Assignment -4

ESP32 Programming with IBM Cloud

Question-1:

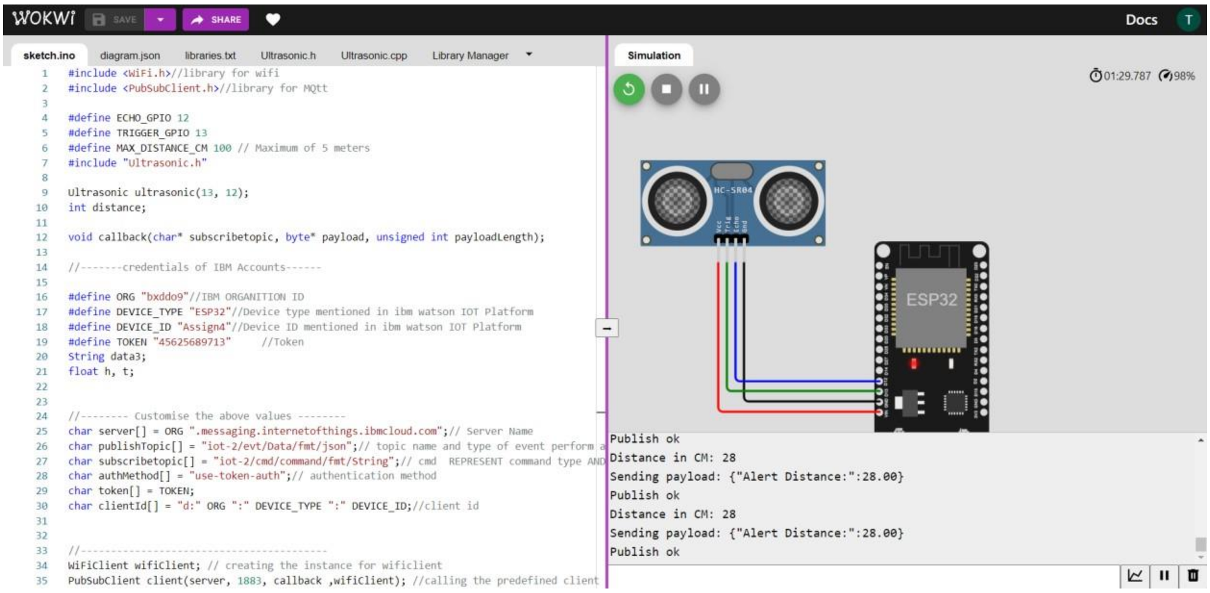
Write code and connections in wokwi for ultrasonic sensor. Whenever distance is less than 100cms send “alert” to ibm cloud and display in device recent events.

Upload document with wokwi share link and images of ibm cloud.

Solution:

```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt

#define ECHO_GPIO 12
#define TRIGGER_GPIO 13
#define MAX_DISTANCE_CM 100 // Maximum of 5 meters
#include "Ultrasonic.h"

Ultrasonic ultrasonic(13, 12); int
distance;
 void callback(char* subscribetopic, byte* payload, unsigned int
payloadLength);
//-------credentials of IBM Accounts------

#define ORG "bxddo9"//IBM ORGANITION ID
#define DEVICE_TYPE "ESP32"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "Assign4"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "45625689713"     //Token
String data3; float h, t;

//-------- 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);
delay(10);   Serial.println();
wificonnect();
mqttconnect();
}  void loop()// Recursive
Function
{    distance =
ultrasonic.read(CM);
if(distance < 100){
  Serial.print("Distance in CM: ");
  Serial.println(distance);
PublishData(distance);
delay(1000);   if
(!client.loop()) {
mqttconnect();
  }
  }
  delay(1000);



}

/*.....................................retrieving to Cloud...............................*/
 void PublishData(float temp) {
mqttconnect();//function call for connecting to ibm
  /*      creating the String in in form JSon to update the data to ibm
cloud   */
  String payload = "{\"Alert Distance:\":";
payload += temp;   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);
  }
else
  {
Serial.println(data3);
  } data3="";
}
```



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char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id


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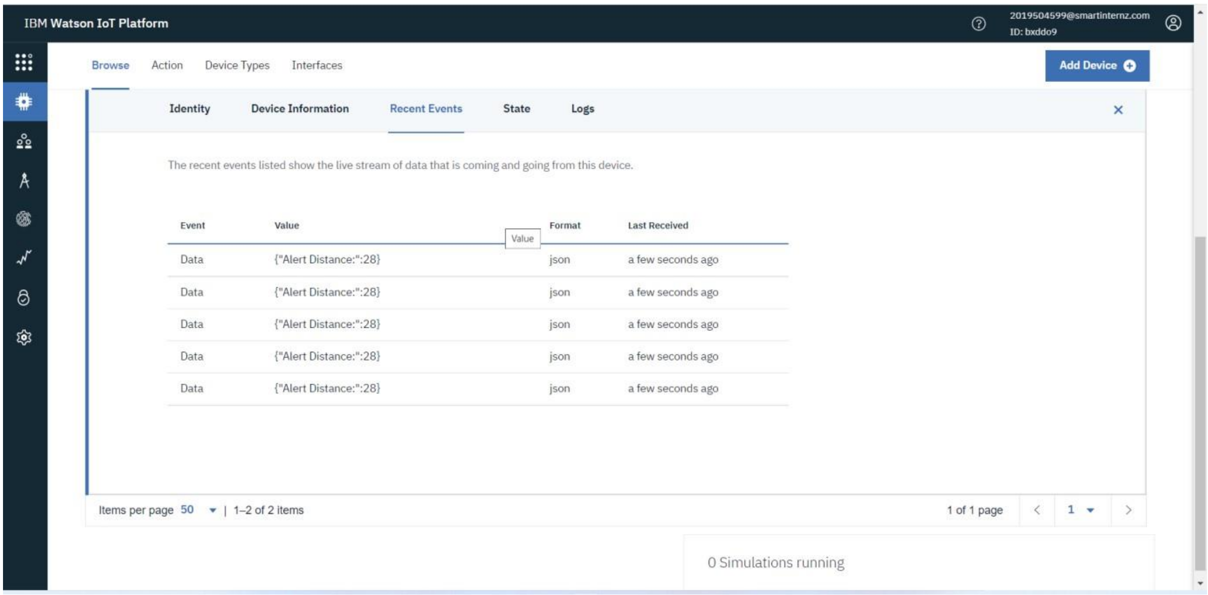
```

```
Publish ok
Distance in CM: 28
Sending payload: {"Alert Distance:":28.00}
Publish ok
Distance in CM: 28
Sending payload: {"Alert Distance:":28.00}
Publish ok
```



The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"Alert Distance:":28}	json	a few seconds ago
Data	{"Alert Distance:":28}	json	a few seconds ago
Data	{"Alert Distance:":28}	json	a few seconds ago
Data	{"Alert Distance:":28}	json	a few seconds ago
Data	{"Alert Distance:":28}	json	a few seconds ago

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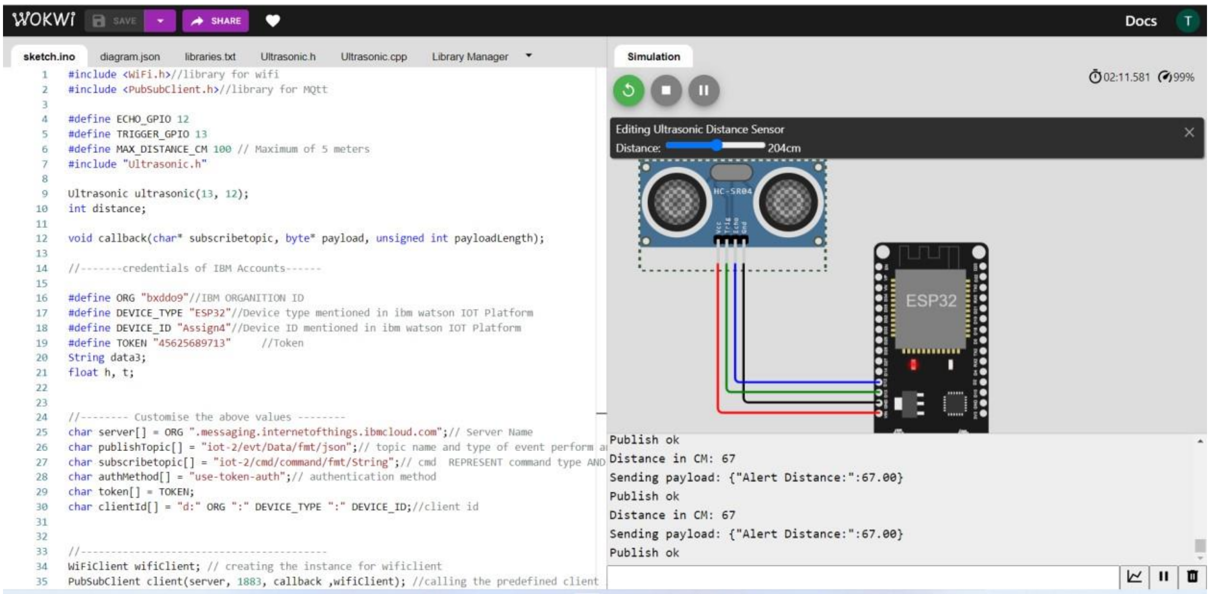

Editing Ultrasonic Distance Sensor
Distance: 204cm

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```
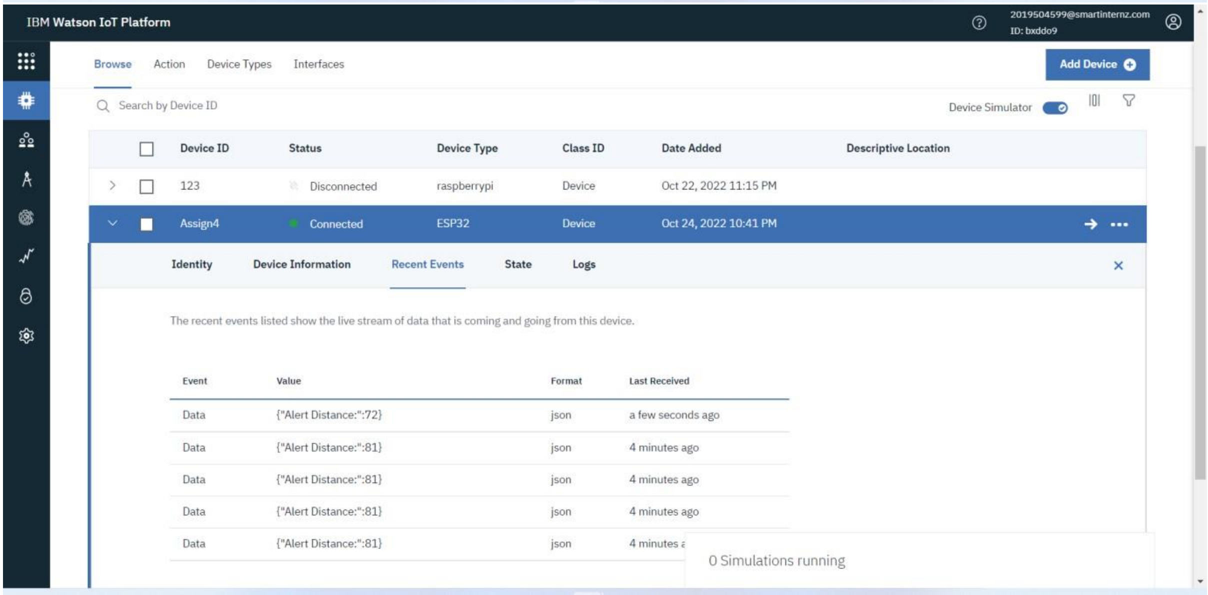

```
Publish ok
Distance in CM: 67
Sending payload: {"Alert Distance:":67.00}
Publish ok
Distance in CM: 67
Sending payload: {"Alert Distance:":67.00}
Publish ok
```



Device ID	Status	Device Type	Class ID	Date Added	Descriptive Location
123	Disconnected	raspberrypi	Device	Oct 22, 2022 11:15 PM	
Assign4	Connected	ESP32	Device	Oct 24, 2022 10:41 PM	

The recent events listed show the live stream of data that is coming and going from this device.

Event	Value	Format	Last Received
Data	{"Alert Distance:":72}	json	a few seconds ago
Data	{"Alert Distance:":81}	json	4 minutes ago
Data	{"Alert Distance:":81}	json	4 minutes ago
Data	{"Alert Distance:":81}	json	4 minutes ago
Data	{"Alert Distance:":81}	json	4 minutes a

Wokwi share link:
https://wokwi.com/projects/346679444402757460