Assignment -4

Assignment Date	31 October 2022
Student Name	Sukumar M
Student Roll Number	611219106077
Maximum Marks	2 Marks

Question-1:

Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100 cm send "alert" to IBM cloud and display in device recent events.

WOWKI LINK:

https://wokwi.com/projects/347013031284179538

Solution:

```
#include <WiFi.h>
#include <WiFiClient.h>
#include <PubSubClient.h>
const int trigPin = 5;
const int echoPin = 18;
//define sound speed in cm/uS
#define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701
long duration;
float distanceCm;
float distanceInch;


void callback(char* subscribetopic, byte*
payload, unsigned  int payloadLength);
 //-------credentials of IBM Accounts------

#define ORG "2jhe7w"//IBM ORGANITION ID
#define DEVICE_TYPE "Assignment-4"//Device
type mentioned in ibm watson IOT Platform
#define DEVICE_ID "SukumarID"//Device ID
mentioned in ibm watson IOT Platform
#define TOKEN "1P0au)qsZq-
U?a3KST"     //Token
String data3;



//-------- 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);

void setup() {
  Serial.begin(115200); // Starts the serial
communication
  pinMode(trigPin, OUTPUT); // Sets the
trigPin as an Output
  pinMode(echoPin, INPUT); // Sets the
echoPin as an Input
  Serial.println();
  wificonnect();
  mqttconnect();

}

void loop() {
  // Clears the trigPin
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  // Sets the trigPin on HIGH state for 10
micro seconds
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);

  // Reads the echoPin, returns the sound
wave travel time in microseconds
  duration = pulseIn(echoPin, HIGH);

  // Calculate the distance
  distanceCm = duration * SOUND_SPEED/2;

  // Convert to inches
  distanceInch = distanceCm * CM_TO_INCH;

  // Prints the distance in the Serial
Monitor
  Serial.print("Distance (cm): ");
  Serial.println(distanceCm);
```

```
  Serial.print("Distance (inch): ");
  Serial.println(distanceInch);

  PublishData(distanceCm);
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}

  void PublishData(float Cm) {
  mqttconnect();//function call for
connecting to ibm
  /*
     creating the String in in form JSon to
update the data to ibm cloud
  */
  String payload = "{\"Distance (cm)\":";
  payload += Cm;
  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
```

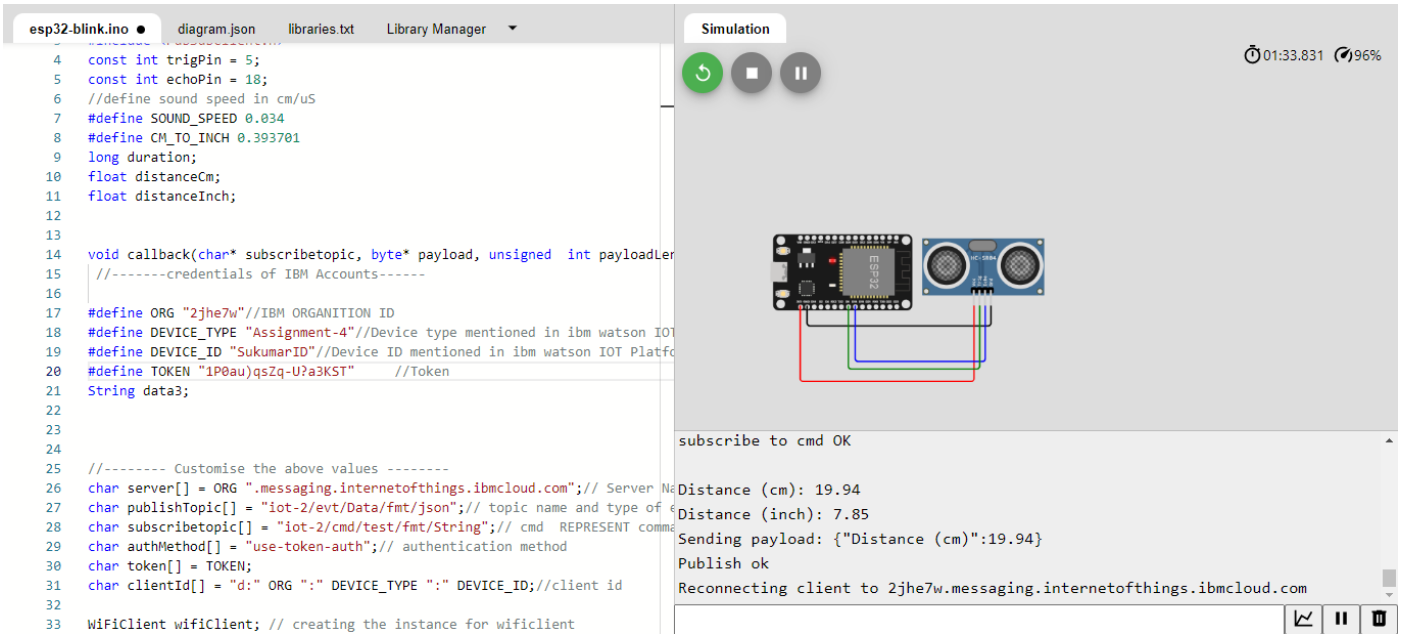
```
{
  Serial.println();
  Serial.print("Connecting to ");

  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];
  }
}
```

Output:


esp32-blink.ino
diagram.json
libraries.txt
Library Manager
Simulation
01:33.831
96%
const int trigPin = 5;
const int echoPin = 18;
//define sound speed in cm/uS
#define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701
long duration;
float distanceCm;
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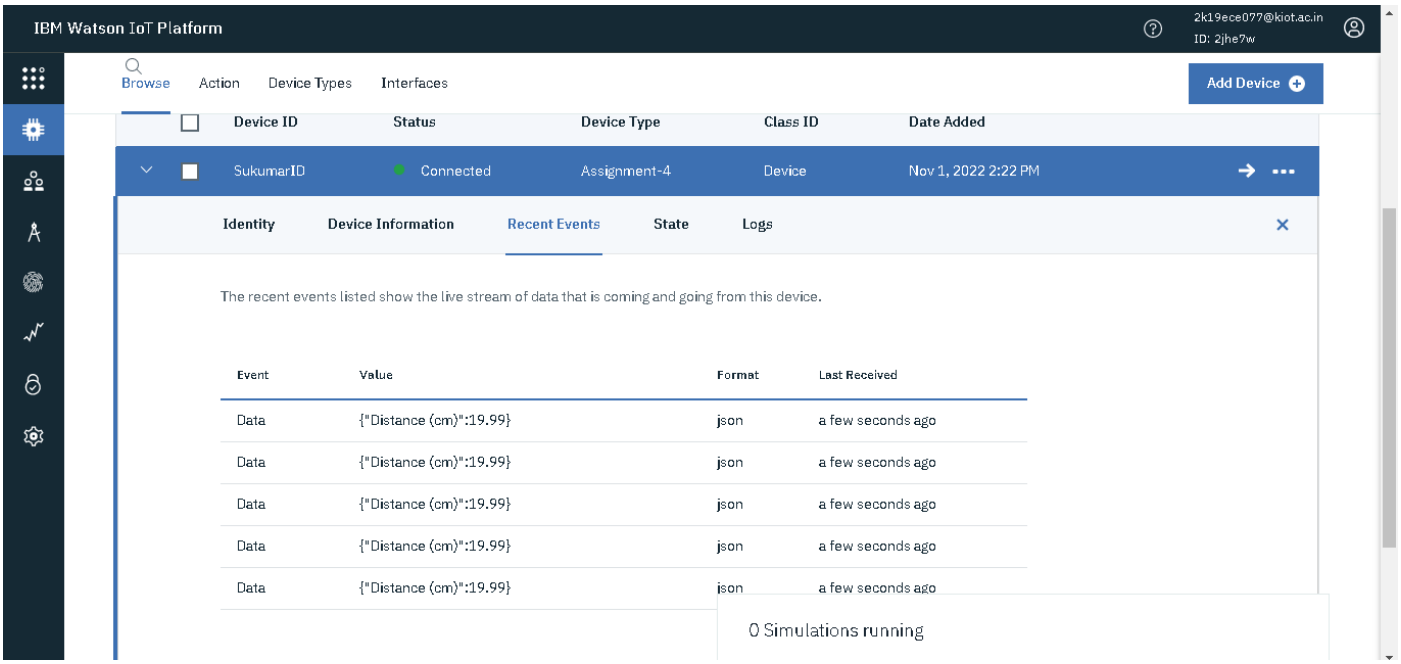
void callback(char* subscribetopic, byte* payload, unsigned int payloadLen
//-------credentials of IBM Accounts------
#define ORG "2jhe7w"//IBM ORGANITION ID
#define DEVICE_TYPE "Assignment-4"//Device type mentioned in ibm watson IOT
#define DEVICE_ID "SukumarID"//Device ID mentioned in ibm watson IOT Platfo
#define TOKEN "1P0au)qsZq-U?a3KST" //Token
String data3;
//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Server Na
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and type of e
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT comma
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
subscribe to cmd OK
Distance (cm): 19.94
Distance (inch): 7.85
Sending payload: {"Distance (cm)":19.94}
Publish ok
Reconnecting client to 2jhe7w.messaging.internetofthings.ibmcloud.com


IBM Watson IoT Platform
2k19ece077@kiot.ac.in
ID: 2jhe7w
Browse
Action
Device Types
Interfaces
Add Device
Device ID
Status
Device Type
Class ID
Date Added
SukumarID
Connected
Assignment-4
Device
Nov 1, 2022 2:22 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 (cm)":19.99}
json
a few seconds ago
0 Simulations running