UNIVERSITY OF BATANGAS – LIPA CAMPUS
COLLEGE OF ENGINEERING AND
ARCHITECTURE COMPUTER ENGINEERING

INTRODUCTION IN ARDUINO

Experiment #1

MICROPROCESSOR SYSTEMS

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Activity Questions:

1. Based on this activity, what does digitalWrite() manipulates? How do you initiate it?

   The digitalWrite() manipulates the a HIGH and a LOW value to a digital pin. It initiated the voltage will be set to the corresponding value: 5V (or 3.3V on 3.3V boards) for HIGH, 0V (ground) for LOW.

2. Does the current and voltage load affect the LED? Why or why not?

   Yes, because as the current and voltage through the LED increases, the brightness also increases.

3. Can you implement the alternate ON/OFF of LEDs without using delay?

   No, we can't.

Results and Discussion:

1. Create a basic circuit diagram with 8 LEDs, 1 switch, and Arduino UNO.

2. Connect the components using the connecting wires and the breadboard.

3. Power **ON** the ARDUINO by connecting the USB Cable to your PC/Laptop.

4. Make sure that the ARDUINO IDE has recognized your ARDUINO UNO.

5. Try the sample code located in the File > Examples > Basic > Blinking LED.

6. Make sure that you connect your LED first on PIN 13 to be able to test the code and its connection.

7. LED lighting pattern combinations:

   a. All LEDs must light ON

```
int buttonState = 0;
void setup()
{
pinMode(1, INPUT);
```

```
pinMode(13, OUTPUT);
pinMode(12, OUTPUT);
pinMode(11, OUTPUT);
pinMode(10, OUTPUT);
pinMode(9, OUTPUT);
pinMode(8, OUTPUT);
pinMode(7, OUTPUT);
pinMode(6, OUTPUT);
}
void loop()
{
buttonState = digitalRead(1);
if (buttonState == HIGH) {
digitalWrite(13, HIGH);
digitalWrite(12, HIGH);
digitalWrite(11, HIGH);
digitalWrite(10, HIGH);
digitalWrite(9, HIGH);
digitalWrite(8, HIGH);
digitalWrite(7, HIGH);
digitalWrite(6, HIGH);
}
if (buttonState == LOW) {
digitalWrite(13, LOW);
digitalWrite(12, LOW);
digitalWrite(11, LOW);
digitalWrite(10, LOW);
digitalWrite(9, LOW);
digitalWrite(8, LOW);
digitalWrite(7, LOW);
digitalWrite(6, LOW);
 }
}
```

b. Blinking LEDs when switch is ON

```
int buttonState = 0;
void setup()
{
pinMode(1, INPUT);
pinMode(13, OUTPUT);
pinMode(12, OUTPUT);
pinMode(11, OUTPUT);
pinMode(10, OUTPUT);
pinMode(9, OUTPUT);
pinMode(8, OUTPUT);
```

```
pinMode(7, OUTPUT);
pinMode(6, OUTPUT);
}
void loop()
{
buttonState = digitalRead(1);
if (buttonState == HIGH) {
digitalWrite(13, HIGH);
digitalWrite(12, HIGH);
digitalWrite(11, HIGH);
digitalWrite(10, HIGH);
digitalWrite(9, HIGH);
digitalWrite(8, HIGH);
digitalWrite(7, HIGH);
digitalWrite(6, HIGH);
delay(1000); // Wait for 1000 millisecond(s)
digitalWrite(13, LOW);
digitalWrite(12, LOW);
digitalWrite(11, LOW);
digitalWrite(10, LOW);
digitalWrite(9, LOW);
digitalWrite(8, LOW);
digitalWrite(7, LOW);
digitalWrite(6, LOW);
delay(1000); // Wait for 1000 millisecond(s)
 }
}
```

c. Alternate blinking LEDs when the switch is ON

```
int buttonState = 0;
void setup()
{
pinMode(1, INPUT);
pinMode(13, OUTPUT);
pinMode(11, OUTPUT);
pinMode(9, OUTPUT);
pinMode(7, OUTPUT);
pinMode(12, OUTPUT);
pinMode(10, OUTPUT);
pinMode(8, OUTPUT);
pinMode(6, OUTPUT);
}
void loop()
{
buttonState = digitalRead(1);
```

```
if (buttonState == HIGH) {
digitalWrite(13, HIGH);
digitalWrite(11, HIGH);
digitalWrite(9, HIGH);
digitalWrite(7, HIGH);
delay(1000); // Wait for 1000 millisecond(s)
digitalWrite(13, LOW);
digitalWrite(11, LOW);
digitalWrite(9, LOW);
digitalWrite(7, LOW);
delay(1000); // Wait for 1000 millisecond(s)
digitalWrite(12, HIGH);
digitalWrite(10, HIGH);
digitalWrite(8, HIGH);
digitalWrite(6, HIGH);
delay(1000); // Wait for 1000 millisecond(s)
digitalWrite(12, LOW);
digitalWrite(10, LOW);
digitalWrite(8, LOW);
digitalWrite(6, LOW);
delay(1000); // Wait for 1000 millisecond(s)
 }
}
```

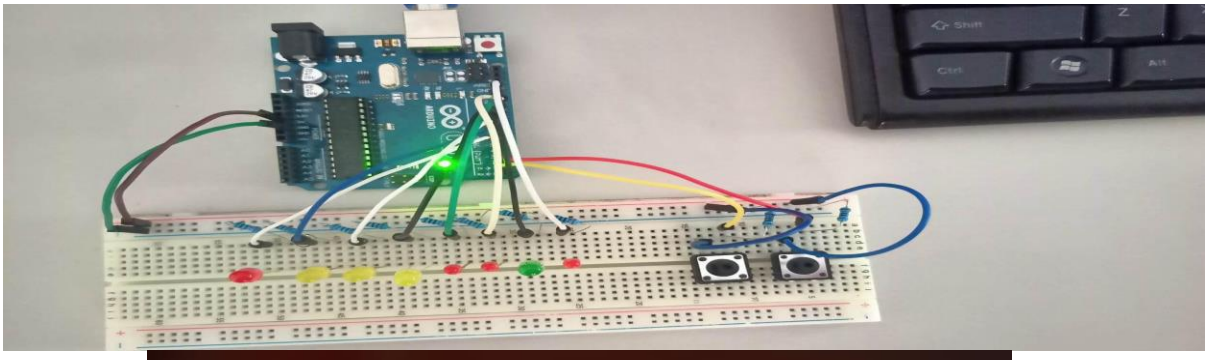
8. Add another switch (for a total of 2 switches), and 8 LEDs. Produce the following LED Lighting Pattern Combinations:

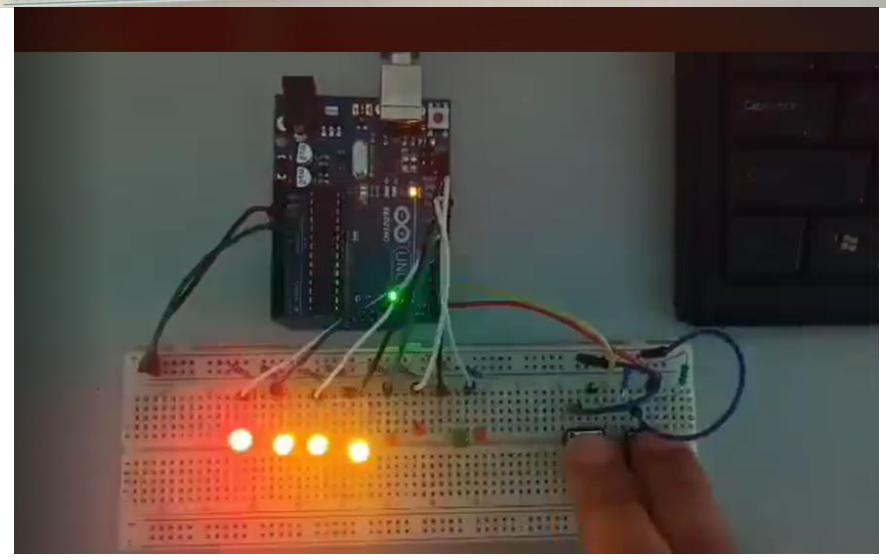
```
int buttonState_1 = 0;
int buttonState_2 = 0;
int button_1 = 1;
int button_2 = 2;
void setup(){
pinMode(button_1, INPUT);
pinMode(button_2, INPUT);
pinMode(13,OUTPUT);
pinMode(12,OUTPUT);
pinMode(11,OUTPUT);
pinMode(10,OUTPUT);
pinMode(9,OUTPUT);
pinMode(8,OUTPUT);
pinMode(7,OUTPUT);
pinMode(6,OUTPUT);
}
```

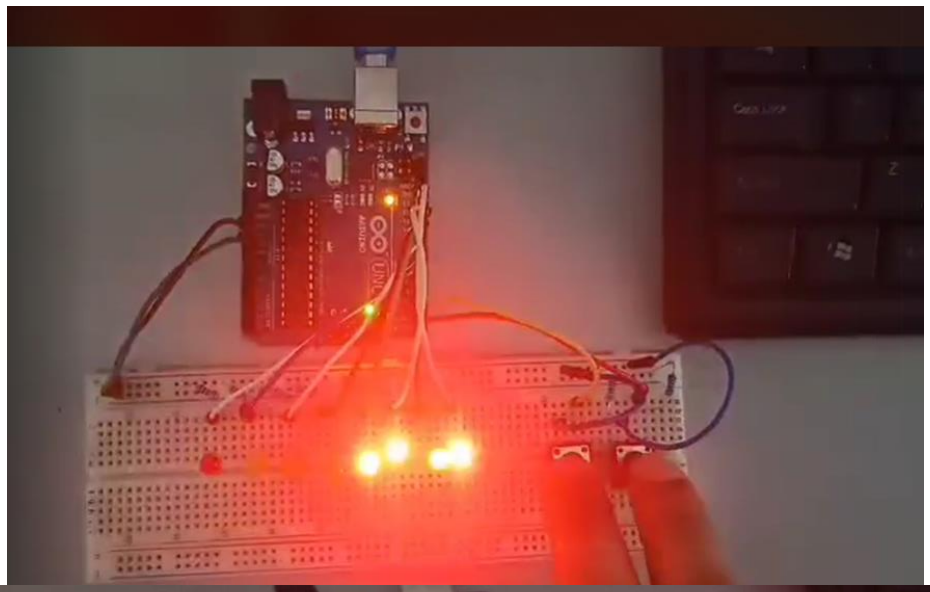
```
void loop() {
buttonState_1 = digitalRead(button_1);
buttonState_2 = digitalRead(button_2);
combination_1();
combination_2();
combination_3();
combination_4();
}
void combination_1(){
if (buttonState_1 == LOW && buttonState_2 == LOW){
digitalWrite(13, HIGH);
digitalWrite(12, HIGH);
digitalWrite(11, HIGH);
digitalWrite(10, HIGH);
digitalWrite(9, HIGH);
digitalWrite(8, HIGH);
digitalWrite(7, HIGH);
digitalWrite(6, HIGH);
 }
}
void combination_2(){
if (buttonState_1 == LOW && buttonState_2 == HIGH){
digitalWrite(13, HIGH);
digitalWrite(12, HIGH);
digitalWrite(11, HIGH);
digitalWrite(10, HIGH);
digitalWrite(9, LOW);
digitalWrite(8, LOW);
digitalWrite(7, LOW);
digitalWrite(6, LOW);
 }
}
void combination_3(){
if (buttonState_1 == HIGH && buttonState_2 == LOW){
digitalWrite(13, LOW);
digitalWrite(12,LOW);
digitalWrite(11, LOW);
digitalWrite(10, LOW);
digitalWrite(9, HIGH);
digitalWrite(8, HIGH);
```

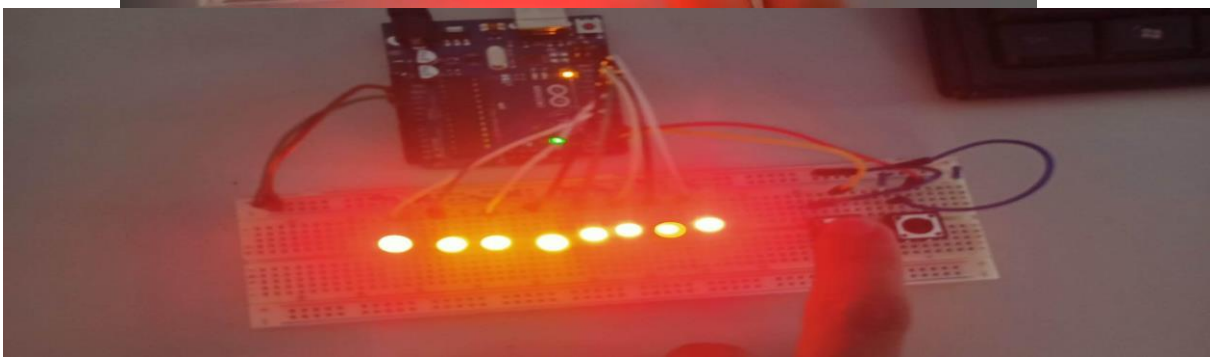
```
digitalWrite(7, HIGH);
digitalWrite(6, HIGH);
 }
}
void combination_4(){
if (buttonState_1 == HIGH && buttonState_2 == HIGH){
digitalWrite(13, LOW);
digitalWrite(12,LOW);
digitalWrite(11, LOW);
digitalWrite(10, LOW);
digitalWrite(9, LOW);
digitalWrite(8,LOW);
digitalWrite(7, LOW);
digitalWrite(6, LOW);
 }
}
```

Documentation:









Conclusion:

We learned in this experiment that each pin on the Arduino must match the code you put in the Arduino IDE. And with digitalWrite () it manipulates each LED and also with delay() it smooths the performance.

https://drive.google.com/drive/u/0/folders/12_oecHhvZQO9vvgzIPMmY-m6S9v57ygO?fbclid=IwAR2tzyFWV6vcbimNN1lVujlPmBnm-AW21NKf0K559rUe3hzhpdWoiKsATVQ