# ASSIGNMENT-4

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| Assignment Date | 25 October 2022 |
| Student Name | M. Selva priya |
| Team Id | PNT2022TMID49915 |
| Maximum Marks | 4 Marks |
| Project title | Real time water quality monitoring and control system |

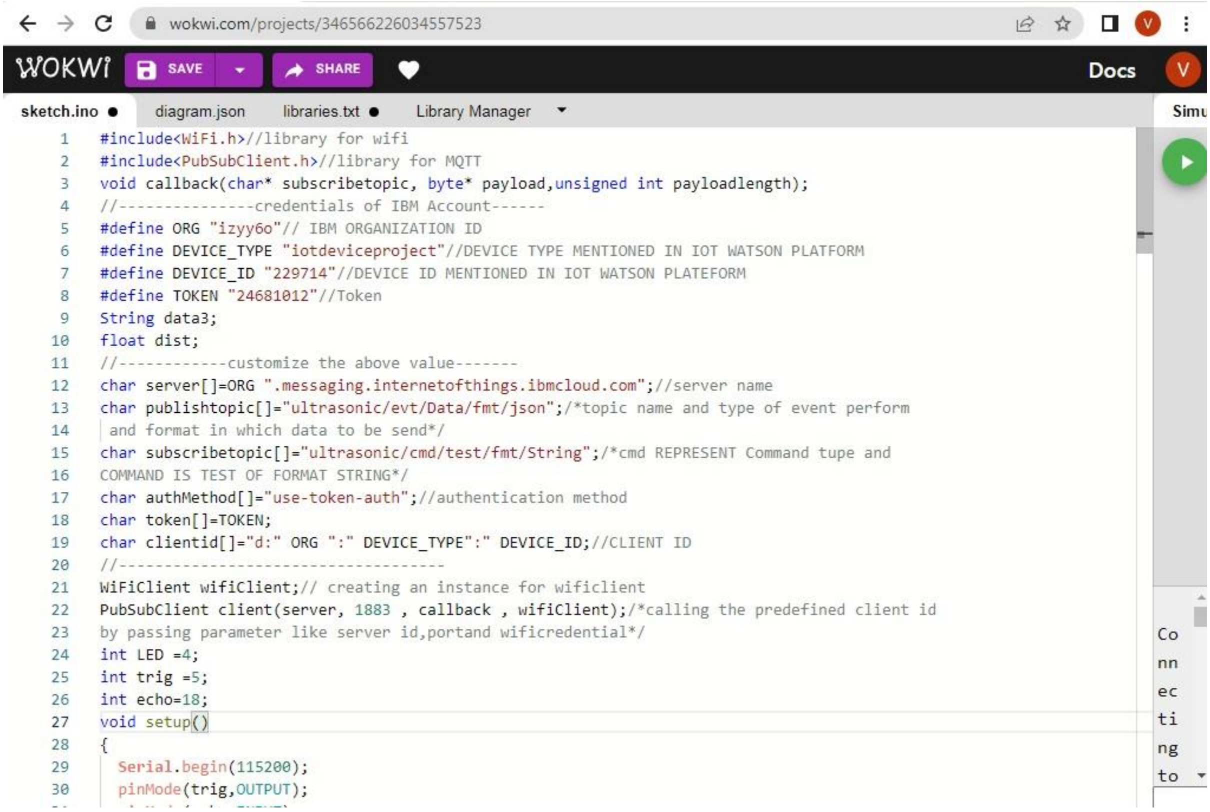
**Question-1:**

Write code and connections in wokwi for ultrasonic sensor.

Whenever distance is less than 100 cms send "alert" to ibm cloud and display in device recent

events.Upload document with wokwi share link and images of ibm cloud

## Solution:



wokwi.com/projects/346566226034557523

```
#include<WiFi.h>//library for wifi
#include<PubSubClient.h>//library for MQTT
void callback(char* subscribetopic, byte* payload,unsigned int payloadlength);
//---------------credentials of IBM Account------
#define ORG "izyy6o"// IBM ORGANIZATION ID
#define DEVICE_TYPE "iotdeviceproject"//DEVICE TYPE MENTIONED IN IOT WATSON PLATFORM
#define DEVICE_ID "229714"//DEVICE ID MENTIONED IN IOT WATSON PLATEFORM
#define TOKEN "24681012"//Token
String data3;
float dist;
//------------customize the above value-------
char server[]=ORG ".messaging.internetofthings.ibmcloud.com";//server name
char publishtopic[]="ultrasonic/evt/Data/fmt/json";/*topic name and type of event perform
 and format in which data to be send*/
char subscribetopic[]="ultrasonic/cmd/test/fmt/String";/*cmd REPRESENT Command tupe and
COMMAND IS TEST OF FORMAT STRING*/
char authMethod[]="use-token-auth";//authentication method
char token[]=TOKEN;
char clientid[]="d:" ORG ":" DEVICE_TYPE":" DEVICE_ID;//CLIENT ID
//-----------------------------------
WiFiClient wifiClient;// creating an instance for wificlient
PubSubClient client(server, 1883 , callback , wifiClient);/*calling the predefined client id
by passing parameter like server id,portand wificredential*/
int LED =4;
int trig =5;
int echo=18;
void setup()
{
  Serial.begin(115200);
  pinMode(trig,OUTPUT);
```

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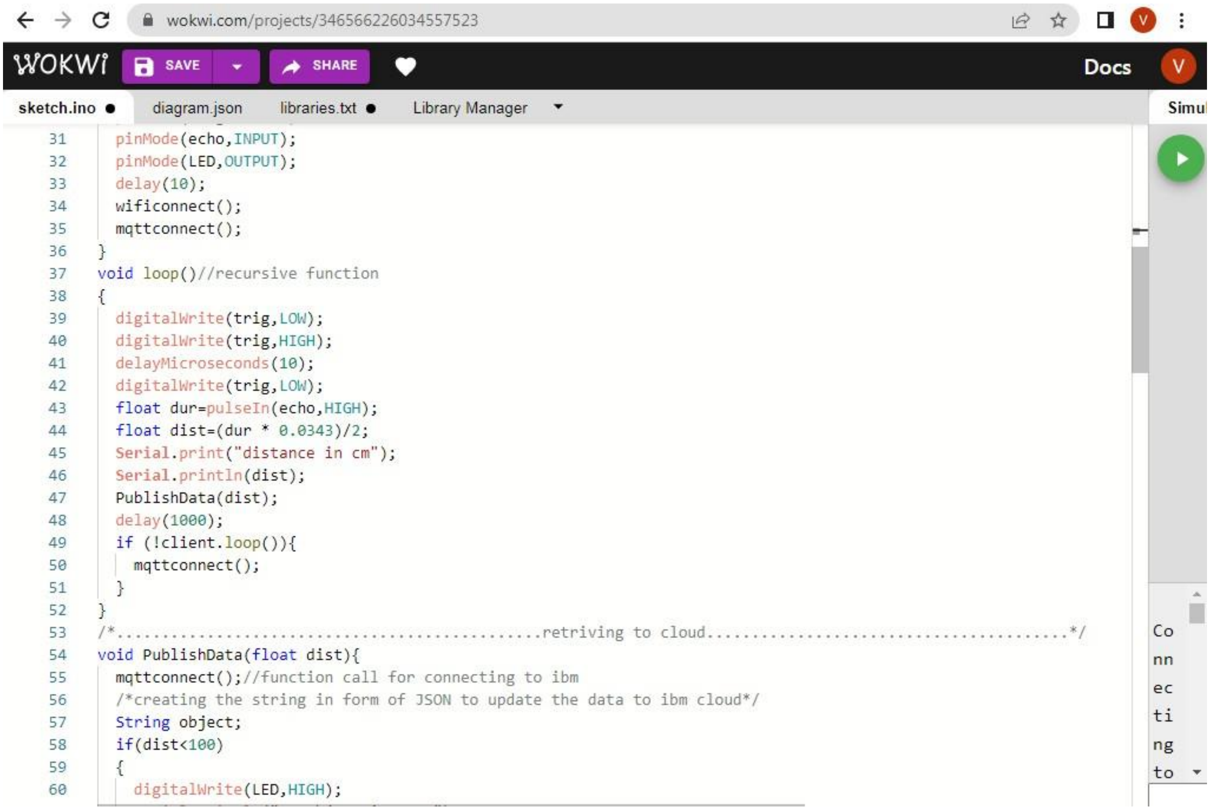
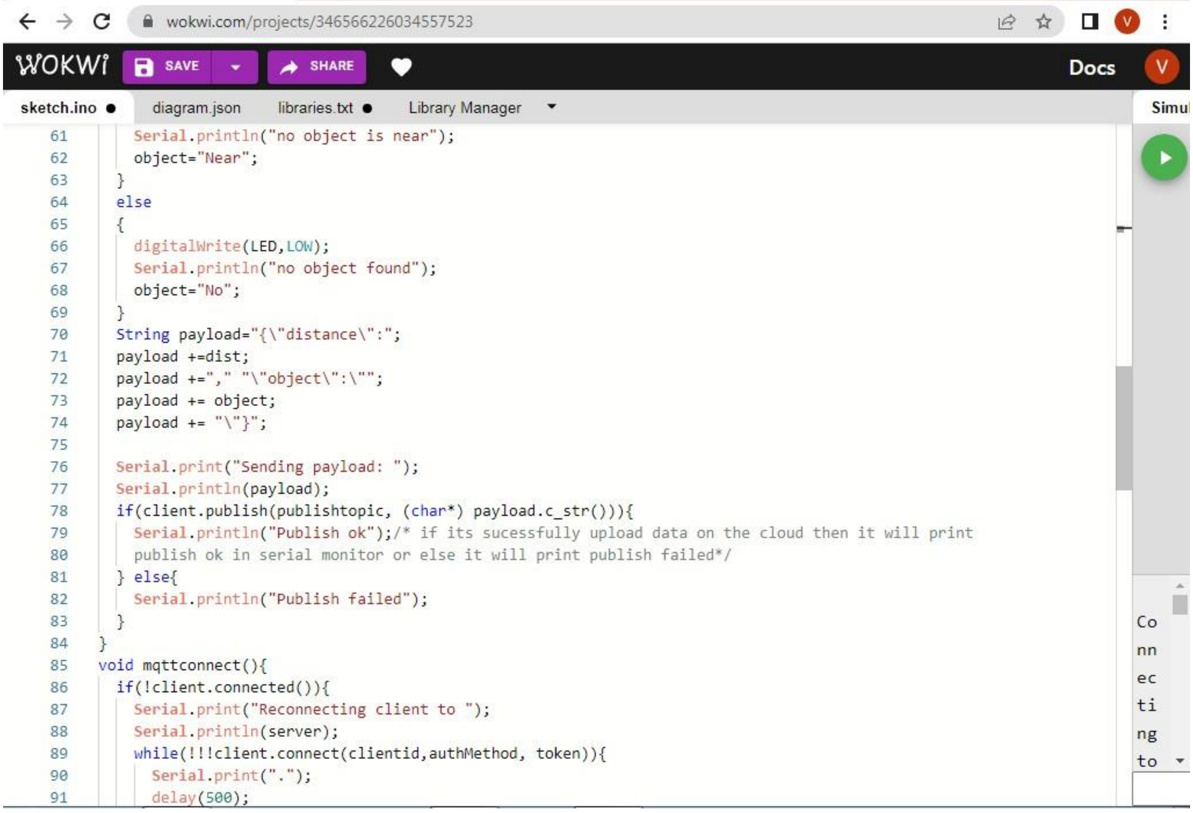
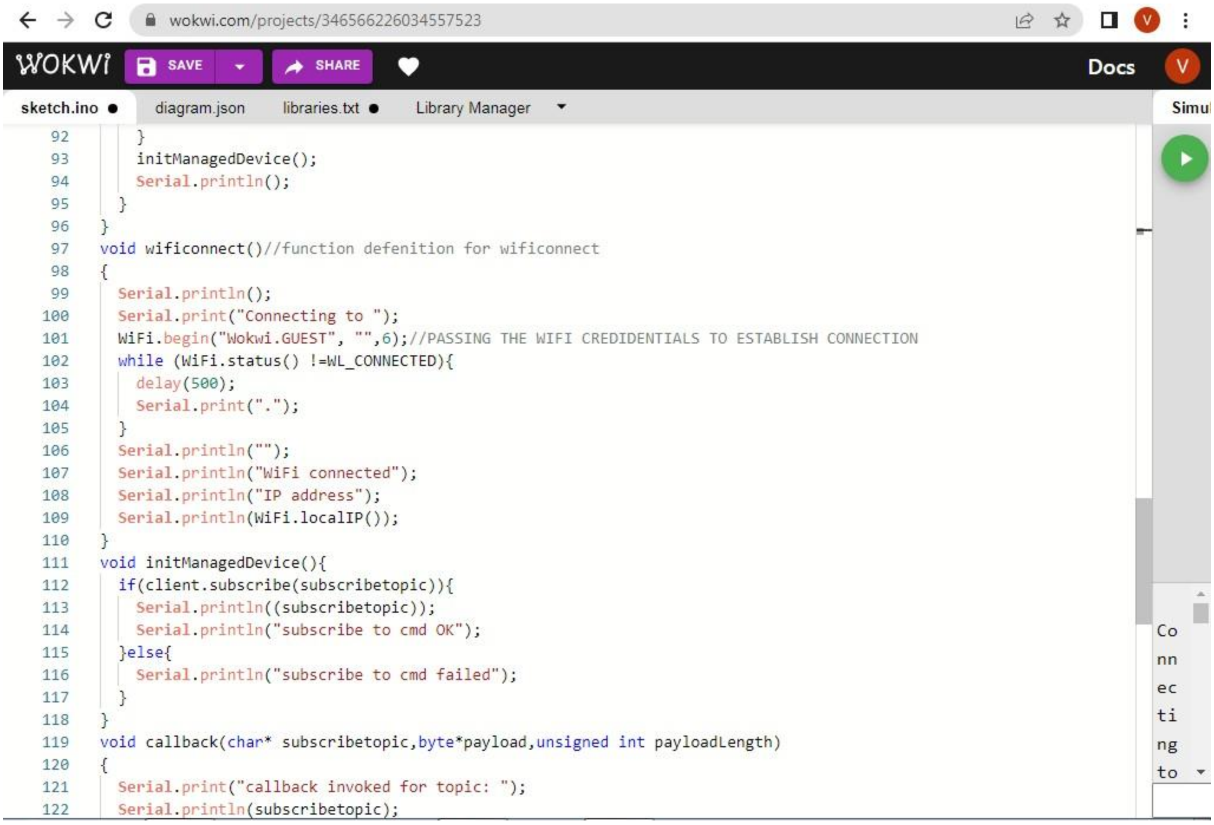


```
  pinMode(echo,INPUT);
  pinMode(LED,OUTPUT);
  delay(10);
  wificonnect();
  mqttconnect();
}
void loop()//recursive function
{
  digitalWrite(trig,LOW);
  digitalWrite(trig,HIGH);
  delayMicroseconds(10);
  digitalWrite(trig,LOW);
  float dur=pulseIn(echo,HIGH);
  float dist=(dur * 0.0343)/2;
  Serial.print("distance in cm");
  Serial.println(dist);
  PublishData(dist);
  delay(1000);
  if (!client.loop()){
    mqttconnect();
  }
}
/*...............................................retriving to cloud......................................*/
void PublishData(float dist){
  mqttconnect();//function call for connecting to ibm
  /*creating the string in form of JSON to update the data to ibm cloud*/
  String object;
  if(dist<100)
  {
    digitalWrite(LED,HIGH);
```



```
    Serial.println("no object is near");
    object="Near";
  }
  else
  {
    digitalWrite(LED,LOW);
    Serial.println("no object found");
    object="No";
  }
  String payload="{\"distance\":";
  payload +=dist;
  payload +="," "\"object\":\"";
  payload += object;
  payload += "\"}";

  Serial.print("Sending payload: ");
  Serial.println(payload);
  if(client.publish(publishtopic, (char*) payload.c_str())){
    Serial.println("Publish ok");/* if its sucessfully upload data on the cloud then it will print
    publish ok in serial monitor or else it will print publish failed*/
  } else{
    Serial.println("Publish failed");
  }
}
void mqttconnect(){
  if(!client.connected()){
    Serial.print("Reconnecting client to ");
    Serial.println(server);
    while(!!!client.connect(clientid,authMethod, token)){
      Serial.print(".");
      delay(500);
```



```
    }
    initManagedDevice();
    Serial.println();
  }
}
void wificonnect()//function defenition for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");
  WiFi.begin("Wokwi.GUEST", "",6);//PASSING THE WIFI CREDIDENTIALS TO ESTABLISH CONNECTION
  while (WiFi.status() !=WL_CONNECTED){
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address");
  Serial.println(WiFi.localIP());
}
void initManagedDevice(){
  if(client.subscribe(subscribetopic)){
    Serial.println((subscribetopic));
    Serial.println("subscribe to cmd OK");
  }else{
    Serial.println("subscribe to cmd failed");
  }
}
void callback(char* subscribetopic,byte*payload,unsigned int payloadLength)
{
  Serial.print("callback invoked for topic: ");
  Serial.println(subscribetopic);
```

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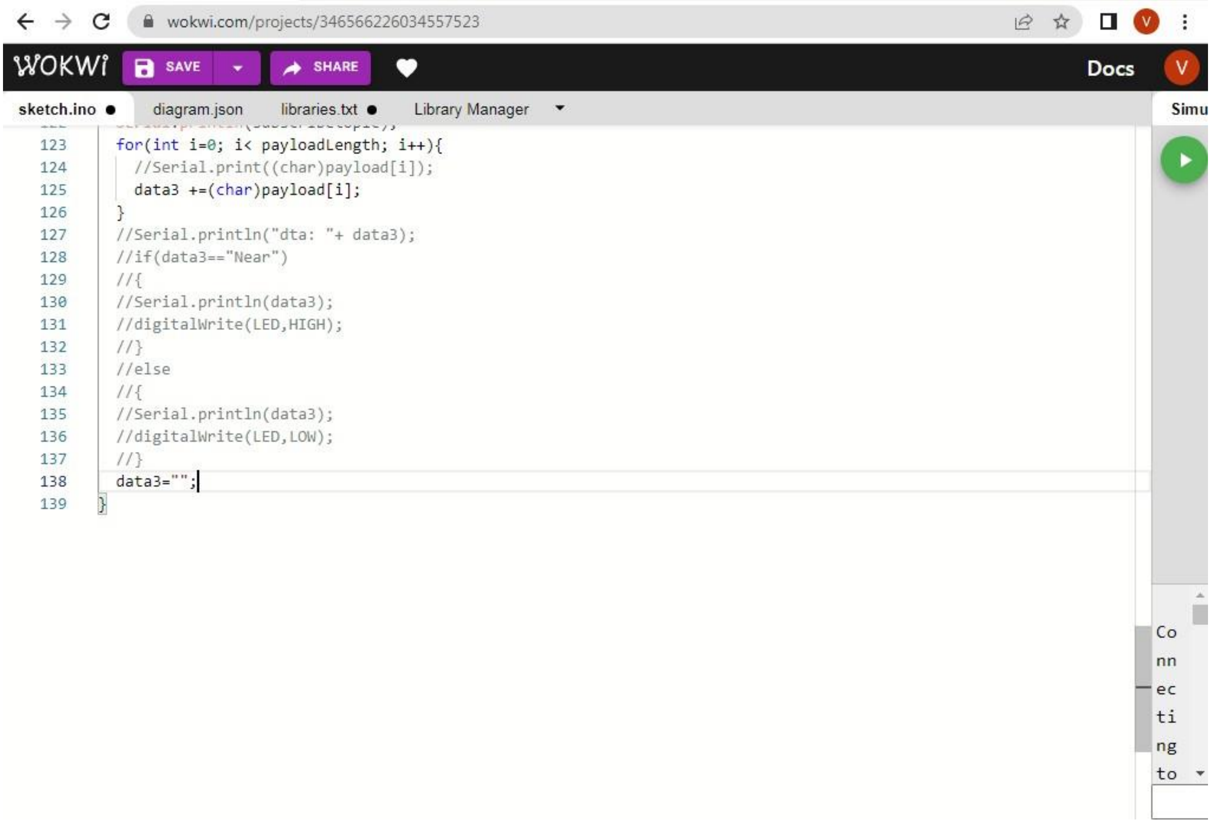

```
  for(int i=0; i< payloadLength; i++){
    //Serial.print((char)payload[i]);
    data3 +=(char)payload[i];
  }
  //Serial.println("dta: "+ data3);
  //if(data3=="Near")
  //{
  //Serial.println(data3);
  //digitalWrite(LED,HIGH);
  //}
  //else
  //{
  //Serial.println(data3);
  //digitalWrite(LED,LOW);
  //}
  data3="";
}
```

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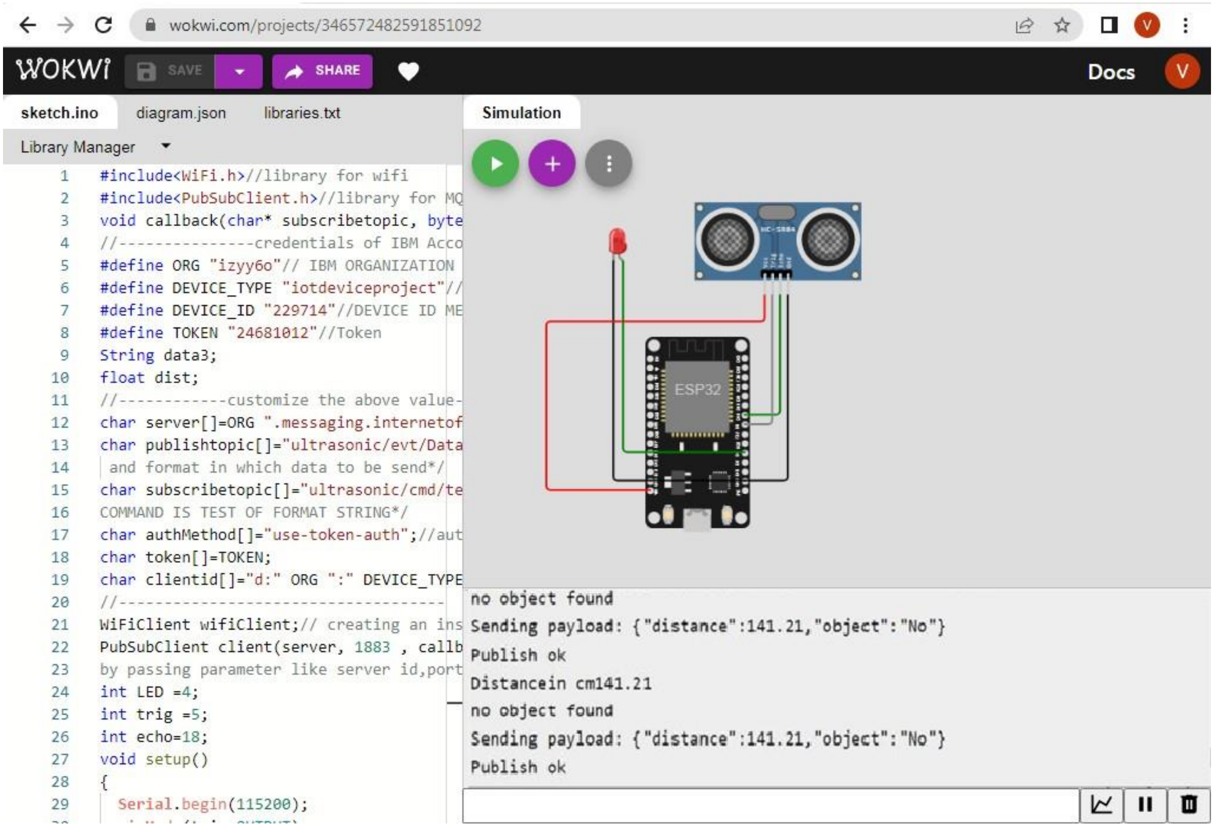

```
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#define TOKEN "24681012"//Token
String data3;
float dist;
//------------customize the above value-
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char publishtopic[]="ultrasonic/evt/Data
 and format in which data to be send*/
char subscribetopic[]="ultrasonic/cmd/te
COMMAND IS TEST OF FORMAT STRING*/
char authMethod[]="use-token-auth";//aut
char token[]=TOKEN;
char clientid[]="d:" ORG ":" DEVICE_TYPE
//-----------------------------------
WiFiClient wifiClient;// creating an ins
PubSubClient client(server, 1883 , callb
by passing parameter like server id,port
int LED =4;
int trig =5;
int echo=18;
void setup()
{
  Serial.begin(115200);
```
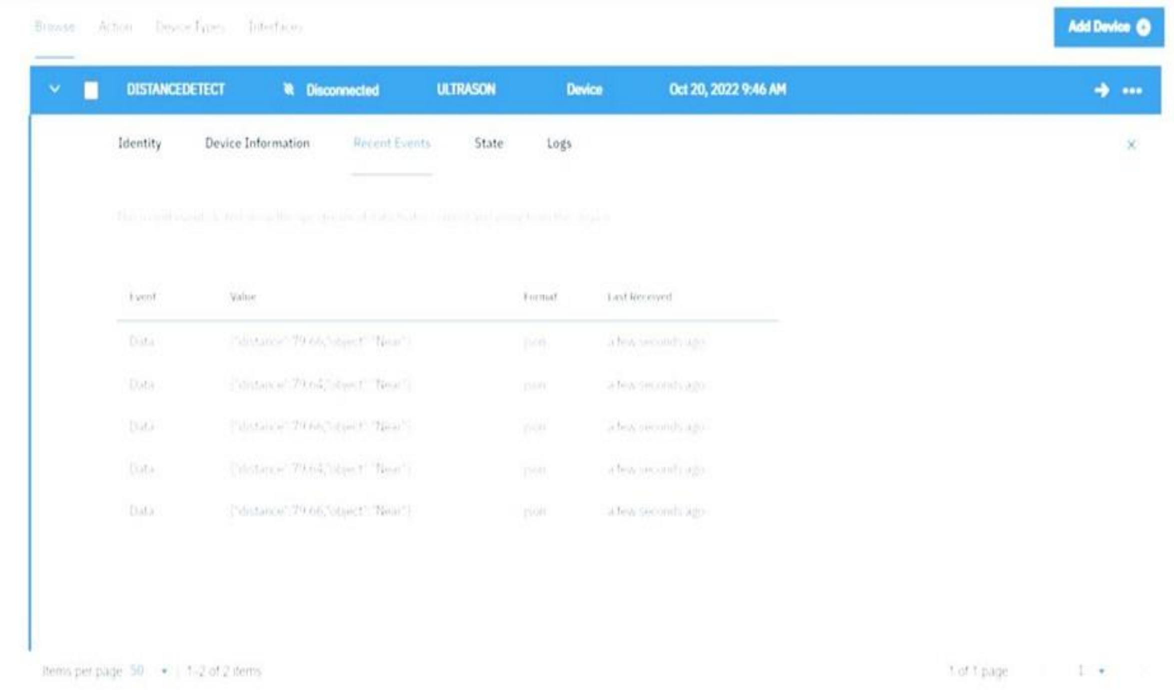

```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```

Data is sent to ibm cloud when object is detected



| DISTANCEDETECT | Disconnected | ULTRASON | Device | Oct 20, 2022 9:46 AM |
|---|---|---|---|---|

| Event | Value | Format | Last Received |
|---|---|---|---|
| Data | {"distance":79.66,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":79.64,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":79.66,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":79.64,"object":"Near"} | json | a few seconds ago |
| Data | {"distance":79.66,"object":"Near"} | json | a few seconds ago |

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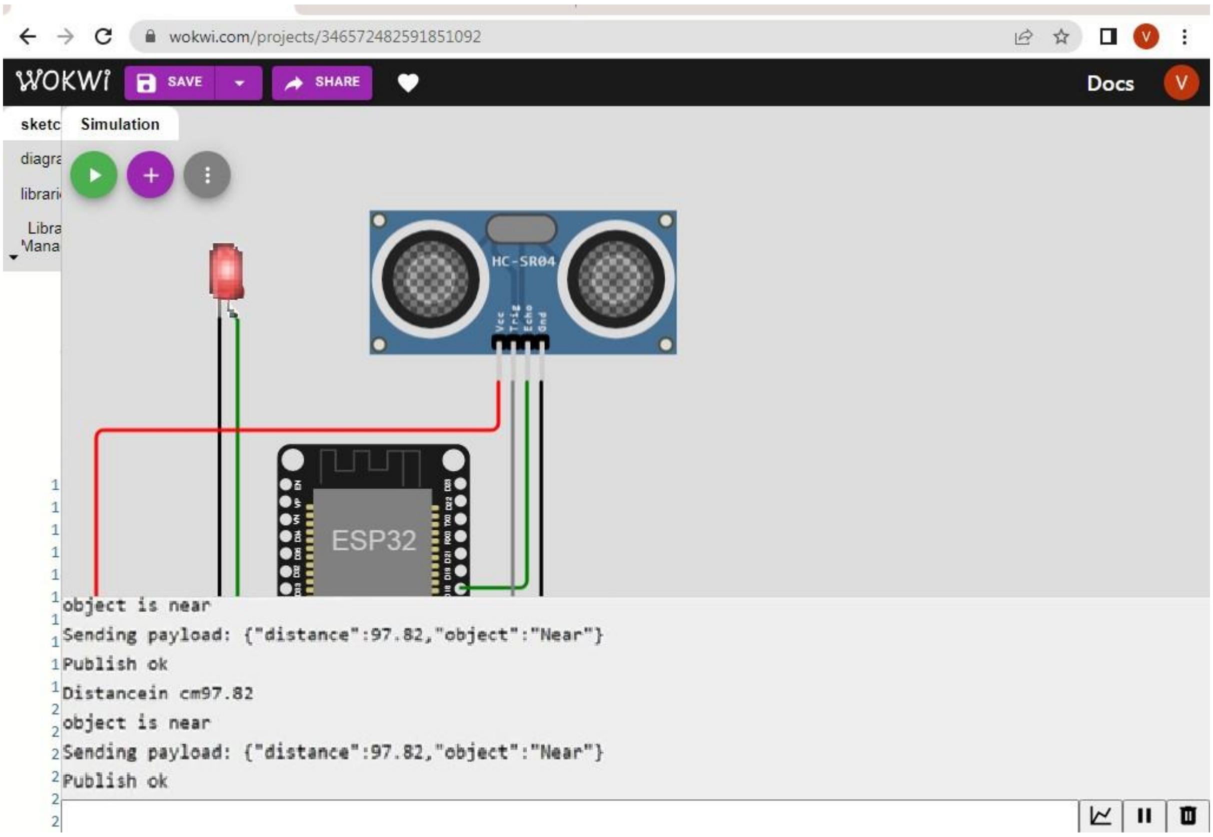
# SIMULATION OUTPUT:



```
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
Distancein cm97.82
object is near
Sending payload: {"distance":97.82,"object":"Near"}
Publish ok
```

# REFERENCE LINK:

https://wokwi.com/projects/346566226034557523