PROBLEM STATEMENT :

Signs with smart connectivity for better road safety.

DOMAIN :

Internet of Things

ASSIGNMENT 4:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events. Upload document with wokwi share link and images of IBM cloud

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Question-1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cmssend "alert" to IBM cloud and display in device recent events.

WOKWI LINK:

https://wokwi.com/projects/348018963875103316

CODE:

```
#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 "6ystet"//IBM ORGANITION ID
#define DEVICE_TYPE "Raspberrypi"//Device type mentioned in
ibm watson IOT Platform
#define DEVICE_ID "1234"//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");

  }

    }

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```

```
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{
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d())
{
   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");
  } }
```
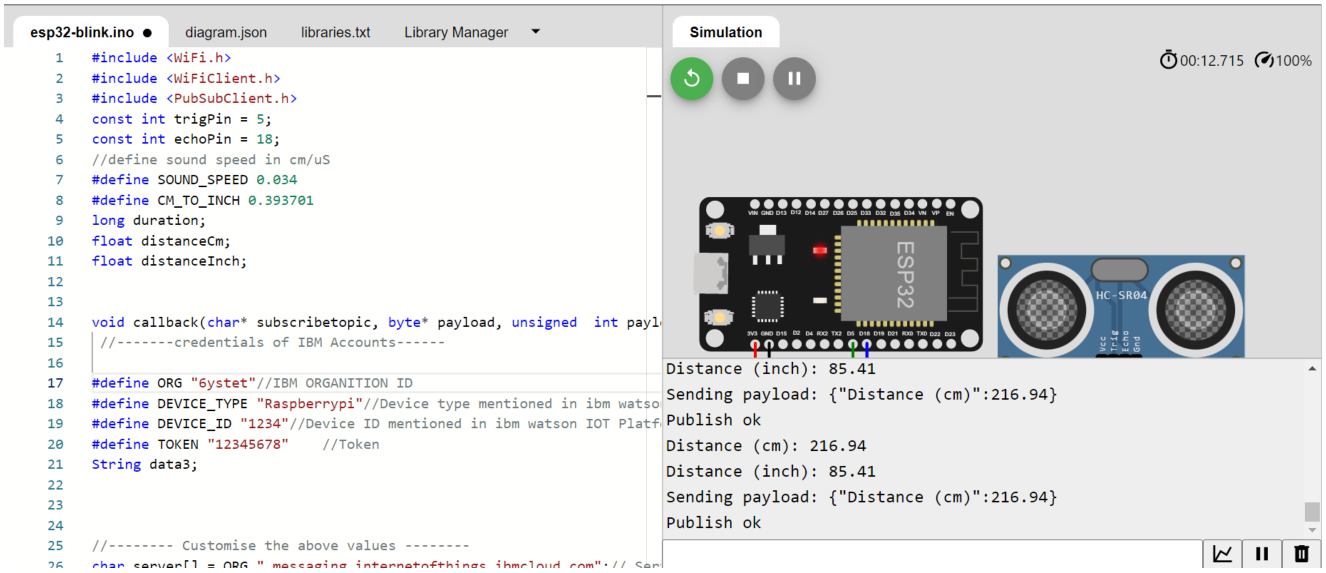

```
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength)

{



  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];

  }

}
```

OUTPUT:



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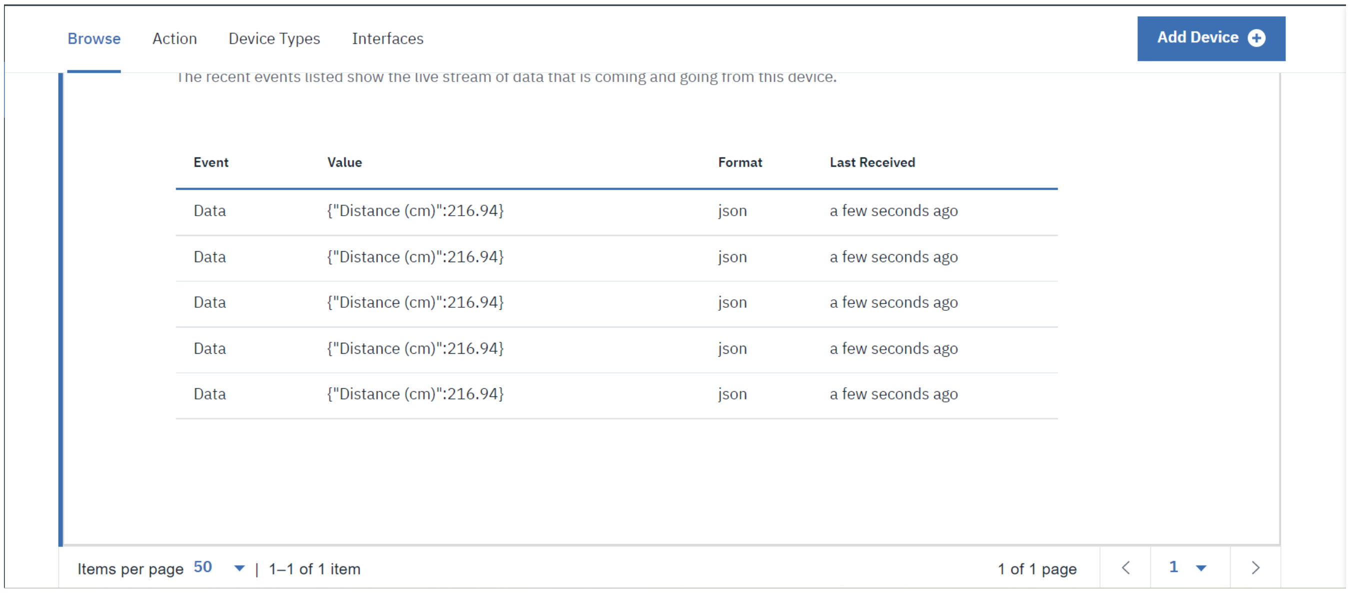

```
Distance (inch): 85.41
Sending payload: {"Distance (cm)":216.94}
Publish ok
Distance (cm): 216.94
Distance (inch): 85.41
Sending payload: {"Distance (cm)":216.94}
Publish ok
```

Watson iot connected:



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

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