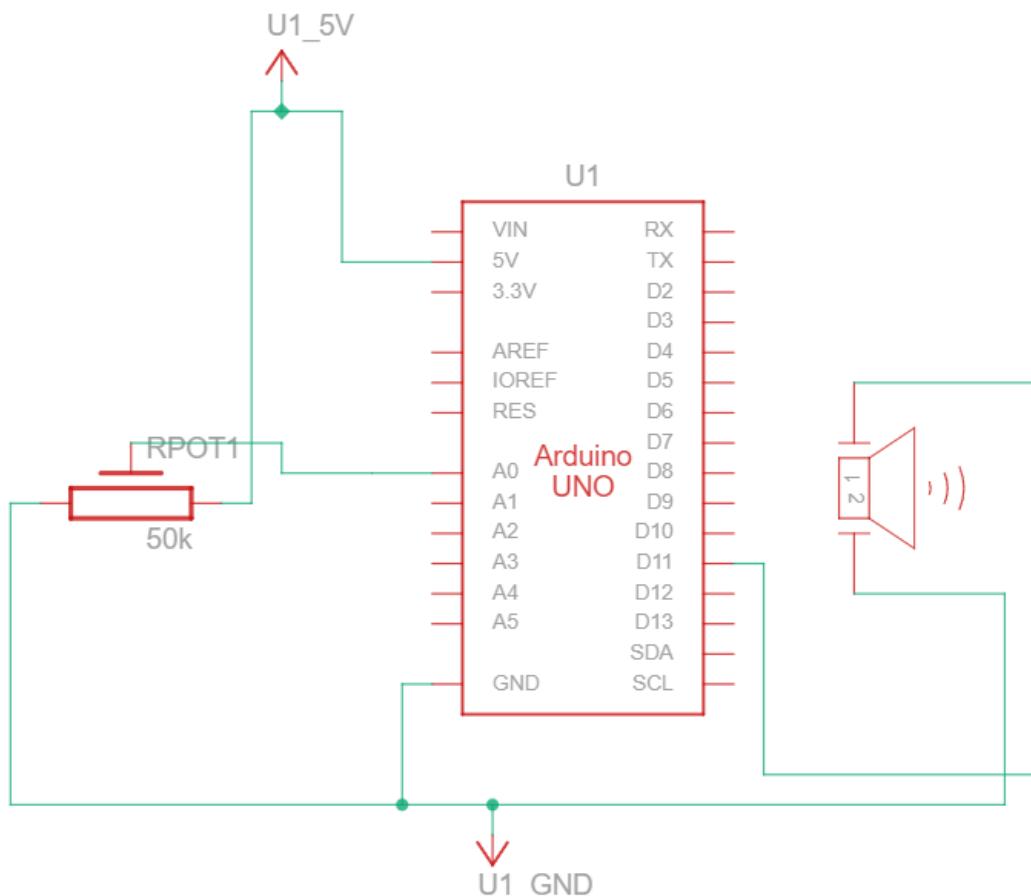
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The Documentation

In this lab, we implemented a voltage threshold detector using Arduino. A $50\text{ K}\Omega$ potentiometer was connected between the 5V and GND pins to act as a variable voltage source. Its middle pin was connected to the analog input (A0) of the Arduino board. The system continuously reads the analog voltage from this pin and prints the measured value on the Serial Monitor.

The Arduino is programmed to activate both the built-in LED (pin 13) and a buzzer (connected to digital pin 11) when the voltage exceeds 3 volts, and to turn them off when the voltage drops below 2.5 volts. This forms a simple ****voltage threshold alarm**** system. The code uses the `analogRead()` function to measure voltage and the `tone()` function to generate a sound through the buzzer. Serial communication is used to monitor the input voltage in real-time.

The Schematic Diagram



The Arduino Code

```
1 const int buzzpin = 11;
2 boolean onState;
3
4 void turnOn(boolean state){
5     if(state){
6         digitalWrite(13, HIGH);
7         tone(buzzpin, 1500, 0);
8     }
9     else {
10        digitalWrite(13, LOW);
11        noTone(buzzpin);
12    }
13 }
14
15 void setup()
16 {
17     Serial.begin(9600);
18     pinMode(A0, INPUT);
19     pinMode(buzzpin, OUTPUT);
20     pinMode(13, OUTPUT);
21 }
22
23 void loop()
24 {
25     float sensorVal = analogRead(A0);
26     Serial.println(sensorVal);
27
28     if(sensorVal > 30)
29         onState = true;
30     else if(sensorVal < 5)
31         onState = false;
32
33     turnOn(onState);
34 }
35
```

Discussion and Results

When the potentiometer was adjusted to increase the voltage at the analog input, the serial monitor showed increasing values. Once the input voltage exceeded approximately 3V, both the buzzer and the LED turned ON and remained ON until the voltage dropped below 2.5V. When the voltage decreased under 2.5V, both indicators turned OFF again. This verified that the Arduino correctly detects and responds to the voltage threshold limits, simulating a simple voltage-based alarm.