SPIRNT 2

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Project Name	Smart Waste Management System For Metropolitan Cities

Code for Data Transfer from Sensors

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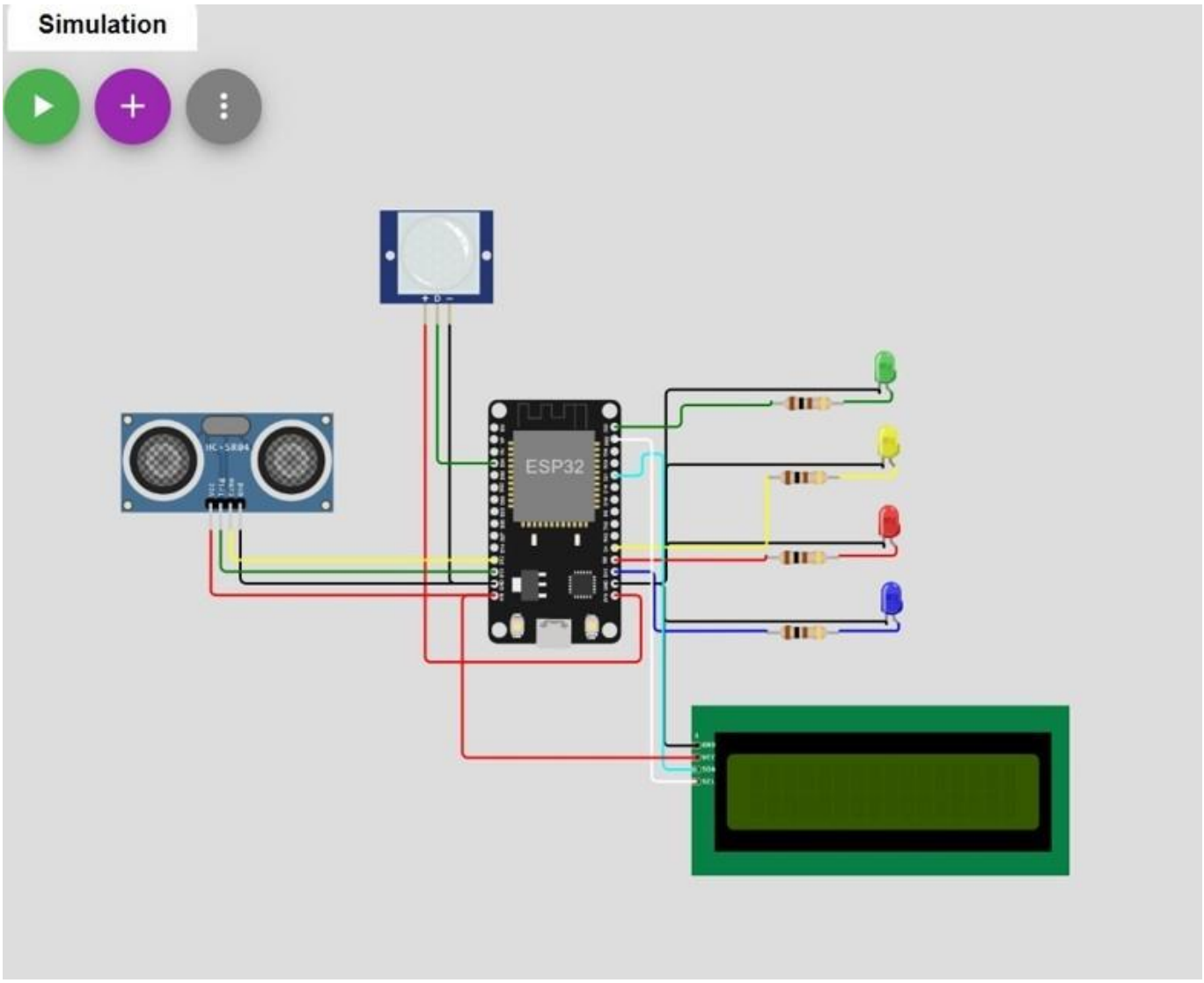
```
#include <WiFi.h>                                   // libraryfor wifi
#include <PubSubClient.h>                           // libraryfor MQTT#include
<LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27,20, 4);

//_____credentials of IBM Accounts_____-

#define ORG "9gbe4w"                                // IBM organisation id
#define DEVICE_TYPE "SWMSMC"                        // Device type mentioned in ibm watson iot platform
#defineDEVICE_ID "ibmproject"                       // DeviceID mentioned in ibm watson iot platform
#define TOKEN "sUNA41tG6-Pq)0rk5X"                  // Token

//_____customise above values_____-_____

char server[] = ORG ".messaging.internetofthings.ibmcloud.com";     // server namechar
publishTopic[] = "iot-2/evt/data/fmt/json";
char topic[] = "iot-2/cmd/led/fmt/String";          // cmd Represent type and command is test format of strings
char authMethod[] = "use-token-auth";               // authentication methodchar
token[]= TOKEN;
char clientId[] = "d:" ORG ":" DEVICE_TYPE ":" DEVICE_ID;           //Client id

//_____

WiFiClient wifiClient;                              // creatinginstance for wificlient
PubSubClient client(server, 1883, wifiClient);

#defineECHO_PIN 12
#define TRIG_PIN13float dist;

void setup()
{
 Serial.begin(115200); pinMode(LED_BUILTIN,
 OUTPUT); pinMode(TRIG_PIN, OUTPUT);
 pinMode(ECHO_PIN, INPUT);
 //pir pin pinMode(4, INPUT);

 //ledpins
 pinMode(23, OUTPUT);
 pinMode(2, OUTPUT);
 pinMode(4, OUTPUT);
 pinMode(15, OUTPUT);


 lcd.init(); lcd.backlight();
 lcd.setCursor(1, 0);
 lcd.print("");

 wifiConnect();
```

```
 mqtConnect();
}

float readcmCM()
{
 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()
 {

 lcd.clear();

 publishData();
 delay(500);
 if (!client.loop())
  {
   mqtConnect();                                          // functioncall to connecto IBM
  }
}

/*_____-retrieving to cloud_____*/

void wifiConnect()
{
 Serial.print("Connecting to ");
 Serial.print("Wifi"); WiFi.begin("Wokwi-
 GUEST", "", 6);
 while (WiFi.status() != WL_CONNECTED)
  {
   delay(500);
   Serial.print(".");
  }
 Serial.print("WiFi connected, IP address: ");
 Serial.println(WiFi.localIP());
}
void mqtConnect()
 {
  if (!client.connected())
   {
    Serial.print("Reconnecting MQTT client to ");
    Serial.println(server);
    while (!client.connect(clientId, authMethod, token))
     {
      Serial.print(".");
      delay(500);
     }
    initManagedDevice();
    Serial.println();
   }
 }
void initManagedDevice()
 {
  if (client.subscribe(topic))
   {
    Serial.println("IBM subscribe to cmd OK");
   }
  else
   {
```

```
      Serial.println("subscribe to cmd FAILED");
    }
 }
void publishData()
{
 float cm = readcmCM();

 if(digitalRead(34))                                          //PIR motion detection
 {
  Serial.println("Motion Detected");
  Serial.println("Lid Opened"); digitalWrite(15,
  HIGH);

 }
 else
 {
  digitalWrite(15, LOW);
 }

if(digitalRead(34)==true)
{
 if(cm <= 100)                                                //Bin level detection
 {
  digitalWrite(2, HIGH);
  Serial.println("High Alert!!!,Trash bin is about to be full");
  Serial.println("Lid              Closed");
  lcd.print("Full!        Don't        use");
  delay(2000);
  lcd.clear(); digitalWrite(4,
  LOW); digitalWrite(23, LOW);
 }
 else if(cm > 150 && cm < 250)
 {
  digitalWrite(4,  HIGH);
  Serial.println("Warning!!,Trash is about to cross 50% of bin level");digitalWrite(2,
  LOW);
  digitalWrite(23, LOW);
 }
 else if(cm > 250 && cm <=400)
 {
  digitalWrite(23, HIGH);
  Serial.println("Bin is available");
  digitalWrite(2,LOW); digitalWrite(4,
  LOW);
 }
  delay(10000);
  Serial.println("Lid  Closed");
}
else
{
 Serial.println("No motion detected");
}



 if(cm <= 100)
{
digitalWrite(21,HIGH);
String payload= "{\"High Alert!!\":\"";
payload+= cm;
payload += "left\" }"; Serial.print("\n");
```

```
Serial.print("Sending payload: ");
Serial.println(payload);


if (client.publish(publishTopic, (char*) payload.c_str()))        // ifdata is uploaded to cloud successfully,prints publish ok or printspublish failed
{
Serial.println("Publish OK");
}
}
if(cm <= 250)
{
digitalWrite(22,HIGH);
String payload= "{\"Warning!!\":\"";
payload+= dist;
payload += "left\" }"; Serial.print("\n");
Serial.print("Sending distance: ");
Serial.println(cm);
if(client.publish(publishTopic, (char*) payload.c_str()))
{
Serial.println("Publish OK");
}
else
{
Serial.println("Publish FAILED");
}
}

 float inches = (cm / 2.54);                                                    //print on LCD
 lcd.setCursor(0,0);
 lcd.print("Inches");
 lcd.setCursor(4,0);
 lcd.setCursor(12,0);
 lcd.print("cm");
 lcd.setCursor(1,1);
 lcd.print(inches, 1);
 lcd.setCursor(11,1);
 lcd.print(cm, 1);
 lcd.setCursor(14,1);
 delay(1000); lcd.clear();
}
```

Connection Diagram


Simulation
ESP32