Assignment 4

Wokwi Assignment

Assignment Date	26 October 2022
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Maximum Marks	2 Marks

Assignment 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.

Wokowi Link: https://wokwi.com/projects/346504267904844371

Program code:

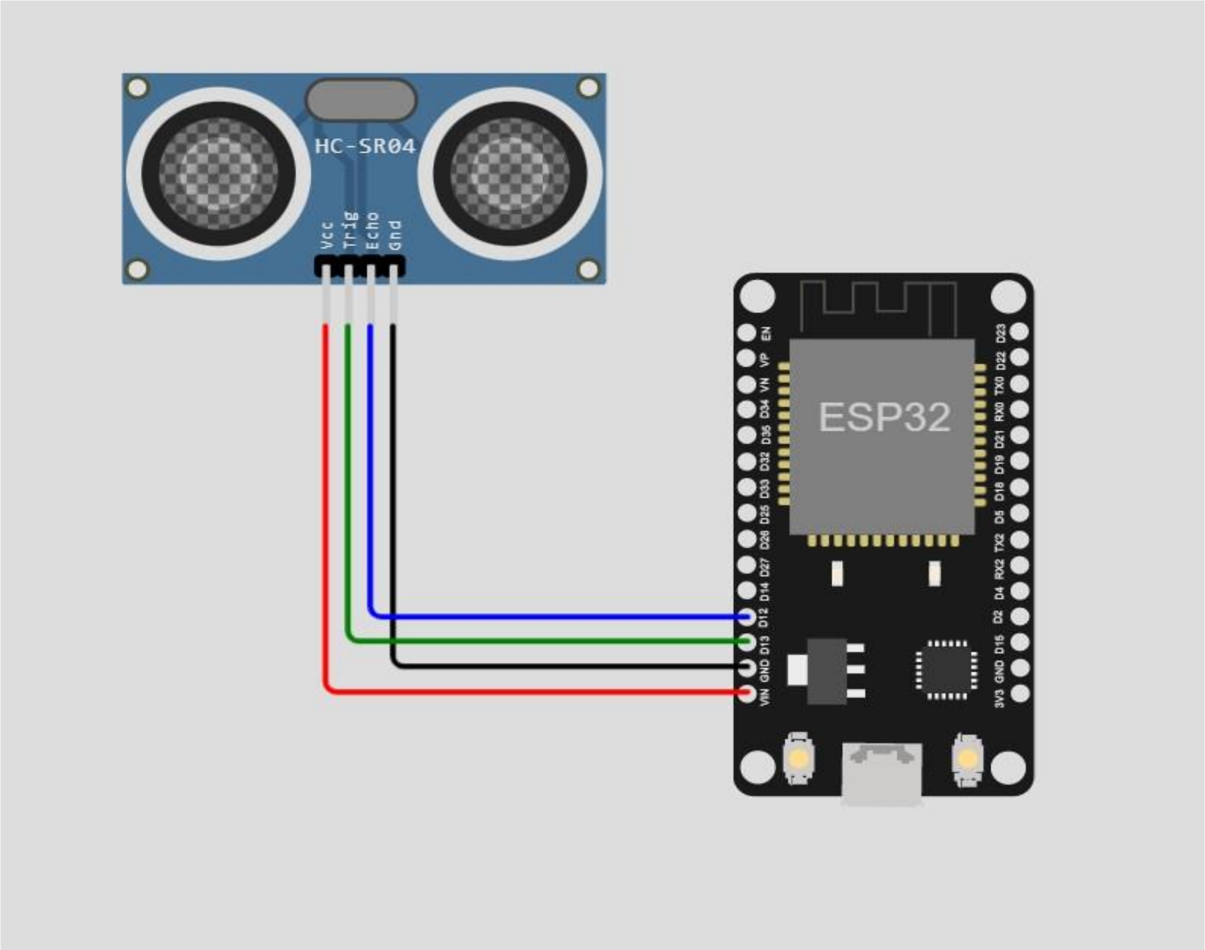
```
#include <WiFi.h>//library for wifi

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


#define ECHO_GPIO 12

#define TRIGGER_GPIO 13

#define MAX_DISTANCE_CM 100 // Maximum of 5 meters

#include "Ultrasonic.h"


Ultrasonic ultrasonic(13, 12);

int distance;


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


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

```
#define ORG "lryrya"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "ESP"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "123456789"     //Token
String data3;
float h, t;


//-------- 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/command/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);
  delay(10);
  Serial.println();
  wificonnect();
  mqttconnect();
```

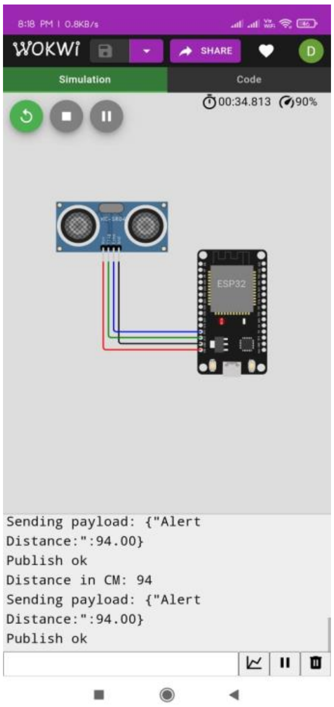
```
}

void loop()// Recursive Function
{

  distance = ultrasonic.read(CM);
  if (distance < 100) {
    Serial.print("Distance in CM: ");
    Serial.println(distance);
    PublishData(distance);
    delay(1000);
    if (!client.loop()) {
      mqttconnect();
    }

  }

  delay(1000);


}

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

void PublishData(float temp) {
  mqttconnect();//function call for connecting to ibm
  /*
     creating the String in in form JSon to update the data to ibm cloud
  */
  String payload = "{\"Alert Distance:\":";
  payload += temp;
  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];
  }
  Serial.println("data: " + data3);
  if (data3 == "lighton")
  {
    Serial.println(data3);
  }
  else
  {
    Serial.println(data3);
  }
  data3 = "";
}
```

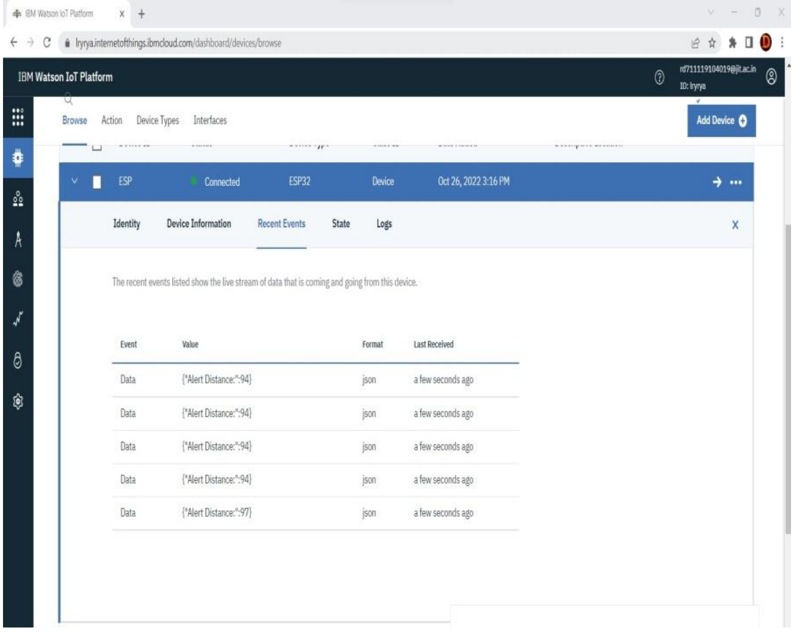
Diagram:



When the distance is less than 100cm the alert is sent to the IBM cloud



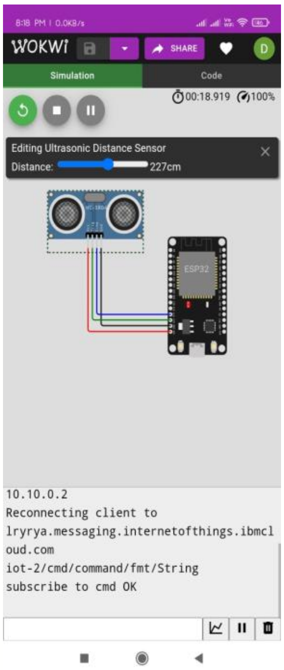
```
Sending payload: {"Alert
Distance:":94.00}
Publish ok
Distance in CM: 94
Sending payload: {"Alert
Distance:":94.00}
Publish ok
```



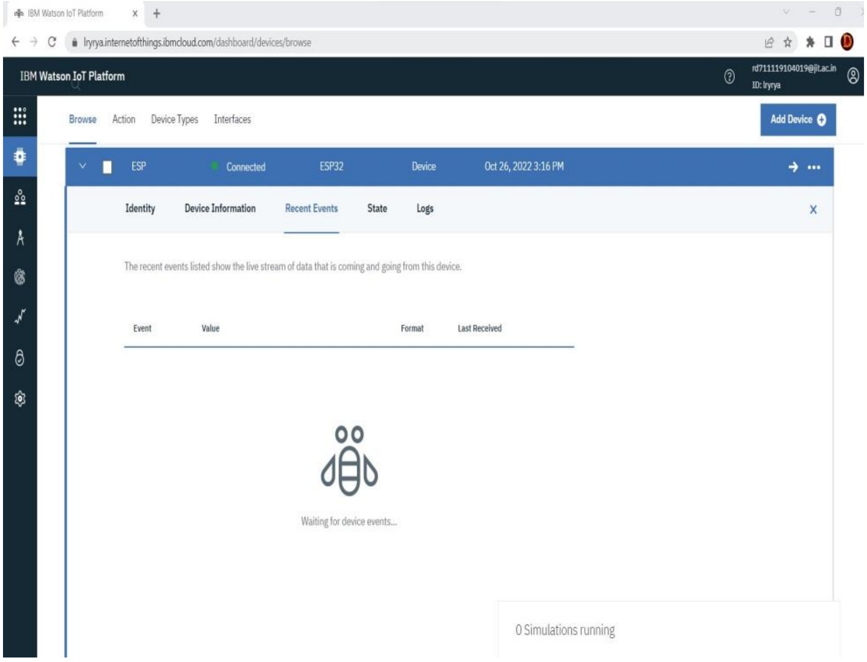
The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"Alert Distance:":94}	json	a few seconds ago
Data	{"Alert Distance:":94}	json	a few seconds ago
Data	{"Alert Distance:":94}	json	a few seconds ago
Data	{"Alert Distance:":94}	json	a few seconds ago
Data	{"Alert Distance:":97}	json	a few seconds ago

When the distance is more than 100cm the alert is not sent to the IBM cloud



```
10.10.0.2
Reconnecting client to
lryrya.messaging.internetofthings.ibmcl
oud.com
iot-2/cmd/command/fmt/String
subscribe to cmd OK
```



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

Event	Value	Format	Last Received

Waiting for device events...

0 Simulations running