KOLEJ PROFESIONAL MARA BERANANG

DIPLOMA IN COMPUTER SCIENCE

COURSE NAME	:	INTERNET OF THINGS
COURSE CODE	:	CSC1333
ACADEMIC SESSION	:	2/2022
TYPE OF ASSESSMENT	:	PROJECT
DURATION	:	13/10/2022 – 10/11/2022

> **CLO 3 : DEVELOP THE PROTOTYPE OF AN INTERNET OF THINGS (IOT) APPLICATION IN THE SELECTED DOMAIN. (C6, PLO2)**

INSTRUCTION TO CANDIDATES:

1. Late submissions after given due date will not be accepted.

2. Report should be written using appropriate format:

   - Font type: Arial
   - Size: 11 pts
   - Line Spacing: 1.5
   - Cover colour : Green

Personal Details	
Name	
I/D Number	
Class	
Lecturer	

Section / Question No.	Marks
1	/26
2	/12
3	/12
Total	/50

Scenario

Based on the IoT project proposal produced in the previous tasks, the Ministry of Environment and Water and the Ministry of Education have agreed with the proposed system and are ready to invest for the project as stated in the project cost. Accordingly, you and the IoT project development team are now entering the most important phase of system development where you are responsible for ensuring that the IoT system design methodology is properly converted to the **actual implementation and development of the project** based on the project's requirements.

The IoT system development project also needs to be documented in a report and a presentation needs to be conducted to demonstrate the completed system and functionalities available in the system. This will be viewed by the ministry that falls under the selected project domain.

Below are the tasks that you need to accomplished in order to develop the selected IoT project.

Tasks:

1. Develop a **prototype** for the IoT project.
   - IoT Devices
   - IoT Network Devices
   - IoT Simulation Model
   - IoT Platform/Cloud
   - IoT Application

2. Prepare a **report in hardcopy** for the developed IoT project.
   - IoT System Operation : How the system works based on 4 IoT components
   - Coding (covers the code for all 4 components)
   - User Manual (with pictures)
   - Pictures during development process

3. Create a **video** to demonstrate the completed system and functionalities available in the system and upload the video in Microsoft Teams.
   - Video intro
   - Content/organization
   - Explanation
   - Simulation model

Assessment Rubrics:

	Tasks	2	4	6	8	Marks
1.	Develop a **prototype** for the IoT project.					
	• IoT Devices	• **IoT Electronic components** and **devices** were assembled accordingly but all the actuator(s) are not working as intended.	• **IoT Electronic components** and **devices** were assembled accordingly but some of the actuator(s) are not working as intended.	• **IoT Electronic components** and **devices** were assembled accordingly and all the actuators are successfully working as intended.	• **IoT Electronic components** and **devices** were assembled accordingly and all the actuators are successfully working as intended. • The testing platform for assembling electrical components and devices is very neat and tangle-free.	
	• IoT Network Devices	• **IoT Network devices** are not working. The ability to connect devices to the internet path is unsuccessful.	• **IoT Network devices** are not working. The ability to connect devices to the internet is not successful, but using Bluetooth as an alternative.	• **IoT Network devices** are working as intended. The ability to connect devices to the internet is successful and further prove the transmission of data via the internet.		
	Tasks	**1**	**2**			
	• IoT Simulation Model	•**IoT Model** is available, but too simple and don't show much effort.	•**IoT Model** is available with a lot of effort and has a clear impact on the project developed.			

Tasks	2	4	6		
• IoT Platform/Cloud	• **IoT Platform/Cloud** is not successfully connected, but effort has been done to create an account and establish the code to make it works.	• **IoT Platform/Cloud** • is successfully connected as a data storage only.	• **IoT Platform/Cloud** • is successfully connected as a data storage and analysis centre.		
• IoT Application	• **IoT Application** not successfully working, but effort has been done to create the apps using appropriate tools and establish the code to make it works.	• **IoT Application** are successfully working as intended and tally with the Step 10 in design methodology.			

Tasks	1	2	3		Marks
2.	Prepare a **report** in hardcopy for the developed IoT project.				
• IoT System Operation	• Provide **brief explanation** about **how the system works** and did not relates the discussion with 4 IoT components.	• Provide **brief explanation** about **how the system works** and briefly touch about the 4 IoT components.	• Provide **detailed explanation** about **how the system works** based on 4 IoT components.		

		Provide **Coding** for the developed IoT project with: • Minimal coding (only provide parts of code and is incomplete)	Provide **Coding** for the developed IoT project with: • Full coding (only provide for components that is successfully working)	Provide **Coding** for the developed IoT project with: • Full coding (for all 4 components that are successfully working)		
	• Coding					
	• User Manual	Provide **User Manual** for the developed IoT project with: • Minimal steps	Provide **User Manual** for the developed IoT project with: • Comprehensive steps	Provide **User Manual** for the developed IoT project with: • Comprehensive steps • Supporting pictures		
	• Pictures during development process	Provide **pictures** during development process. • Less than 6 pictures that is related and appropriate.	Provide **pictures** during development process. • More than 6 pictures that is related and appropriate.	Provide **pictures** during development process. • More than 6 pictures that is related and appropriate with clear caption for each picture.		
	Tasks	**1**	**2**	**3**		**Marks**
3.	Present the IoT project by preparing a **demo video** and upload the video in Microsoft Teams.					
	• Video Intro	• The video introduction is out of topic and does not orient the viewer to what will be shown next in the video.	• The video introduction goes straight in to the content without any trigger to create interest in the topic.	• The video introduction is compelling and provides motivating content that hooks the viewer from the beginning of the video and keeps the viewer's attention.		

	• Content/Organization	• Most of the information in the video is incomplete because there is too little persuasive information about the whole demonstration. • Presentation is not orderly.	• Some of the information does not seem to fit the main idea or appears as a disconnected series of scenes with no unifying main idea. • Presentation is orderly but not effective.	• A rich variety of information in the video contributes to understanding the project's main idea. • Presentation is orderly and visually appealing.	
	• Explanation	• Provide brief explanation of how the IoT system works and lack of description about the interaction between all components.	• Clear explanation of how the IoT system works but lack of description about the interaction between all components.	• Clear and thorough explanation of how the IoT system works and able to describe the interaction between all components clearly.	
	• Simulation model	• Ineffective use of simulation tools/models that is not neat enough and does not even represent the IoT system in the real world.	• Effective use of simulation tools/models. However, projects are simulated using simulation model that is not neat enough, but it is still representing the IoT system in the real world.	• Effective use of simulation tools/models. Projects are simulated using a neat simulation model that is closely related to IoT system in the real world.	

Total Marks Earned	/50

Total Percentage (40%)	

• Any late submission will be penalized.

IoT System Operation :

1) Sensors/Devices

The Door Alarm Security System has devices and sensors that can detect changes from the School Vault and collect all kinds of real-time data related to school vault entry and exit. Door Alarm Security uses a magnetic door sensor, thus preventing theft.

2) Connectivity

The data must find a route to the cloud before being transmitted there.

The NodeMcu V3 can be connected to the cloud through a WiFi, connecting via a gateway/router or connecting directly to the internet .

Setup Connectivity from Blynk to NodeMCU using WiFi

```
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

#define BLYNK_TEMPLATE_ID "TMPLxIejXOVJ"
#define BLYNK_DEVICE_NAME "Door Alarm"
#define BLYNK_AUTH_TOKEN "zlIBdsnZOHItFKVbswQdqN5sjcpBxE0C"

char auth[] = BLYNK_AUTH_TOKEN;
char ssid[] = "Rumahjejakaidaman";
char pass[] = "adamHarris07";
```

3) Data Processing

After the data is transferred to the cloud, software (Blynk) processes it in some way.

IoT is capable of converting the data into knowledge about how many users enter the school vault. The user who opens the school vault is also informed.
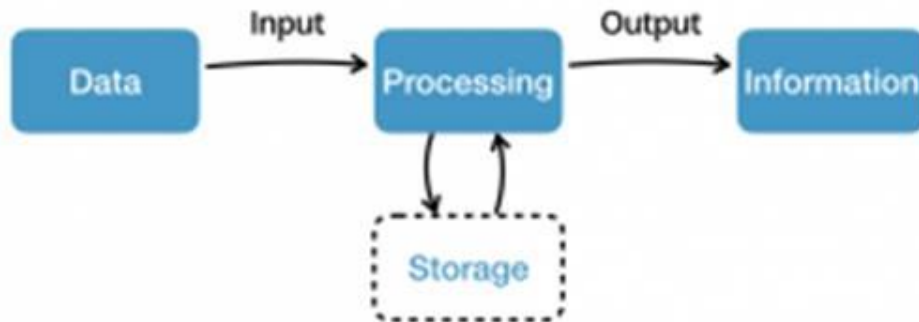
4) User Interface

The information is then utilised in some way by the end user. X

It's not necessarily a one-way street, though. The user might also be able to take action and influence the system, depending on the IoT application. The IoT system might automatically notify security professionals or the appropriate authorities in addition to calling you to let you know there has been an intrusion.
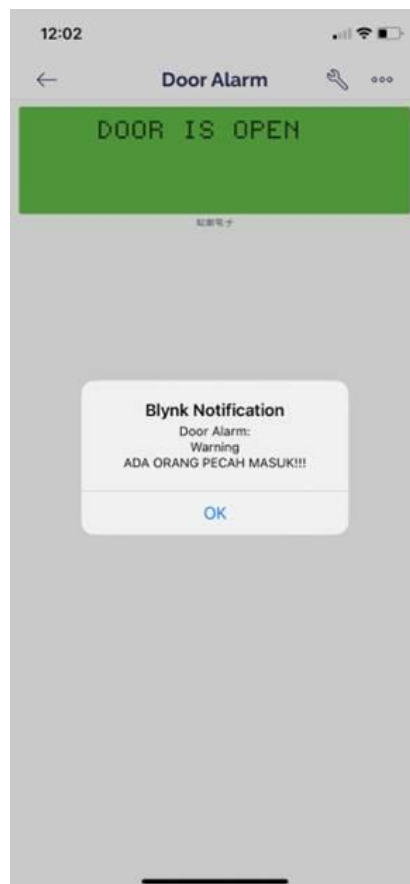
Coding :

```
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

#define BLYNK_TEMPLATE_ID "TMPLxIejXOVJ"
#define BLYNK_DEVICE_NAME "Door Alarm"
#define BLYNK_AUTH_TOKEN "SlgMjGLpI56uwBntgpxKA2Wz-2Fy3lnm"

char auth[] ="SlgMjGLpI56uwBntgpxKA2Wz-2Fy3lnm";
char ssid[] ="Rumahjejakaidaman";
char pass[] ="adamHarris07";

const int Reed = D1;
const int buzzer = D2;
const int ledred = D3;
const int ledyellow = D0;
const int ledyellow2 = D4;
int state;

BlynkTimer timer;
WidgetLCD lcd(V0);

void setup() {
  pinMode(Reed, INPUT_PULLUP);
  pinMode(buzzer, OUTPUT);
  pinMode(ledred, OUTPUT);
  pinMode(ledyellow, OUTPUT);
  pinMode(ledyellow2, OUTPUT);
  Serial.begin(9600);
  Blynk.begin(auth, ssid, pass, "blynk.cloud", 80);
  timer.setInterval(1000L,doorAlarm);
}

void loop() {
  Blynk.run();
  timer.run();
}


void doorAlarm() {
  state = digitalRead(Reed);
  if(state == 0){
    Serial.println("Door is close");
    delay(500);
    lcd.clear();
    lcd.print(2, 0, "DOOR IS CLOSED");
    digitalWrite(ledyellow,LOW);
    digitalWrite(ledyellow2,LOW);
  }
  else{
    Serial.println("Door is open");
    alarm();
    delay(500);
    lcd.clear();
    lcd.print(2, 0, "DOOR IS OPEN");
    digitalWrite(ledyellow,HIGH);
    digitalWrite(ledyellow2,HIGH);
    Blynk.logEvent("warning","ADA ORANG PECAH MASUK!!!");
  }
}

void alarm(){
  for(int e=0;e<5;e++){
    digitalWrite(buzzer, HIGH);
    delay(50);
    digitalWrite(buzzer, LOW);
    delay(50);
    digitalWrite(ledred, HIGH);
    delay(50);
    digitalWrite(ledred, LOW);
    delay(50);}
}
```

#define BLYNK_PRINT Serial

#include <ESP8266WiFi.h>

#include <BlynkSimpleEsp8266.h>

#define BLYNK_TEMPLATE_ID "TMPLxIejXOVJ"

#define BLYNK_DEVICE_NAME "Curi Dosa"

#define BLYNK_AUTH_TOKEN "2o3Ylf2zqp8L4-oeEO56w-dHs6md_jde"

```
char auth[] ="SlgMjGLpI56uwBntgpxKA2Wz-2Fy31nm";
char ssid[] ="Rumahjejakaidaman";
char pass[] ="adamHarris07";

const int Reed = D1;
const int buzzer = D2;
const int ledred = D3;
const int ledyellow = D0;
const int ledyellow2 = D4;
int state;

BlynkTimer timer;
WidgetLCD lcd(V0);

void setup() {
  pinMode(Reed, INPUT_PULLUP);
  pinMode(buzzer, OUTPUT);
  pinMode(ledred, OUTPUT);
  pinMode(ledyellow, OUTPUT);
  pinMode(ledyellow2, OUTPUT);
  Serial.begin(9600);
  Blynk.begin(auth, ssid, pass, "blynk.cloud", 80);
  timer.setInterval(1000L,doorAlarm);
}
void loop() {
  Blynk.run();
  timer.run();
}
void doorAlarm() {
  state = digitalRead(Reed);
  if(state == 0){
    Serial.println("Door is close");
    delay(500);
    lcd.clear();
    lcd.print(2, 0, "DOOR IS CLOSED");
    digitalWrite(ledyellow,LOW);
    digitalWrite(ledyellow2,LOW);
  }
  else{
    Serial.println("Door is open");
    alarm();
```

```
    delay(500);
    lcd.clear();
    lcd.print(2, 0, "DOOR IS OPEN");
    digitalWrite(ledyellow,HIGH);
    digitalWrite(ledyellow2,HIGH);
    Blynk.logEvent("warning","ADA ORANG PECAH MASUK!!!");
  }
}
void alarm(){
  for(int e=0;e<5;e++){
    digitalWrite(buzzer, HIGH);
    delay(50);
    digitalWrite(buzzer, LOW);
    delay(50);
    digitalWrite(ledred, HIGH);
    delay(50);
    digitalWrite(ledred, LOW);
    delay(50);}
}
```

User Manual (with picture) :
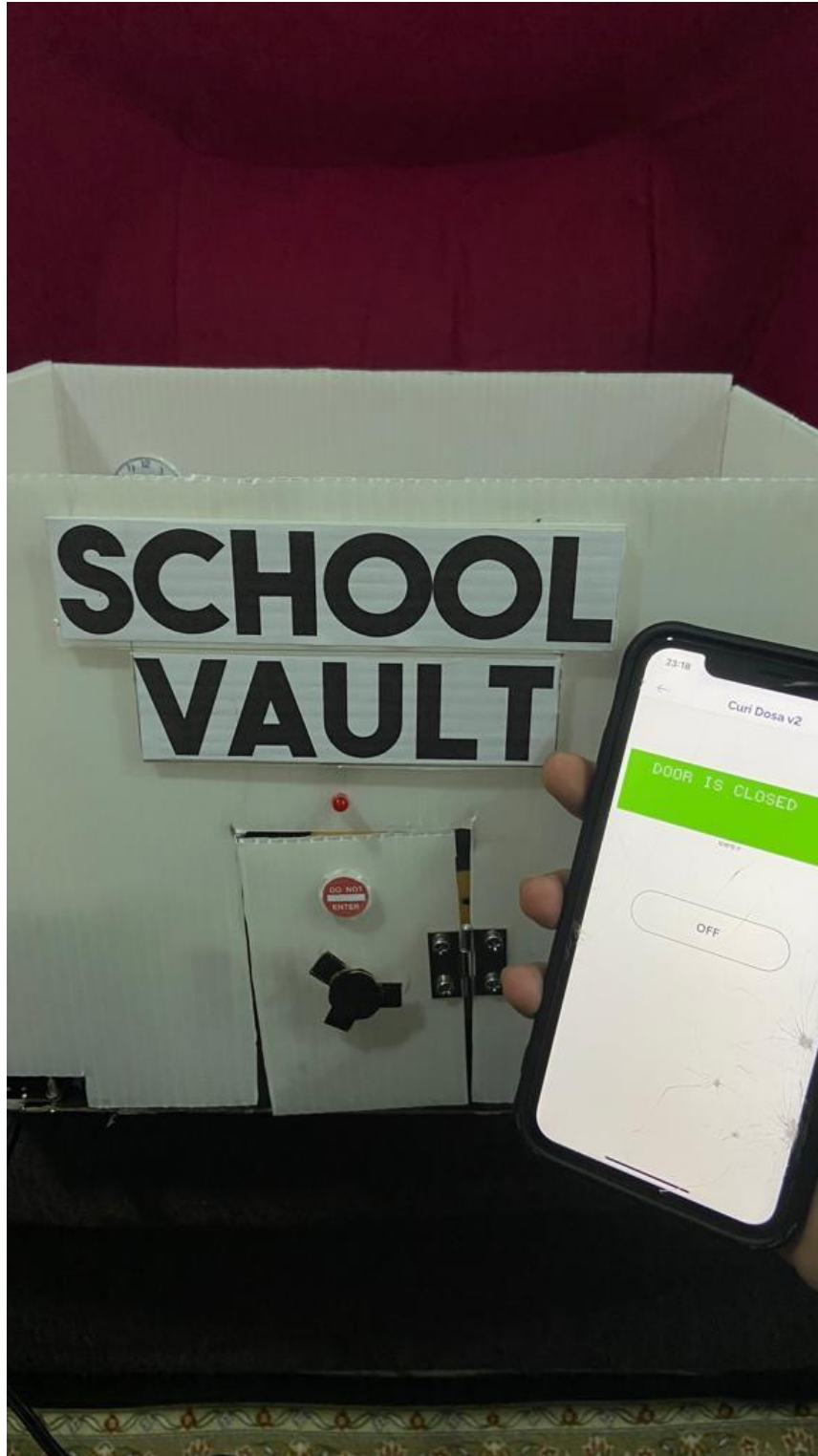
When the door closes, there will be no LED Red blink and buzzer beeps neither blynk notification.

There is a display in the blynk that shows "Door is Closed".
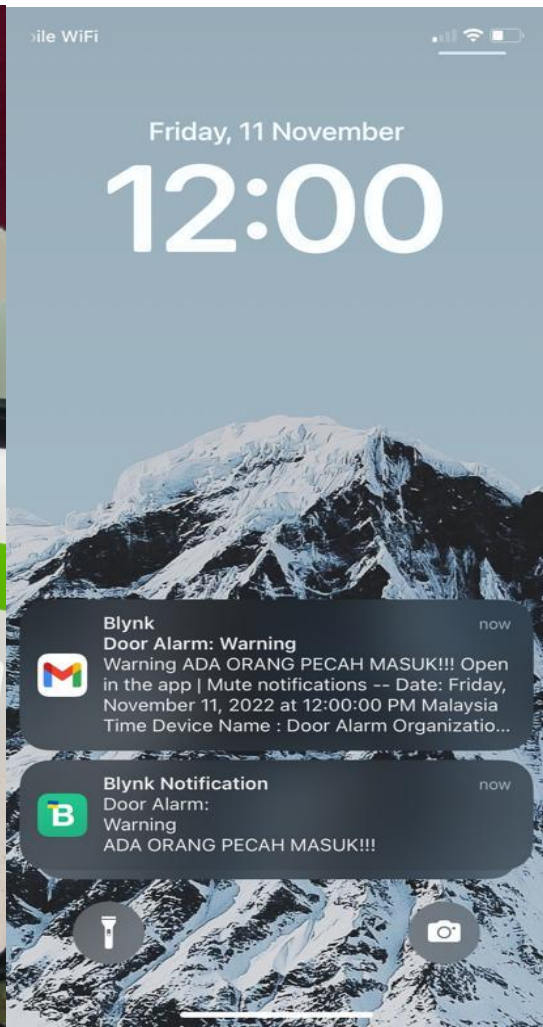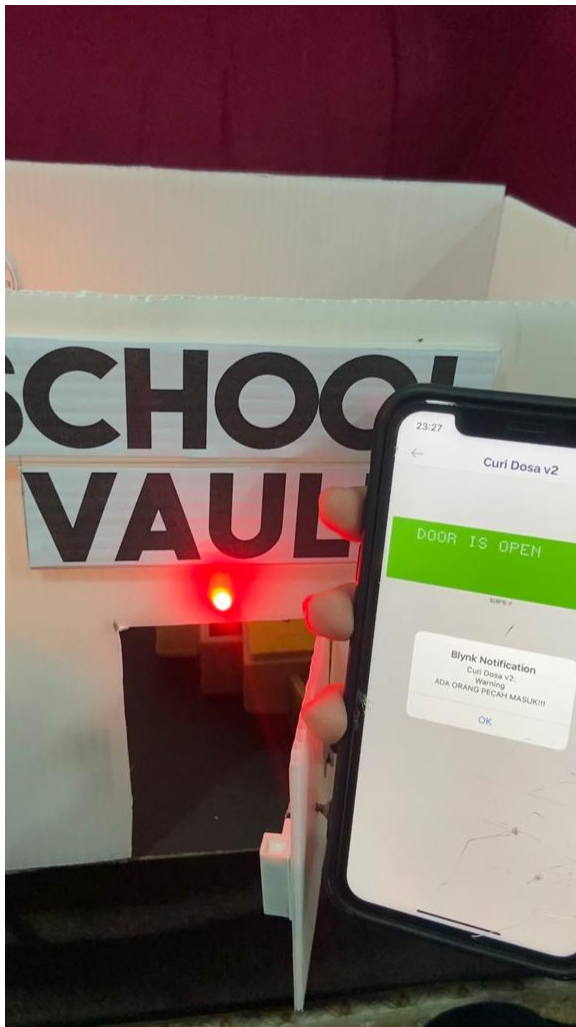
When the door is opened ,light inside school vault will on,buzzer will start beeping,LED Red will blinking and you will be notified through blynk notification that shows someone has opened the door.

There is a display in the blynk that shows "Door is Open".

Pictures during development process :
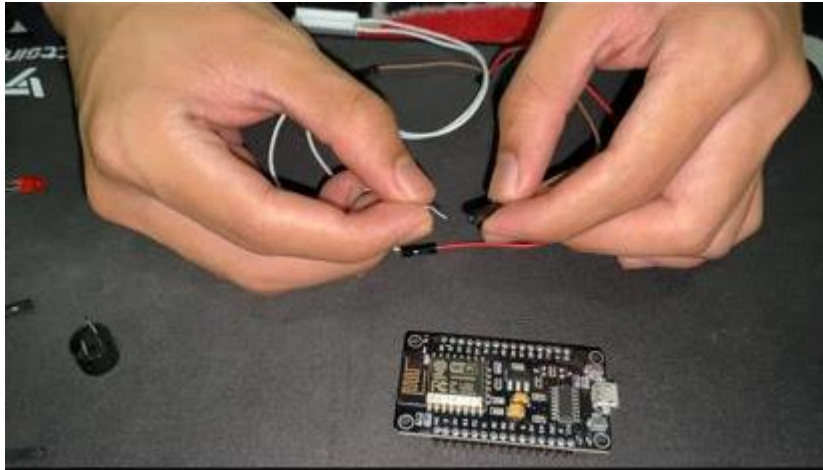
Connect the jumper to the magnetic door sensor.
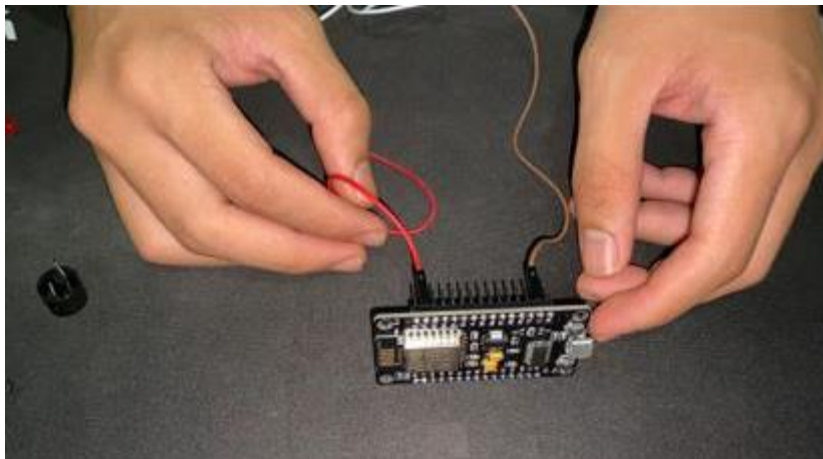
Connect the magnetic door sensor to NodeMCU.
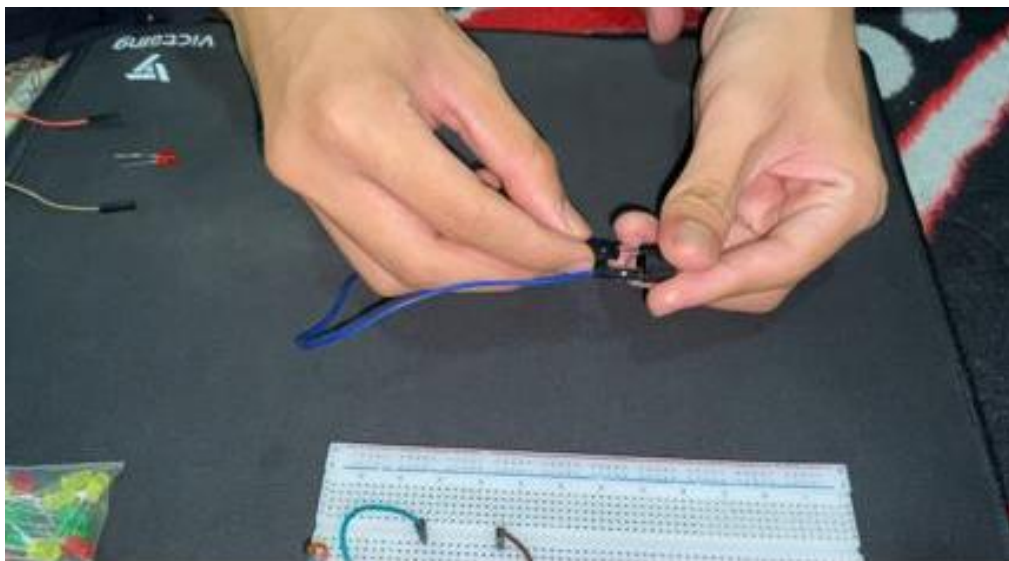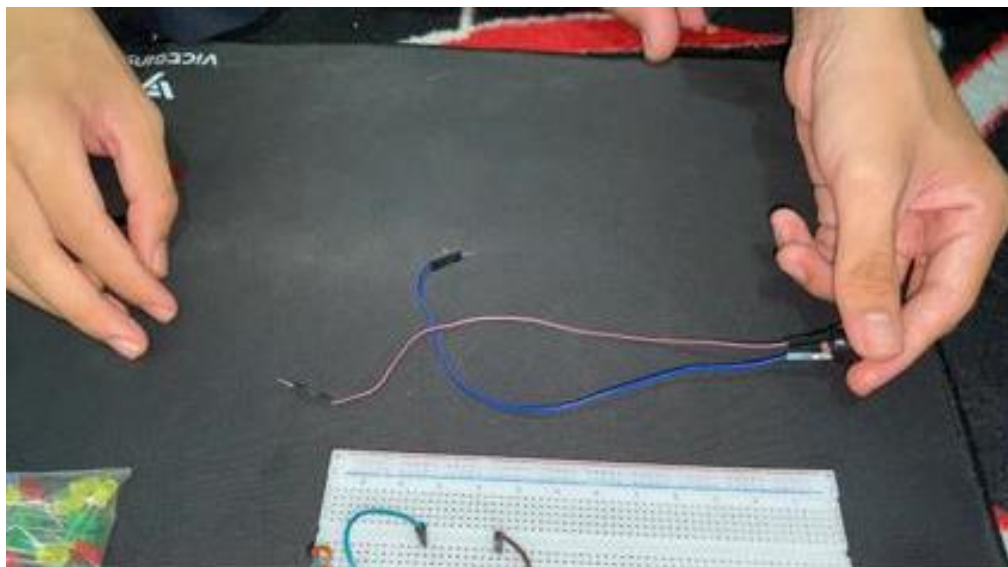
Connect the jumper to the buzzer.
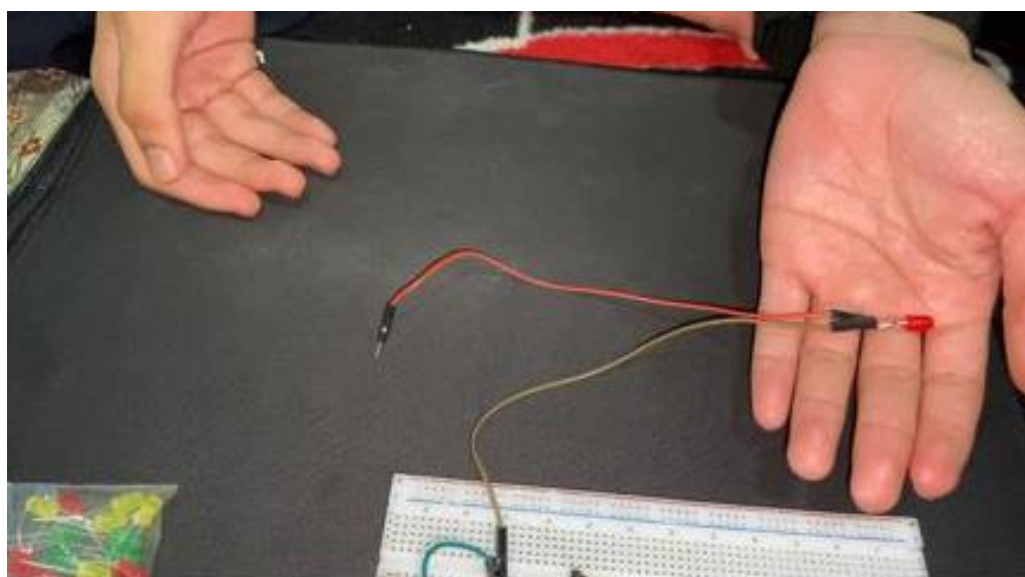
Connect the jumper to the LED Red.
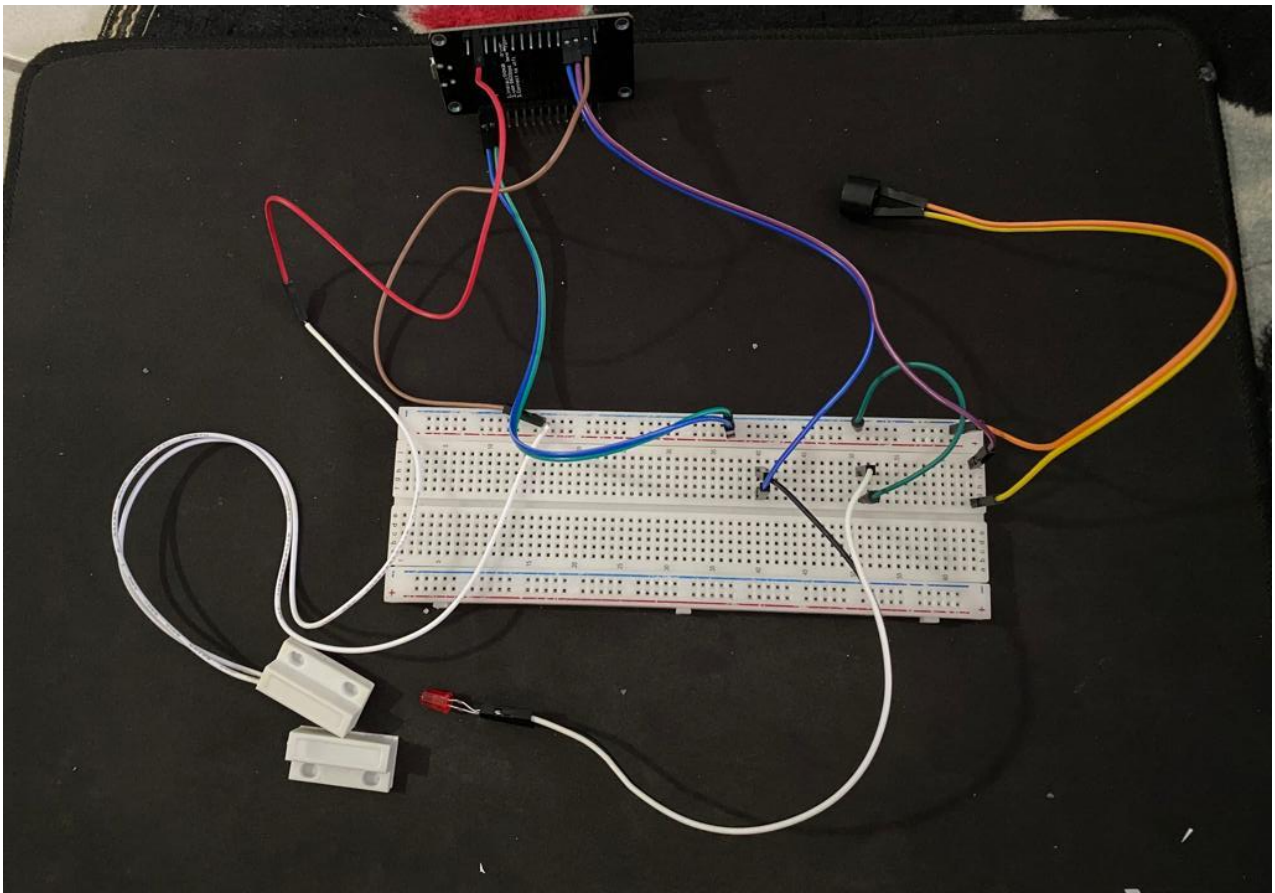
Complete Door Alarm Security circuit.

Transfer the circuit into the model prototype.

Setup Code using Arduino.

Setup Blynk