ASSIGNMENT- 4

Ultrasonic sensor simulation in Wokwi

Date	29 October2022
Team ID	PNT2022TMID28778
project	Real time river water quality monitoring and control system
Maximum Marks	2Marks

Question-1:

Write a code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100cms send an “Alert” to IBM cloud and display in the device recent events.

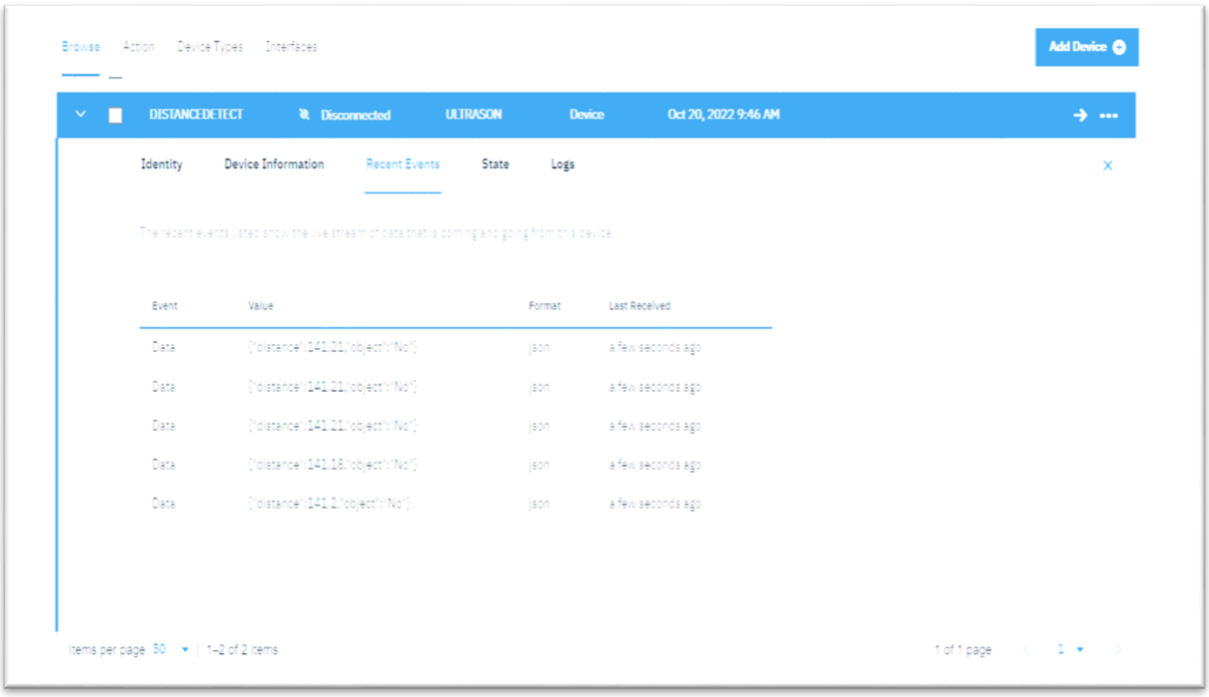
```
#include <WiFi.h> #include <PubSubClient.h>
void callback(char* subscribetopic, byte*
payload, unsigned int payloadLength);
//-------credentials of IBM Accounts------
#define ORG "kotoq5"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "12345"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678" //Token String
data3; char server[] = ORG
".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-
2/evt/Data/fmt/json";
char subscribetopic[] = "iot-
2/cmd/test/fmt/String";
char authMethod[] = "use-token-auth";
char token[]=TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
wifiClient;
 PubSubClient client(server, 1883, callback ,wifiClient);
const int trigPin =5;
const int echoPin= 18;
#define SOUND_SPEED 0.034 long
duration;
float distance;
 void setup() {
Serial.begin(115200);
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
wificonnect();
mqttconnect();
}
void loop() {
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
```

```
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
 duration = pulseIn(echoPin, HIGH);
distance = duration * SOUND_SPEED/2;
Serial.print("Dista
nce (cm): ");
Serial.println(dist
ance);
if(distance<100)
{
Serial.println("ALE
RT!!");
delay(1000);
PublishData(distanc
e); delay(1000);
if (!client.loop())
{
mqttconnect();
}
}
delay(1000
);
} void
Serial.print("Reconnecting client to
");
Serial.println(server);

 PublishDat a(float dist)
 {
 mqttconnect();
 String payload = "{\"Distance\":"; payload += dist;
 payload += ",\"ALERT!!\":""\"Distance less than
 100cms\""; payload += "}";
 Serial.print("Sending payload: ");
  Serial.println(payload);
  if (client.publish(publishTopic, (char*) payload.c_str())) {
 Serial.println("Publish ok");
 }
 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()
{
Serial.println();
Serial.print("Connecting to ");
WiFi.begin("Wokwi-GUEST", "", 6);
while (WiFi.status() !=WL_CONNECTED)
{ d
elay(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);
data3="";
}
```

Diagram. json:

```
{
  "version": 1,
  "author": "Aravind",
  "editor": "wokwi",
  "parts": [
    { "type": "wokwi-esp32-devkit-v1", "id": "esp", "top": -4.67, "left": -114.67,
    "attrs": {} },
    { "type": "wokwi-hc-sr04", "id": "ultrasonic1", "top": 15.96, "left": 89.17,
    "attrs": {} }
  ],
  "connections": [
    [ "esp:TX0", "$serialMonitor:RX", "", [] ],
    [ "esp:RX0", "$serialMonitor:TX", "", [] ],
    [
      "esp:VIN",
      "ultrasonic1:VCC",
      "red",
      [ "h-37.16", "v-178.79", "h200", "v173.33", "h100.67" ]
    ],
    [ "esp:GND.1", "ultrasonic1:GND", "black", [ "h39.87", "v44.04", "h170" ] ],
    [ "esp:D5", "ultrasonic1:TRIG", "green", [ "h54.54", "v85.07", "h130.67" ] ],
    [ "esp:D18", "ultrasonic1:ECHO", "green", [ "h77.87", "v80.01", "h110" ] ]
  ]
}
```

OUTPUT:



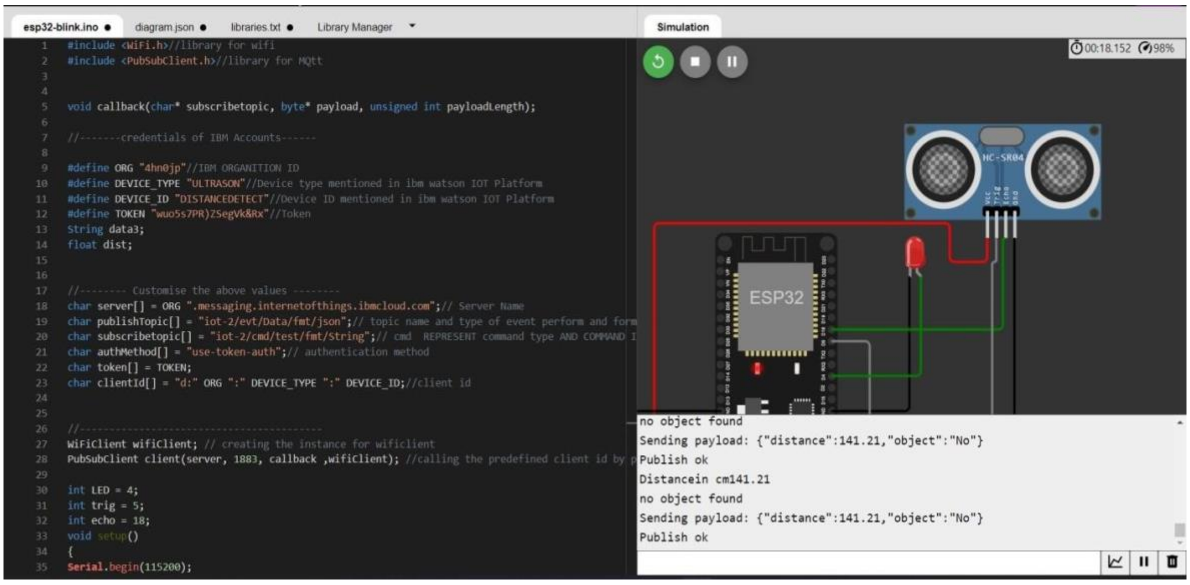
DISTANCEDETECT   Disconnected   ULTRASON   Device   Oct 20, 2022 9:46 AM

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":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.21,"object":"No"}	json	a few seconds ago
Data	{"distance":141.18,"object":"No"}	json	a few seconds ago
Data	{"distance":141.2,"object":"No"}	json	a few seconds ago

Items per page 50 | 1–2 of 2 items   1 of 1 page   1

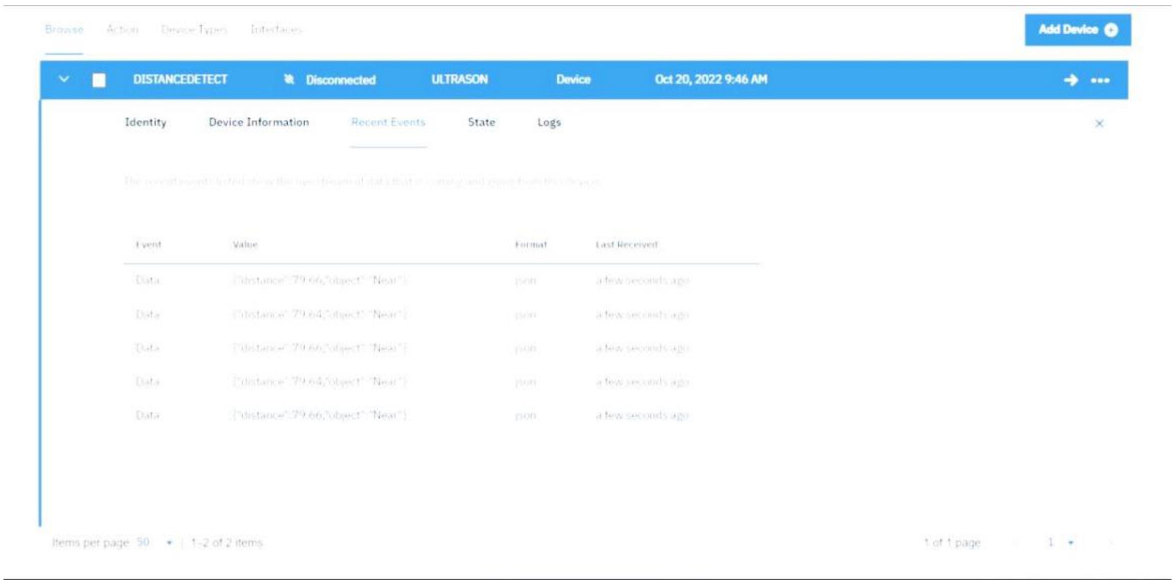
Data send to the IBM cloud device when the object is far:



```
#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 "ULTRASON"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "DISTANCEDETECT"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "wuo5s7PR)ZSegVk&Rx"//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 form
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd  REPRESENT command type AND COMMAND I
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 p

int LED = 4;
int trig = 5;
int echo = 18;
void setup()
{
Serial.begin(115200);
```

```
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distancein cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
```

Data sent to the IBM Cloud Device when the object is near:



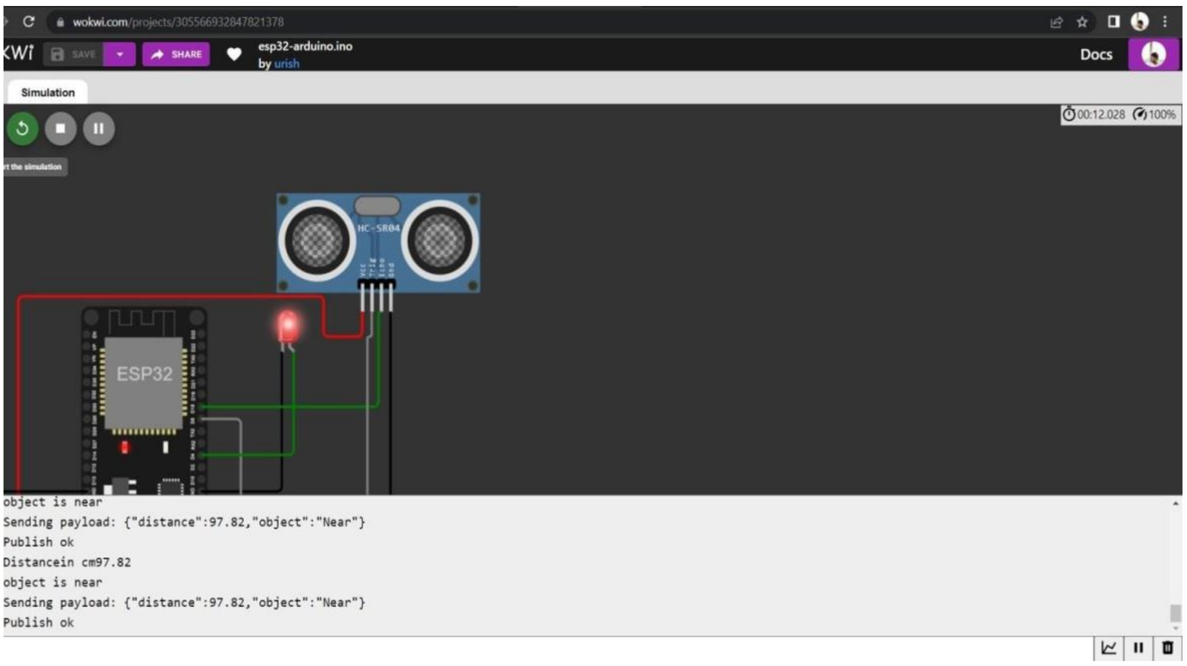
DISTANCEDETECT	Disconnected	ULTRASON	Device	Oct 20, 2022 9:46 AM

[illegible]

Event	Value	Format	Last Received
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.64,"object":"Near"}	json	a few seconds ago
Data	{"distance":79.66,"object":"Near"}	json	a few seconds ago

Items per page 50 | 1–2 of 2 items   1 of 1 page   1

When object is near to the ultrasonic sensor:



```
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
```