Assignment -4

ESP32 Programming with IBM Cloud

Assignment Date	24 October 2022
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Maximum Marks	2 Marks

Question:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100cms send “alert” to ibm cloud and display in device recent events.

Upload document with wokwi share link and images of ibm cloud.

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 "dqr7ac"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "2019504533"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "8J&CCQTO!*nDqH01Lu" //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);
```

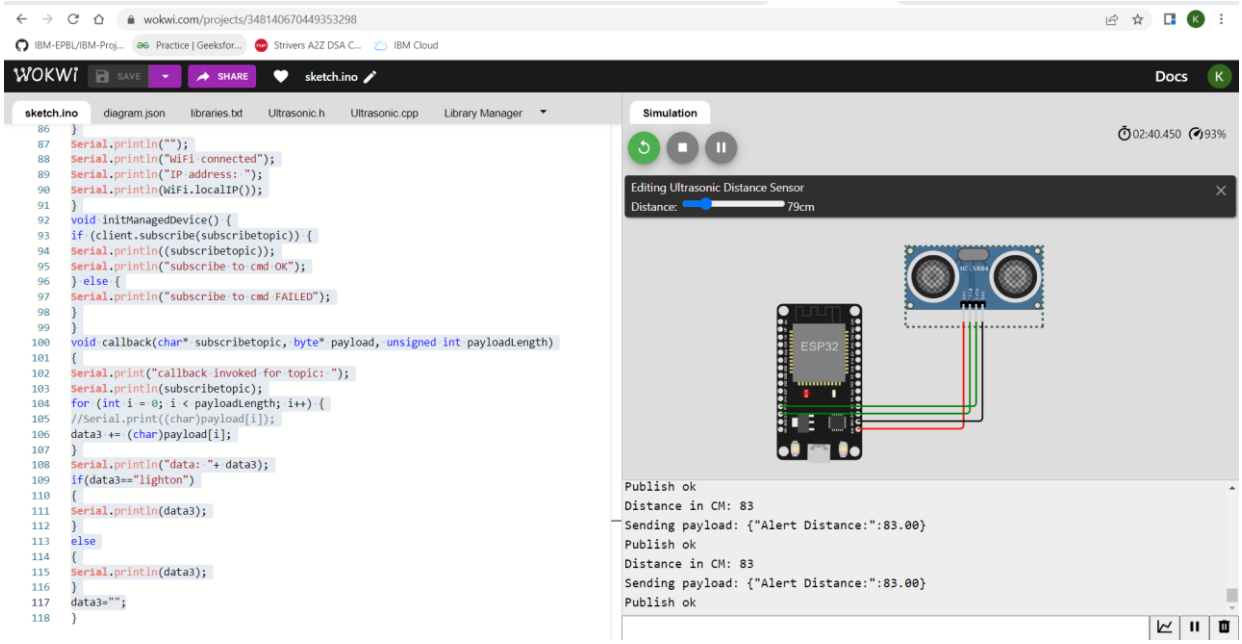
```
delay(10);
Serial.println();
wificonnect();
mqttconnect();
}
void loop()// Recursive Function
{
distance = ultrasonic.read(CM);
if(distance < 100){
Serial.print("Distance in CM: ");
Serial.println(distance);
PublishData(distance);
delay(1000);
if (!client.loop()) {
mqttconnect();
}
}
delay(1000);
}
/*.....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();
```

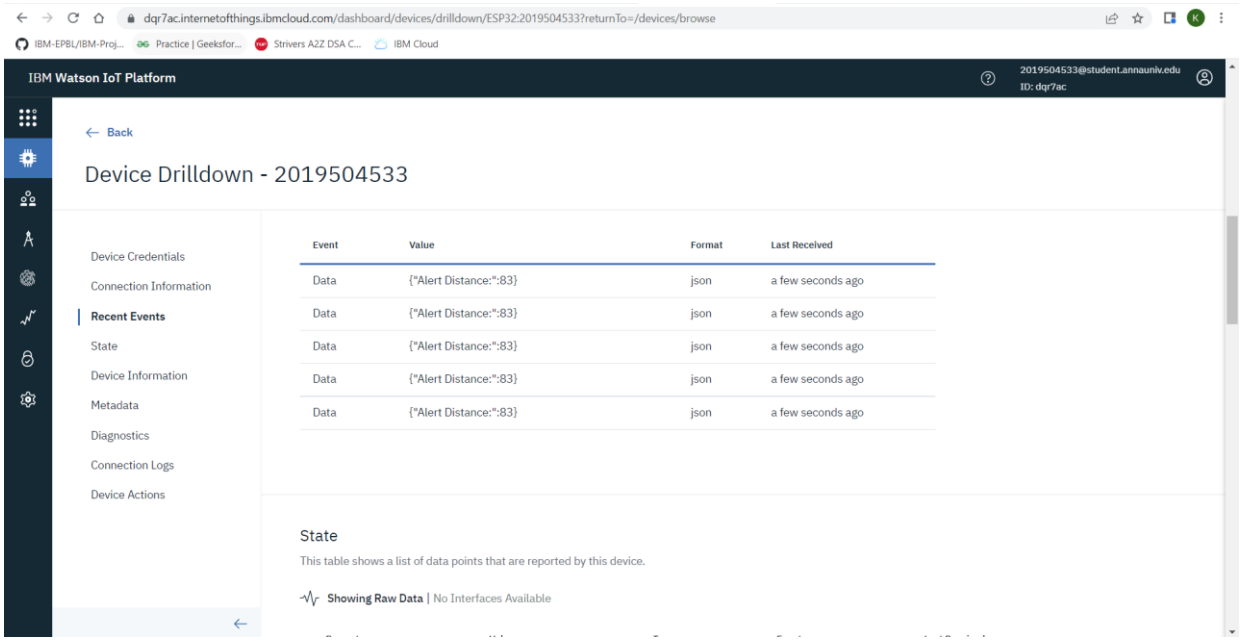
```
Serial.print("Connecting to ");
WiFi.begin("Wokwi-GUEST", "", 6);//passing the wifi credentials to establish the
connection
while (WiFi.status() != WL_CONNECTED) {
delay(500);
Serial.print(".");
}
Serial.println("");
Serial.println("WiFi connected");
Serial.println("IP address: ");
Serial.println(WiFi.localIP());
}
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="";
```

Wokwi Link:

https://wokwi.com/projects/348140670449353298

Output:


wokwi.com/projects/348140670449353298
WOKWI
SAVE
SHARE
sketch.ino
Docs
sketch.ino
diagram.json
libraries.txt
Ultrasonic.h
Ultrasonic.cpp
Library Manager
Simulation
02:40.450
93%
Editing Ultrasonic Distance Sensor
Distance:
79cm
ESP32
Publish ok
Distance in CM: 83
Sending payload: {"Alert Distance:":83.00}
Publish ok
Distance in CM: 83
Sending payload: {"Alert Distance:":83.00}
Publish ok


dqr7ac.internetofthings.ibmcloud.com/dashboard/devices/drilldown/ESP32:2019504533?returnTo=/devices/browse
IBM Watson IoT Platform
2019504533@student.annauniv.edu
ID: dqr7ac
Back
Device Drilldown - 2019504533
Device Credentials
Connection Information
Recent Events
State
Device Information
Metadata
Diagnostics
Connection Logs
Device Actions
Event
Value
Format
Last Received
Data
{"Alert Distance:":83}
json
a few seconds ago
State
This table shows a list of data points that are reported by this device.
Showing Raw Data | No Interfaces Available