*Alexandria University*
*Faculty of Engineering*
*Computer and Systems Engineering Dept.*
*CSE233: Computer Organization*

# Lab #4 Report

# Voltage threshold detector

**Names:**

1. Mohamed Abdalla Yassen Mohamed (23010765)
2. Ahmed Mohamed Saied Mohamed (23011684)

## 1. Problem Statement

Use the Arduino analog input to act as a simple voltmeter with an alarm to indicate that the voltage has exceeded a certain limit.

## 2. Code “GitHub Rebo”

***GitHub:***

https://github.com/Mohamed-Abdalla-Yassen/Computer-Organization-Projects.git

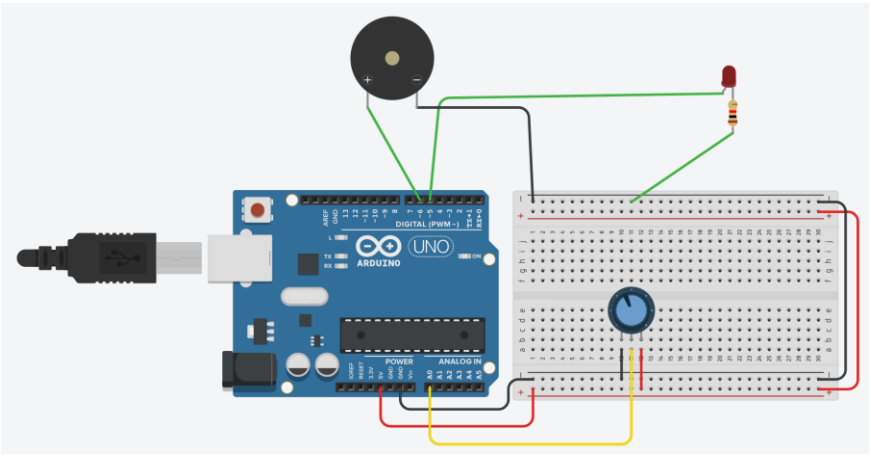
***Arduino web editor:***

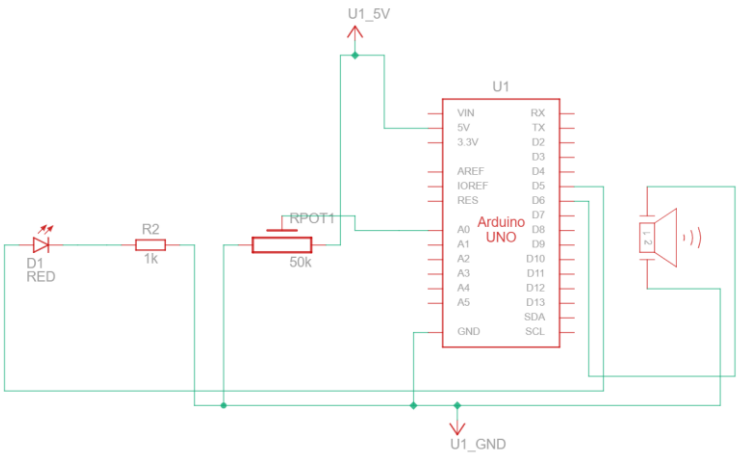
https://app.arduino.cc/sketches/8ba902c6-6a0c-48e7-a90d-bb2a6cb57731?view-mode=preview

## 3. Video “YouTube”

https://youtu.be/w6NZKIcYQR0

## 4. Schematic diagram



## 5. Description & Challenges

**50 kΩ potentiometer** is connected between the 5 V and GND pins of the Arduino to provide a **variable analog input voltage** to one of the analog pins (A0). The Arduino continuously measures this voltage using its **analog-to-digital converter (ADC)** and displays the corresponding voltage value on the **Serial Monitor**.
When the measured voltage **exceeds 3 V**, the system activates an **alarm indicator** by turning **ON** both the **buzzer** and the **LED**. These remain ON as long as the voltage stays above the threshold.
When the voltage **drops below 2.5 V**, both the buzzer and LED are turned **OFF**, indicating that the voltage has fallen below the safe range.

**Challenges:**

- **Repeated analog readings:**
  If analogRead() is called more than once per loop, the values may slightly differ. It's better to read once and reuse the value for calculations.

- **Resetting the warning variable:**
  If the warning variable isn't declared as static or declared on global scope, it resets to false each time the loop runs, causing the LED and buzzer to turn off unexpectedly.

- **Fluctuating readings near the threshold:**
  When the voltage is close to 3V, small ADC changes can cause the buzzer and LED to turn ON and OFF quickly. Adding two thresholds (3V and 2.5V) prevents this flickering.