Experiment No. – 2

Title: Open-source prototype platform- Raspberry-Pi/Beagle board/Arduino
2A -Simple program digital read/write using LED and Switch
2B -Analog read/write using sensor and actuators.

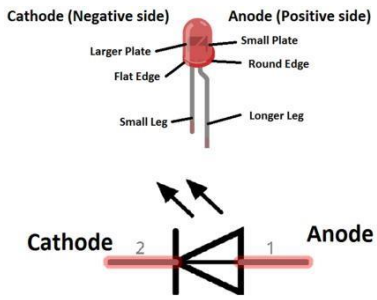
Aim: To blink the LED when the switch is pressed using Arduino.

Hardware Requirements: Arduino Board, LED, Push Button

Software Requirements: Arduino IDE

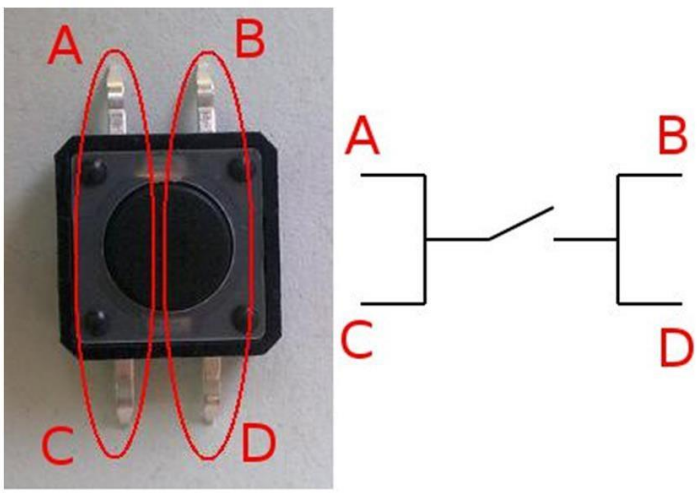
Theory:

LED:



A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energyof the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light- emitting phosphor on the semiconductor device

Push Button:



A push-button (also spelled pushbutton) or simply button is a simple switch mechanism to control some aspect of a machine or a process. Buttons are typically made out of hard material,

usually plastic or metal.[1] The surface is usually flat or shaped to accommodate the

human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing, slapping, hitting, and punching.

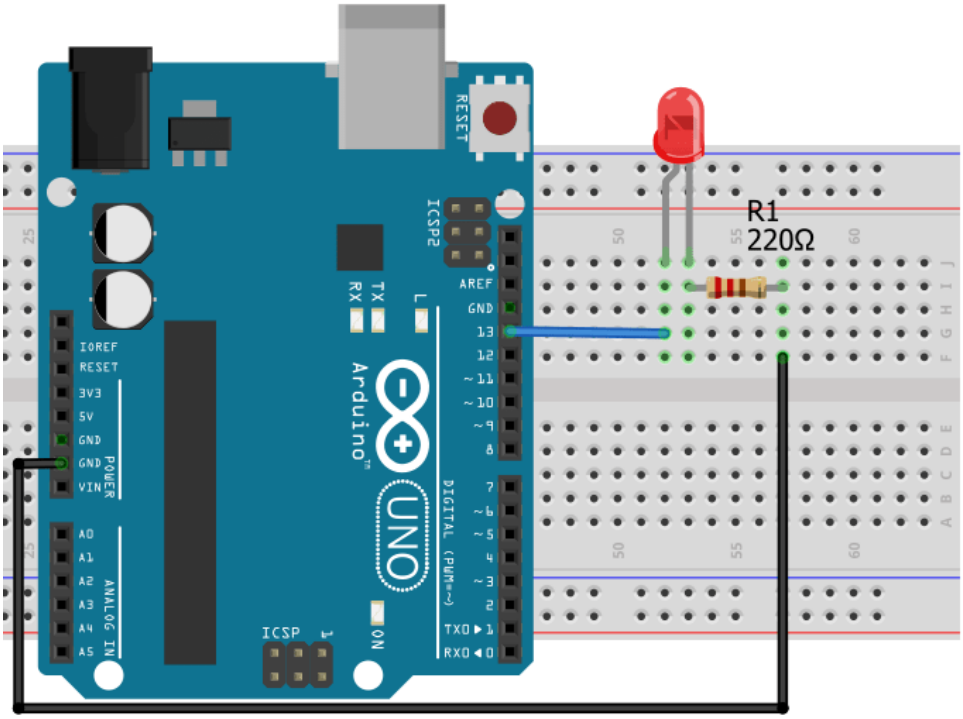


Fig.1 Interfacing of LED

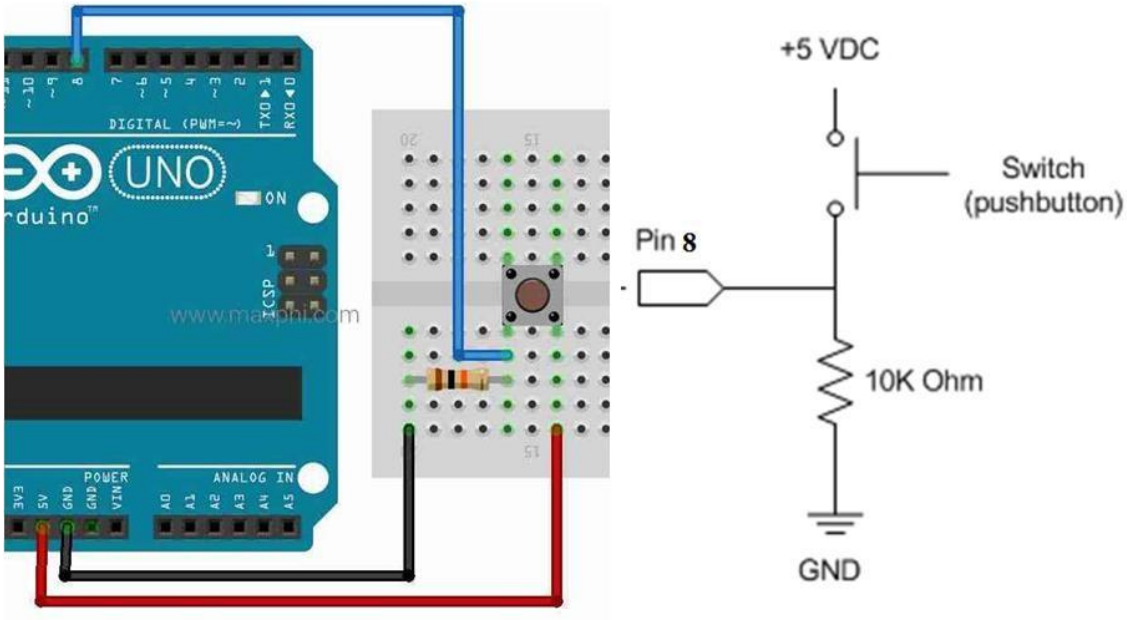
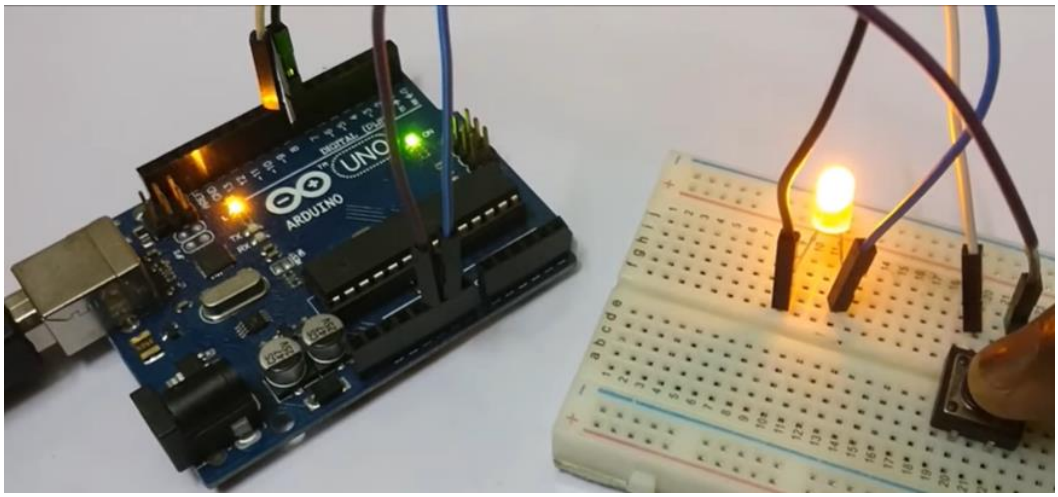


Fig.2 Interfacing of Push Button



Procedure:

Step 1: Connect the Arduino board to the Micro-IoT Sensor board using the FRC cable provided with the board.

Step 2: Connect the Power supply adaptor and power on the circuit.

Step 3: Open Arduino IDE and create a new sketch (program) for LED blinking using the above pins.

Step 4: In the Arduino IDE go to tools→Port and select the appropriate COM port.

Step 5: In the Arduino IDE click on the upload button () to compile and download the code into the Arduino UNO. When successfully downloaded the code will start running and you can observe the LED's blinking on the board.

Observation:
You can observe the following; when you press a switch the LED will turn ON and after 1 second it will turn OFF. For every switch press a different LED will blink.

Conclusion:

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_____
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Code :

```
/*simple program to glow led when switch is pressed*/
/*demonstrates the use of digital read and write */
/* for pinout refer to the manual*/
/*LEDS - pins 0, 1, 2, 4*/
/*LED will be ON when pin is LOW - inverse logic*/
/*SWITCH -10,11,12,13 */

 void setup() {
  // put your setup code here, to run once:
pinMode(0,OUTPUT);  /*set LED pin as OUTPUT*/
pinMode(1,OUTPUT);  /*set LED pin as OUTPUT*/
pinMode(2,OUTPUT);  /*set LED pin as OUTPUT*/
pinMode(4,OUTPUT);  /*set LED pin as OUTPUT*/
pinMode(10,INPUT);  /*set switch pin as INPUT*/
pinMode(11,INPUT);  /*set switch pin as INPUT*/
pinMode(12,INPUT);  /*set switch pin as INPUT*/
pinMode(13,INPUT);  /*set switch pin as INPUT*/
}
void loop() {
  // put your main code here, to run repeatedly:
 digitalWrite(0,HIGH);
 digitalWrite(1,HIGH);
 digitalWrite(2,HIGH);
 digitalWrite(4,HIGH);

 /*check for key press and then make the LED ON*/
if(digitalRead(10)== 0)
{
  digitalWrite(0,LOW);
  delay(1000);
}
if(digitalRead(11)== 0)
{
  digitalWrite(1,LOW);
  delay(1000);
}
if(digitalRead(12)== 0)
{
  digitalWrite(2,LOW);
  delay(1000);
}
if(digitalRead(13)== 0)
{
  digitalWrite(4,LOW);
  delay(1000);
}

}
```

Experiment 2B: Simple program for Analog read using sensor

Aim: write a simple program using Arduino to read the analog values for LDR.

Apparatus: Arduino Uno board, Micro-IoT sensor actuator board, Power adaptor.

Interface:

Peripheral	Arduino Pin
Light Dependent Resistor	A0 (CN11)

Procedure:

Step 1: Connect the Arduino board to the Micro-IoT Sensor board using the FRC cable provided with the board.

Step 2: Connect the Power supply adaptor and power on the circuit.

Step 3: Open Arduino IDE and create a new sketch (program) using the above pins.

Step 4: In the Arduino IDE go to tools→Port and select the appropriate COM port.

Step 5: In the Arduino IDE click on the upload button () to compile and download the code into the Arduino UNO. When successfully downloaded the code will start running.

Step 6: Connect the LDR sensor to CN11 (pin A0). Open the Serial Monitor from **Tools→Serial Monitor** and observe the analog values for the LDR.

Observation:

The analog values from the LDR change when the LDR is exposed to light as against when it is shielded from light in darkness.

Code:

```
void setup() {
// put your setup code here, to run once:
Serial.begin(9600);
Serial.print("light intensity using LDR");
}
void loop() {
// put your main code here, to run repeatedly:
unsigned int val;
val = analogRead(A0);
Serial.println(val);
delay(500);
}
```

Conclusion: