ASSIGNMENT: 4

Assignment Date:	26.10.2022
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Maximum Marks:	2

Question:

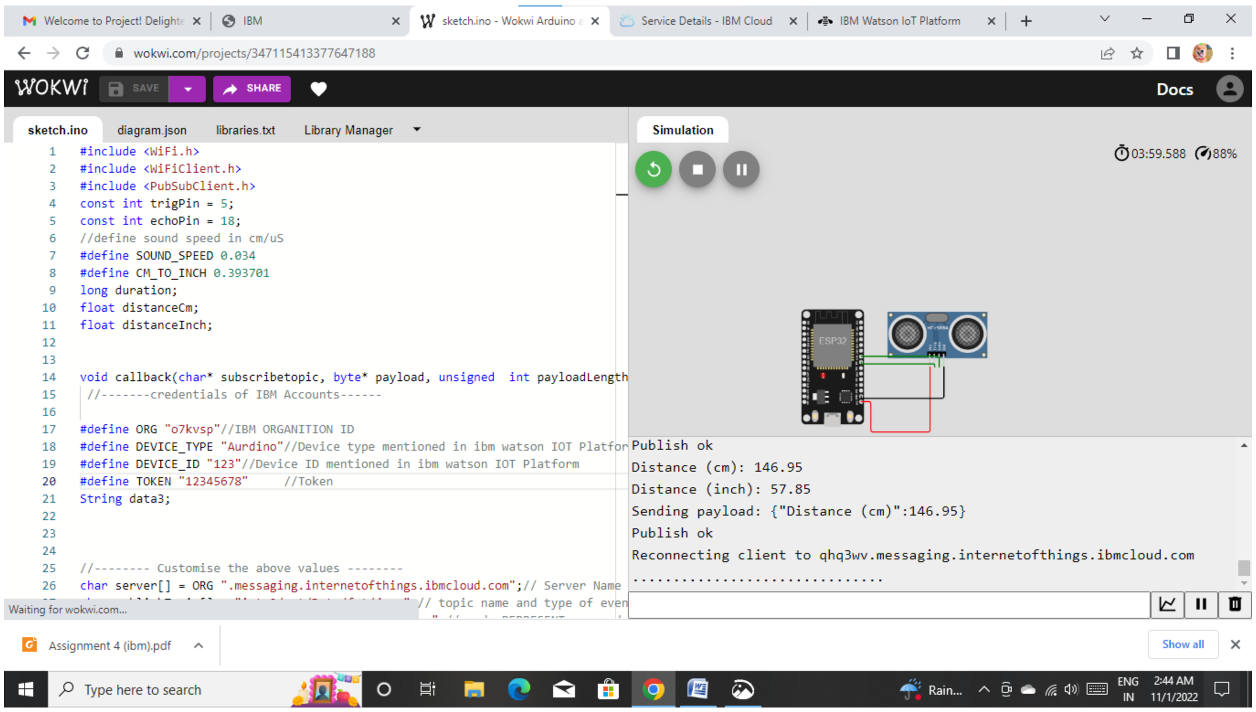
Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than

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:

Wokwi link: https://wokwi.com/projects/347115413377647188



```
#include <WiFi.h>
#include <WiFiClient.h>
#include <PubSubClient.h>
const int trigPin = 5;
const int echoPin = 18;
//define sound speed in cm/uS
#define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701
long duration;
float distanceCm;
float distanceInch;


void callback(char* subscribetopic, byte* payload, unsigned  int payloadLength
 //-------credentials of IBM Accounts------

#define ORG "o7kvsp"//IBM ORGANITION ID
#define DEVICE_TYPE "Aurdino"//Device type mentioned in ibm watson IOT Platfor
#define DEVICE_ID "123"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678"     //Token
String data3;



//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Name
```

```
Publish ok
Distance (cm): 146.95
Distance (inch): 57.85
Sending payload: {"Distance (cm)":146.95}
Publish ok
Reconnecting client to qhq3wv.messaging.internetofthings.ibmcloud.com
...............................
```

CODE:

```
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#include <WiFiClient.h>
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 int payloadLength);
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#define ORG "o7kvsp"//IBM ORGANITION ID
#define DEVICE_TYPE "Aurdino"//Device type mentioned in ibm
watson IOT Platform
#define DEVICE_ID "123"//Device ID mentioned in ibm watson
IOT Platform
#define TOKEN "12345678"     //Token
String data3;



//-------- 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);

void setup() {
  Serial.begin(115200); // Starts the serial communication
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT); // Sets the echoPin as an Input
  Serial.println();
  wificonnect();
  mqttconnect();

}

void loop() {
  // Clears the trigPin
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin on HIGH state for 10 micro seconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  // Reads the echoPin, returns the sound wave travel time
in microseconds
  duration = pulseIn(echoPin, HIGH);

  // Calculate the distance
  distanceCm = duration * SOUND_SPEED/2;

  // Convert to inches
  distanceInch = distanceCm * CM_TO_INCH;

  // Prints the distance in the Serial Monitor
  Serial.print("Distance (cm): ");
  Serial.println(distanceCm);
  Serial.print("Distance (inch): ");
  Serial.println(distanceInch);

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

  void PublishData(float Cm) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data
to ibm cloud
  */
  String payload = "{\"Distance (cm)\":";
  payload += Cm;
  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];
  }
}
```
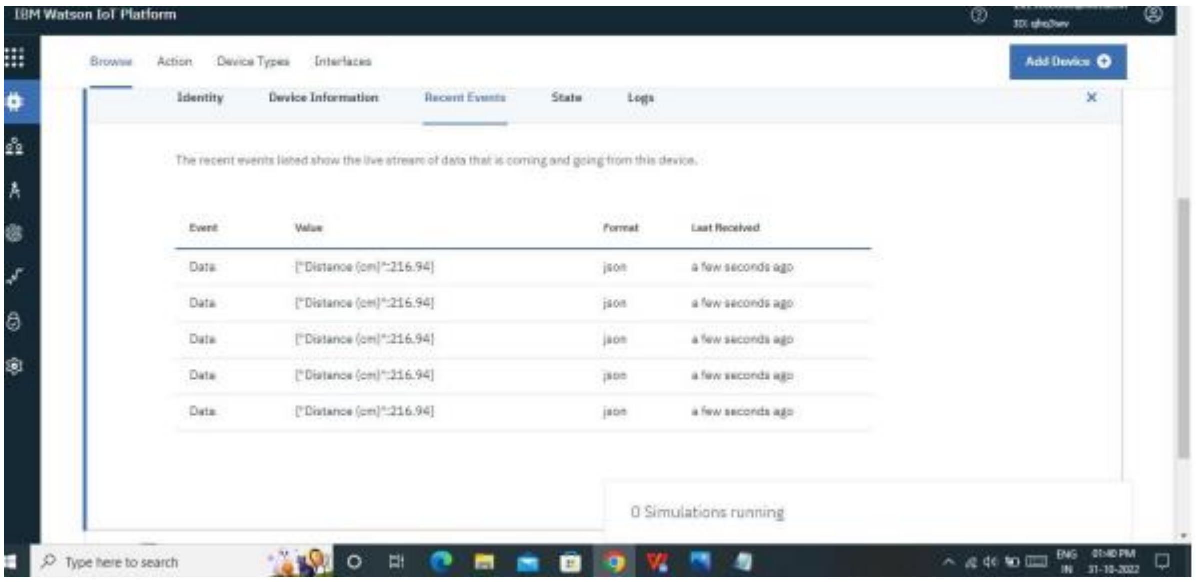

IMAGE OF IBM CLOUD



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

Event	Value	Format	Last Received
Data	{"Distance (cm)":216.94}	json	a few seconds ago
Data	{"Distance (cm)":216.94}	json	a few seconds ago
Data	{"Distance (cm)":216.94}	json	a few seconds ago
Data	{"Distance (cm)":216.94}	json	a few seconds ago
Data	{"Distance (cm)":216.94}	json	a few seconds ago

0 Simulations running