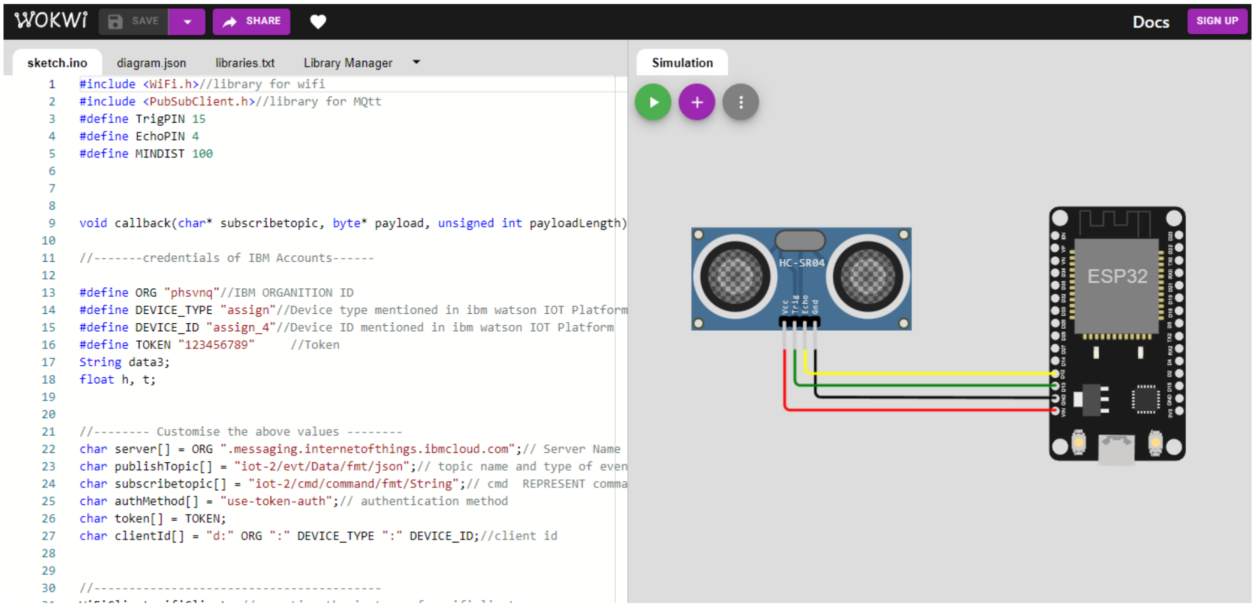
ASSIGNMENT-4

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.

```
/*
 * Ultrasonic.cpp
 *
 * Library for Ultrasonic Ranging Module in a minimalist way
 *
 */

#if ARDUINO >= 100
  #include <Arduino.h>
#else
  #include <WProgram.h>
#endif

#include "Ultrasonic.h"

Ultrasonic::Ultrasonic(uint8_t trigPin, uint8_t echoPin, unsigned long timeOut) {
  trig = trigPin;
  echo = echoPin;
  threePins = trig == echo ? true : false;
  pinMode(trig, OUTPUT);
  pinMode(echo, INPUT);
  timeout = timeOut;
}

unsigned int Ultrasonic::timing() {
  if (threePins)
    pinMode(trig, OUTPUT);

  digitalWrite(trig, LOW);
  delayMicroseconds(2);
  digitalWrite(trig, HIGH);
  delayMicroseconds(10);
  digitalWrite(trig, LOW);

  if (threePins)
    pinMode(trig, INPUT);
    previousMicros = micros();
    while(!digitalRead(echo) && (micros() - previousMicros) <= timeout); // wait for the echo pin HIGH or timeout
    previousMicros = micros();
    while(digitalRead(echo)  && (micros() - previousMicros) <= timeout); // wait for the echo pin LOW or timeout

    return micros() - previousMicros; // duration
  }

  /*
   * If the unit of measure is not passed as a parameter,
   * sby default, it will return the distance in centimeters.
   * To change the default, replace CM by INC.
   */
  unsigned int Ultrasonic::read(uint8_t und) {
    return timing() / und / 2;  //distance by divisor
  }

  /*
   * This method is too verbal, so, it's deprecated.
   * Use read() instead.
   */
  unsigned int Ultrasonic::distanceRead(uint8_t und) {
    return read(und);
  }
/*
   * Ultrasonic.h
   *
   * Library for Ultrasonic Ranging Module in a minimalist way
   *
   */

  #ifndef Ultrasonic_h
  #define Ultrasonic_h

  /*
   * Values of divisors
   */
  #define CM 28
  #define INC 71
```

```
class Ultrasonic {
  public:
    Ultrasonic(uint8_t sigPin) : Ultrasonic(sigPin, sigPin) {};
    Ultrasonic(uint8_t trigPin, uint8_t echoPin, unsigned long timeOut = 20000UL);
    unsigned int read(uint8_t und = CM);
    unsigned int distanceRead(uint8_t und = CM) __attribute__ ((deprecated ("This method is deprecated, use read() instead.")));
    void setTimeout(unsigned long timeOut) {timeout = timeOut;}
    void setMaxDistance(unsigned long dist) {timeout = dist*CM*2;}

  private:
    uint8_t trig;
    uint8_t echo;
    boolean threePins = false;
    unsigned long previousMicros;
    unsigned long timeout;
    unsigned int timing();
};

#endif // Ultrasonic_h
```

```
{
  "version": 1,
  "author": "Rozen Berg",
  "editor": "wokwi",
  "parts": [
    {
      "type": "wokwi-arduino-uno",
      "id": "uno",
      "top": 259.31,
      "left": 31.06,
      "rotate": 0,
      "hide": false,
      "attrs": {}
    },
    {
      "type": "wokwi-hc-sr04",
      "id": "ultrasonic",
      "top": 86.99,
      "left": 109.89,
      "rotate": 0,
      "hide": false,
      "attrs": { "distance": "100" }
    }
  ],
  "connections": [
    [ "uno:GND.1", "ultrasonic:GND", "black", [ "v-8", "*", "v8" ] ],
    [ "uno:13", "ultrasonic:ECHO", "green", [] ],
    [ "uno:12", "ultrasonic:TRIG", "purple", [ "*", "v4" ] ],
    [ "uno:5V", "ultrasonic:VCC", "red", [ "v16", "h-96", "*", "v12" ] ]
  ]
}
/*
   Ultrasonic Simple
   Prints the distance read by an ultrasonic sensor in
   centimeters. They are supported to four pins ultrasound
   sensors (liek HC-SC04) and three pins (like PING)))
   and Seeed Studio sensors).
   The circuit:
 * * Module HR-SC04 (four pins) or PING))) (and other with
     three pins), attached to digital pins as follows:
   ---------------------    --------------------
   | HC-SC04 | Arduino |    | 3 pins | Arduino |
   ---------------------    --------------------
   |   Vcc   |   5V    |    |   Vcc  |   5V    |
   |   Trig  |   12    | OR |   SIG  |   13    |
   |   Echo  |   13    |    |   Gnd  |   GND   |
   |   Gnd   |   GND   |    --------------------
   ---------------------

*/

#include "Ultrasonic.h"

/*
   Pass as a parameter the trigger and echo pin, respectively,
   or only the signal pin (for sensors 3 pins), like:
   Ultrasonic ultrasonic(13);
*/
Ultrasonic ultrasonic(12, 13);
int distance;

void setup() {
  Serial.begin(9600);
}

void loop() {
  // Pass INC as a parameter to get the distance in inches

  distance = ultrasonic.read(CM);

  Serial.print("Distance in CM: ");
  Serial.println(distance);

  distance = ultrasonic.read(INC);

  Serial.print("Distance in Inches: ");
  Serial.println(distance);

  delay(1000);
}
```



```
#include <WiFi.h>//library for wifi
#include <PubSubClient.h>//library for MQtt
#define TrigPIN 15
#define EchoPIN 4
#define MINDIST 100



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

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

#define ORG "phsvnq"//IBM ORGANITION ID
#define DEVICE_TYPE "assign"//Device type mentioned in ibm watson IOT Platform
#define DEVICE_ID "assign_4"//Device ID mentioned in ibm watson IOT Platform
#define TOKEN "123456789"     //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 even
char subscribetopic[] = "iot-2/cmd/command/fmt/String";// cmd  REPRESENT comma
char authMethod[] = "use-token-auth";// authentication method
char token[] = TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;//client id


//----------------------------------------
```