SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT213- IoT SYSTEM ARCHITECTURE

II ECE / IV SEMESTER

UNIT 3 – ACTUATORS AND IOT NETWORKING DEVICES

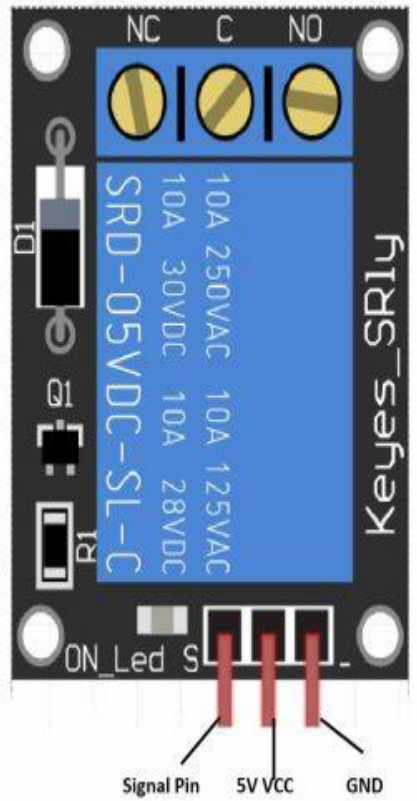
TOPIC 2 –Programming and Interfacing of Actuators: - Relay

Relay Module

•A relay is generally an electrically operated switch.
•The principle used by the relays is an electromagnet to mechanically operate the switch.
•Basically it operates a switch using an electromagnet which needs only less power like 5V, 12V or 24V.

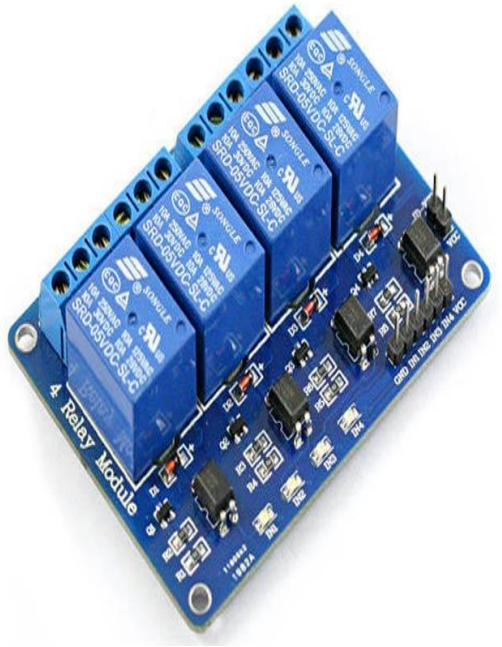
PINs

•NO : Normally Open – This is the normally open terminal of the relay, if the relay is not energized there won't be any contact with Common terminal. But it will establish electrical contact with Common terminal once the relay is energized.
•C : Common terminal
•NC : Normally Closed –It will have electrical contact with common terminal whenever the relay is not energised. And there won't be no electrical contact when the relay is energised.
•GND : Ground Pin , Signal : Actuation signal to control the relay.
•5V VCC : Operating voltage for the relay.



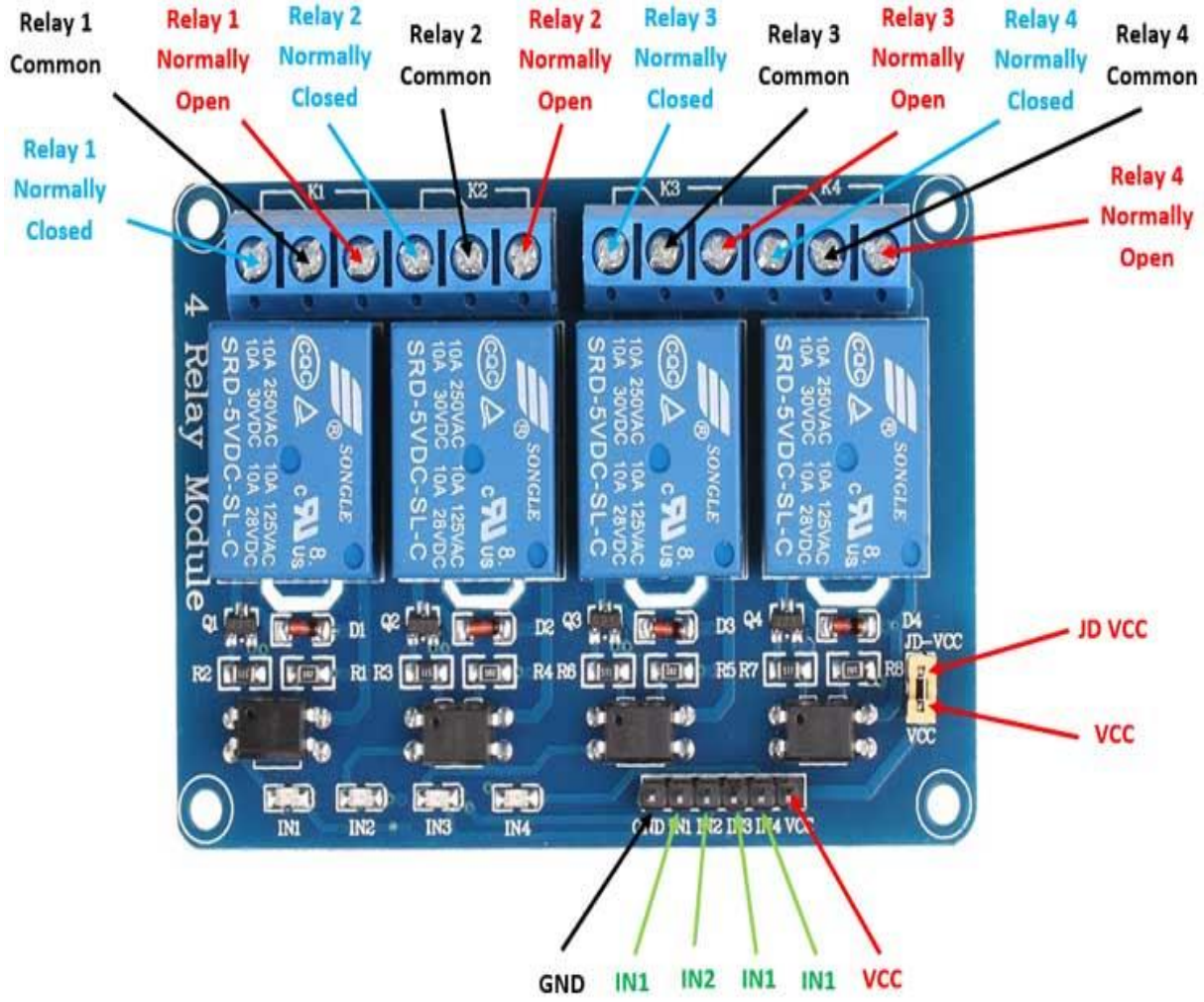
5V Four Channel Relay Module

- Isolated Module- Optical isolation between individual relay
- Control High voltage device (The contacts on each relay are specified for 250VAC and 30VDC and 10A in each case)
- Electro Mechanical Device
- Act as Two way switch- 3 pin use
- Act as switch- 2 pin use
- Supply voltage – 3.75V to 6V



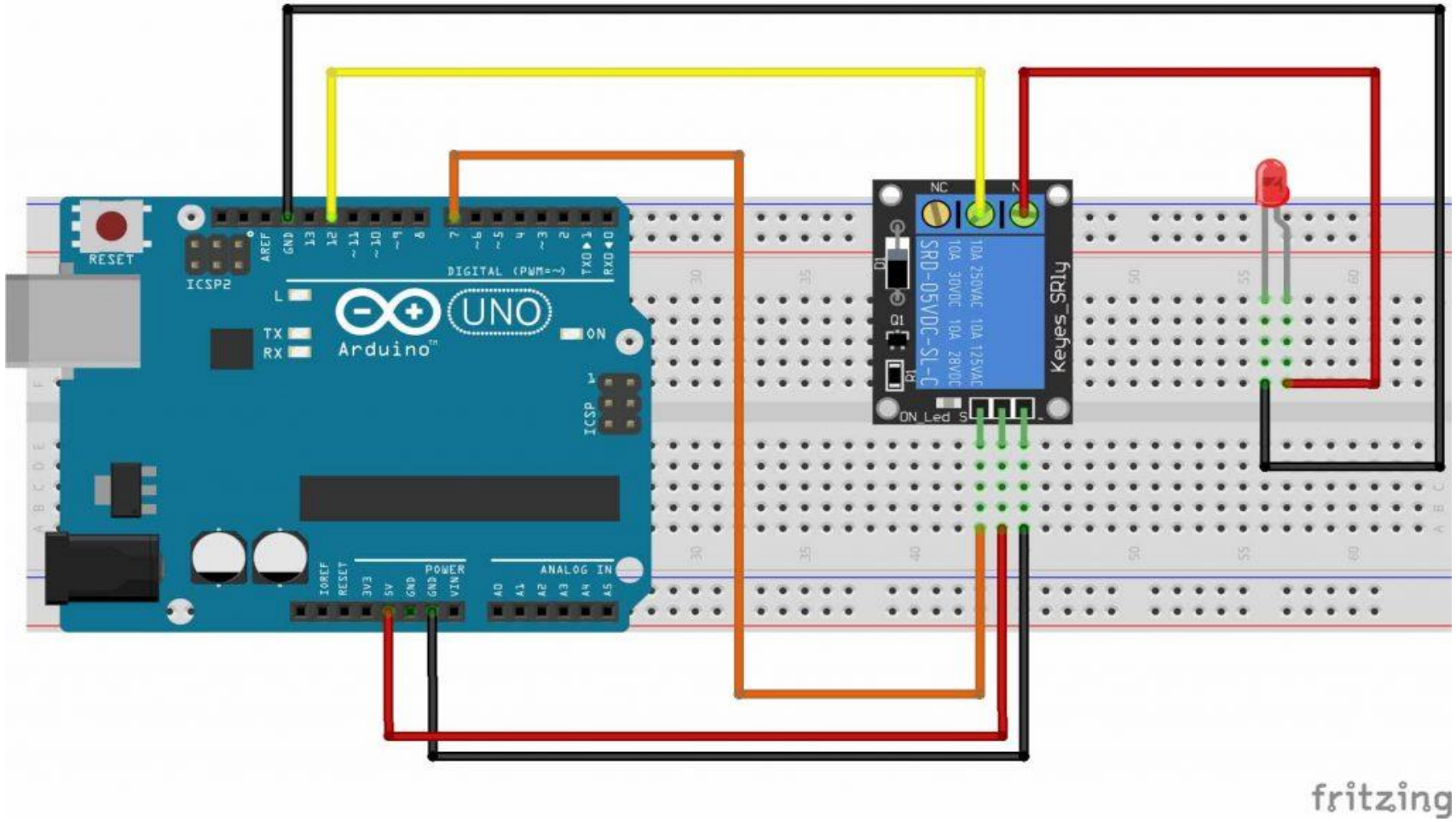
- Trigger current – 5mA
- Current when the relay is active - ~70mA (single), ~300mA (all four)
- Relay maximum contact voltage – 250VAC, 30VDC
- Relay maximum current – 10A

5V Four-Channel Relay Module



- The four-channel relay module contains four 5V relays and the associated switching and isolating components
- There are two terminal blocks with six terminals each, and each block is shared by two relays.
- The terminals are screw type, which makes connections to mains wiring easy and changeable.
- The indicator LEDs glow when the coil of the respective relay is energized, indicating that the relay is active.
  The optocouplers form an additional layer of isolation between the load being switched and the inputs.

Programming and Interfacing of Relay with Arduino



Programming and Interfacing of Relay with Arduino

Components Required

- Arduino Uno
- LED
- 5V Relay Module
- Bread Board
- Jumper Wires

Description

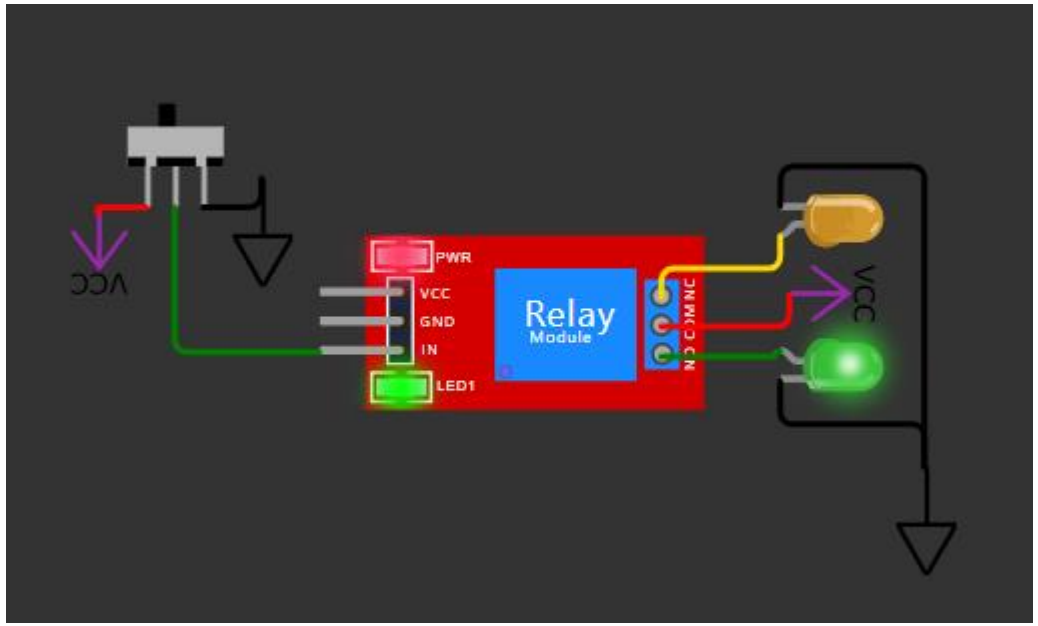
- GND pin of 5V Relay – GND pin of Arduino
- Signal (Input) pin of 5V Relay – pin 7 of Arduino
- VCC pin of 5V Relay – 5V pin of Arduino
- Common pin of 5V Relay – pin 12 of Arduino
- NO pin of 5V Relay – Positive pin of the LED
- GND pin of LED – GND pin of Arduino

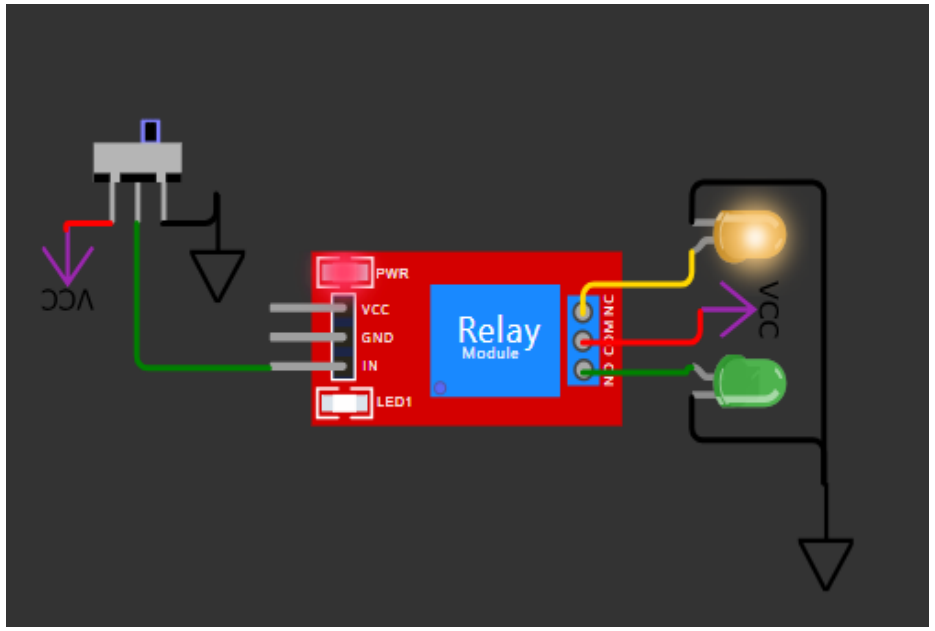
Programming and Interfacing of Relay with Arduino

```
int relay_pin = 7;
 int led_pin = 12;
void setup()
 {
pinMode(relay_pin,OUTPUT);
pinMode(led_pin,OUTPUT);
digitalWrite(led_pin,HIGH);
}
void loop()
{ digitalWrite(relay_pin,HIGH);
delay(2000);
digitalWrite(relay_pin,LOW);
 delay(2000);
}
```

Programming and Interfacing of Relay with Arduino

- https://wokwi.com/projects/394759187425923073

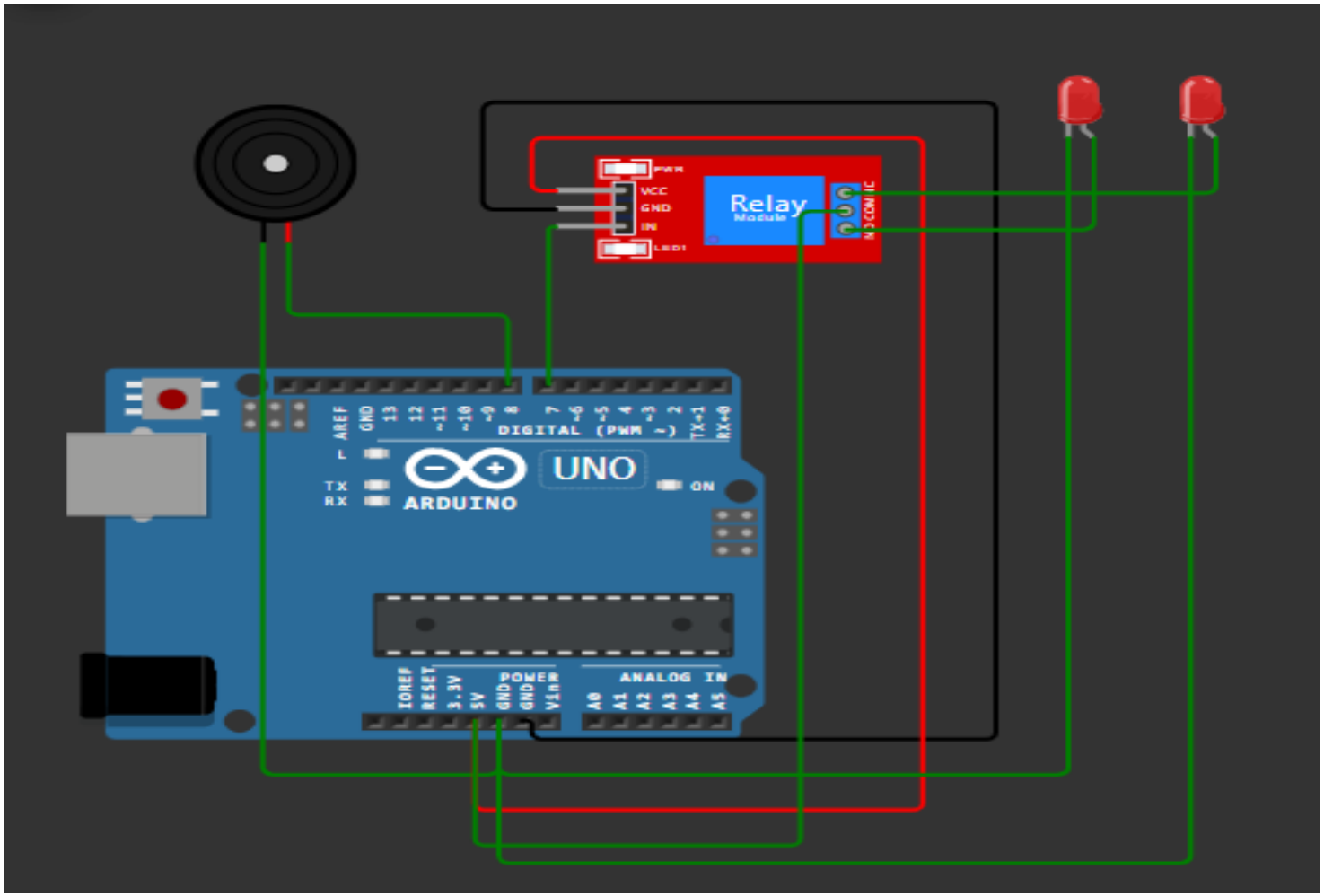




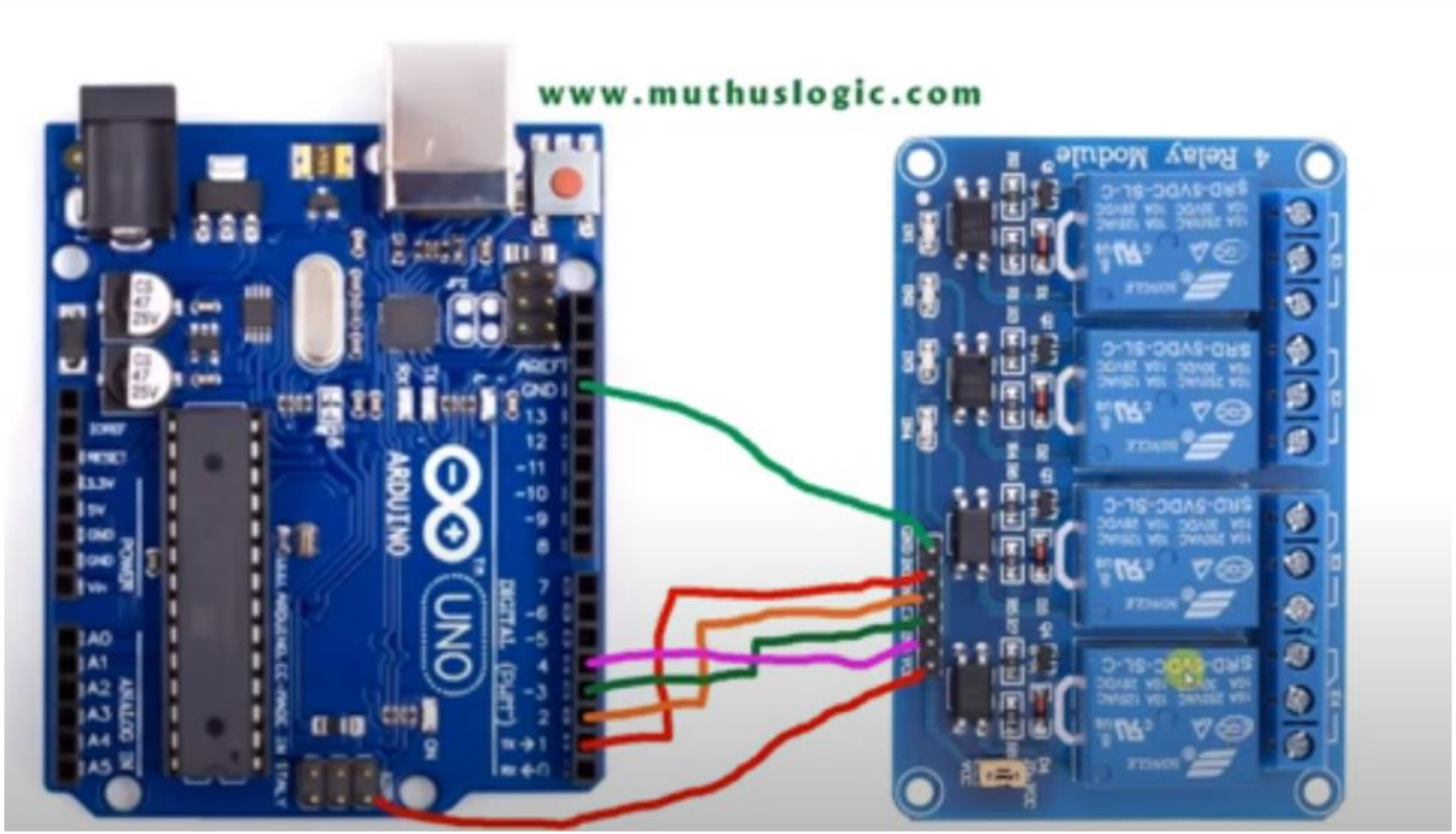
Programming and Interfacing of Relay with Arduino

- https://wokwi.com/projects/394759238448594945
- First 2 seconds- LED1 ON, LED2 OFF, BUzzer OFF
- Next 1 seconds- LED2 ON, BUzzer ON, LED1 OFF

Programming and Interfacing of Relay with Arduino



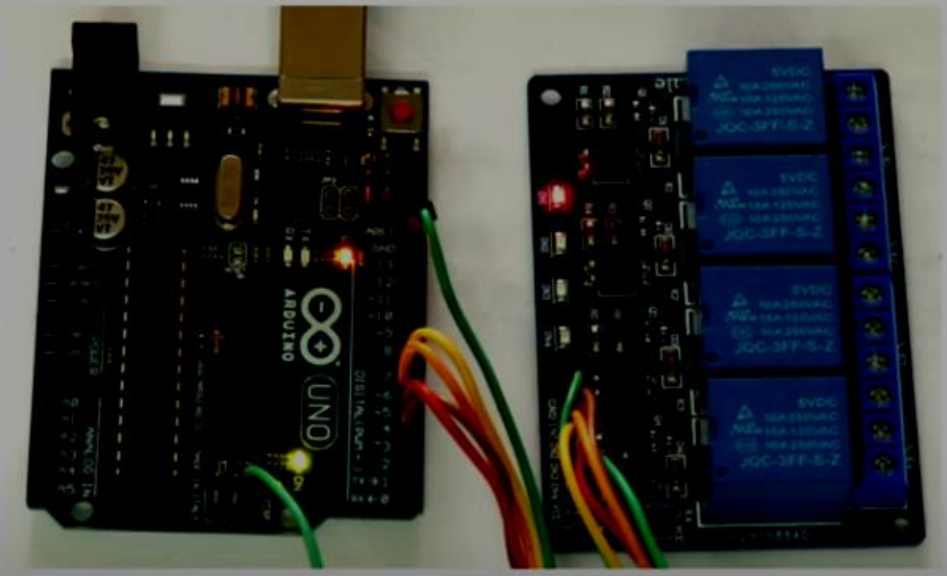
Programming and Interfacing of Relay with Arduino



Programming and Interfacing of Relay with Arduino

relay_module_demo1 §

```
1  void setup() {
2    // put your setup code here, to run once:
3    pinMode(1, OUTPUT);
4    pinMode(2, OUTPUT);
5    pinMode(3, OUTPUT);
6    pinMode(1, OUTPUT);
7  }
8
9  void loop() {
10   // put your main code here, to run repeatedly:
11   digitalWrite(1, HIGH); // aply 5volt at pin 1
12   delay(1000); // 1 second delay
13   digitalWrite(1, LOW); // 0 volt
14   delay(1000);
15 }
```



https://www.youtube.com/watch?v=5ocLn2b0n-c

Programming and Interfacing of Relay with Arduino

```
  pinMode(3, OUTPUT);
  pinMode(4, OUTPUT);
}

void loop() {
  // put your main code here, to run repeatedly:
  digitalWrite(1, HIGH); // aply 5volt at pin 1
  digitalWrite(2, HIGH); // aply 5volt at pin 1
  digitalWrite(3, HIGH); // aply 5volt at pin 1
  digitalWrite(4, HIGH); // aply 5volt at pin 1

  delay(1000); // 1 second delay

  digitalWrite(1, LOW); // 0 volt
  digitalWrite(2, LOW); // 0 volt
  digitalWrite(3, LOW); // 0 volt
  digitalWrite(4, LOW); // 0 volt
  delay(1000);
}
```