

Assignment -4
Python Programming

Assignment Date	25 October 2022
Student Name	K Midhun Surya Kalyan
Student Roll Number	110719104028
Maximum Marks	2 Marks

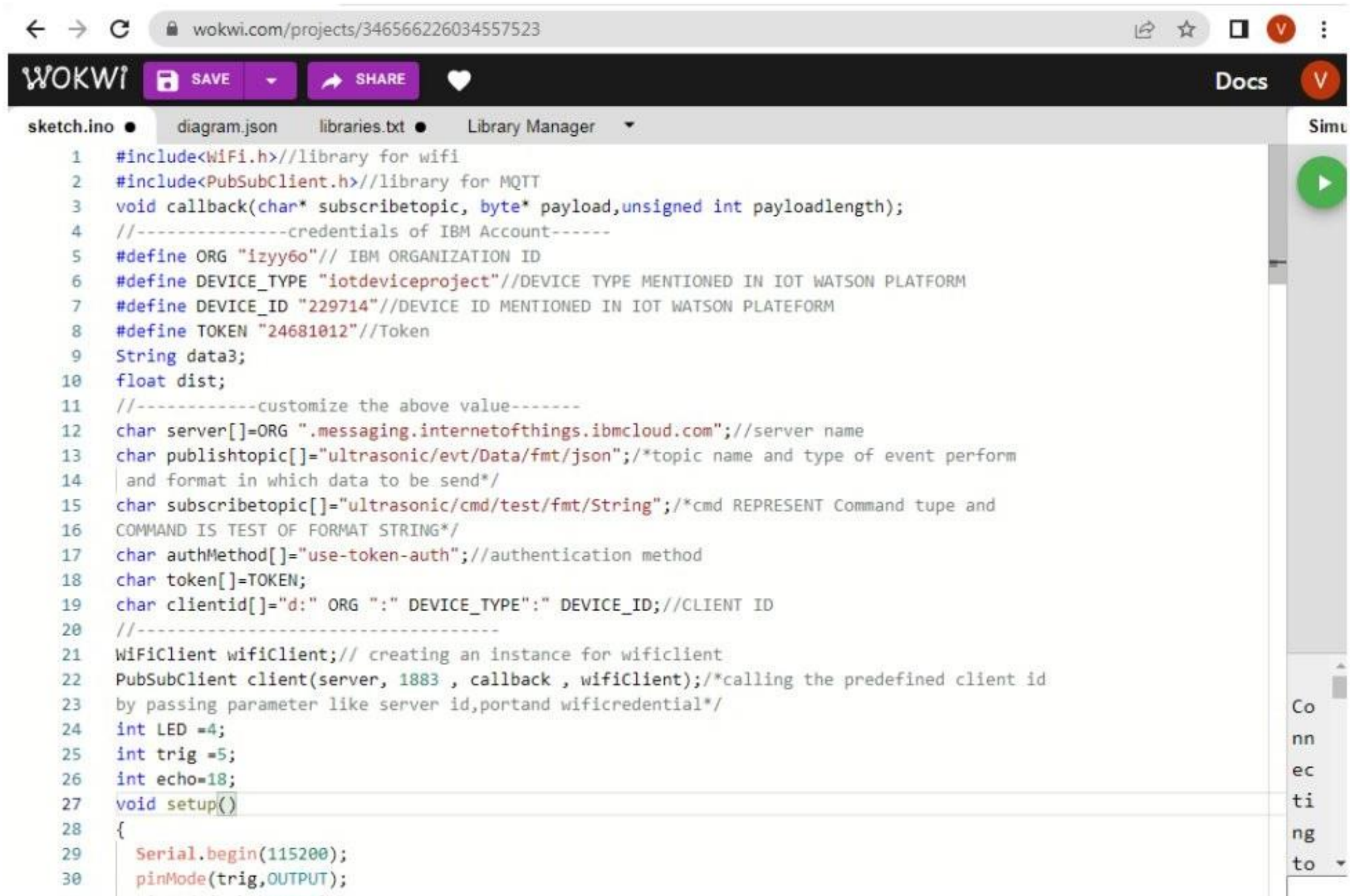
Question-1:

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.

Upload document with wokwi share link and images of ibm cloud

Solution:



```
1 #include<WiFi.h>//library for wifi
2 #include<PubSubClient.h>//library for MQTT
3 void callback(char* subscribetopic, byte* payload,unsigned int payloadlength);
4 //-----credentials of IBM Account-----
5 #define ORG "izyy6o"// IBM ORGANIZATION ID
6 #define DEVICE_TYPE "iotdeviceproject"//DEVICE TYPE MENTIONED IN IOT WATSON PLATFORM
7 #define DEVICE_ID "229714"//DEVICE ID MENTIONED IN IOT WATSON PLATFORM
8 #define TOKEN "24681012"//Token
9 String data3;
10 float dist;
11 //-----customize the above value-----
12 char server[]=ORG ".messaging.internetofthings.ibmcloud.com";//server name
13 char publishtopic[]="ultrasonic/evt/Data/fmt/json";/*topic name and type of event perform
14 |and format in which data to be send*/
15 char subscribetopic[]="ultrasonic/cmd/test/fmt/String";/*cmd REPRESENT Command tupe and
16 COMMAND IS TEST OF FORMAT STRING*/
17 char authMethod[]="use-token-auth";//authentication method
18 char token[]=TOKEN;
19 char clientid[]="d:" ORG ":" DEVICE_TYPE":" DEVICE_ID;//CLIENT ID
20 //-----
21 WiFiClient wificlient;// creating an instance for wificlient
22 PubSubClient client(server, 1883 , callback , wificlient);/*calling the predefined client id
23 by passing parameter like server id,portand wificredential*/
24 int LED =4;
25 int trig =5;
26 int echo=18;
27 void setup()
28 {
29   Serial.begin(115200);
30   pinMode(trig,OUTPUT);
31 }
```

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libraries.txt

Library Manager

31

pinMode(echo,INPUT);

32

pinMode(LED,OUTPUT);

33

delay(10);

34

wificonnect();

35

mqttconnect();

36

}

37

void loop()//recursive function

38

{

39

digitalWrite(trig,LOW);

40

digitalWrite(trig,HIGH);

41

delayMicroseconds(10);

42

digitalWrite(trig,LOW);

43

float dur=pulseIn(echo,HIGH);

44

float dist=(dur * 0.0343)/2;

45

Serial.print("distance in cm");

46

Serial.println(dist);

47

PublishData(dist);

48

delay(1000);

49

if (!client.loop()){

50

mqttconnect();

51

}

52

}

53

/*.....retriving to cloud.....*/

54

void PublishData(float dist){

55

mqttconnect();//function call for connecting to ibm

56

/*creating the string in form of JSON to update the data to ibm cloud*/

57

String object;

58

if(dist<100)

59

{

60

digitalWrite(LED,HIGH);

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Library Manager

61

Serial.println("no object is near");

62

object="Near";

63

}

64

else

65

{

66

digitalWrite(LED,LOW);

67

Serial.println("no object found");

68

object="No";

69

}

70

String payload="{\"distance\":";

71

payload +=dist;

72

payload +=",\" \"object\":\":";

73

payload += object;

74

payload += "\":";

75

}

76

Serial.print("Sending payload: ");

77

Serial.println(payload);

78

if(client.publish(publishtopic, (char*) payload.c_str())){

79

Serial.println("Publish ok");/* if its sucessfully upload data on the cloud then it will print

80

publish ok in serial monitor or else it will print publish failed*/

81

} else{

82

Serial.println("Publish failed");

83

}

84

}

85

void mqttconnect(){

86

if(!client.connected()){

87

Serial.print("Reconnecting client to ");

88

Serial.println(server);

89

while(!client.connect(clientid,authMethod, token)){

90

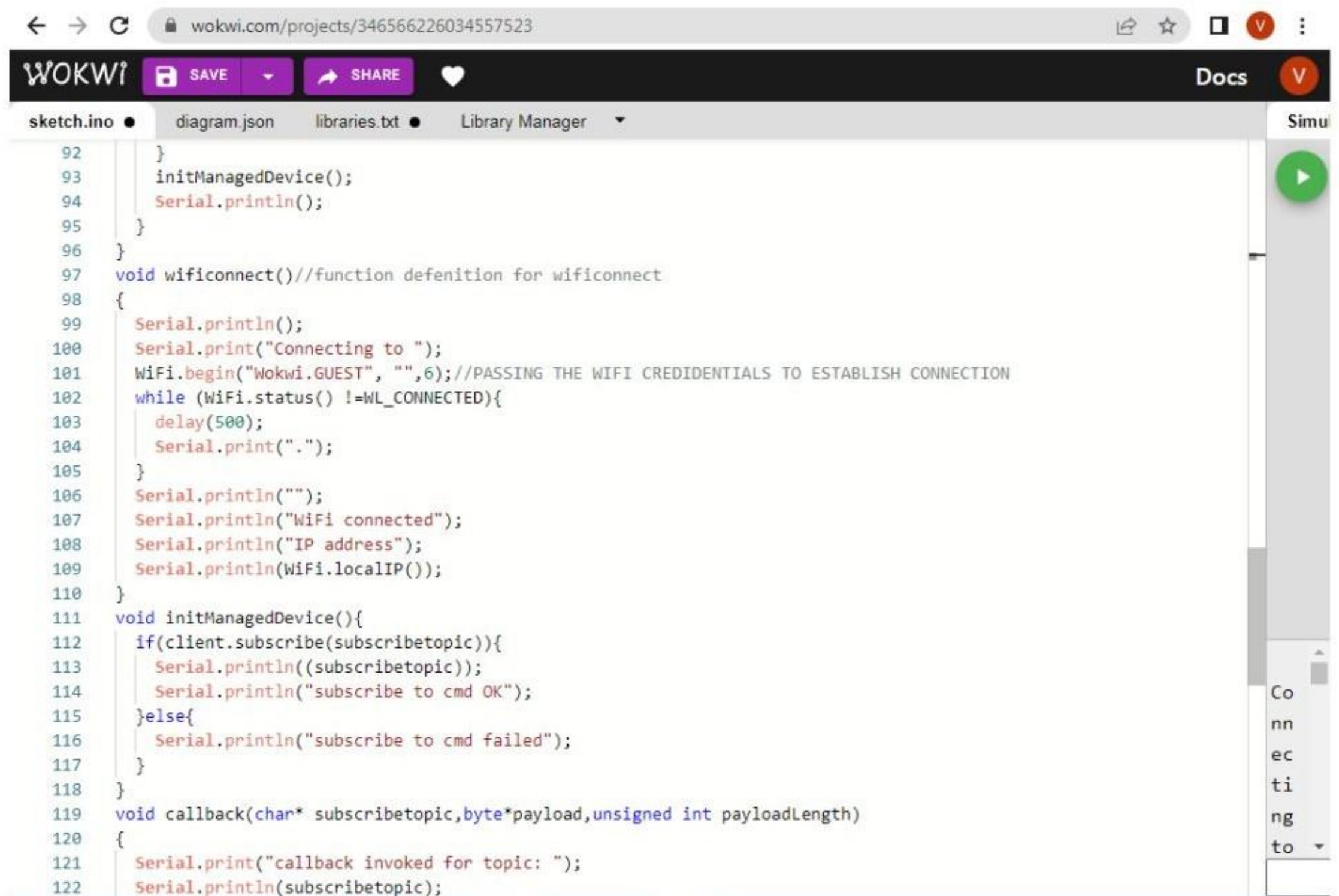
Serial.print(".");

91

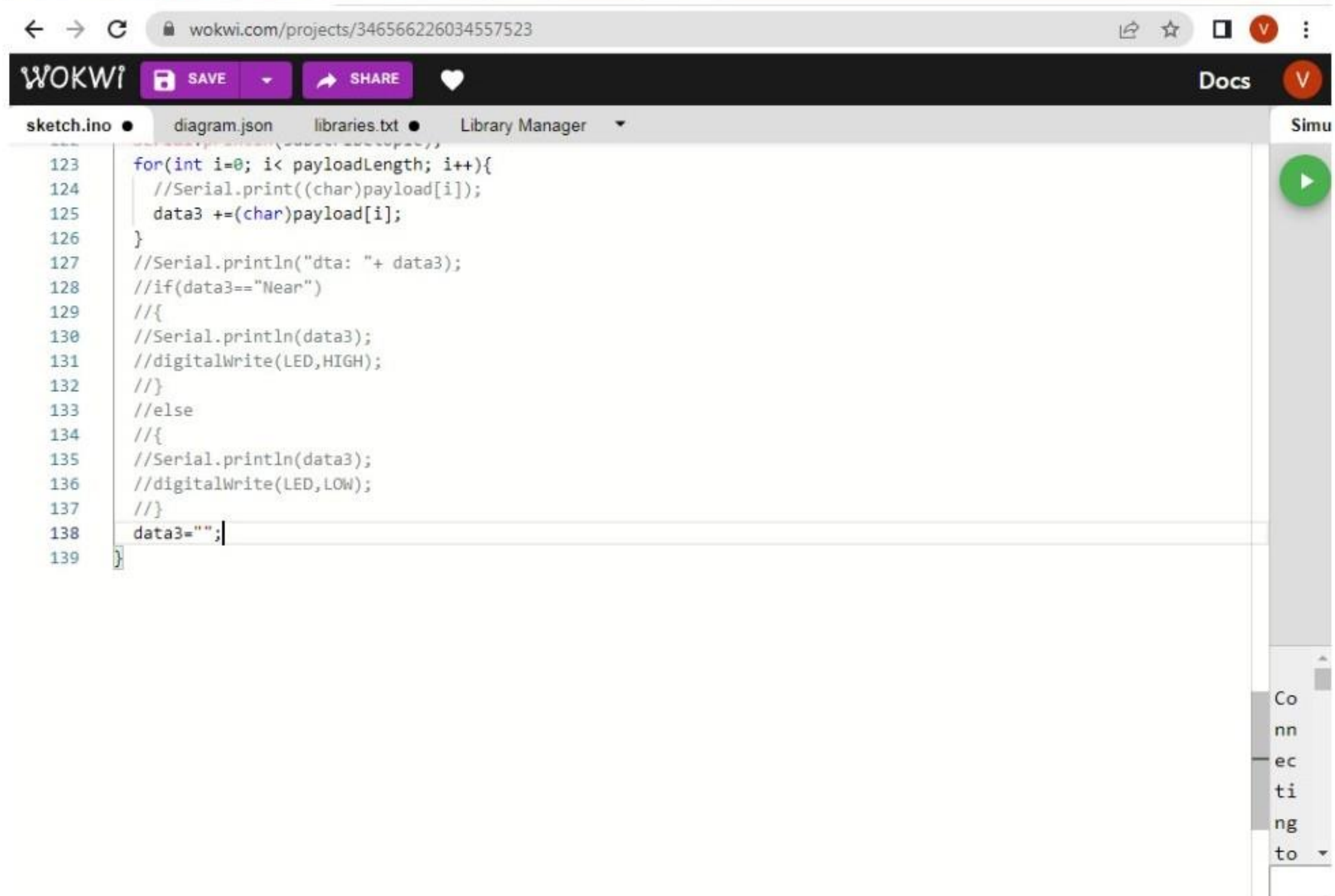
delay(500);

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```
92     }
93     initManagedDevice();
94     Serial.println();
95 }
96 }
97 void wificonnect();//function defenition for wificonnect
98 {
99     Serial.println();
100    Serial.print("Connecting to ");
101    WiFi.begin("Wokwi.GUEST", "",6);//PASSING THE WIFI CREDENTIALS TO ESTABLISH CONNECTION
102    while (WiFi.status() !=WL_CONNECTED){
103        delay(500);
104        Serial.print(".");
105    }
106    Serial.println("");
107    Serial.println("Wifi connected");
108    Serial.println("IP address");
109    Serial.println(WiFi.localIP());
110 }
111 void initManagedDevice(){
112     if(client.subscribe(subscribetopic)){
113         Serial.println((subscribetopic));
114         Serial.println("subscribe to cmd OK");
115     }else{
116         Serial.println("subscribe to cmd failed");
117     }
118 }
119 void callback(char* subscribetopic,byte*payload,unsigned int payloadLength)
120 {
121     Serial.print("callback invoked for topic: ");
122     Serial.println(subscribetopic);
```



```
123     for(int i=0; i< payloadLength; i++){
124         //Serial.print((char)payload[i]);
125         data3 +=(char)payload[i];
126     }
127     //Serial.println("dta: "+ data3);
128     //if(data3=="Near")
129     //{
130     //Serial.println(data3);
131     //digitalWrite(LED,HIGH);
132     //}
133     //else
134     //{
135     //Serial.println(data3);
136     //digitalWrite(LED,LOW);
137     //}
138     data3="";
139 }
```

OUTPUT:

DATA IS SENT TO IBM CLOUD WHEN NO OBJECT IS DETECTED

Browse
Action
Device Types
Interfaces
Add Device

DISTANCEDETECT
Disconnected
ULTRASON
Device
Oct 20, 2022 9:46 AM

Identity
Device Information
Recent Events
State
Logs

This table lists events in the order they were received. It lists the payload and the time it was received.

Event	Value	Format	Last Received
Data	{ "distance": 79.66, "object": "Near" }	json	a few seconds ago
Data	{ "distance": 79.64, "object": "Near" }	json	a few seconds ago
Data	{ "distance": 79.66, "object": "Near" }	json	a few seconds ago
Data	{ "distance": 79.64, "object": "Near" }	json	a few seconds ago
Data	{ "distance": 79.66, "object": "Near" }	json	a few seconds ago

Items per page: 50
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1 of 1 page
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When no object is detected

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sketch.ino
diagram.json
libraries.txt

Library Manager

```

1 #include<WiFi.h>//library for wifi
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3 void callback(char* subscribetopic, byte
4 //-----credentials of IBM Account
5 #define ORG "izyy6o"// IBM ORGANIZATION
6 #define DEVICE_TYPE "iotdeviceproject"//
7 #define DEVICE_ID "229714"//DEVICE ID ME
8 #define TOKEN "24681012"//Token
9 String data3;
10 float dist;
11 //-----customize the above values
12 char server[]=ORG ".messaging.internetof
13 char publishtopic[]="ultrasonic/evt/Data
14 |and format in which data to be send*/
15 char subscribetopic[]="ultrasonic/cmd/te
16 COMMAND IS TEST OF FORMAT STRING*/
17 char authMethod[]="use-token-auth";//aut
18 char token[]=TOKEN;
19 char clientid[]="d:" ORG ":" DEVICE_TYPE
20 //-----
21 WiFiClient wifiClient;// creating an ins
22 PubSubClient client(server, 1883 , callb
23 by passing parameter like server id,port
24 int LED =4;
25 int trig =5;
26 int echo=18;
27 void setup()
28 {
29   Serial.begin(115200);
30   pinMode(LED, OUTPUT);
31   pinMode(trig, OUTPUT);
32   pinMode(echo, INPUT);
33 }
34 void loop()
35 {
36   digitalWrite(trig, HIGH);
37   delay(10);
38   digitalWrite(trig, LOW);
39   delay(10);
40   int duration = pulseIn(echo, HIGH);
41   float distance = duration * 0.034 / 2;
42   if (distance < 200) {
43     digitalWrite(LED, HIGH);
44     Serial.print("Distance in cm:");
45     Serial.print(distance);
46     Serial.println();
47     String payload = "{"distance": " + distance + ", "object": "Near"}";
48     client.publish(publishtopic, payload);
49     Serial.println("Publish ok");
50   } else {
51     digitalWrite(LED, LOW);
52     Serial.println("no object found");
53     String payload = "{"distance": " + distance + ", "object": "No"}";
54     client.publish(publishtopic, payload);
55     Serial.println("Publish ok");
56   }
57   delay(1000);
58 }

```

Simulation

```

no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok
Distance in cm141.21
no object found
Sending payload: {"distance":141.21,"object":"No"}
Publish ok

```

Data is sent to ibm cloud when object is detected

Browse
Action
Device Types
Interfaces
Add Device

DISTANCEDETECT
Disconnected
ULTRASON
Device
Oct 20, 2022 9:46 AM

Identity
Device Information
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This table lists events that are sent by the device. It lists the type of event, the value, the format, and the time it was received.

Event	Value	Format	Last Received
Data	["distance":79.66,"object":"Near"]	json	a few seconds ago
Data	["distance":79.64,"object":"Near"]	json	a few seconds ago
Data	["distance":79.66,"object":"Near"]	json	a few seconds ago
Data	["distance":79.64,"object":"Near"]	json	a few seconds ago
Data	["distance":79.66,"object":"Near"]	json	a few seconds ago

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When object is detected in ultrasonic detector

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sketch
Simulation
diagram
library
Libraries Manager

```

1 object is near
1 Sending payload: {"distance":97.82,"object":"Near"}
1 Publish ok
1 Distance in cm 97.82
2 object is near
2 Sending payload: {"distance":97.82,"object":"Near"}
2 Publish ok

```