

TECHNOLOGICAL UNIVERSITY OF THE PHILIPPINES

Ayala Boulevard, Ermita, Manila

CIT-ELECTRONICS DEPARTMENT

**CPET11L-M – Microprocessor and Microcontroller Systems, Lab**

**1st Semester, SY 2-24-2025**

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<b>Course &amp; Section:</b> BET-CPET- 3A	<b>Date Submitted:</b> September 20, 2025

**Activity 1**

**Topic 1: LED with Potentiometer**

**Topic 2: LED with Switch**

**Topic 3: LED with combination of Potentiometer and Switch**

**I. OBJECTIVES**

- To apply practical knowledge in using the Arduino Uno R3
- To explain the functions and components of the related topics
- To implement LED Blinking and LED Chaser using code and circuit diagrams
- To develop and enhance problem-solving skills related to the topics

**II. EQUIPMENT AND MATERIALS**

**HARDWARE**

- Arduino Uno/Mega 2560
- Breadboard
- Jumper Wires
- Laptop
- Red Light-emitting diode

- Resistors:  $220\Omega$  and  $10K\ \Omega$
- $10K\ \Omega$  Potentiometer
- Push/Tactile Button
- Arduino USBVCC

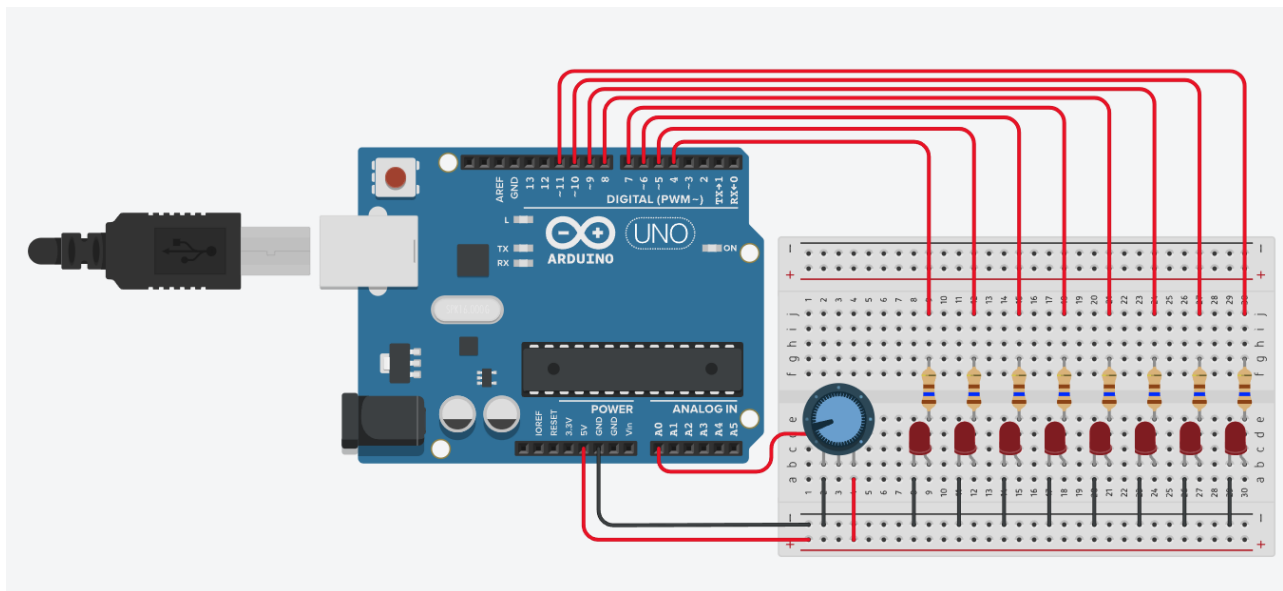
## SOFTWARE

- Arduino IDE
- MS Word
- TinkerCad Simulator

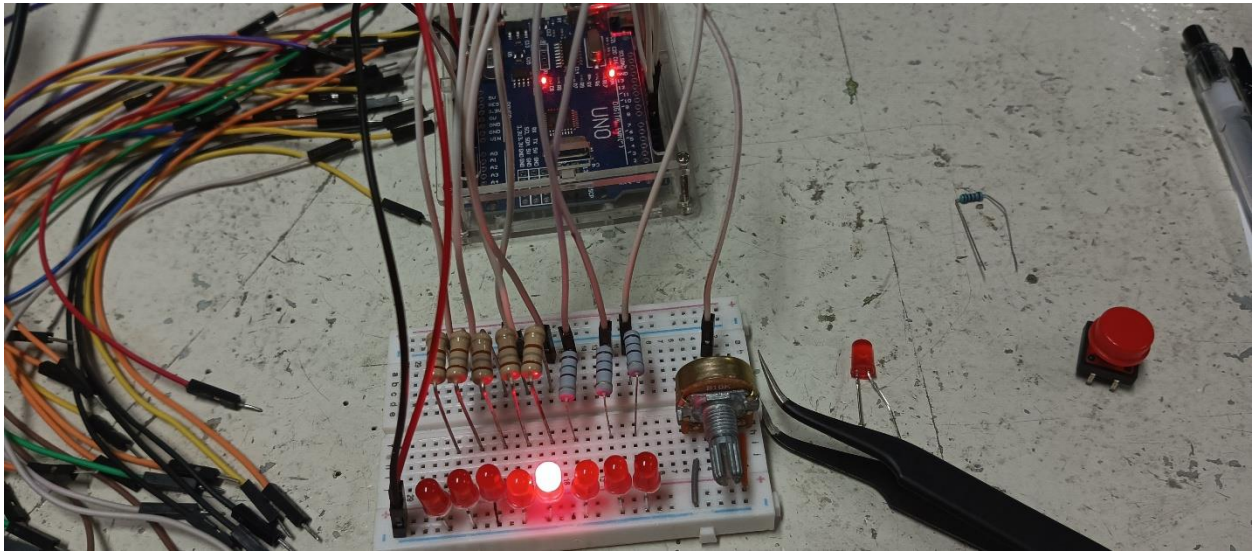
## III. DIAGRAM

### ===== TOPIC 1: LED with Potentiometer =====

#### A. TinkerCad Simulation



## B. Breadboard



## C. Source Code

```
int ledNum = 8;
int ledPin[] = {4, 5, 6, 7, 8, 9, 10, 11};
int delayTime;
int potPin = A0;

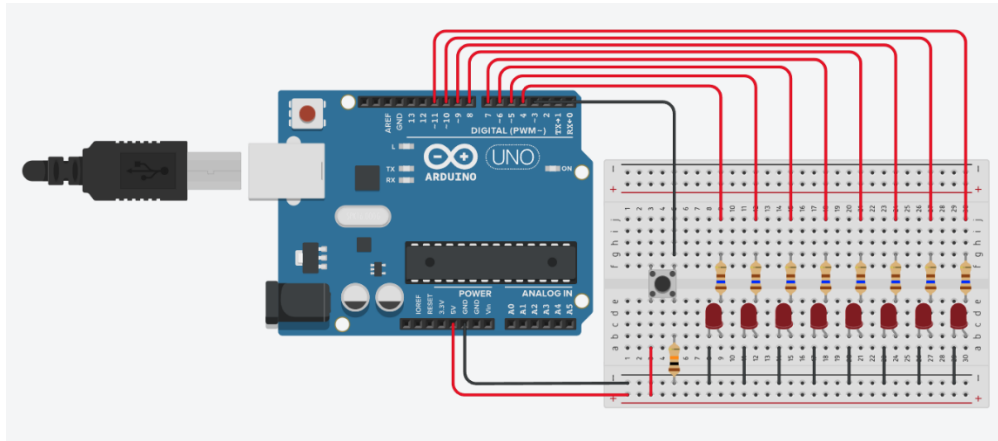
void setup() {
  for (int x = 0; x < ledNum; x++) {
    pinMode(ledPin[x], OUTPUT);
  }
}

void loop() {
  for (int i = 0; i < 8; i++) {
    delayTime = analogRead(potPin);
    digitalWrite(ledPin[i], HIGH);
    delay(delayTime);
    digitalWrite(ledPin[i], LOW);
  }
}
```

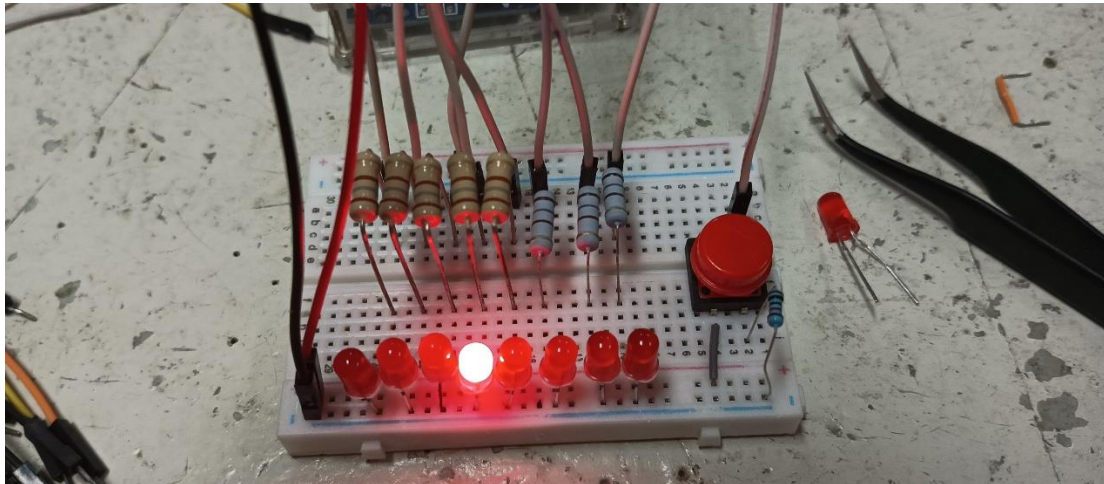
```
for (int i = 7; i >= 0; i--) {
  delayTime = analogRead(potPin);
  digitalWrite(ledPin[i], HIGH);
  delay(delayTime);
  digitalWrite(ledPin[i], LOW);
}
```

## ===== TOPIC 2: LED with Push Button =====

### A. TinkerCad Simulation



### B. Breadboard



### C. Source Code

```
int t = 0;

void setup()
{
    for(int x = 4 ; x<=11 ; x++){
        pinMode(x,OUTPUT);
    }
    pinMode (4 , OUTPUT);
    pinMode (5 , OUTPUT);
    pinMode (6 , OUTPUT);
    pinMode (7 , OUTPUT);
    pinMode (8 , OUTPUT);
    pinMode (9 , OUTPUT);
    pinMode (10 , OUTPUT);
    pinMode (11 , OUTPUT);
    pinMode(3, INPUT);
}

void loop()
{
    if (digitalRead(3)==HIGH){
        t++;
        delay(100);
    }
    if (t==1){
        pattern1();
    }
    if (t==2){
        pattern2();
    }
    if (t==3){
        pattern3();
    }
    if (t==4){
        pattern4();
    }
    if (t==5){
        pattern5();
    }
}
```

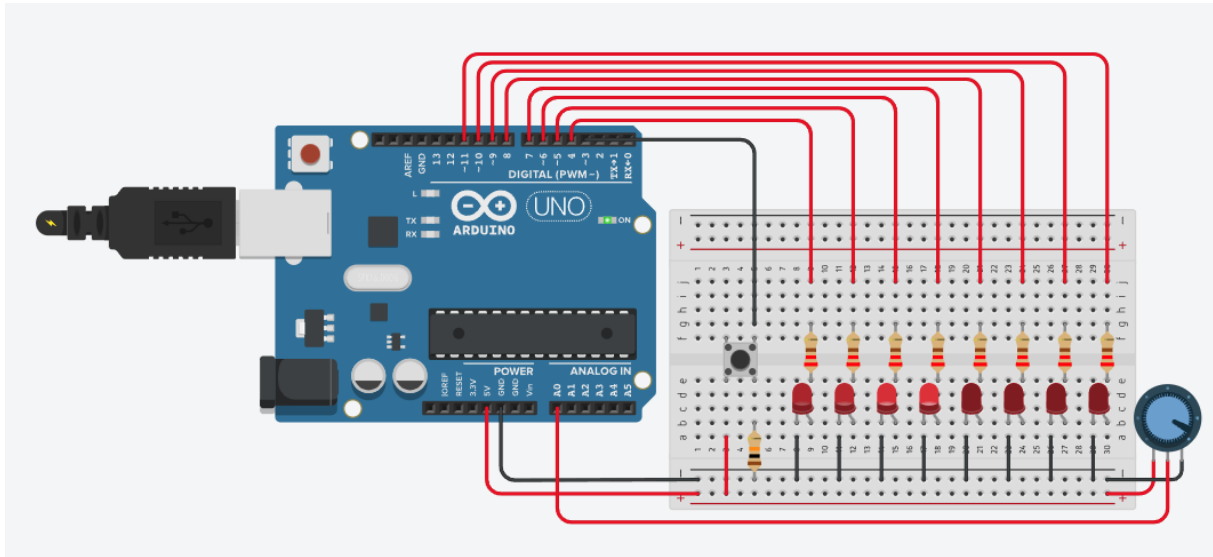
```
void pattern1(){  
    for(int x = 4; x<=11 ; x++){  
        digitalWrite(x, HIGH);  
        delay(100);  
        digitalWrite(x, LOW);  
        delay(100);} }  
  
void pattern2(){  
    for(int x = 4; x<=11 ; x++){  
        digitalWrite(x, HIGH);  
        delay(100);} }  
    for(int x = 11 ; x>=4 ; x--){  
        digitalWrite(x, LOW);  
        delay(100);} }  
  
void pattern3(){  
    for(int x = 4; x<=11 ; x++){  
        digitalWrite(x, HIGH);  
        delay(100);  
        digitalWrite(x, LOW);} }  
    for(int x = 11; x>=4 ; x--){  
        digitalWrite(x, HIGH);  
        delay(100);  
        digitalWrite(x, LOW);} }  
  
void pattern4(){  
    digitalWrite(4, HIGH);  
    digitalWrite(11, HIGH);  
    delay(100);  
    digitalWrite(4, LOW);  
    digitalWrite(11, LOW);  
    delay(100);  
    digitalWrite(5, HIGH);  
    digitalWrite(10, HIGH);  
    delay(100);  
    digitalWrite(5, LOW);  
    digitalWrite(10, LOW);
```

```
digitalWrite(6, HIGH);  
digitalWrite(9, HIGH);  
delay(100);  
digitalWrite(6, LOW);  
digitalWrite(9, LOW);  
delay(100);  
digitalWrite(7, HIGH);  
digitalWrite(8, HIGH);  
delay(100);  
digitalWrite(7, LOW);  
digitalWrite(8, LOW);  
delay(100);  
digitalWrite(7, HIGH);  
digitalWrite(8, HIGH);  
delay(100);  
digitalWrite(7, LOW);  
digitalWrite(8, LOW);  
delay(100);  
digitalWrite(6, HIGH);  
digitalWrite(9, HIGH);  
delay(100);  
digitalWrite(6, LOW);  
digitalWrite(9, LOW);  
delay(100);  
digitalWrite(5, HIGH);  
digitalWrite(10, HIGH);  
delay(100);  
digitalWrite(5, LOW);  
digitalWrite(10, LOW);  
delay(100);
```

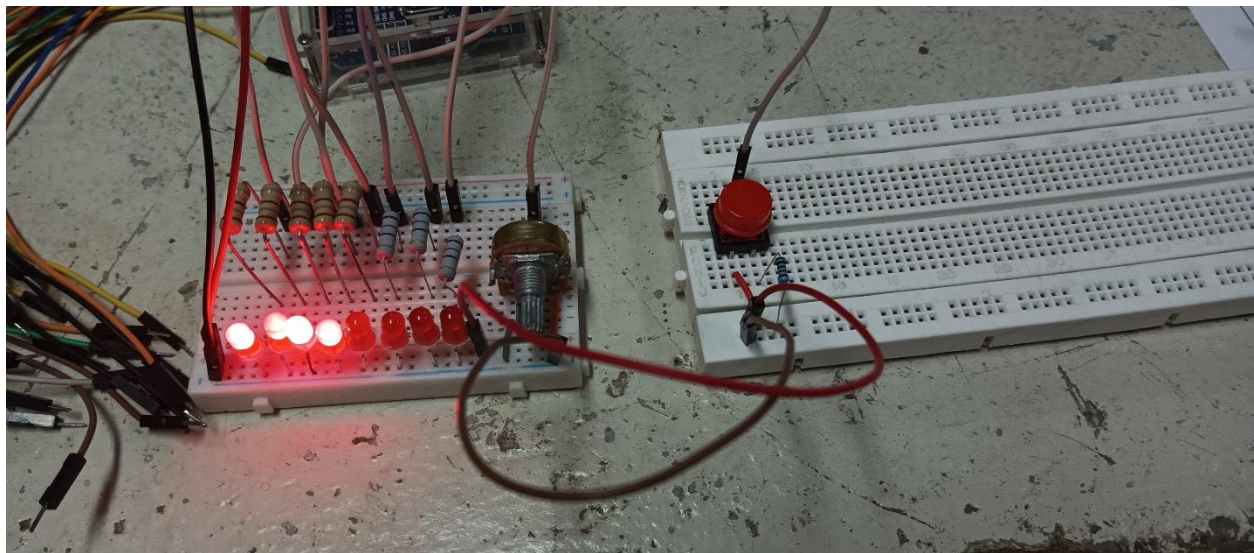
```
digitalWrite(4, HIGH);  
digitalWrite(11, HIGH);  
delay(100);  
digitalWrite(4, LOW);  
digitalWrite(11, LOW);  
delay(100);}   
  
void pattern5 () {  
    digitalWrite(4, LOW);  
    digitalWrite(5, LOW);  
    digitalWrite(6, LOW);  
    digitalWrite(7, LOW);  
    digitalWrite(8, LOW);  
    digitalWrite(9, LOW);  
    digitalWrite(10, LOW);  
    digitalWrite(11, LOW);  
    t=0;} 
```

## === TOPIC 3: LED with combination of Potentiometer and Switch ===

### A. TinkerCad Simulation



### B. Breadboard



## C. Source Code

```
int t = 0;
int potention= A0;
int delayTime;

void setup(){
  for(int x = 4 ; x<=11 ; x++){
    pinMode(x, OUTPUT);}
    pinMode(3, INPUT);
  }

void loop(){
  if (digitalRead(3)==HIGH){
    t++;
    delay(10);
  }

  if (t==1){
    pattern1();}
  if (t==2){
    pattern2();}
  if (t==3){
    pattern3();}
  if (t==4){
    pattern4();}
  if (t==5){
    reset();}
}
```

```
void pattern1(){
  for(int x = 4; x<=11 ; x++){
    delayTime= analogRead(potention);
    digitalWrite(x, HIGH);
    delay(delayTime);
    digitalWrite(x, LOW);
    delay(delayTime);} }

void pattern2(){
  for(int x = 4; x<=11 ; x++){
    delayTime= analogRead(potention);
    digitalWrite(x, HIGH);
    delay(delayTime);}

  for(int x = 11 ; x>= 4 ; x--){
    delayTime= analogRead(potention);
    digitalWrite(x, LOW);
    delay(delayTime);} }

void pattern3(){
  for(int x = 4; x<=11 ; x++){
    delayTime= analogRead(potention);
    digitalWrite(x, HIGH);
    delay(delayTime);
    digitalWrite(x, LOW);}

  for(int x = 11; x>=4 ; x--){
    delayTime= analogRead(potention);
    digitalWrite(x, HIGH);
    delay(delayTime);
    digitalWrite(x, LOW);} }
```



```

void pattern4(){
    delayTime= analogRead(potentio);
    digitalWrite(4, HIGH);
    digitalWrite(11, HIGH);
    delay(delayTime);
    digitalWrite(4, LOW);
    digitalWrite(11, LOW);
    delay(delayTime);

    delayTime= analogRead(potentio);
    digitalWrite(5, HIGH);
    digitalWrite(10, HIGH);
    delay(delayTime);
    digitalWrite(5, LOW);
    digitalWrite(10, LOW);
    delay(delayTime);

    delayTime= analogRead(potentio);
    digitalWrite(6, HIGH);
    digitalWrite(9, HIGH);
    delay(delayTime);
    digitalWrite(6, LOW);
    digitalWrite(9, LOW);
    delay(delayTime);

    delayTime= analogRead(potentio);
    digitalWrite(7, HIGH);
    digitalWrite(8, HIGH);
    delay(delayTime);
    digitalWrite(7, LOW);
    digitalWrite(8, LOW);
    delay(delayTime);
}

```

```

    delayTime= analogRead(potentio);
    digitalWrite(7, HIGH);
    digitalWrite(8, HIGH);
    delay(delayTime);
    digitalWrite(7, LOW);
    digitalWrite(8, LOW);
    delay(delayTime);
    delayTime= analogRead(potentio);
    digitalWrite(6, HIGH);
    digitalWrite(9, HIGH);
    delay(delayTime);
    digitalWrite(6, LOW);
    digitalWrite(9, LOW);
    delay(delayTime);
    delayTime= analogRead(potentio);
    digitalWrite(5, HIGH);
    digitalWrite(10, HIGH);
    delay(delayTime);
    digitalWrite(5, LOW);
    digitalWrite(10, LOW);
    delay(delayTime);
    delayTime= analogRead(potentio);
    digitalWrite(4, HIGH);
    digitalWrite(11, HIGH);
    delay(delayTime);
    digitalWrite(4, LOW);
    digitalWrite(11, LOW);
    delay(delayTime);}

void reset(){
    for (int i = 0 ; i < 8 ; i++){
        digitalWrite(i, LOW);
        t = 0;}}

```

## **IV. PROCEDURE**

### **A. Preparation**

- Gather the required components: Arduino Uno R3, breadboard, LEDs, resistors, potentiometer, buttons, and jumper wires.
- Install the Arduino IDE on the computer.
- Review the circuit diagrams for each topic. Simulate your circuit diagram to a circuit simulator such as TinkerCAD or Wokwi.

### **B. Actual**

- Connect the LED with a potentiometer according to the diagram and upload the code.
- Set up the LED with a switch and test the on/off function.
- Combine the potentiometer and switch to control the LED in different ways.

### **C. Checking**

- Observe if the LED responds correctly to the potentiometer and/or switch.
- Verify the wiring connections and the uploaded code.
- Adjust values or fix errors if the output is not working as expected.

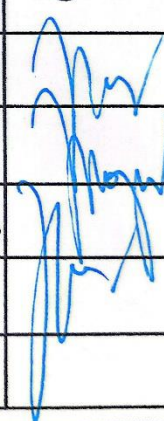
### **D. Uploading**

- Upload the final and corrected code to the Arduino Uno R3.
- Ensure that all three topics (potentiometer, switch, and combination) work properly.

## **V. CONCLUSION**

The activities have been a great help for me to understand further on how to make a row of LED lights light up in a “running” manner. In this activity, I learned how to utilize function in an effective manner to group light patterns. However, this lesson is among other

things. With this activity, I am slowly grasping the proper functions and things needed to understand the Arduino.

Name: <u>Arenas, Joseph C.</u>			
Section: <u>BET-CPET 3A</u>			
Activity No: <u>1</u>			
Topic	Date	Time	Signature
1. LED with Potentiometer	8-27-2025	11:29 AM	
2. LED with Push Button	8-27-2025	11:29 AM	
3. LED with potentiometer & Push Button	8-27-2025	11:49 AM	