ASSIGNMENT-4

Date	20 Oct 2022
Team ID	PNT2022TMID04692
Project Name	IoT Based Smart Crop Protection System For Agriculturre
Maximum Marks	2 Marks

Question1:

Write code and connections in work for ultrasonic sensor. Whenever distance is less than100cms send "alert" to IBM cloud and display in device recent events.

CODE:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt


void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-------credentials of IBM Accounts------

#define ORG "4hn0jp"//IBM ORGANITION ID
#define DEVICE_TYPE "ULTRASONIC"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "DISTANCEDETECT"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "[illegible]"//Token
String data3;
float dist;


//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of event perform and format in which data to be send
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd  REPRESENT command type 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 the 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);
```

esp32-blink.ino ● diagram.json ● libraries.txt ● Library Manager

```
pinMode(trig,OUTPUT);
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 ("Distancein cm");
  Serial.println(dist);


  PublishData(dist);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}



/*.....retrieving to Cloud.....*/

void PublishData(float dist) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
*/
String object;
if (dist <100)
{
  digitalWrite(LED,HIGH);
  Serial.println("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);
```

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```
  if (client.publish(publishTopic, (char*) payload.c_str())) {
    Serial.println("Publish ok");// if it successfully 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 defination for wificonnect
{
  Serial.println();
  Serial.print("Connecting to ");

  WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
```

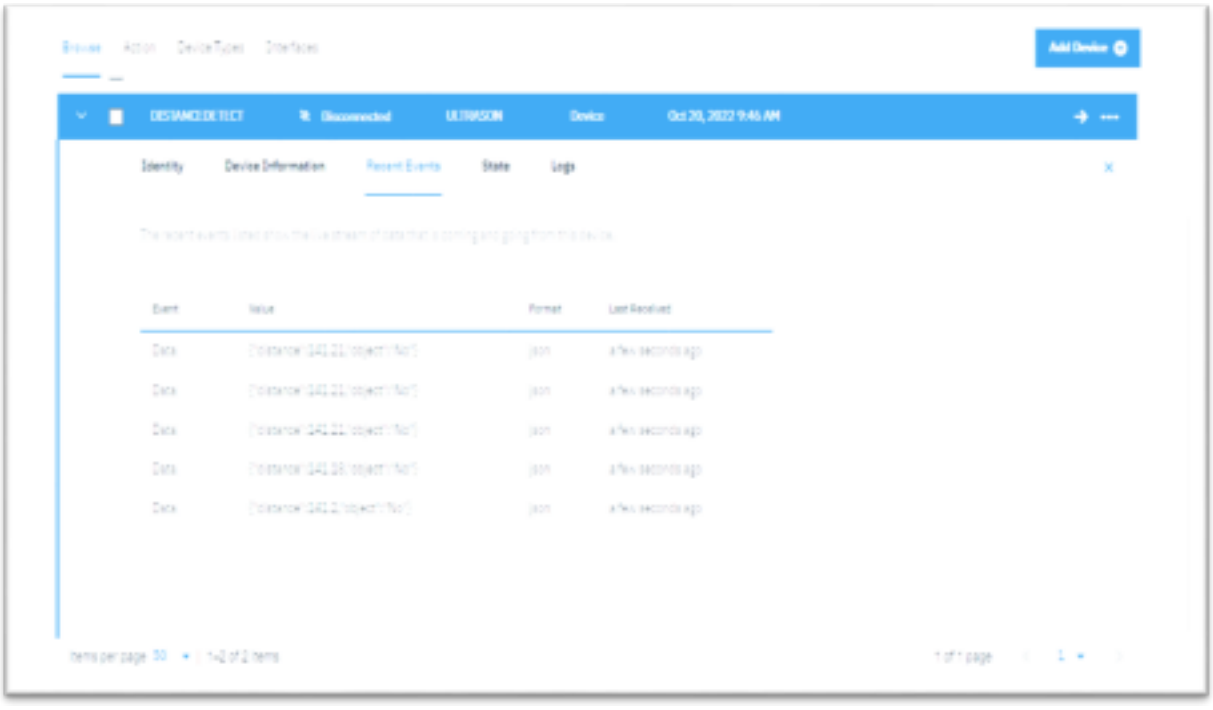
esp32-blink.ino ● diagram.json ● libraries.txt ● Library Manager

```
    WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the 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);
    for (int i = 0; i < payloadLength; i++) {
      //Serial.print((char)payload[i]);
      data3 += (char)payload[i];
    }

  //   Serial.println("data: "+ data3);
  //   if(data3=="Near")
  //   {
  // Serial.println(data3);
```

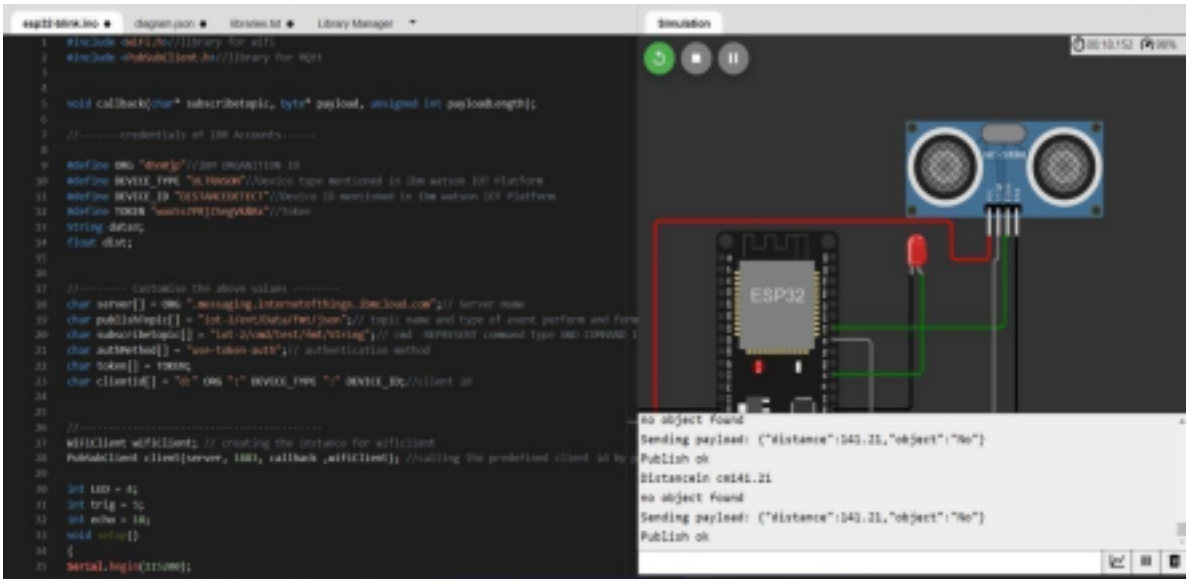
esp32-blink.ino ● diagram.json ● libraries.txt ● Library Manager

```
142  }
143
144  void callback(char* subscribetopic, byte* payload, unsigned int payloadLength)
145  {
146
147    Serial.print("callback invoked for topic: ");
148    Serial.println(subscribetopic);
149    for (int i = 0; i < payloadLength; i++) {
150      //Serial.print((char)payload[i]);
151      data3 += (char)payload[i];
152    }
153
154  //   Serial.println("data: "+ data3);
155  //   if(data3=="Near")
156  //   {
157  // Serial.println(data3);
158  // digitalWrite(LED,HIGH);
159
160  //   }
161
162  //   else
163  //   {
164  // Serial.println(data3);
165  // digitalWrite(LED,LOW);
166
167  //   }
168  data3="";
169
170
171  }
```

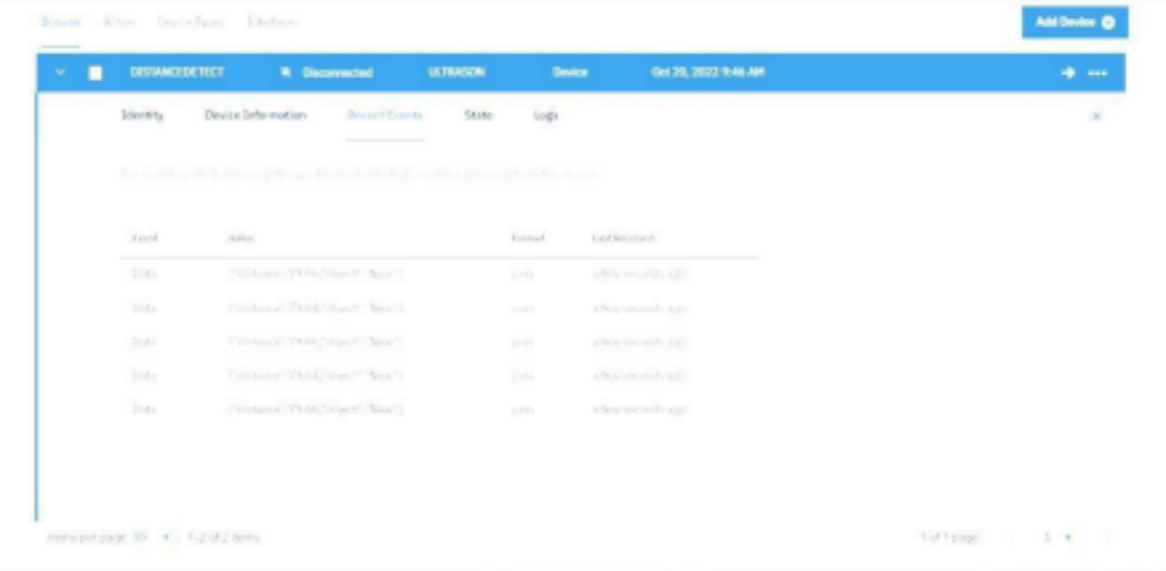
OUTPUT:



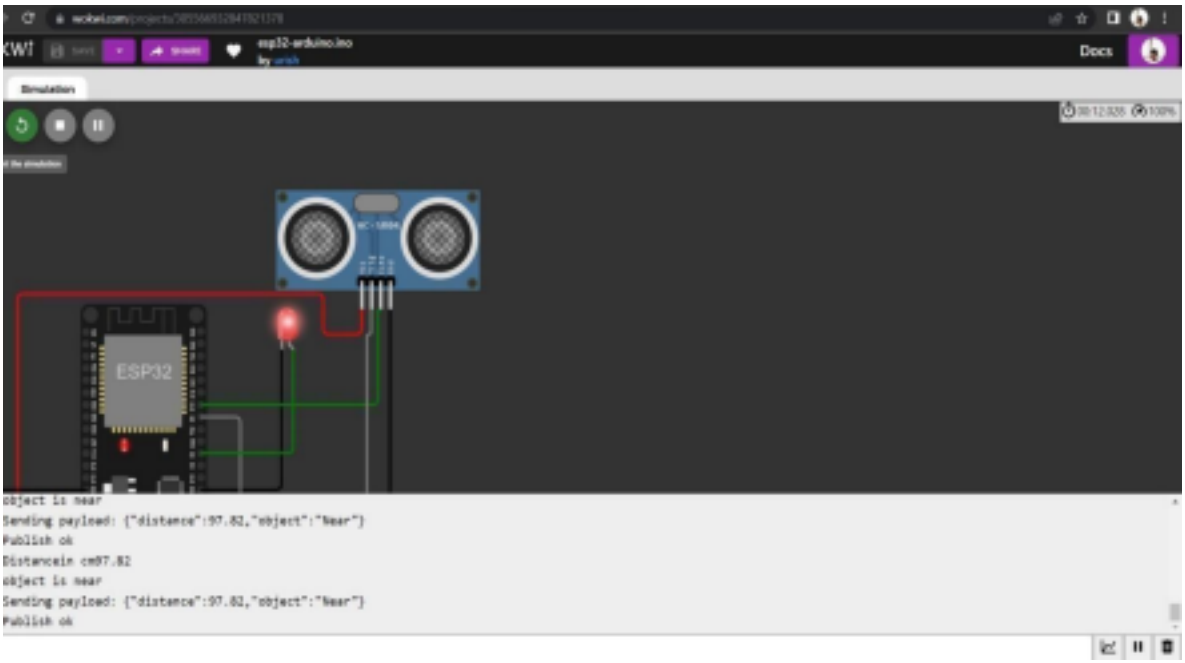
Data send to the IBMcloud device when the objectics far



Data sent to the IBMCloud Device when the objectis near



When objectics near to the ultrasonicsensor


esp32-arduino.ino
Docs
Simulation
ESP32
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