NAAN MUDHALVAN-IBM
ASSIGNMENT 3

TRACK - IOT
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TOPIC- Build wowki product, use ultrasonic sensor and detect the distance from the object. Whenever distance is less than 100cms upload the value to the ibm cloud.in recent device events upload the data from wokwi.

Wokwi - https://wokwi.com/projects/364258488383044609

PROGRAM:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#define ECHO_PIN 5
#define TRIG_PIN 4
const int LED = 13;

void callback(char* subscribetopic, byte* payload, unsigned int payloadLength);

//-------credentials of IBM Accounts------

#define ORG "etuanl"//IBM ORGANITION ID
#define DEVICE_TYPE "acbd"//Device type mentioned in ibm watson IOT
      Platform
#define DEVICE_ID "1234"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "12345678"//Token
String data3;
float distance;


//-------- 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);
  pinMode(LED, OUTPUT);
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);
  wificonnect();
  mqttconnect();
}
float readDistanceCM() {
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);
  int duration = pulseIn(ECHO_PIN, HIGH);
  return duration * 0.034 / 2;
}


void loop()// Recursive Function
{

 float distance = readDistanceCM();

  bool isNearby = distance < 100;
  digitalWrite(LED, isNearby);

  Serial.print("Measured distance: ");
  Serial.println(readDistanceCM());

  delay(100);
  if(distance<=100.00)
  {
  PublishData(distance);
  }
  delay(1000);
  if (!client.loop()) {
    mqttconnect();
  }
}
/*.....retrieving to Cloud.....*/
```

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

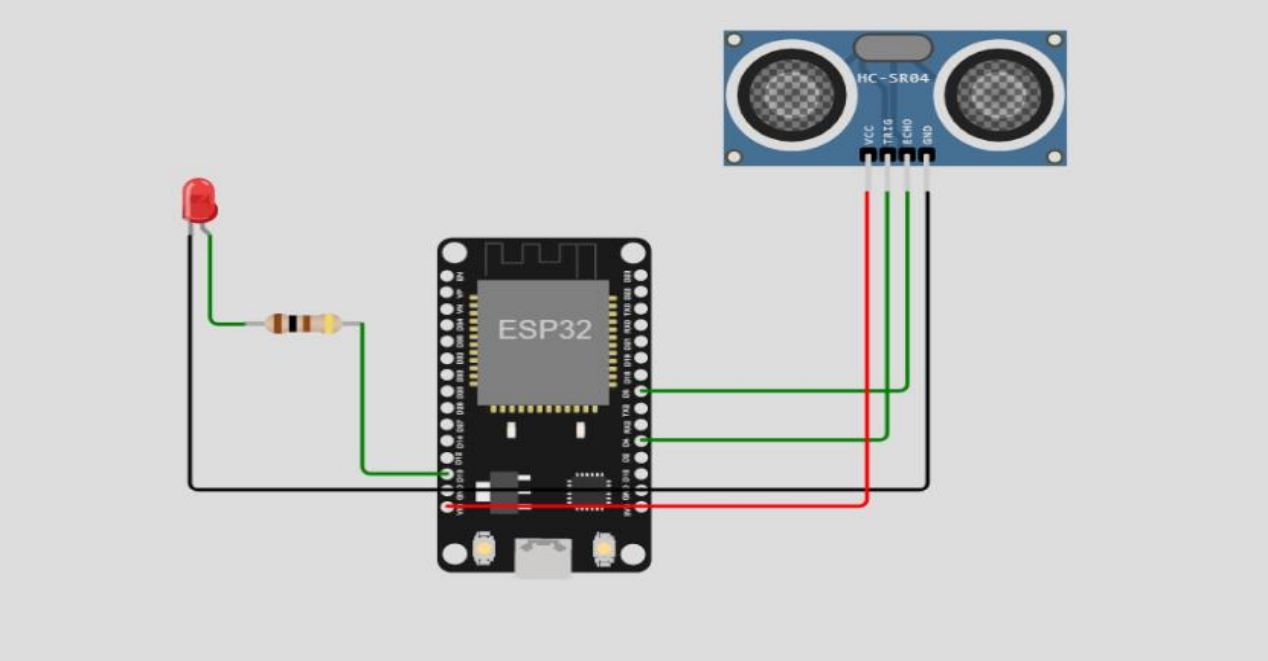
```
  }
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
}

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);
digitalWrite(LED,HIGH);
  }
  else
  {
Serial.println(data3);
digitalWrite(LED,LOW);
  }
data3="";
}
```

SIMULATION:



SIMULATION OUTPUT :

Measured distance: 88.98

Sending payload: {"distance":88.96}

Publish ok

Measured distance: 88.98

Sending payload: {"distance":88.96}

Publish ok

Measured distance: 88.98

Sending payload: {"distance":88.96}

Publish ok

Measured distance: 88.98

Sending payload: {"distance":88.96}

Publish ok

Measured distance: 89.03

Sending payload: {"distance":88.96}

Publish ok

Measured distance: 193.95

Measured distance: 193.95

Measured distance: 4.98

Sending payload: {"distance":4.98}

Publish ok

Measured distance: 4.98

Sending payload: {"distance":4.98}

Publish ok

Measured distance: 4.98

Sending payload: {"distance":4.98}

Publish ok

Measured distance: 4.98

Sending payload: {"distance":4.98}

Publish ok

Measured distance: 399.99

IBM CLOUD: