



Centurion  
UNIVERSITY

# INDUSTRIAL INTERNET OF THINGS LAB

2ND YEAR BTECH 4TH SEM

Guided By- Prof. Rajesh Mishra

(Course Code: CUTM1017)

Session 2021-2022

## **Hands on Lab Guide (Lab Manual)**



Department of computer science & Engineering

CUTM, Parlakhemundi

# INDEX

Exp. No.	Name of the Experiment	Page. No	Remarks
01	To Interface Led with Arduino Uno and its Proteus Simulation	01	
02	To Interface Led and switch with Arduino Uno and its Proteus Simulation	02	
03	To Interface IR Sensor with Arduino Uno and its Proteus Simulation	03	
04	To Interface Rain Sensor with Arduino Uno and its Proteus Simulation	04	
05	To Interface Motor with Arduino Uno and its Proteus Simulation.	05	
06	To Interface led and Relay with Arduino Uno and its Proteus Simulation	06	
07	Ladder Diagram for all the logic Gates in using Virtual Lab	07 - 08	
08	Ladder Diagram for given Expression using Virtual Lab	09	
09	To Interface Node Mcu Connectivity with WIFI Network.	10 - 11	
10	To Send field Data to Thingspeak Server	12 - 13	
11	To Receive Data from Thingspeak Server	14 - 16	

# IIOT LAB EXPERIMENT RESULT

## EXP – 01

Aim – To Interface Led with Arduino Uno and its Proteus Simulation.

- ARDUINO IDE CODE -

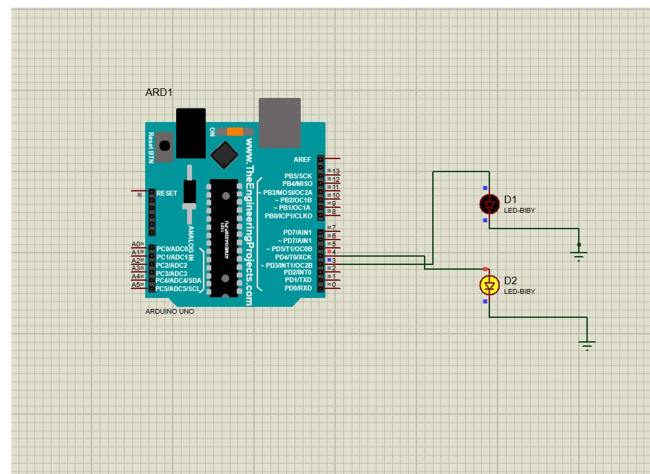
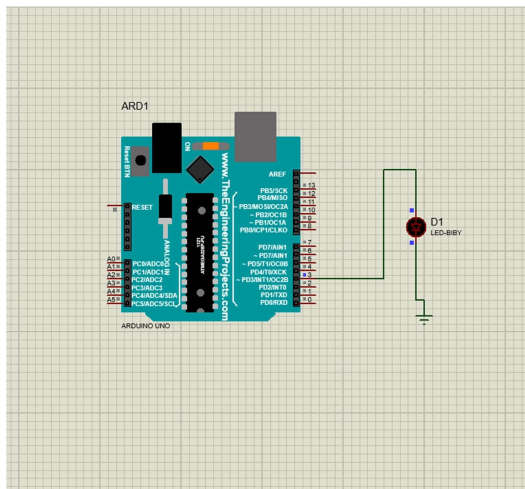
➤ For Single Led -

```
int led = 3;
void setup(){
  pinMode (3, OUTPUT);
}
void loop(){
  digitalWrite(3,HIGH);
  delay(1000);
  digitalWrite(3,LOW);
  delay(1000);
}
```

➤ For Double Led -

```
int led1 = 3;
int led2 = 4;
void setup(){
  pinMode (3, OUTPUT);
  pinMode (4, OUTPUT);
}
void loop(){
  digitalWrite(3,HIGH);
  digitalWrite(4,LOW);
  delay(200);
  digitalWrite(3,LOW);
  digitalWrite(4,HIGH);
  delay(200);
}
```

- PROTEUS SIMULATION -



# IIOT LAB EXPERIMENT RESULT

## EXP – 02

Aim – To Interface Led and switch with Arduino Uno and its Proteus Simulation.

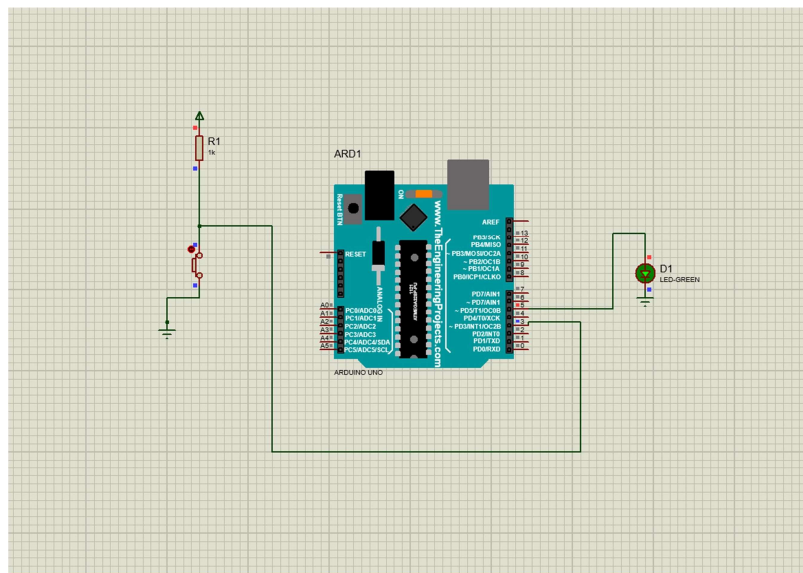
- ARDUINO IDE CODE -

```
int sw = 3;
int led =5;

void setup(){
  pinMode (3,INPUT);
  pinMode (5,OUTPUT);
}

void loop(){
  int x= digitalRead (3);
  if(x==HIGH){
    digitalWrite (5,HIGH);
  }
  else{
    digitalWrite(5,LOW);
  }
}
```

- PROTEUS SIMULATION -



# IIOT LAB EXPERIMENT RESULT

## EXP – 03

Aim – To Interface IR Sensor with Arduino Uno and its Proteus Simulation.

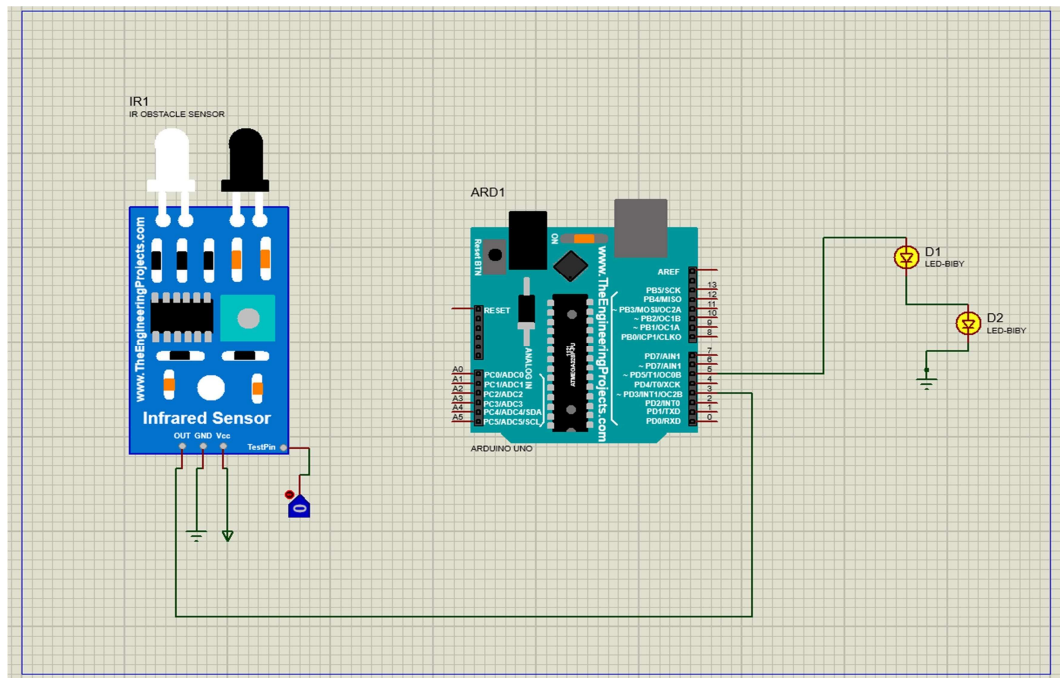
- ARDUINO IDE CODE -

```
int ir = 3;
int led =5;

void setup(){
  pinMode (3,INPUT);
  pinMode (5,OUTPUT);
}

void loop(){
  int x= digitalRead (3);
  if(x==HIGH){
    digitalWrite (5,HIGH);
  }
  else{
    digitalWrite(5,LOW);
  }
}
```

- PROTEUS SIMULATION -



# IIOT LAB EXPERIMENT RESULT

## EXP – 04

Aim – To Interface Rain Sensor with Arduino Uno and its Proteus Simulation.

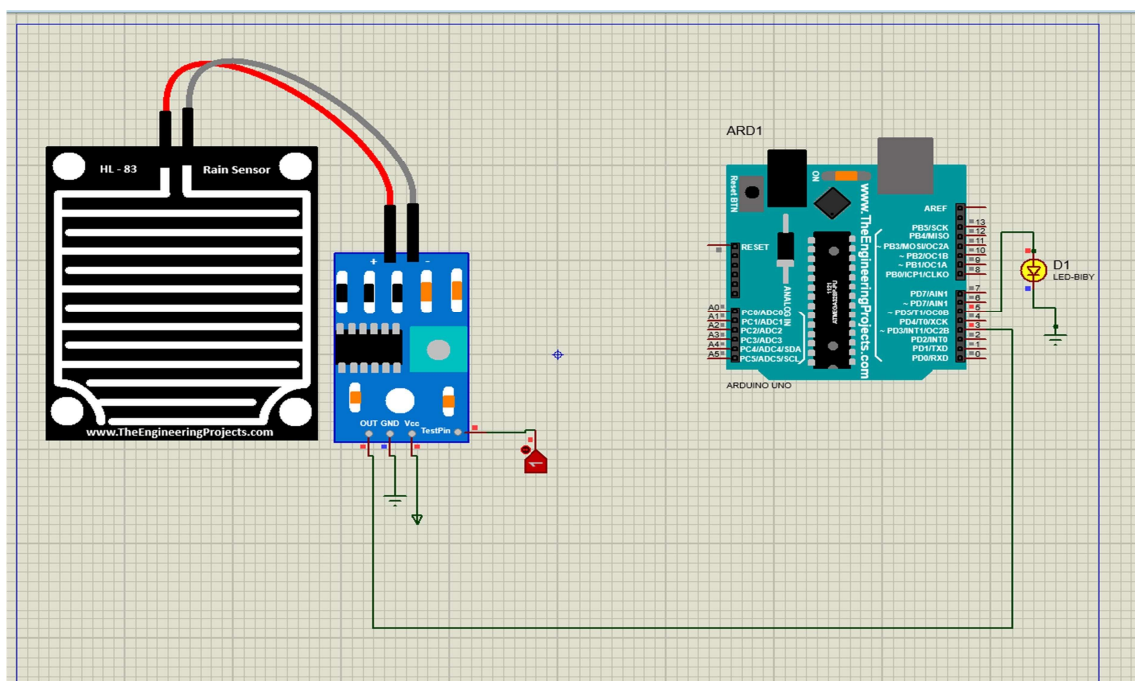
- ARDUINO IDE CODE -

```
int rain = 3;
int led =5;

void setup(){
  pinMode (3,INPUT);
  pinMode (5,OUTPUT);
}

void loop(){
  int x= digitalRead (3);
  if(x==HIGH){
    digitalWrite (5,HIGH);
  }
  else{
    digitalWrite(5,LOW);
  }
}
```

- PROTEUS SIMULATION -



# IIOT LAB EXPERIMENT RESULT

## EXP – 05

Aim – To Interface Motor with Arduino Uno and its Proteus Simulation.

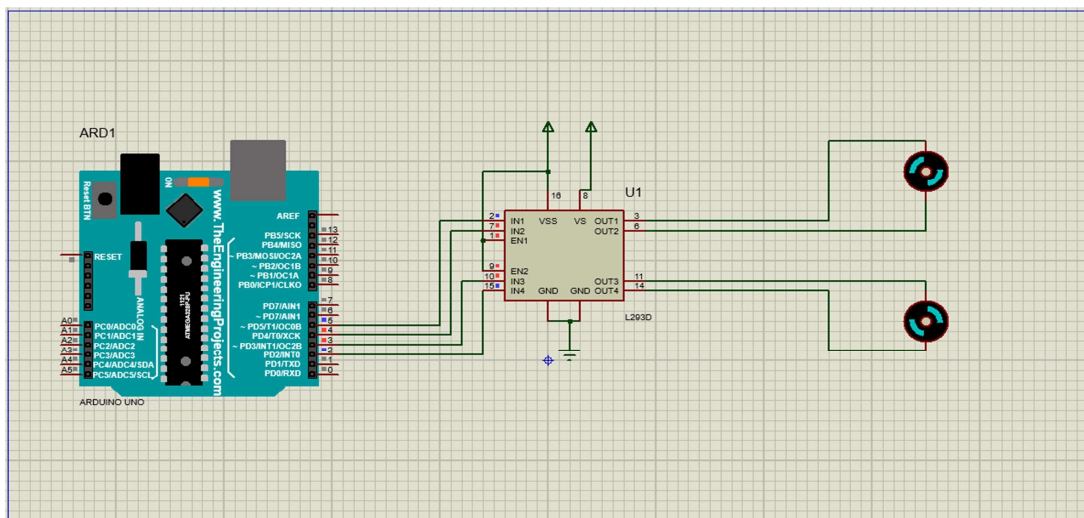
- ARDUINO IDE CODE -

```
int pinm1 =2;
int pinm2 =3;
int pinm3 =4;
int pinm4 =5;

void setup(){
  pinMode(2,OUTPUT);
  pinMode(3,OUTPUT);
  pinMode(4,OUTPUT);
  pinMode(5,OUTPUT);
}

void loop(){
  digitalWrite(3,HIGH);
  digitalWrite(2,LOW);
  digitalWrite(4,HIGH);
  digitalWrite(5,LOW);
  delay(2000);
}
```

- PROTEUS SIMULATION -



# IIOT LAB EXPERIMENT RESULT

## EXP – 06

Aim – To Interface led and Relay with Arduino Uno and its Proteus Simulation.

- ARDUINO IDE CODE-

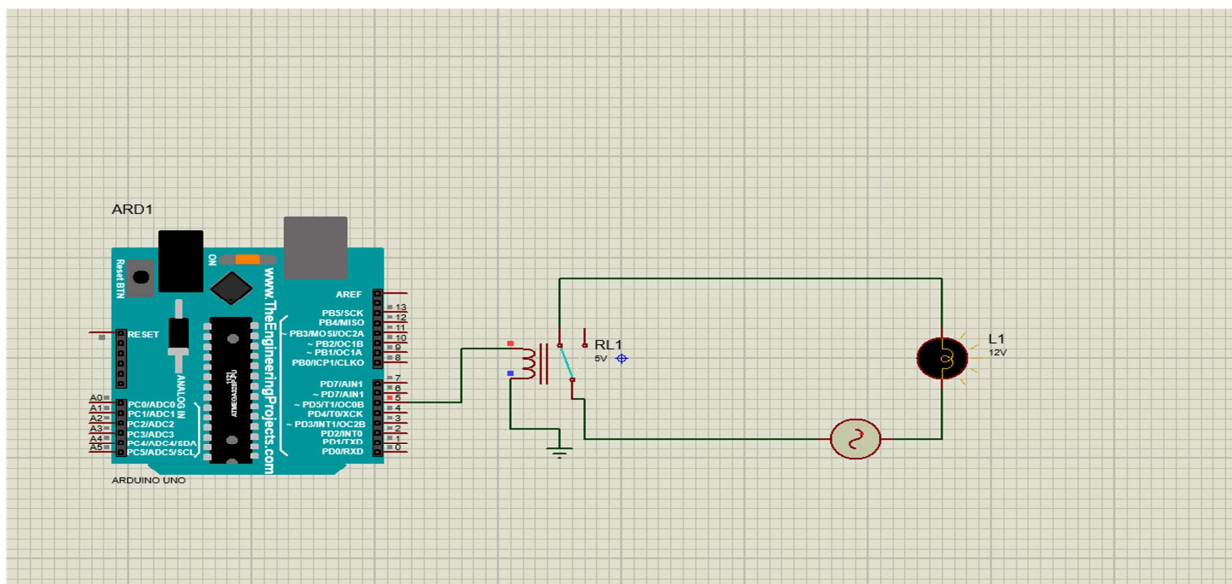
```
int led =5;

void setup(){
  pinMode (5,OUTPUT);
}

void loop(){
  digitalWrite (5,HIGH);
  delay(2000);

  digitalWrite(5,LOW);
  delay(2000);
}
```

- PROTEUS SIMULATION-



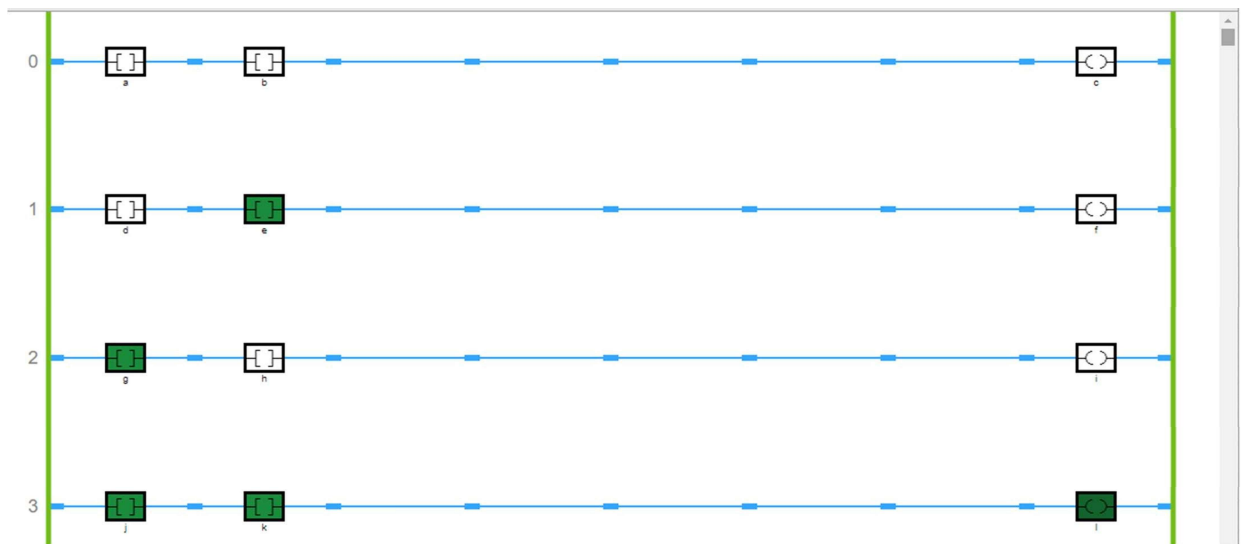


# IIOT LAB EXPERIMENT RESULT

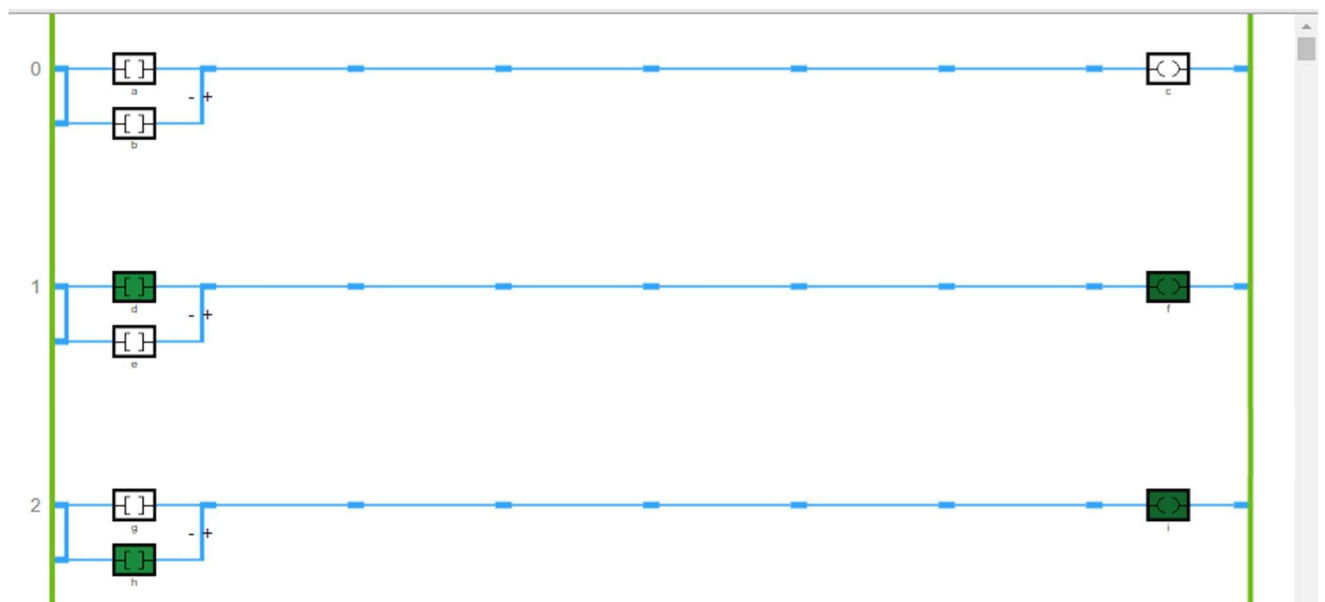
## EXP – 07

Aim – Ladder Diagram for all the logic Gates in using Virtual Lab.

### **AND GATE:**



### **OR GATE:**



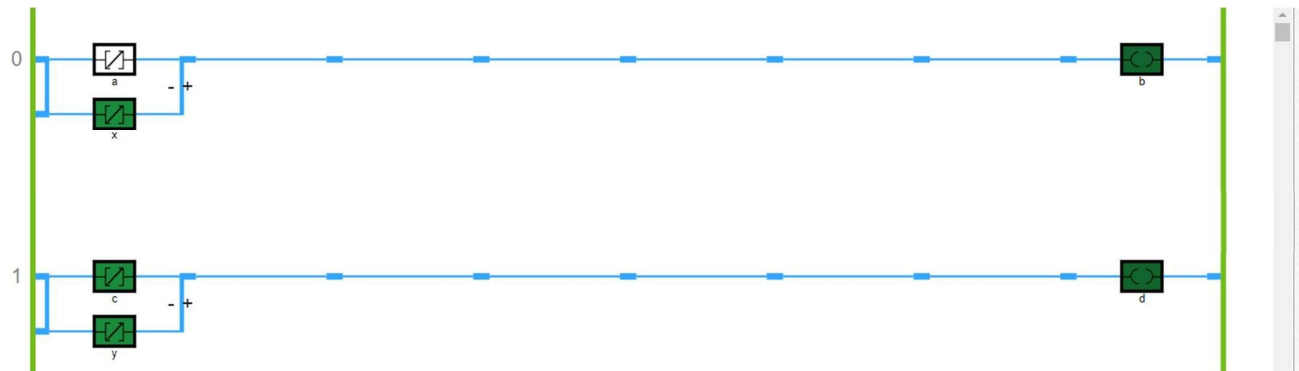
# IOT LAB EXPERIMENT RESULT

## EXP – 07

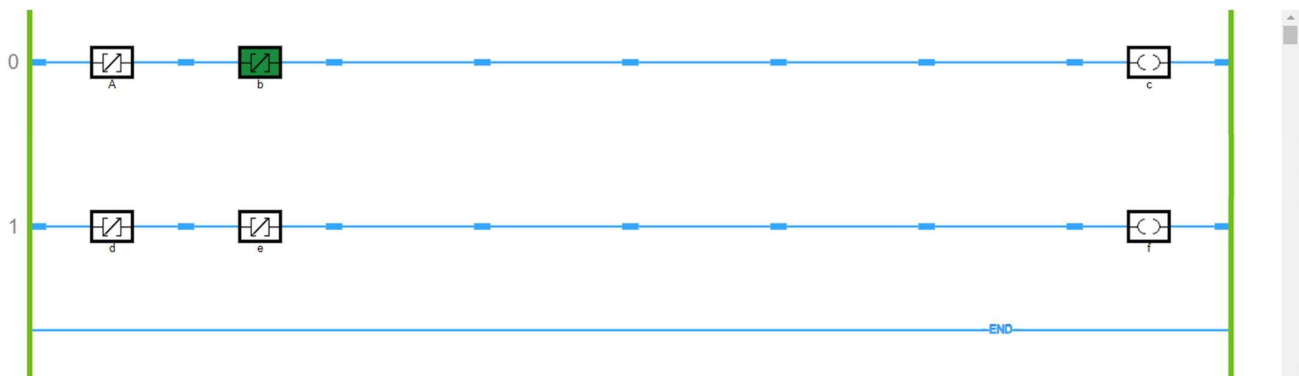
### NOT GATE:



### NAND GATE:



### NOR GATE:

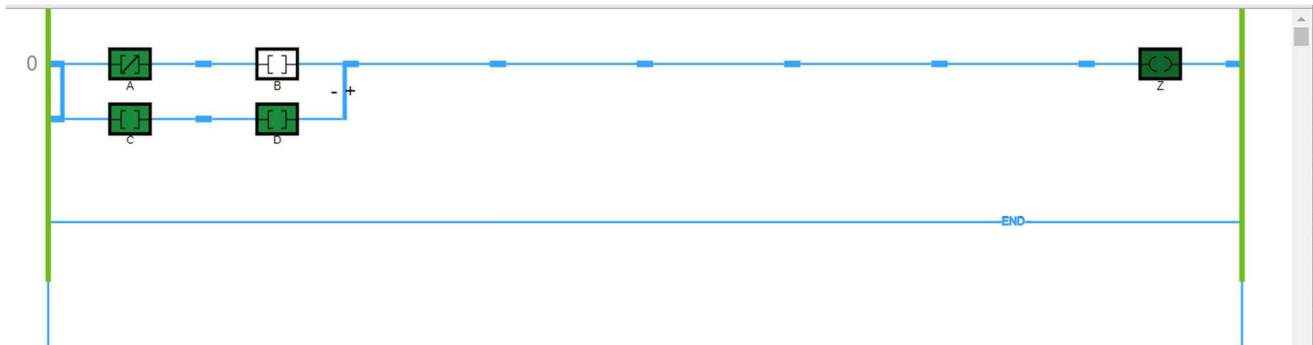


# IIOT LAB EXPERIMENT RESULT

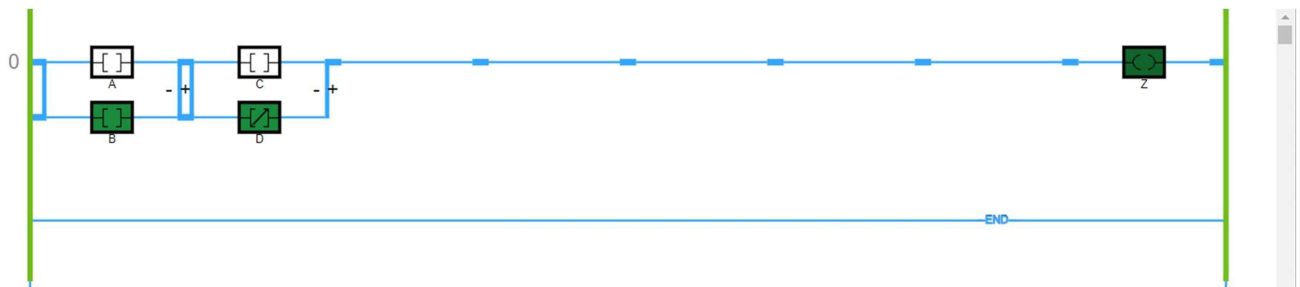
## EXP – 08

Aim – Ladder Diagram for given Expression using Virtual Lab.

1.)  $Z = \sim AB + CD$



2.)  $Z = (A + B) (C + \sim D)$



3.)  $F = (\sim A + B) (C + \sim D + E)$



# IIOT LAB EXPERIMENT RESULT

## EXP – 09

Aim – To Interface Node Mcu Connectivity with WIFI Network.

- ARDUINO IDE CODE –

```
#include <ESP8266WiFi.h>

const char* ssid = "iQ00 Z6 Lite 5G";
const char* password = "12345670";

void setup()
{
    Serial.begin(115200);
    delay(10);

    WiFi.begin(ssid, password);

    Serial.println();
    Serial.print("Connecting to ");
    Serial.println(ssid);

    while (WiFi.status() != WL_CONNECTED)
    {
        Serial.println("WIFI is not Connected");
        //Serial.println();
        delay(500);
    }
    Serial.println();
    Serial.println("WIFI is Connected");
    Serial.print("Connected, IP address: ");
    Serial.println(WiFi.localIP());
}

void loop() {
}
```

## IIOT LAB EXPERIMENT RESULT

EXP – 09

- WIFI CONNECTING -

```
COM3
rll!r□$□$n▲▲▲$▲!$▲b|!$□□□$r□b$▲b□$nn□lnn□b▲b□p$!$b□lrlp$nn0□▲▲$▲!▲$□▲▲▲b▲n$nl$▲▲□b$!nn'!$□l`□$□□nn▲l`□□□nr$!$n▲▲b▲$`□□r$!$n▲▲b▲
Connecting to iQOO Z6 Lite 5G
WIFI is not Connected
WIFI is not Connected
WIFI is not Connected
WIFI is not Connected
WIFI is not Connected
WIFI is Connected
Connected, IP address: 192.168.243.145
```

# IIOT LAB EXPERIMENT RESULT

## EXP – 10

Aim – To Send field Data to Thingspeak Server.

- ARDUINO IDE CODE :-

```
#include <ESP8266WiFi.h>;
#include <WiFiClient.h>;
#include <ThingSpeak.h>;
const char* ssid = "IQ00 Z6 Lite 5G";
const char* password = "12345670";

WiFiClient client;
unsigned long myChannelNumber = 2069527;
const char * myWriteAPIKey = "SVE0BPVK6R8AJTYL";

void setup()
{
  Serial.begin(9600);
  WiFi.begin(ssid, password);

  Serial.println();
  Serial.print("Connecting to ");
  Serial.println(ssid);

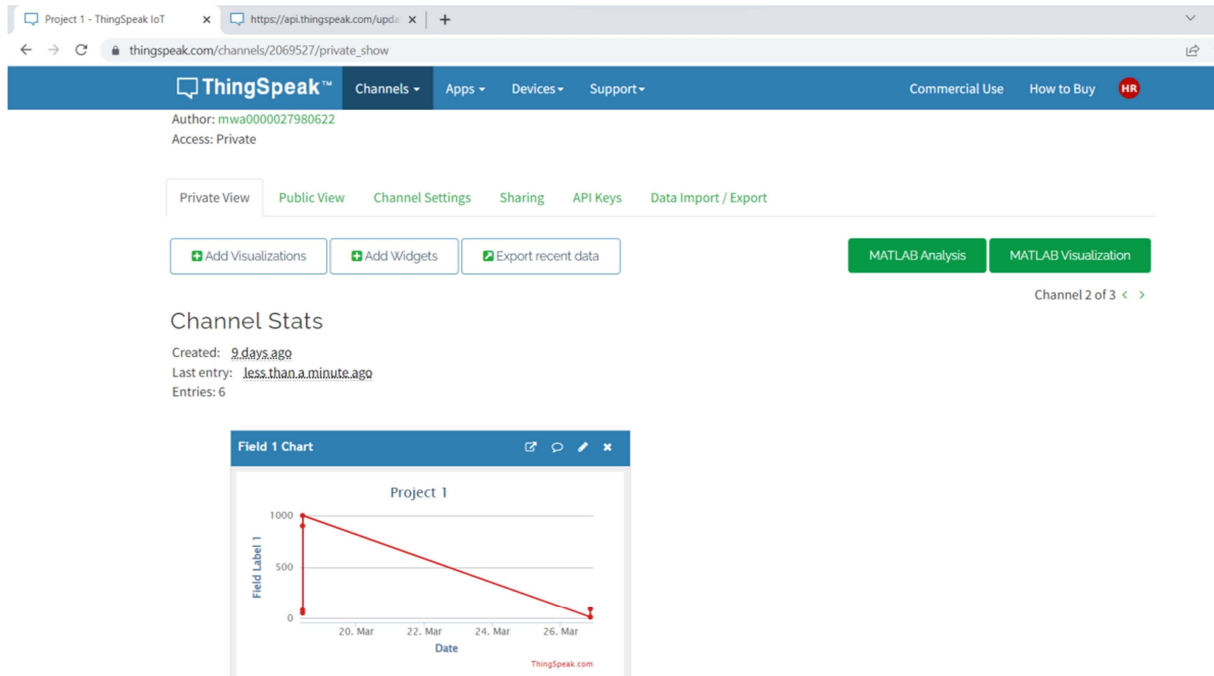
  while (WiFi.status() != WL_CONNECTED)
  {
    Serial.print(".");
    delay(500);
  }
  ThingSpeak.begin(client);
}

void loop()
{
  int c=5;
  Serial.println("c value:");
  Serial.println(c);
  ThingSpeak.writeField(myChannelNumber, 1,c, myWriteAPIKey);
  delay(100);
}
```

# IIOT LAB EXPERIMENT RESULT

## EXP – 10

- SENDING DATA TO THINGSPEAK: -



# IIOT LAB EXPERIMENT RESULT

## EXP – 11

Aim – To Receive Data from Thingspeak Server.

- ARDUINO IDE CODE-

```
#include "ThingSpeak.h"
#include <ESP8266WiFi.h>

const char* ssid = "iQ00 Z6 Lite 5G";
const char* password = "12345670";

unsigned long channel = 2070847;
unsigned int led1 = 1;
unsigned int led2 = 2;
unsigned int led3 = 3;

WiFiClient client;
void setup() {
  Serial.begin(115200);
  delay(100);

  pinMode(D0, OUTPUT);
  pinMode(D2, OUTPUT);
  pinMode(D4, OUTPUT);
  digitalWrite(D0, 0);
  digitalWrite(D2, 0);
  digitalWrite(D4, 0);

  Serial.println();
  Serial.println();
  Serial.print("Connecting to ");
  Serial.println(ssid);

  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED) {
    delay(500);

    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
```



# IIOT LAB EXPERIMENT RESULT

## EXP – 11

```
Serial.print("Netmask: ");
Serial.println(WiFi.subnetMask());
Serial.print("Gateway: ");
Serial.println(WiFi.gatewayIP());
ThingSpeak.begin(client);

}
void loop() {

  int led_1 = ThingSpeak.readFloatField(channel, led1);
  int led_2 = ThingSpeak.readFloatField(channel, led2);
  int led_3 = ThingSpeak.readFloatField(channel, led3);

  if(led_1 == 1){
    digitalWrite(D0, 1);
    Serial.println("D0 is On..!");
  }
  else if(led_1 == 0){
    digitalWrite(D0, 0);
    Serial.println("D0 is Off..!");
  }

  if(led_2 == 1){
    digitalWrite(D2, 1);
    Serial.println("D2 is On..!");
  }
  else if(led_2 == 0){
    digitalWrite(D2, 0);
    Serial.println("D2 is Off..!");
  }

  if(led_3 == 1){
    digitalWrite(D4, 1);
    Serial.println("D4 is On..!");
  }
  else if(led_3 == 0){
    digitalWrite(D4, 0);
    Serial.println("D4 is Off..!");
  }

  Serial.println(led_1);
  Serial.println(led_2);
  Serial.println(led_3);
  delay(5000);

}
```

# IIOT LAB EXPERIMENT RESULT

## EXP – 11

- RECEIVING DATA FROM THINGSPEAK -

