SPRINT -2

Date	8 November 2022
Team ID	PNT2022TMID42807
Project Name	Project - Smart waste management system for metropolitan cities

Python code:

```
#include <WiFi.h>
#include <PubSubClient.h>
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27, 20, 4);

#define ORG "kvnnui"
#define DEVICE_TYPE "smart"
#define DEVICE_ID "project"
#define TOKEN "a1b2c3d4e5f6g7h8"

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/data/fmt/json";
char topic[] = "iot-2/cmd/led/fmt/String";
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;



WiFiClient wifiClient;
PubSubClient client(server, 1883, wifiClient);

#define ECHO_PIN 12
#define TRIG_PIN 13
float dist;

void setup()
{
  Serial.begin(115200);
  pinMode(LED_BUILTIN, OUTPUT);
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);
  ////pir pin////
  pinMode(34, INPUT);
```

```
  ////ledpins////
  pinMode(23, OUTPUT);
  pinMode(2, OUTPUT);
  pinMode(4, OUTPUT);
  pinMode(15, OUTPUT);


  lcd.init();
  lcd.backlight();
  lcd.setCursor(1, 0);
  lcd.print("");
  wifiConnect();
  mqttConnect();
}

float readcmCM()
{
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);
  int duration = pulseIn(ECHO_PIN, HIGH);
  return duration * 0.034 / 2;
}

void loop()
 {

  lcd.clear();

  publishData();
  delay(500);
  if (!client.loop())
    {
      mqttConnect();
    }
}




void wifiConnect()
{
  Serial.print("Connecting to ");
```

```
  Serial.print("Wifi");
  WiFi.begin("Wokwi-GUEST", "", 6);
  while (WiFi.status() != WL_CONNECTED)
    {
      delay(500);
      Serial.print(".");
    }
  Serial.print("WiFi connected, IP address: ");
  Serial.println(WiFi.localIP());
}
void mqttConnect()
  {
    if (!client.connected())
      {
        Serial.print("Reconnecting MQTT client to ");
        Serial.println(server);
        while (!client.connect(clientId, authMethod, token))
          {
            Serial.print(".");
            delay(500);
          }
        initManagedDevice();
        Serial.println();
      }
  }
void initManagedDevice()
  {
    if (client.subscribe(topic))
      {
        Serial.println("IBM subscribe to cmd OK");
      }
    else
      {
        Serial.println("subscribe to cmd FAILED");
      }
  }
void publishData()
{
  float cm = readcmCM();

  if(digitalRead(34))
  {
    Serial.println("Motion Detected");
    Serial.println("Lid Opened");
    digitalWrite(15, HIGH);
```

```
if(digitalRead(34)== true)
{
 if(cm <= 60)
 {
   digitalWrite(2, HIGH);
   Serial.println("High Alert!!!,garbage bin is about to be full");
   Serial.println("Lid Closed");
   lcd.print("Full! Don't use");
   delay(2000);
   lcd.clear();
   digitalWrite(4, LOW);
   digitalWrite(23, LOW);
 }
 else if(cm > 60 && cm < 120)
 {
   digitalWrite(4, HIGH);
   Serial.println("Warning!!!,Tis about to cross 50% of bin level");
   digitalWrite(2, LOW);
   digitalWrite(23, LOW);

 }
 else if(cm > 120)
 {
   digitalWrite(23, HIGH);
   Serial.println("Bin is available");
   digitalWrite(2,LOW);
   digitalWrite(4, LOW);

 }
   delay(10000);
   Serial.println("Lid Closed");
}
else
{
  Serial.println("No motion detected");
   digitalWrite(2, LOW);
   digitalWrite(15, LOW);
   digitalWrite(4, LOW);
   digitalWrite(23, LOW);
}
```

```
}
  else
  {
    digitalWrite(15, LOW);
  }


  if(cm <= 60)
{
digitalWrite(21,HIGH);
String payload = "{\"High_Alert\":";
payload += cm;
payload += " }";
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);

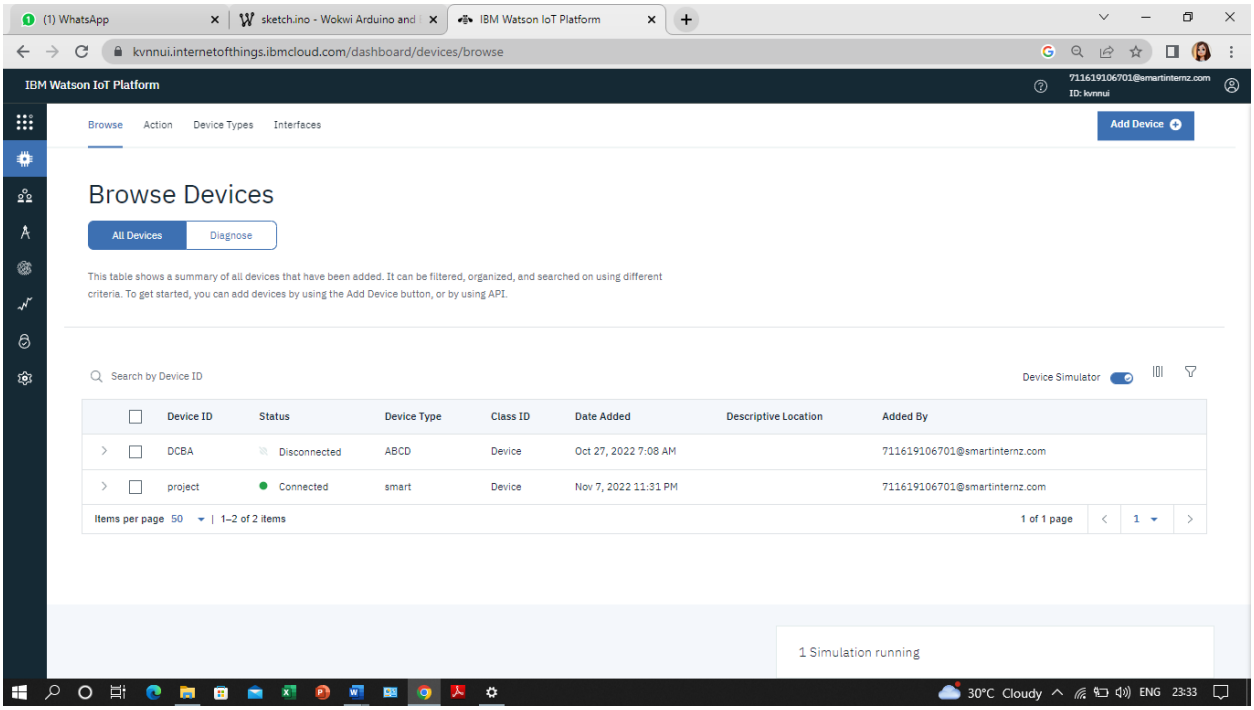
if (client.publish(publishTopic, (char*) payload.c_str()))
{
Serial.println("Publish OK");
}
}
else if(cm <= 120)
{
digitalWrite(22,HIGH);
String payload = "{\"Warning\":";
payload += cm ;
payload += " }";
Serial.print("\n");
Serial.print("Sending payload: ");
Serial.println(payload);
if(client.publish(publishTopic, (char*) payload.c_str()))
{
Serial.println("Publish OK");
}
else
{
Serial.println("Publish FAILED");
}
}
else
{
Serial.println("");
}
```

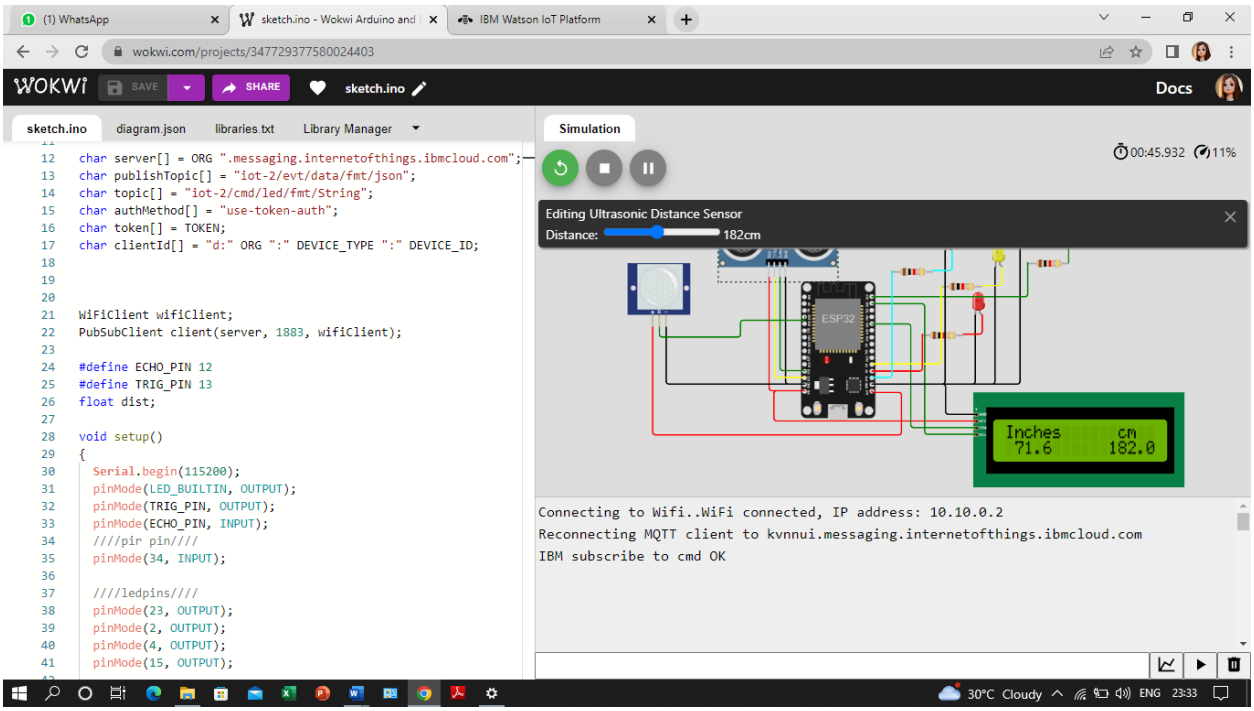
```
  float inches = (cm / 2.54);
  lcd.setCursor(0,0);
  lcd.print("Inches");
  lcd.setCursor(4,0);
  lcd.setCursor(12,0);
  lcd.print("cm");
  lcd.setCursor(1,1);
  lcd.print(inches, 1);
  lcd.setCursor(11,1);
  lcd.print(cm, 1);
  lcd.setCursor(14,1);
  delay(1000);
  lcd.clear();
}
```

WOKWI LINK:

https://wokwi.com/projects/347729377580024403

SIMULATION OUTPUT:






```
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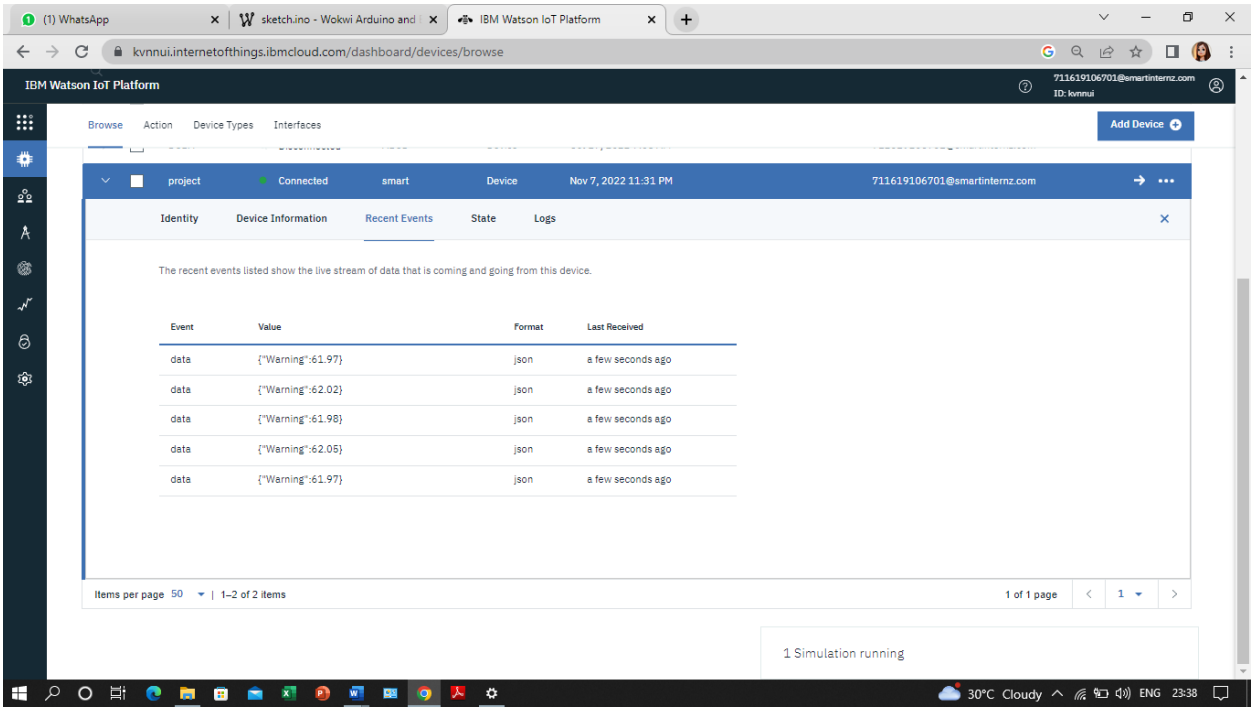
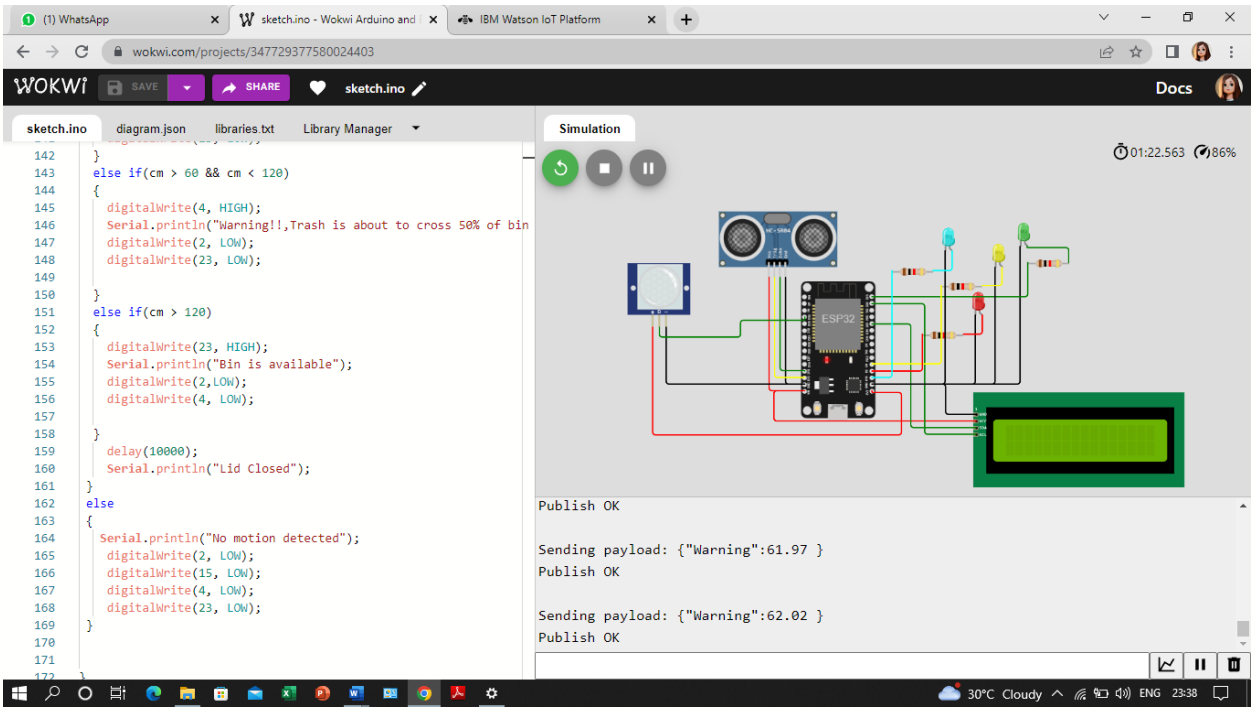
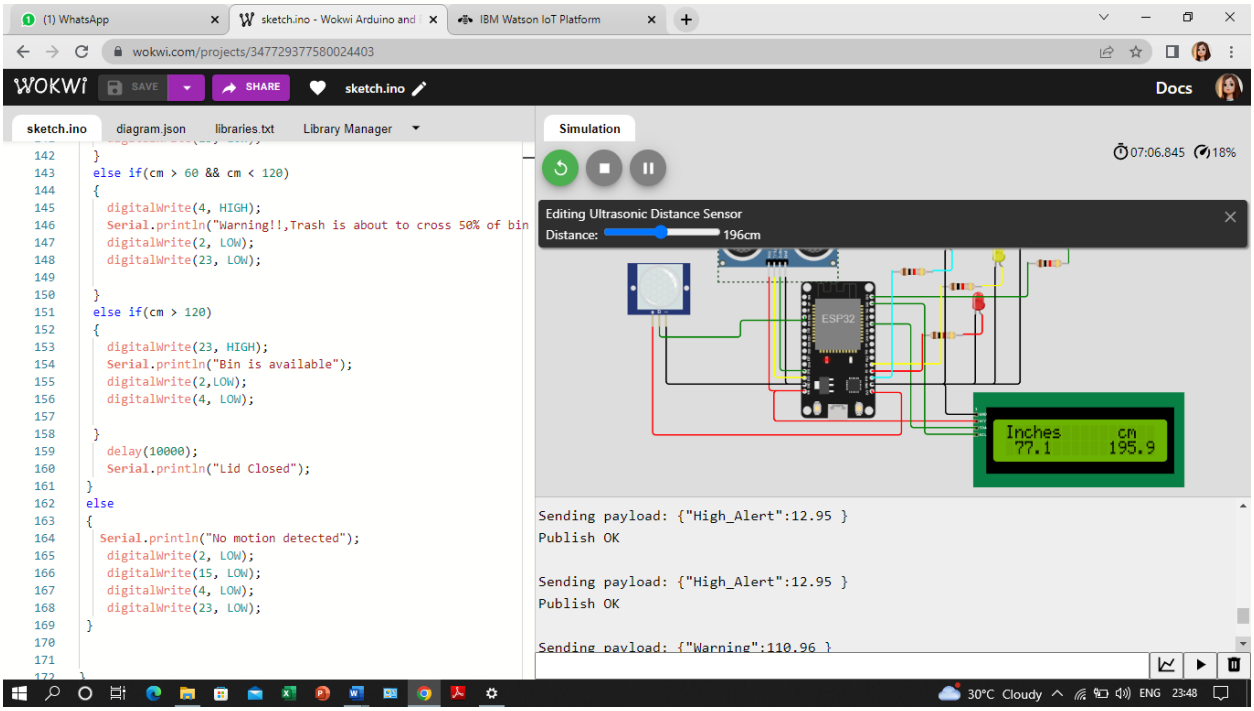





```
  }
  else if(cm > 60 && cm < 120)
  {
    digitalWrite(4, HIGH);
    Serial.println("Warning!!,Trash is about to cross 50% of bin
    digitalWrite(2, LOW);
    digitalWrite(23, LOW);

  }
  else if(cm > 120)
  {
    digitalWrite(23, HIGH);
    Serial.println("Bin is available");
    digitalWrite(2,LOW);
    digitalWrite(4, LOW);

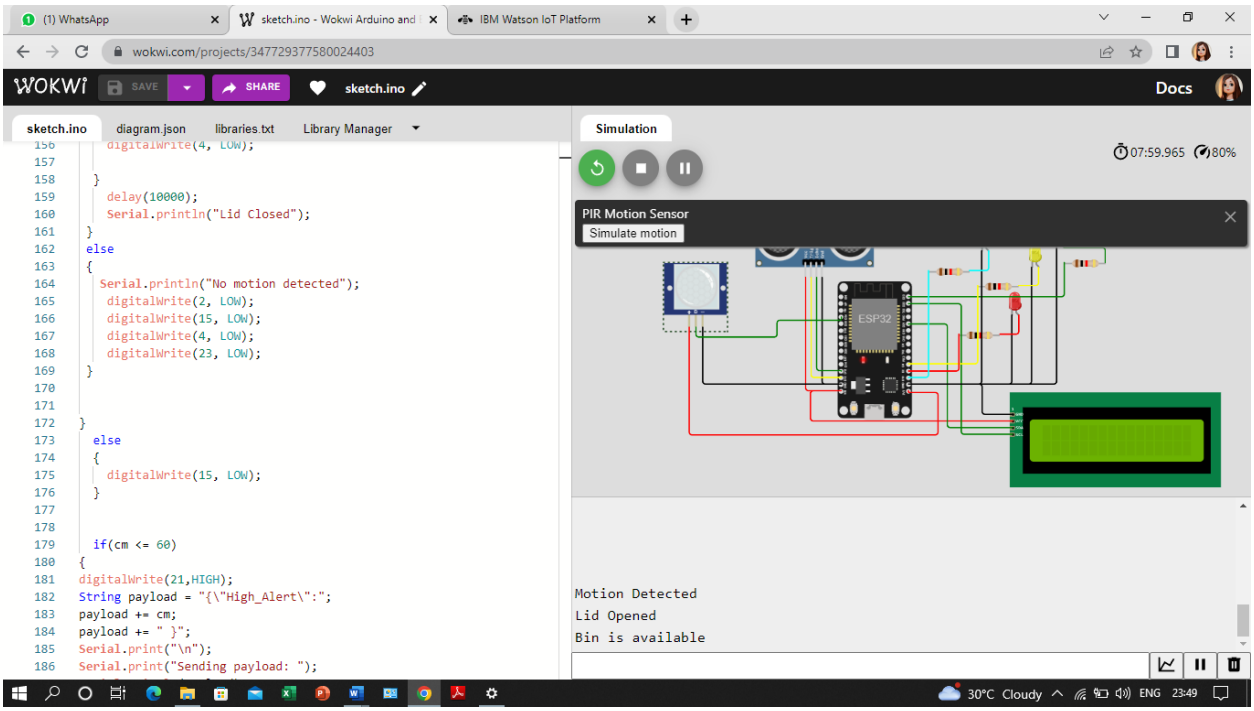
  }
    delay(10000);
    Serial.println("Lid Closed");
}
else
{
  Serial.println("No motion detected");
    digitalWrite(2, LOW);
    digitalWrite(15, LOW);
    digitalWrite(4, LOW);
    digitalWrite(23, LOW);
}
```




```
  }
  else if(cm > 60 && cm < 120)
  {
    digitalWrite(4, HIGH);
    Serial.println("Warning!!,Trash is about to cross 50% of bin
    digitalWrite(2, LOW);
    digitalWrite(23, LOW);

  }
  else if(cm > 120)
  {
    digitalWrite(23, HIGH);
    Serial.println("Bin is available");
    digitalWrite(2,LOW);
    digitalWrite(4, LOW);

  }
    delay(10000);
    Serial.println("Lid Closed");
}
else
{
  Serial.println("No motion detected");
    digitalWrite(2, LOW);
    digitalWrite(15, LOW);
    digitalWrite(4, LOW);
    digitalWrite(23, LOW);
}
```


(1) WhatsApp
sketch.ino - Wokwi Arduino and
IBM Watson IoT Platform
wokwi.com/projects/347729377580024403
WOKWI
SAVE
SHARE
sketch.ino
Docs
sketch.ino
diagram.json
libraries.txt
Library Manager
digitalWrite(4, LOW);
}
delay(10000);
Serial.println("Lid Closed");
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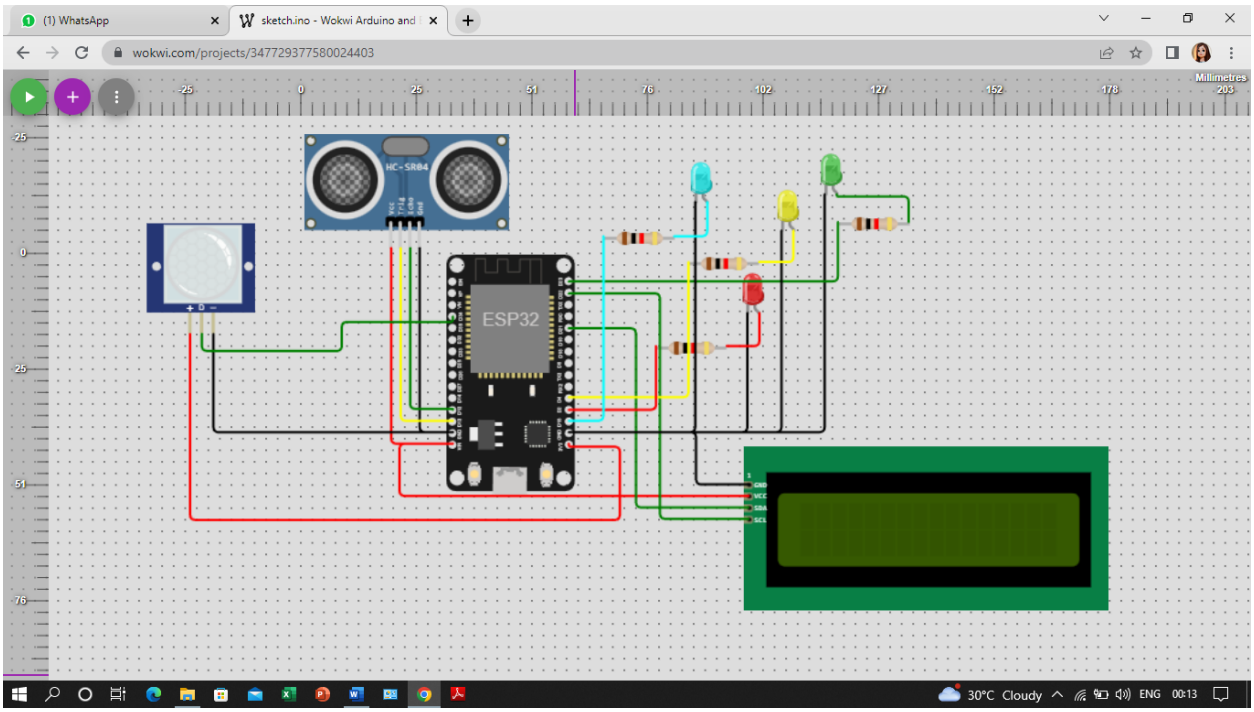
Serial.println("No motion detected");
digitalWrite(2, LOW);
digitalWrite(15, LOW);
digitalWrite(4, LOW);
digitalWrite(23, LOW);
}
}
else
{
digitalWrite(15, LOW);
}
if(cm <= 60)
{
digitalWrite(21,HIGH);
String payload = "{\"High_Alert\":";
payload += cm;
payload += " }";
Serial.print("\n");
Serial.print("Sending payload: ");
Simulation
07:59.965
80%
PIR Motion Sensor
Simulate motion
ESP32
Motion Detected
Lid Opened
Bin is available
30°C Cloudy
ENG
23:49

Connection: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sketch.ino - Wokwi Arduino and
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HC-SR04
ESP32
30°C Cloudy
ENG
00:13