Assignment - 4

ESP 32 - Ultrasonic Sensor

Assignment Date	3 NOVEMBER 2022
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Maximum Marks	2 Marks

Question-1:

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

Solution:

Program:

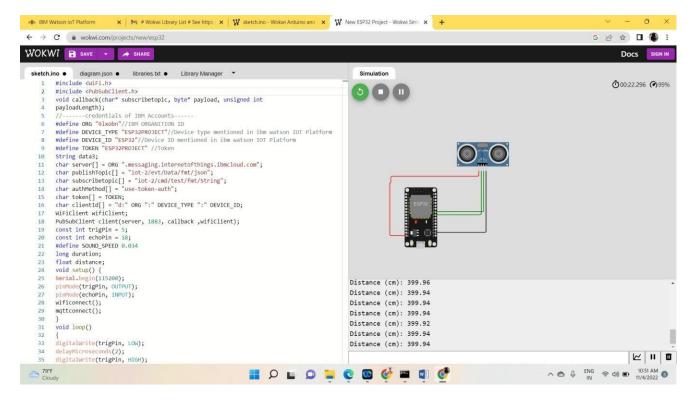
```
#include <WiFi.h>
#include <WiFiClient.h>
#include <PubSubClient.h>
const int trigPin = 5;
const int echoPin = 18;
//define sound speed in cm/uS
#define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701
long duration;
float distanceCm;
float distanceInch;
void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//----credentials of IBM Accounts-----
#define ORG "b31tni"//IBM ORGANITIONID
#define DEVICE TYPE "Assignment4"//Device type mentioned in ibm watson IOT
#define DEVICE_ID "assignment"//Device ID mentioned in ibm watson IOT
Platform#define TOKEN "6r?TKCIuy+okJ?9B+7" //Token
String data3;
//----- Customise theabove 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 cmdFAILED");
  }
}
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++) {</pre>
    //Serial.print((char)payload[i]);
    data3 += (char)payload[i];
  }
}
```

Wokwi Simulation:



IoT Watson Platform:

