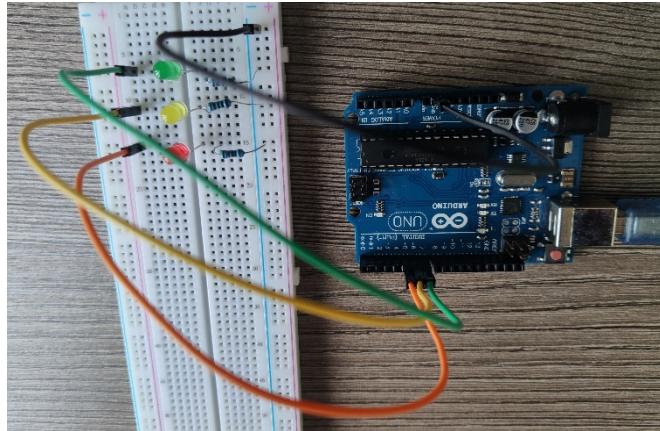
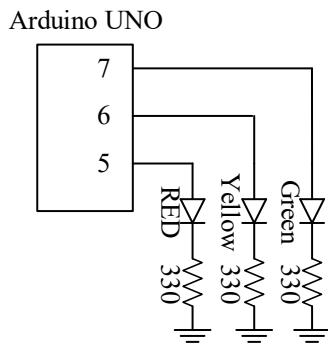


Exercise 1: Connect three LEDs to the pins 5, 6, and 7 of the Arduino UNO as shown below.



Write the Arduino program (using the Arduino IDE software) as shown below. When uploading this program to the Arduino UNO, the LEDs will be on/off (one LED at a time with a different delay time).

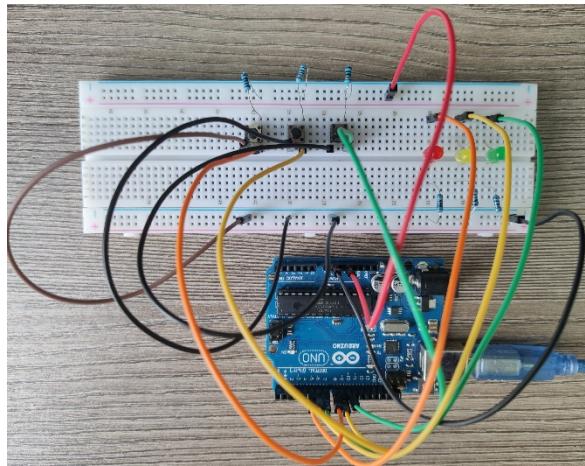
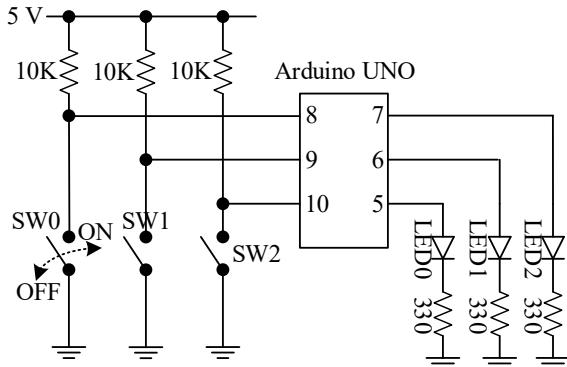
```

Ex1
1 int pin[] = {5, 6, 7};
2 int Tdelay[] = {2000, 1000, 3000};
3
4 void setup() {
5     for (int i = 0; i <= 2; i++) {
6         pinMode(pin[i], OUTPUT);
7         digitalWrite(pin[i], LOW);
8     }
9 }
10
11 void loop() {
12     for (int i=0; i<=2; i++) {
13         digitalWrite(pin[i], HIGH);
14         digitalWrite(pin[(i+1)%3], LOW);
15         digitalWrite(pin[(i+2)%3], LOW);
16         delay(Tdelay[i]);
17     }
18 }

```

Upload this Arduino program to your Arduino UNO board. Take a video to demonstrate your result. Name it “Ex1” and submit to the Google Classroom.

Exercise 2: Connect three switches to the pins 8, 9, and 10 of the Arduino UNO and, also, connect three LEDs to the pins 5, 6, and 7 of the Arduino UNO. The circuit is shown below.



Write the following Arduino program (using the Arduino IDE software). When uploading this program to the Arduino UNO, pressing switches will turn on/off LEDs.

```
Ex2
1 int outPin[] = {5, 6, 7};
2 int inPin[] = {8, 9, 10};
3
4 void setup() {
5   for (int i = 0; i <= 2; i++) {
6     pinMode(inPin[i], INPUT);
7     pinMode(outPin[i], OUTPUT);
8     digitalWrite(outPin[i], LOW);
9   }
10 }
11
12 void loop() {
13   for (int i = 0; i <= 2; i++) {
14     digitalWrite(outPin[i], !digitalRead(inPin[i]));
15   }
16 }
```

MOUNT = 0

When pressed

!0 > 1

Upload the Arduino prgram to the Arduino board and answer the following questions.

- a) If we press the switch SW0, which LED is on?

5

- b) If we press the switch SW1, which LED is on?

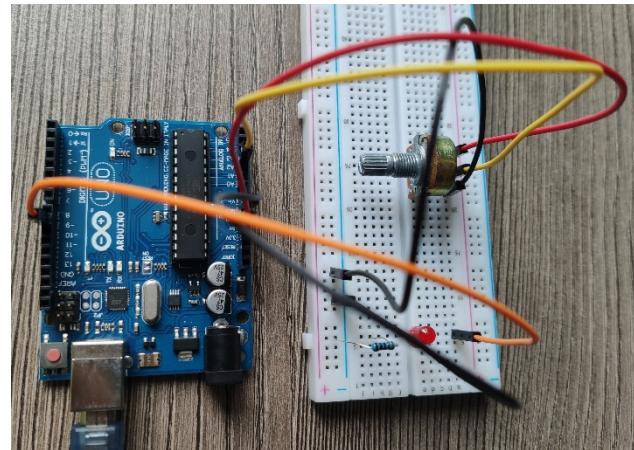
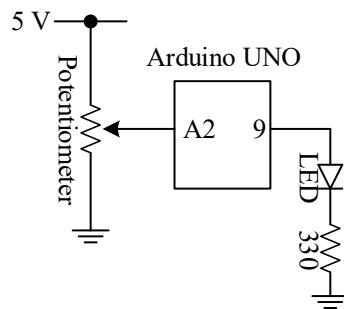
6

- c) If we press the switch SW2, which LED is on?

7

- d) Take a video to demonstrate your answers above. Name it “Ex2” and submit to the Google Classroom.

Exercise 3: Connect a potentiometer to the pin A2 and an LED to the pin 9 of the Arduino UNO as shown below.

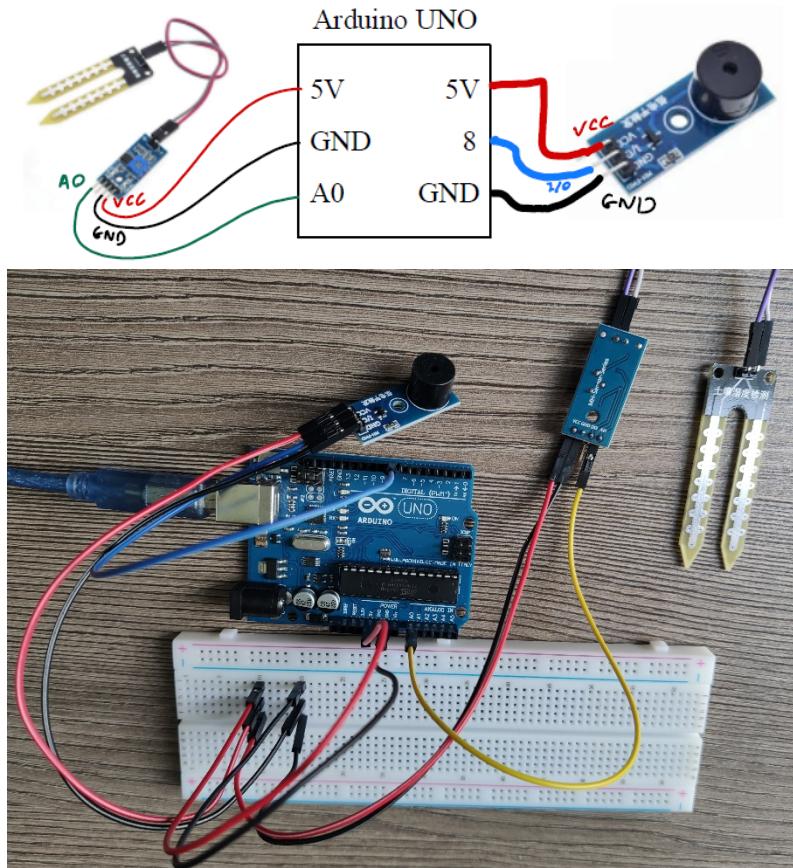


Write the following Arduino program (using the Arduino IDE software). When uploading the Arduino program to the Arduino UNO, rotating the potentiometer will adjust the brightness of the LED.

```
Ex3
1 void setup() {
2 }
3
4 void loop() {
5     int inValue = analogRead(A2);
6     int outValue = map(inValue, 0, 1023, 0, 255);
7     analogWrite(9, outValue);
8 }
```

Upload this Arduino program to your Arduino UNO board. Take a video to demonstrate your result (the video shows that, when you rotate the knob of the potentiometer, the brightness of the LED changes). Name it “Ex3” and submit to the Google Classroom.

Exercise 4: Connect a soil moisture sensor to the pin A0 and a buzzer to the pin 8 of the Arduino UNO as shown below.



Write the following Arduino program (using the Arduino IDE software). When uploading the Arduino program to the Arduino UNO, if the soil moisture sensor reads the input value larger than 750 (750 is around 3.6 volt), the buzzer will alarm.

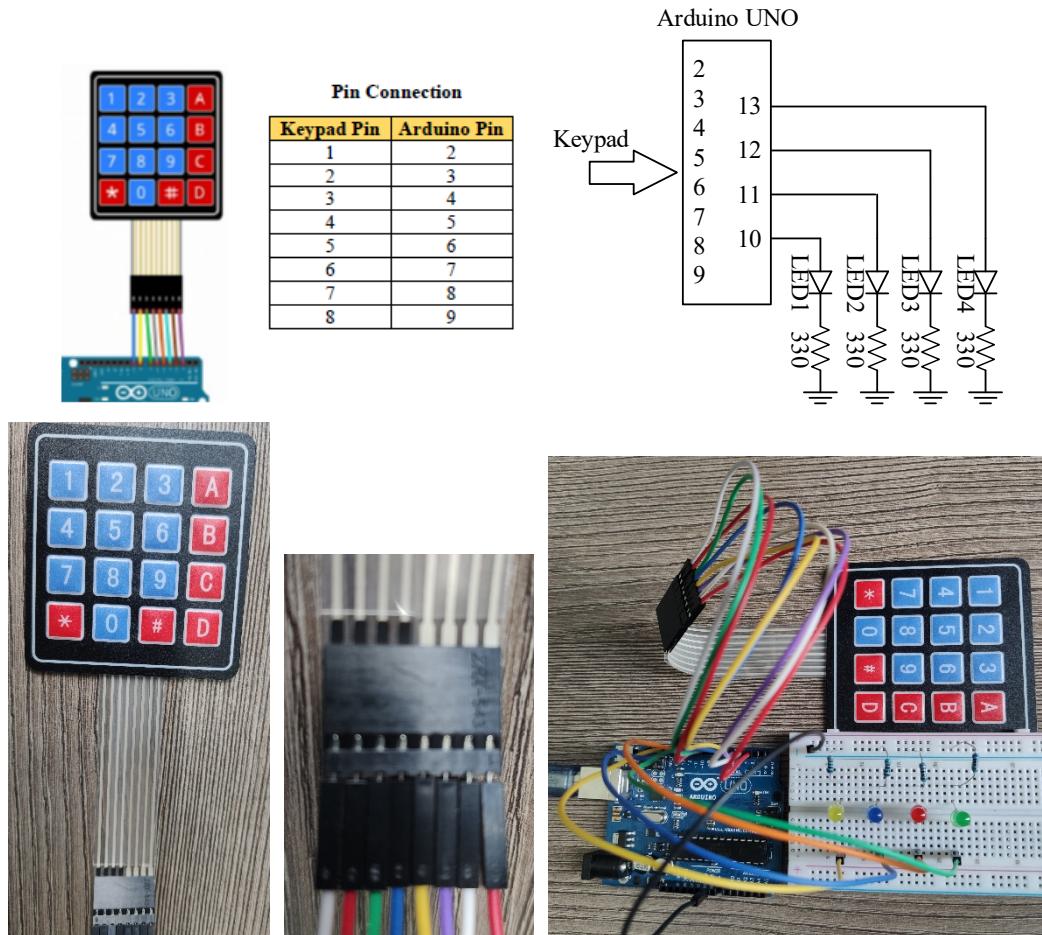
```
Ex4
1 void setup() {
2   Serial.begin(9600);
3   pinMode(8, OUTPUT);
4   digitalWrite(8, HIGH);
5 }
6
7 void loop() {
8   int inValue = analogRead(A0);
9   Serial.println(inValue);
10  if (inValue > 750) {
11    digitalWrite(8, HIGH);
12  } else {
13    digitalWrite(8, LOW);
14  }
15  delay(1000);
16 }
```

To demonstrate your work, you might need to touch both legs of the soil moisture sensor on a wet/soak material (for example, a soak napkin, a soak cloth, etc.). When you do so,

the buzzer will alarm. Take a video to demonstrate your work. Name it “Ex4” and upload to the Google Classroom.

Exercise 5: *** Before you can do this exercise, you must install the keypad library in the Arduino IDE. Please follow the steps shown on Page 38-39 in the Lecture 12 to install the keypad library; otherwise, you will get an error message. ***

Connect a keypad and four LEDs to the Arduino UNO as shown below.



Write an Arduino program (using the Arduino IDE software) and upload the Arduino Uno such that we have the following operations.

- To turn on an LED:
 - press the button 1 → LED1 on
 - press the button 2 → LED2 on
 - press the button 3 → LED3 on
 - press the button 4 → LED4 on
- To turn off an LED:
 - press the button A → LED1 off
 - press the button B → LED2 off
 - press the button C → LED3 off
 - press the button D → LED4 off

Upload this Arduino program to your Arduino Uno board. Take a video to demonstrate your result (the video shows that pressing the buttons above will turn on/off the LEDs as required). Name it “Ex5” and submit to the Google Classroom.