# ASSIGNMENT-4
# DISTANCE DETECTION USING ULTRASONIC SENSOR

| | |
|---|---|
| Date | 05 November 2022 |
| Team ID | PNT2022TMID24841 |
| Name | S. HARINISHREE |
| Student Roll Number | 210419106038 |
| Maximum Marks | 2 MARKS |

Question1 :

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.

WOKWI LINK :

https://wokwi.com/projects/ 346926683555627603

CODE :

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

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

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

#define ORG "yatg33"//IBM ORGANITION ID
#define DEVICE_TYPE "ultrad"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "ultrad456"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "@UCMS0N6Tb6o9tjJbb"     //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
```

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```
25
26  //----------------------------------------
27  WiFiClient wifiClient; // creating the instance for wificlient
28  PubSubClient client(server, 1883, callback ,wifiClient); //calling the predefined client id by passing parameter like server id,portand wificredential
29
30  int LED=4;
31  int trig=5;
32  int echo=18;
33  void setup()// configureing the ESP32
34  {
35    Serial.begin(115200);
36
37    pinMode(trig,OUTPUT);
38    pinMode(echo,INPUT);
39    pinMode(LED,OUTPUT);
40    delay(10);
41    Serial.println();
42    wificonnect();
43    mqttconnect();
44  }
45
46  void loop()// Recursive Function
47  {
48
49   digitalWrite(trig,LOW);
50   digitalWrite(trig,HIGH);
51   delayMicroseconds(10);
52   digitalWrite(trig,LOW);
     float dur=pulseIn(echo,HIGH);
```

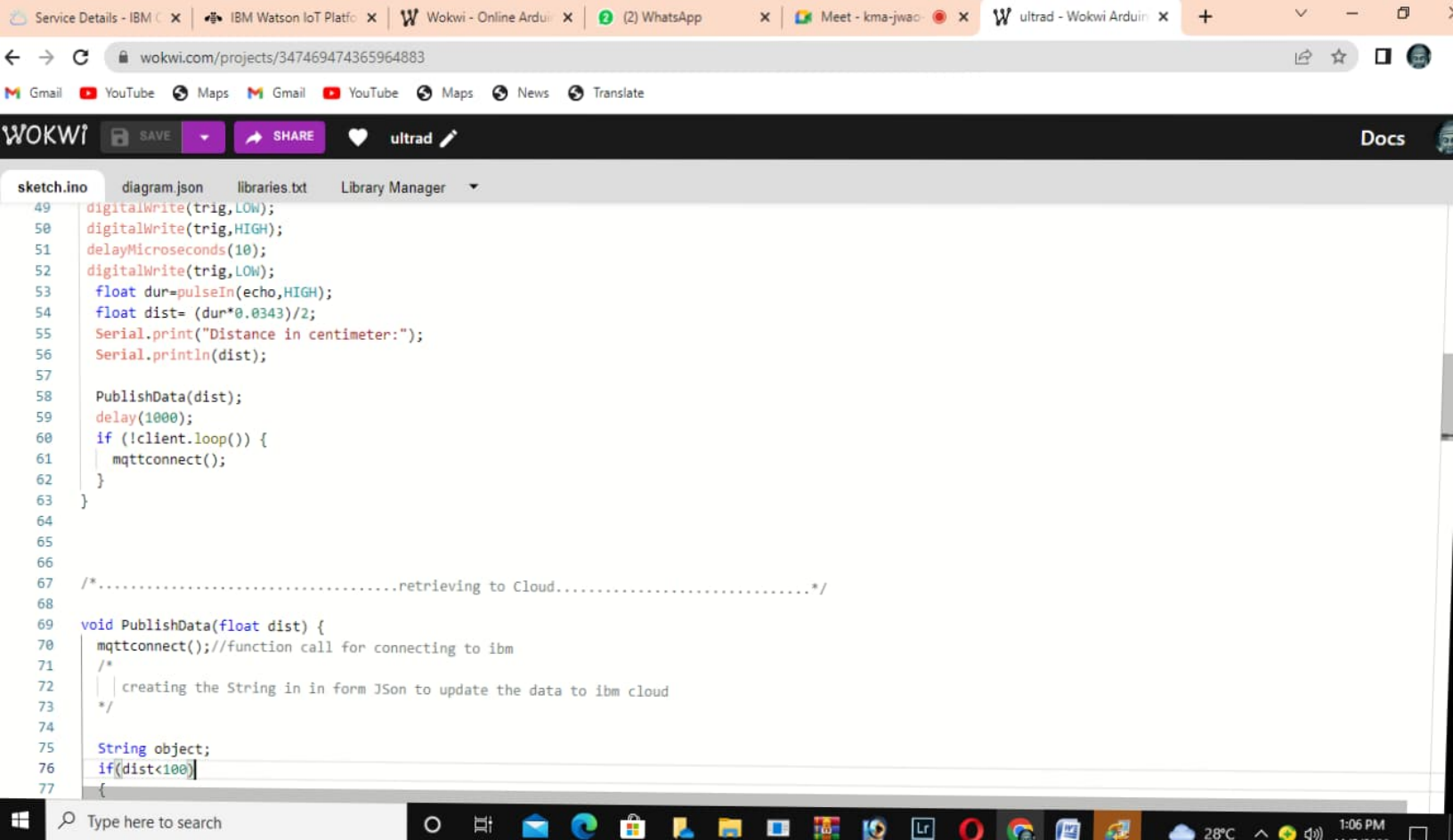
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diagram.json
libraries.txt
Library Manager
digitalWrite(trig,LOW);
digitalWrite(trig,HIGH);
delayMicroseconds(10);
digitalWrite(trig,LOW);
float dur=pulseIn(echo,HIGH);
float dist= (dur*0.0343)/2;
Serial.print("Distance in centimeter:");
Serial.println(dist);
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)
{
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```
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);


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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```
100     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
101   } else {
102     Serial.println("Publish failed");
103   }
104
105 }
106 void mqttconnect() {
107   if (!client.connected()) {
108     Serial.print("Reconnecting client to ");
109     Serial.println(server);
110     while (!!!client.connect(clientId, authMethod, token)) {
111       Serial.print(".");
112       delay(500);
113     }
114
115      initManagedDevice();
116      Serial.println();
117   }
118 }
119 void wificonnect() //function defination for wificonnect
120 {
121   Serial.println();
122   Serial.print("Connecting to ");
123
124   WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the connection
125   while (WiFi.status() != WL_CONNECTED) {
126     delay(500);
127     Serial.print(".");
128   }
```

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```
127     Serial.print(".");
128   }
129   Serial.println("");
130   Serial.println("WiFi connected");
131   Serial.println("IP address: ");
132   Serial.println(WiFi.localIP());
133 }
134
135 void initManagedDevice() {
136   if (client.subscribe(subscribetopic)) {
137     Serial.println((subscribetopic));
138     Serial.println("subscribe to cmd OK");
139   } else {
140     Serial.println("subscribe to cmd FAILED");
141   }
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=="lighton")
```

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```
{

  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=="lighton")
 // {
//Serial.println(data3);
//digitalWrite(LED,HIGH);

 // }

 // else
 // {
//Serial.println(data3);
//digitalWrite(LED,LOW);

 // }
data3="";


}
```

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  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=="lighton")
 // {
//Serial.println(data3);
//digitalWrite(LED,HIGH);

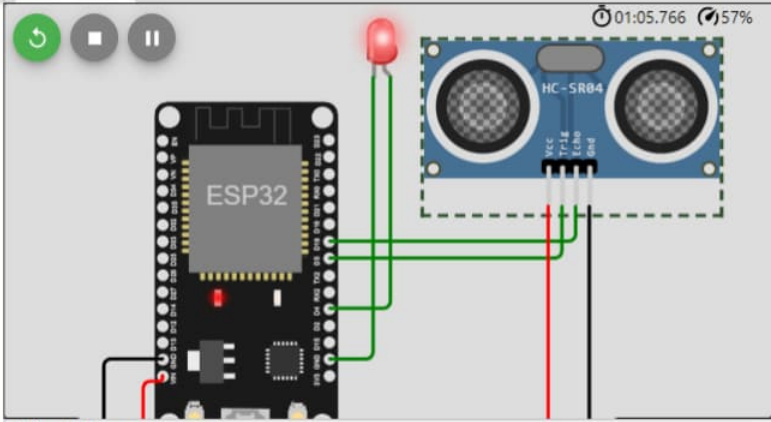
 // }

 // else
 // {
//Serial.println(data3);
//digitalWrite(LED,LOW);

 // }
data3="";


}
```

Simulation




```
object is near
Sending payload: {"distance":30.24,"object":"Near"}
Publish ok
Distance in centimeter:30.24
object is near
Sending payload: {"distance":30.24,"object":"Near"}
Publish ok
```

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```
{

  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=="lighton")
 // {
//Serial.println(data3);
//digitalWrite(LED,HIGH);

 // }

 // else
 // {
//Serial.println(data3);
//digitalWrite(LED,LOW);

 // }
data3="";


}
```

Simulation

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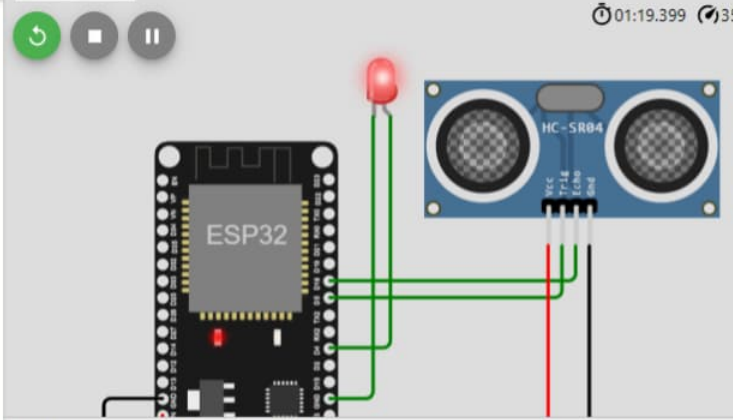


```
Distance in centimeter:30.24
object is near
Sending payload: {"distance":30.24,"object":"Near"}
Publish ok
Distance in centimeter:30.24
object is near
Sending payload: {"distance":30.24,"object":"Near"}
```

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```
{

  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=="lighton")
 // {
//Serial.println(data3);
//digitalWrite(LED,HIGH);

 // }

 // else
 // {
//Serial.println(data3);
//digitalWrite(LED,LOW);

 // }
data3="";


}
```

Simulation

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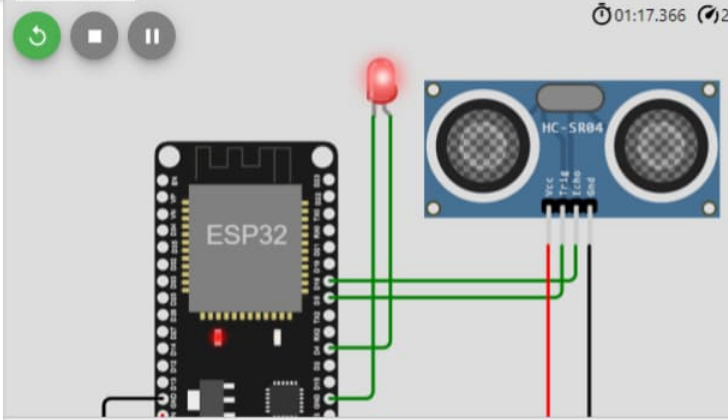


```
Connecting to .
WiFi connected
IP address:
10.10.0.2
Reconnecting client to yatg33.messaging.internetofthings.ibmcloud.com
iot-2/cmd/test/fmt/String
subscribe to cmd OK
```

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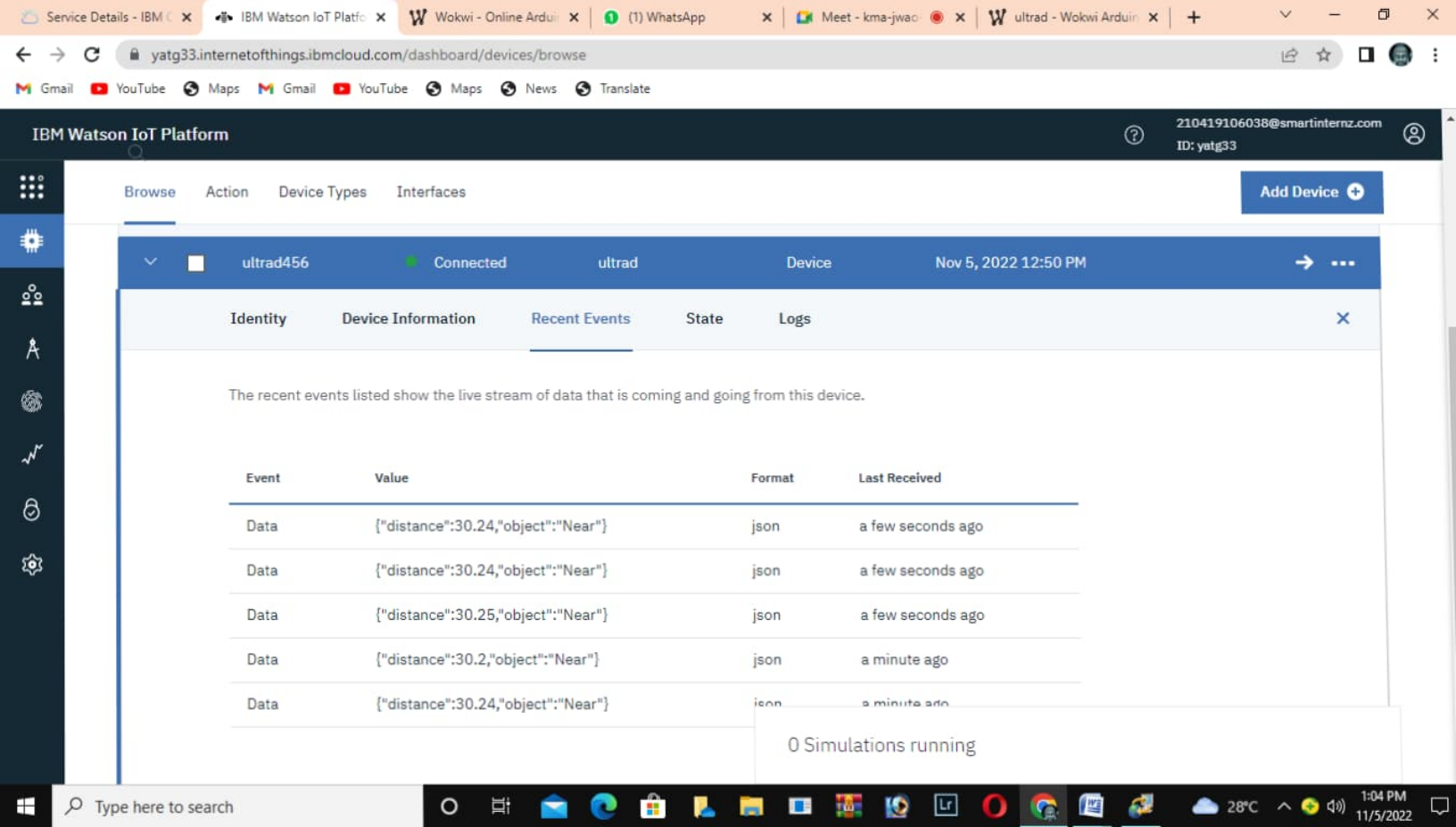
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210419106038@smartinternz.com
ID: yatg33
Browse Action Device Types Interfaces
Add Device
ultrad456 Connected ultrad Device Nov 5, 2022 12:50 PM
Identity Device Information Recent Events State Logs
The recent events listed show the live stream of data that is coming and going from this device.
Event Value Format Last Received
Data {"distance":30.24,"object":"Near"} json a few seconds ago
Data {"distance":30.24,"object":"Near"} json a few seconds ago
Data {"distance":30.25,"object":"Near"} json a few seconds ago
Data {"distance":30.2,"object":"Near"} json a minute ago
Data {"distance":30.24,"object":"Near"} json a minute ago
0 Simulations running
Type here to search
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