PROBLEM STATEMENT :

REAL TIME RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM

DOMAIN :

Internet of Things

ASSIGNMENT 4:

Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events. Upload document with wokwi share link and images of IBM cloud

By,

POONGUNDRAN G
MOHAMED ASHARAF M
NAVEENKUMAR T
NIKIL V

Question-1:

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.

WOKWI LINK:

https://wokwi.com/projects/347932283905245780

CODE:

```
#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 " ddc8ue"//IBM ORGANITION ID

#define DEVICE_TYPE "esp32"//Device type mentioned in ibm
watson IOT Platform

#define DEVICE_ID "POONGUNDRAN"//Device ID mentioned
in ibmwatson IOT Platform

#define TOKEN "9361336050"    //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);
```

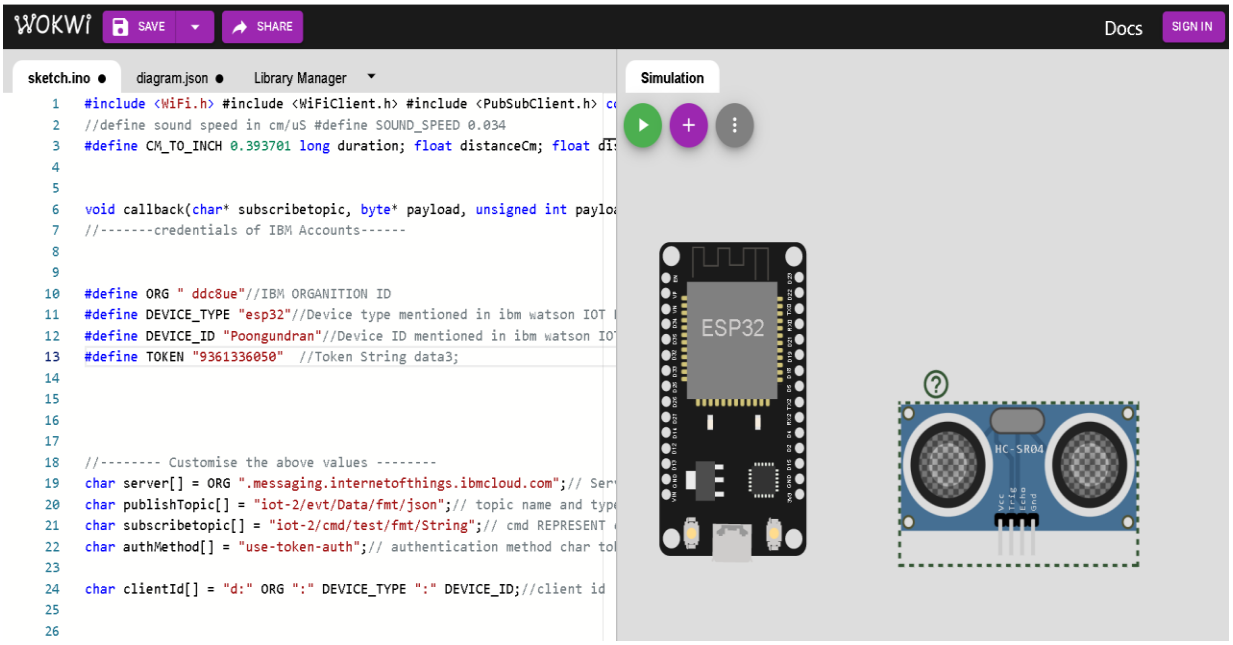
```
  // Reads the echoPin, returns the sound wave travel time in
microseconds
  duration = pulseIn(echoPin, HIGH);

  // 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:


WOKWi
SAVE
SHARE
Docs
SIGN IN
sketch.ino
diagram.json
Library Manager
Simulation
#include <WiFi.h> #include <WiFiClient.h> #include <PubSubClient.h>
//define sound speed in cm/uS #define SOUND_SPEED 0.034
#define CM_TO_INCH 0.393701 long duration; float distanceCm; float
void callback(char* subscribetopic, byte* payload, unsigned int
//-------credentials of IBM Accounts------
#define ORG " ddc8ue"//IBM ORGANITION ID
#define DEVICE_TYPE "esp32"//Device type mentioned in ibm watson IOT
#define DEVICE_ID "Poongundran"//Device ID mentioned in ibm watson IO
#define TOKEN "9361336050" //Token String data3;
//-------- Customise the above values --------
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";// Ser
char publishTopic[] = "iot-2/evt/Data/fmt/json";// topic name and typ
char subscribetopic[] = "iot-2/cmd/test/fmt/String";// cmd REPRESENT
char authMethod[] = "use-token-auth";// authentication method char to
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id
ESP32
HC-SR04

Watson iot connected: