ASSIGNMENT 4

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Team ID	PNT2022TMID53651
Project name	Project - Industry Specific Intelligent Fire Management system

QUESTION:

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:

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 "x7a1le"//IBM ORGANITION ID
#define DEVICE_TYPE "Sakthi"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "1391"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "Sakthi@1391"     //Token
String data3;
 float distance;
#define sound_speed 0.034

int trigpin=18;

int echopin=19;
int led=5;
int LED=9;
long duration;
String message;

//-------- 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 void setup()// configureing
the ESP32  {
  Serial.begin(115200);
  pinMode(trigpin,OUTPUT);
  pinMode(echopin,INPUT);
  pinMode(led,OUTPUT);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
}

void loop()// Recursive Function
```

```
{
   digitalWrite(trigpin,LOW);
   digitalWrite(trigpin,HIGH);
   delay(1000);
   digitalWrite(trigpin,LOW);
  duration=pulseIn(echopin,HIGH);
  distance=duration*sound_speed/2;

  Serial.println("distance"+String(distance)+"cm");

  if(distance<100)
  {message="Alert";
  digitalWrite(led,HIGH);}
  else
  {message="No problem";
  digitalWrite(led,LOW);}
  delay(1000);
  PublishData(distance,message);
  if (!client.loop()) {
   mqttconnect();
  } }



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

void PublishData(float d,String a) {
  mqttconnect();//function call for connecting to ibm
  /*
    creating the String in in form JSon to update the data to ibm cloud   */
  String payload = "{\"distance\":";
  payload += d;
payload += "}";
  payload += "," "{\"message\":";
  payload += a;
  payload += "}";

  Serial.print("Sending payload: ");
  Serial.println(payload);


  if (client.publish(publishTopic, (char*) payload.c_str())) {
   Serial.println("Publish ok");// if it 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 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: ");
```

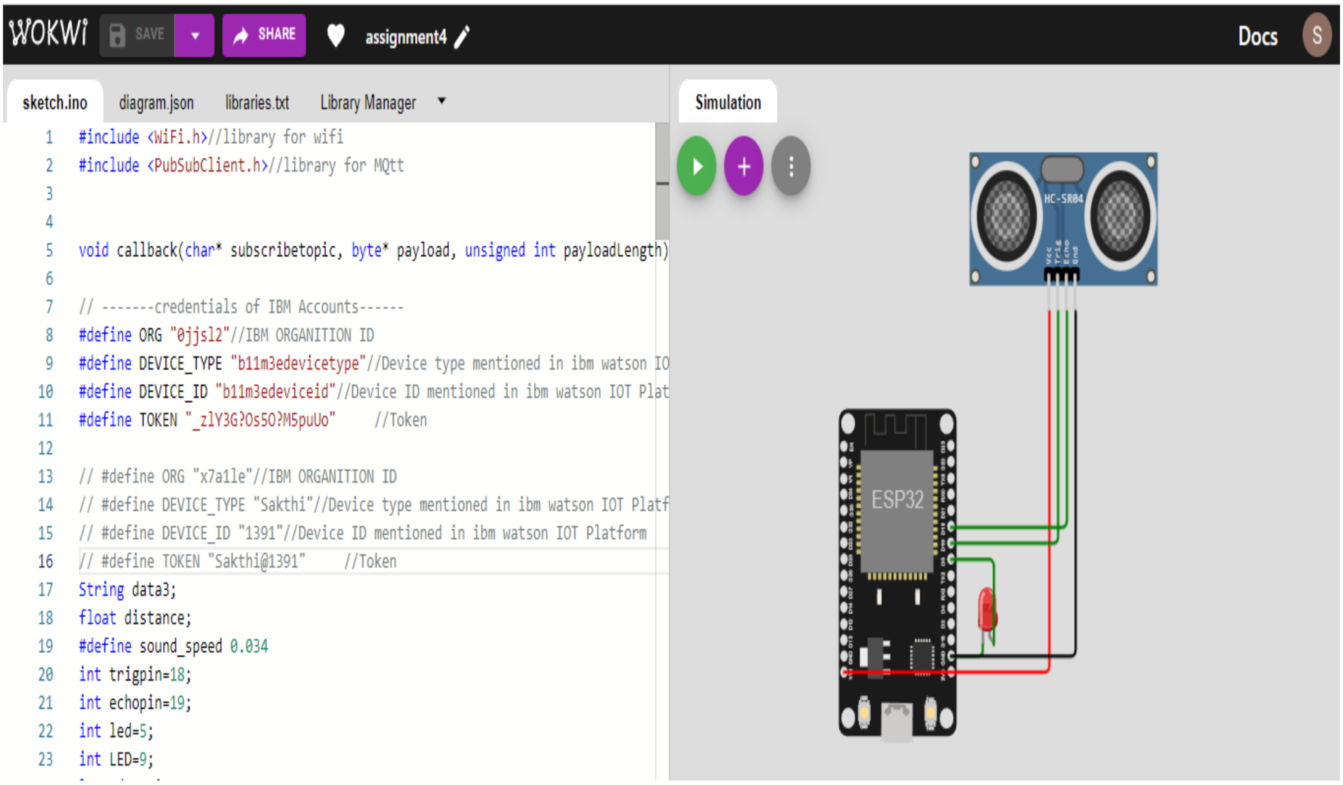
```
  Serial.println(WiFi.localIP());
}

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];   }
  data3="";}
```

WOKWI:



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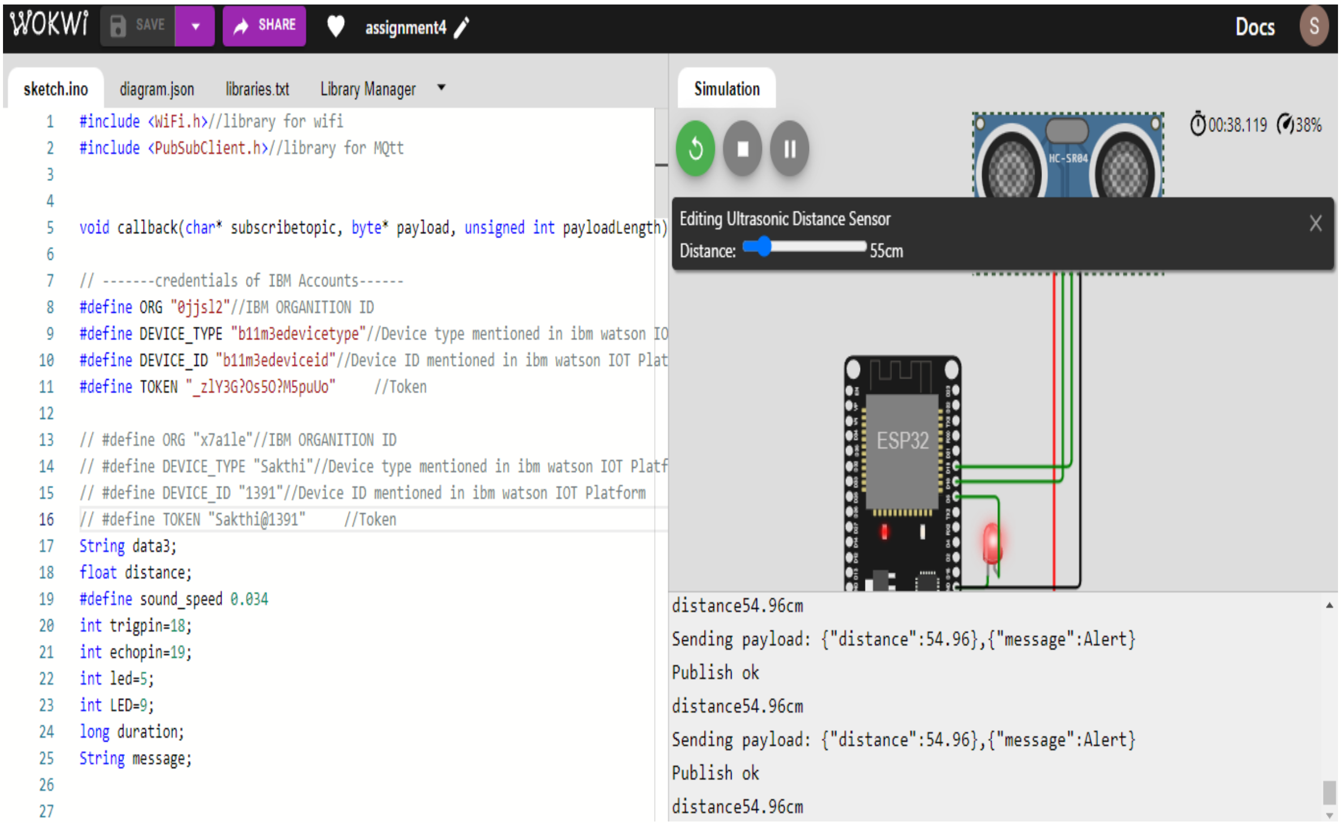
#include <PubSubClient.h>//library for MQtt


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

// -------credentials of IBM Accounts------
#define ORG "0jjsl2"//IBM ORGANITION ID
#define DEVICE_TYPE "b11m3edevicetype"//Device type mentioned in ibm watson IO
#define DEVICE_ID "b11m3edeviceid"//Device ID mentioned in ibm watson IOT Plat
#define TOKEN "_zlY3G?Os5O?M5puUo"     //Token

// #define ORG "x7a1le"//IBM ORGANITION ID
// #define DEVICE_TYPE "Sakthi"//Device type mentioned in ibm watson IOT Platf
// #define DEVICE_ID "1391"//Device ID mentioned in ibm watson IOT Platform
// #define TOKEN "Sakthi@1391"     //Token
String data3;
float distance;
#define sound_speed 0.034
int trigpin=18;
int echopin=19;
int led=5;
int LED=9;
```

DISTANCE IS LESS THAN 100 cms :



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String data3;
float distance;
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int trigpin=18;
int echopin=19;
int led=5;
int LED=9;
long duration;
String message;

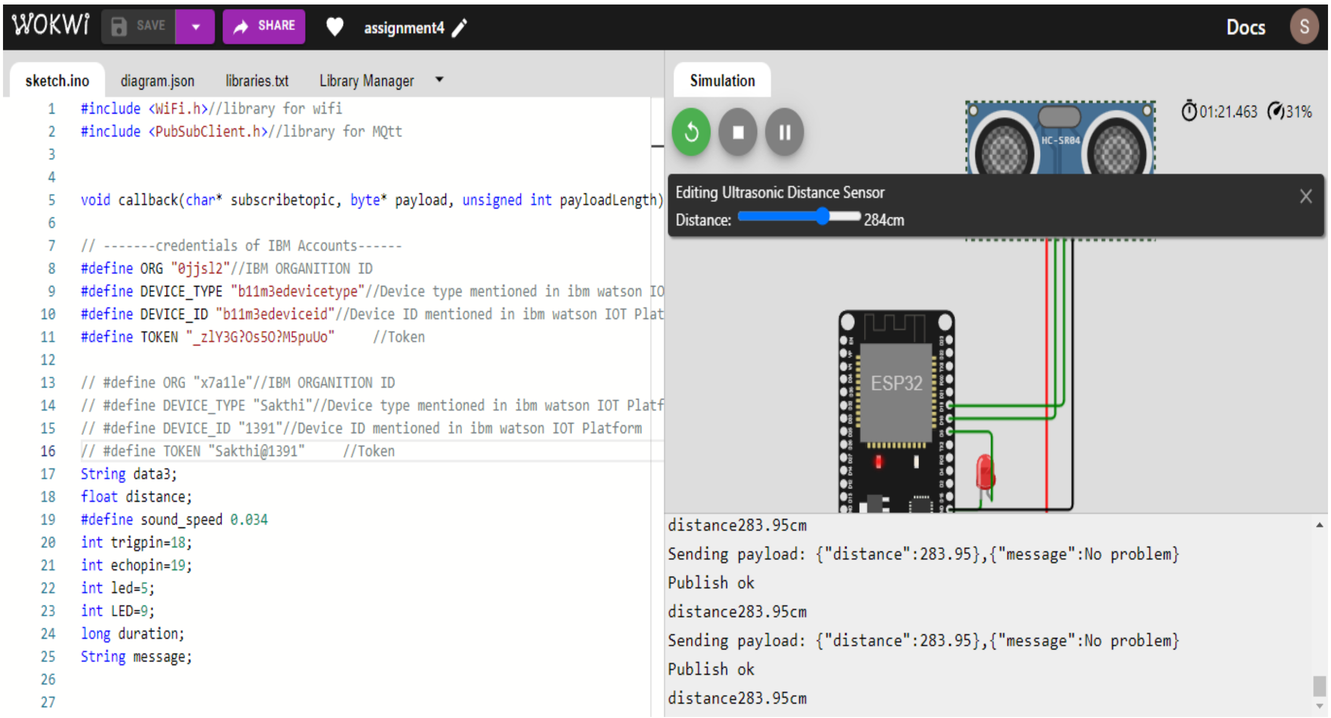
```

Editing Ultrasonic Distance Sensor

Distance: 55cm

```
distance54.96cm
Sending payload: {"distance":54.96},{"message":Alert}
Publish ok
distance54.96cm
Sending payload: {"distance":54.96},{"message":Alert}
Publish ok
distance54.96cm
```

DISTANCE IS GREATER THAN 100 cms :



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String data3;
float distance;
#define sound_speed 0.034
int trigpin=18;
int echopin=19;
int led=5;
int LED=9;
long duration;
String message;

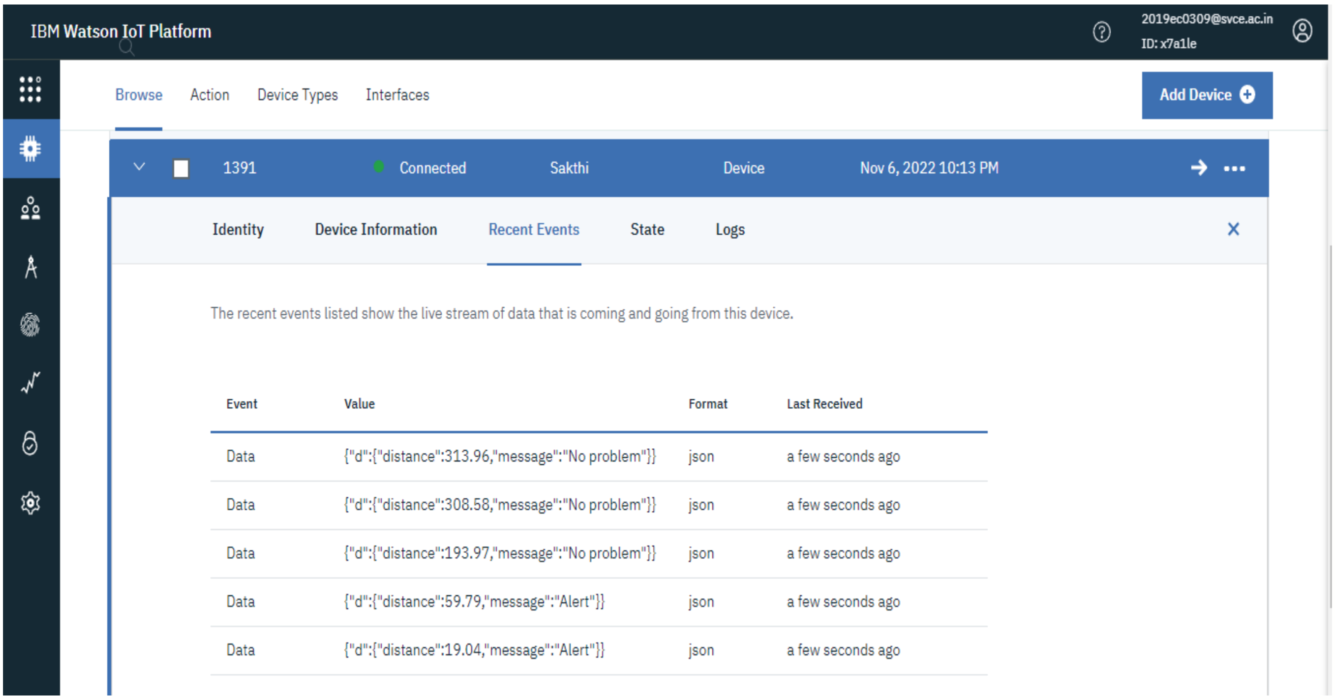
```

Editing Ultrasonic Distance Sensor

Distance: 284cm

```
distance283.95cm
Sending payload: {"distance":283.95},{"message":No problem}
Publish ok
distance283.95cm
Sending payload: {"distance":283.95},{"message":No problem}
Publish ok
distance283.95cm
```

DEVICE RECENT EVENTS IN IBM WATSON:



The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"d":{"distance":313.96,"message":"No problem"}}	json	a few seconds ago
Data	{"d":{"distance":308.58,"message":"No problem"}}	json	a few seconds ago
Data	{"d":{"distance":193.97,"message":"No problem"}}	json	a few seconds ago
Data	{"d":{"distance":59.79,"message":"Alert"}}	json	a few seconds ago
Data	{"d":{"distance":19.04,"message":"Alert"}}	json	a few seconds ago

WOKWI LINK:

https://wokwi.com/projects/347597347473064532