ASSIGNMENT – 4

SMARTFARMER – IOT ENABLED SMART FARMING APPLICATION

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Question-1:

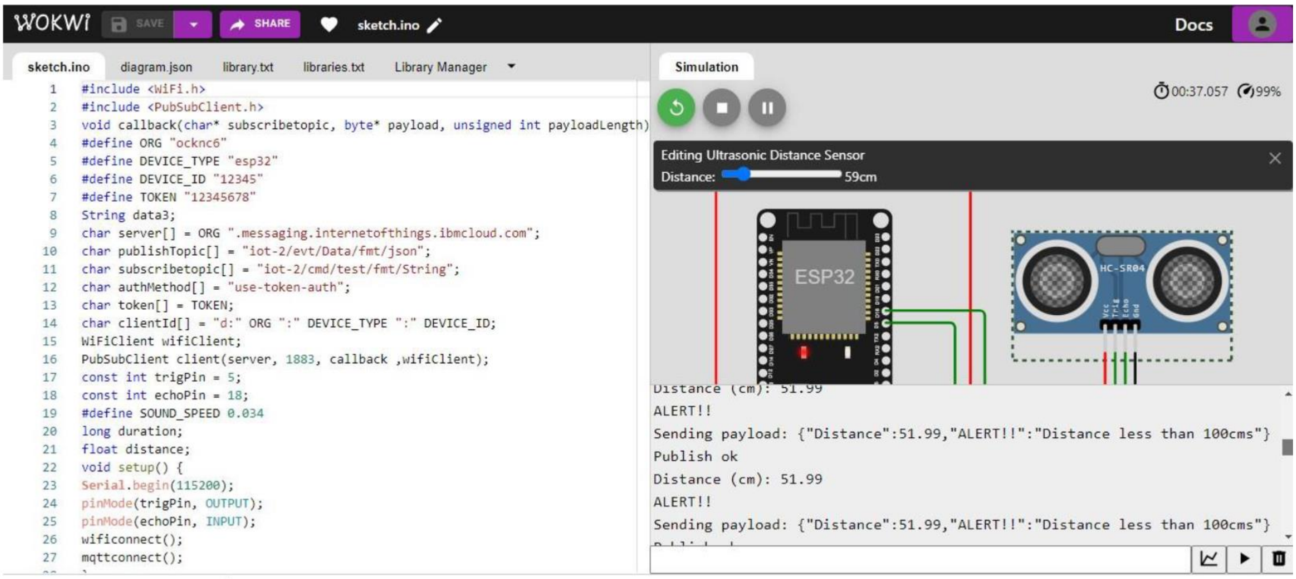
Write code and connections in wokwi for the ultrasonic sensor. Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events. Upload document with wokwi share link and images of IBM cloud

CODE 1 :

```
  #include <WiFi.h>
  #include <PubSubClient.h>   void callback(char* subscribetopic, byte* payload,
unsigned int payloadLength);
   #define ORG "ocknc6"
  #define DEVICE_TYPE "esp32"
  #define DEVICE_ID "12345"
  #define TOKEN "12345678" String data3; char server[] = ORG
  ".messaging.internetofthings.ibmcloud.com"; char publishTopic[]
  = "iot-2/evt/Data/fmt/json"; char subscribetopic[] = "iot-
  2/cmd/test/fmt/String"; char authMethod[] = "use-token-auth";
  char token[] = TOKEN; char clientId[] = "d:" ORG ":"
  DEVICE_TYPE ":" DEVICE_ID;
  WiFiClient wifiClient;
  PubSubClient client(server, 1883, callback ,wifiClient);
  const int trigPin = 5; const int echoPin = 18; #define
  SOUND_SPEED 0.034 long duration; float distance; void
  setup() { Serial.begin(115200); pinMode(trigPin,
  OUTPUT); pinMode(echoPin, INPUT); wificonnect();
  mqttconnect();
  }
  void loop()
  {
  digitalWrite(trigPin,          LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin,         HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW); duration
  = pulseIn(echoPin, HIGH); distance =
  duration * SOUND_SPEED/2;
  Serial.print("Distance (cm): ");
  Serial.println(distance); if(distance<100)
  {
  Serial.println("ALERT!!"); delay(1000);
  PublishData(distance);
  delay(1000); if
  (!client.loop()) {
  mqttconnect();
  } }
  delay(1000);
  }
  void PublishData(float dist) {
  mqttconnect();
String payload = "{\"Distance\":"; payload += dist;
payload += ",\"ALERT!!\":""\"Distance less than 100cms\"";
payload += "}";
Serial.print("Sending payload: ");
Serial.println(payload);

if (client.publish(publishTopic, (char*) payload.c_str())) {
Serial.println("Publish ok");
} 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()
{
Serial.println();
Serial.print("Connecting     to     ");
WiFi.begin("Wokwi-GUEST", "", 6); 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++)
{
data3 += (char)payload[i];
}
Serial.println("data: "+ data3); data3="";
}
```

Output and Simulation :



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#define ORG "ocknc6"
#define DEVICE_TYPE "esp32"
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String data3;
char server[] = ORG ".messaging.internetofthings.ibmcloud.com";
char publishTopic[] = "iot-2/evt/Data/fmt/json";
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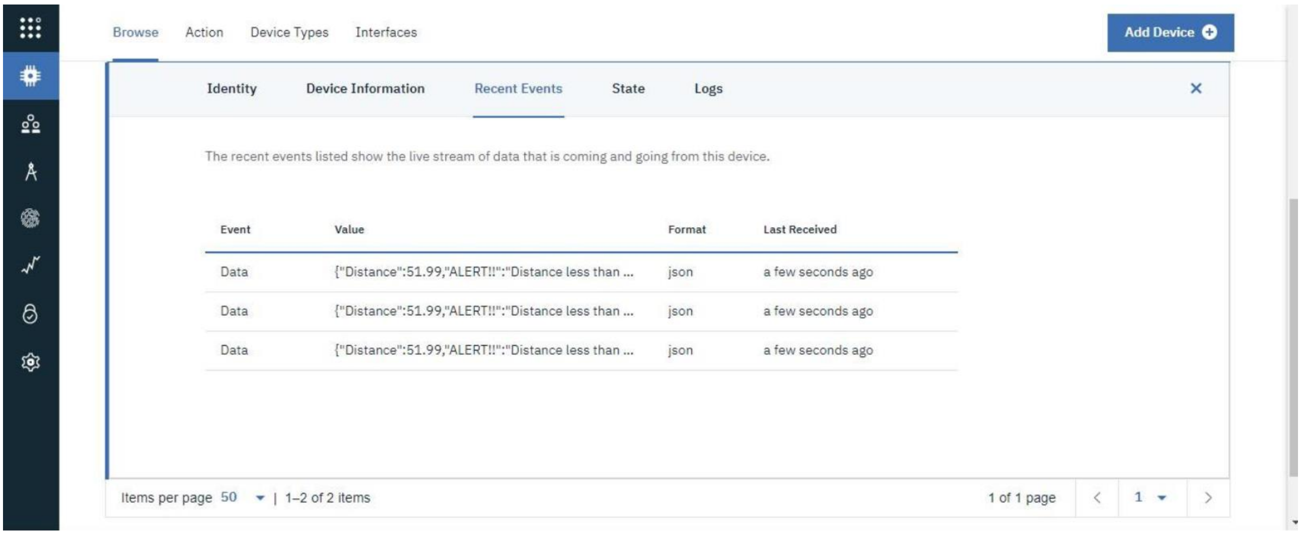
char authMethod[] = "use-token-auth";
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;
WiFiClient wifiClient;
PubSubClient client(server, 1883, callback ,wifiClient);
const int trigPin = 5;
const int echoPin = 18;
#define SOUND_SPEED 0.034
long duration;
float distance;
void setup() {
Serial.begin(115200);
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
wificonnect();
mqttconnect();
```

```
Distance (cm): 51.99
ALERT!!
Sending payload: {"Distance":51.99,"ALERT!!":"Distance less than 100cms"}
Publish ok
Distance (cm): 51.99
ALERT!!
Sending payload: {"Distance":51.99,"ALERT!!":"Distance less than 100cms"}
```

Whenever the distance is less than 100 cms send an "alert" to the IBM cloud and display in the device recent events.



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

Event	Value	Format	Last Received
Data	{"Distance":51.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":51.99,"ALERT!!":"Distance less than ...	json	a few seconds ago
Data	{"Distance":51.99,"ALERT!!":"Distance less than ...	json	a few seconds ago