Assignment 4

Wokwi Assignment

Assignment Date	29 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 "ydw0ta"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "ESP32"//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();
```

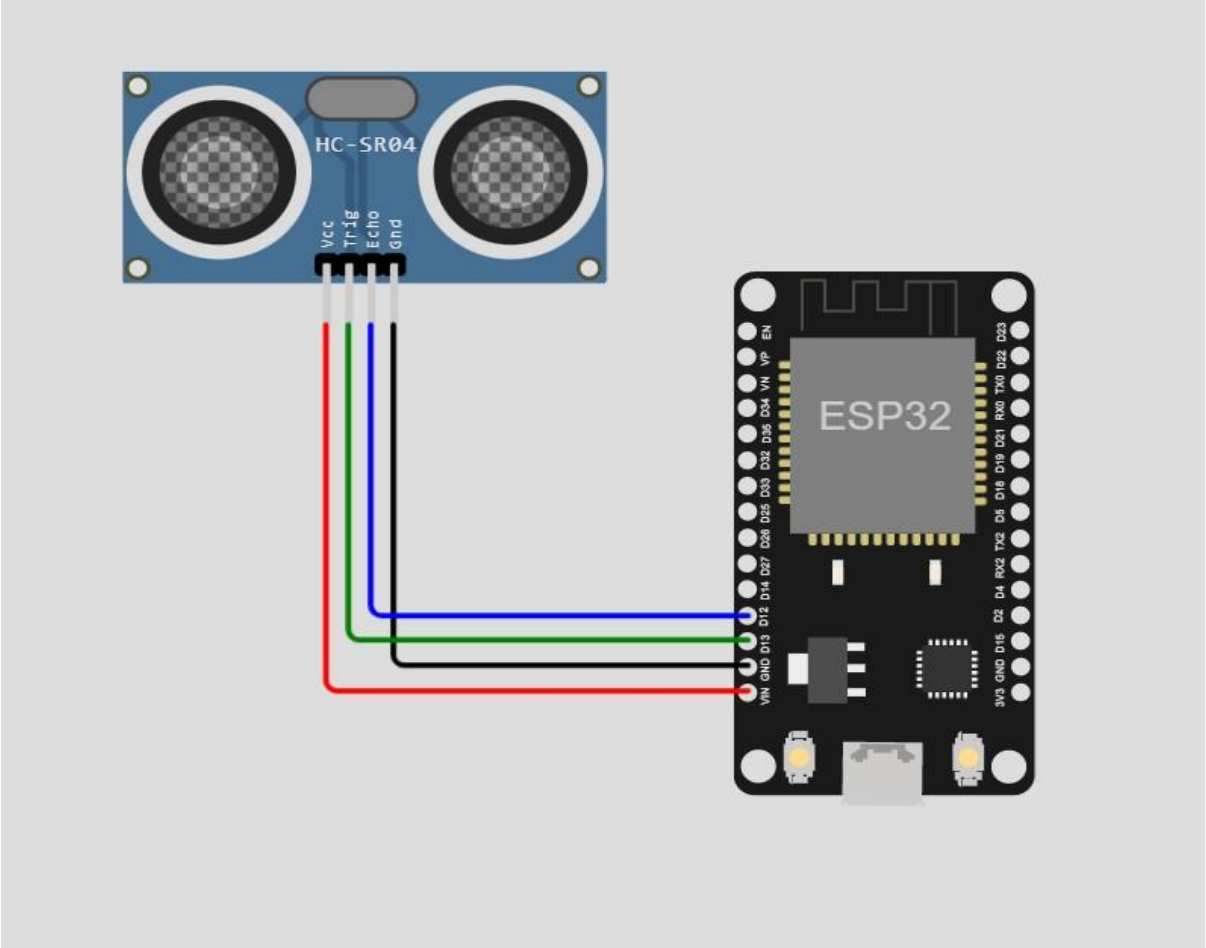
```
}

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
```

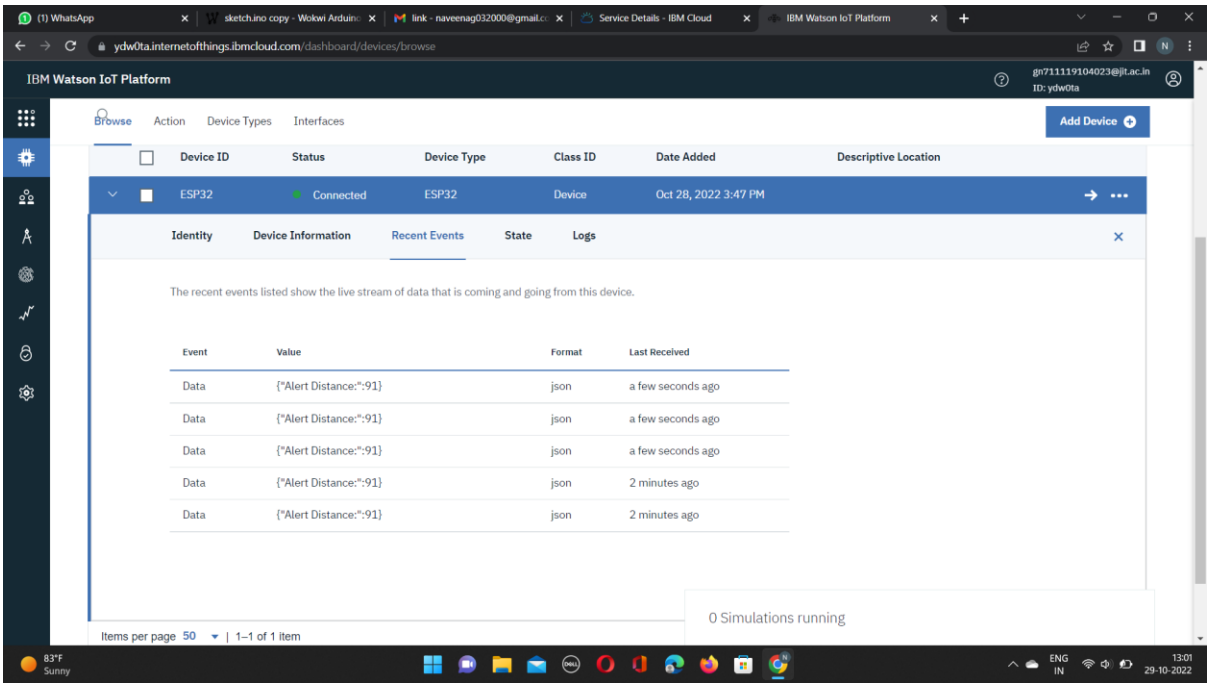
```
{
  Serial.println();
  Serial.print("Connecting  to ");

  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++)  {
```

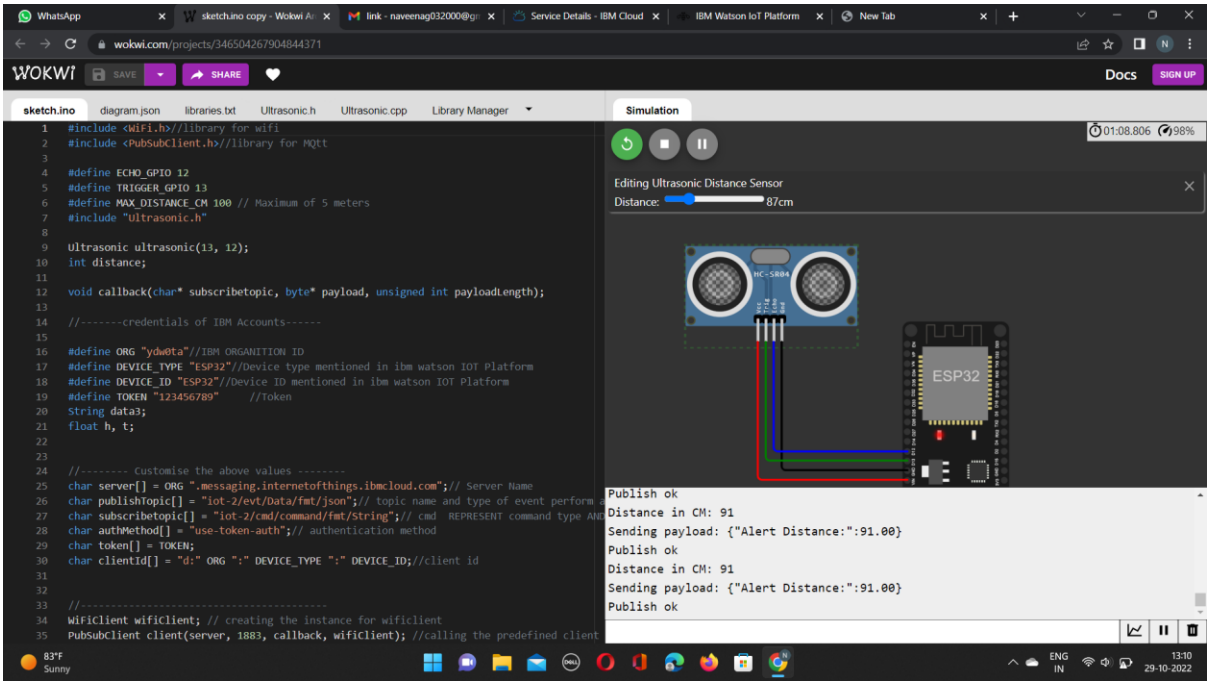
```
  //Serial.print((char)payload[i]);
  data3 += (char)payload[i];
 }
 Serial.println("data:  " + data3);
 if (data3 == "lighton")
 {
  Serial.println(data3);
 }
 else
 {
  Serial.println(data3);
 }
 data3 = "";
}
```

Diagram:



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





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