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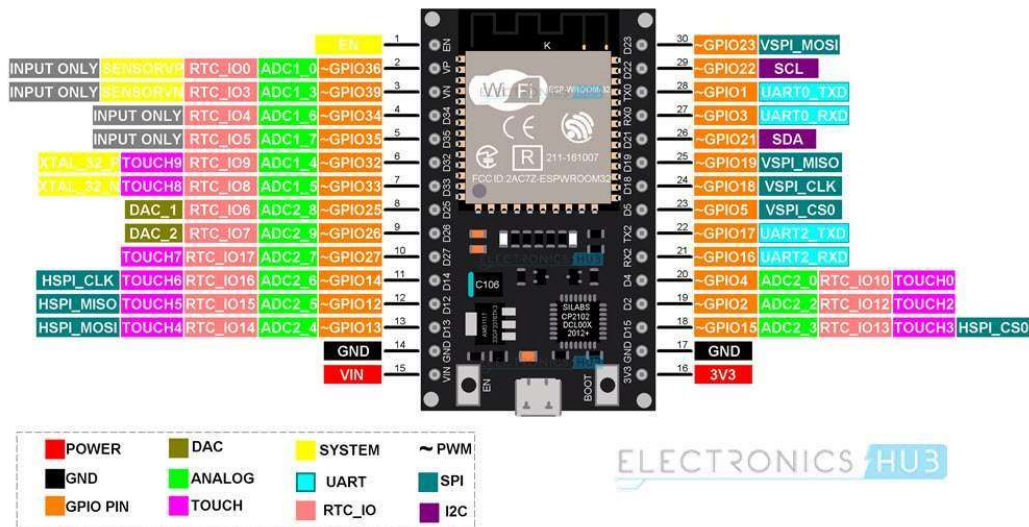
## Chapter 1: Introduction

In this project we want to take record or count of the number of the people who are entering and the leaving the room such that we can know the exact number of people who are present in the room, and display it on seven segment display. and send alert on Whatsapp when count of the people in the room exceeds the particular limit .

### APPARATUS REQUIRED :

1. seven segment display
2. SRC O4(ultra sonic sensor)
3. ESP 32

### Pin layouts of Esp32:



## ULTRASONIC SENSOR

The transmitter converts the electrical signal into 40KHz ultrasonic sound pulses. The receiver listens for the transmitted pulses. When the receiver receives these pulses, it produces an output pulse whose width is proportional to the distance of the object in front. This sensor provides excellent non-contact range detection between 2 cm to 400 cm (~13 feet) with an accuracy of 3mm.

In order to calculate the distance between the sensor and the object, the sensor measures the time it takes between the emission of the sound by the transmitter to its contact with the receiver. The formula for this calculation is  $D = S \times T \times C$  (where D is the distance, T is the time, and C is the speed of sound ~ 343 meters/second).

$$D = S \times T \times C$$

### Seven segment Display:

A 7-segment display is commonly used in electronic display devices for decimal numbers from 0 to 9 and in some cases, basic characters. The use of light-emitting diodes (LEDs) in seven-segment displays made it more popular, whereas of late liquid crystal displays (LCD) have also come into use.

Electronic devices like microwave ovens, calculators, washing machines, radios, digital clocks, etc. to display numeric information are the most common applications

. Let's take a look at the seven-segment display pinout to have a better understanding.

A seven-segment display is made of seven different illuminating segments. These are arranged in a way to form numbers and characters by displaying different combinations of segments.

We have used **common anode type** configuration in our project:

### **Common Anode (CA) 7 Segment Display :**

The common anode display is commonly called CA display. In this type the common pin on the 7-segment display is connected to all the eight Anode pins of the LEDs.

So In order to make this type of seven segment display to work we should connect the Com pin to the Vcc (+5V typically) and ground the required segment pin to turn it on.

### **Enabling Whatsapp Alert:**

We have used Call me bot to send notification when the number of people exceeded.

Add the phone number +34 644 51 95 23 to your Phone Contacts. (Name it as you wish);

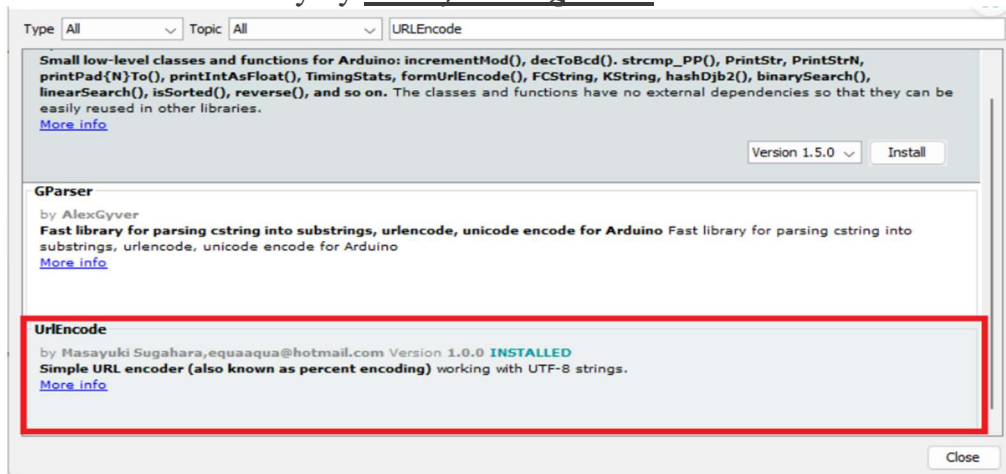
Send the following message: **"I allow callmebot to send me messages"** to the new Contact created (using WhatsApp of course);

Wait until you receive the message “**API Activated for your phone number. Your APIKEY is XXXXXX**” from the bot.

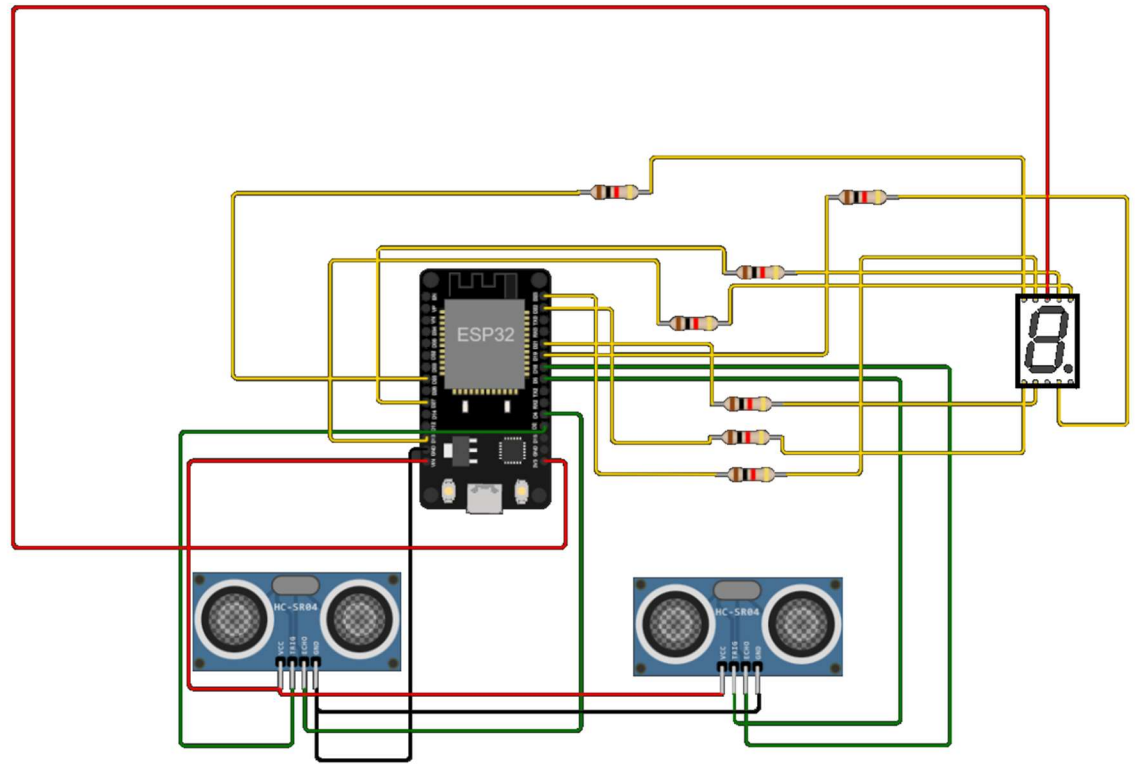
We have to use inbuilt library in Arduino ide “**HTTPClient.h**” & “**WiFi.h**” in order to perform the task.

Also, We have to include library “**UrlEncode.h**” to encode the url generated for your http request .

Go to **Sketch > Include Library > Manage Libraries** and search for **UrlEncode** library by Masayuki Sugahara as shown below.



## Connection Diagram:



## Code:

```
#include <WiFi.h>
#include <HTTPClient.h>
#include <UrlEncode.h>

const char* ssid = "OPPO A96";
const char* password = "123456789";

String phoneNumber = "918423842781";
String apiKey = "3803884";
```

```

int LED[] = {27,13,19,21,22,23,25};

int one[] = {1,0,0,1,1,1,1};
int two[] = {0,0,1,0,0,1,0};
int three[] = {0,0,0,0,1,1,0};
int four[] = {1,0,0,1,1,0,0};
int five[] = {0,1,0,0,1,0,0};
int six[] = {0,1,0,0,0,0,0};
int seven[] = {0,0,0,1,1,1,1};
int eight[] = {0,0,0,0,0,0,0};
int nine[] = {0,0,0,0,1,0,0};
int zero[] = {0,0,0,0,0,0,1};

int trigPin1=2;
int echoPin1=4;

int trigPin2=5;
int echoPin2=18;

int measureDistance(int trigPin, int echoPin){

    digitalWrite(trigPin,HIGH);
    delayMicroseconds(10);
    digitalWrite(trigPin,LOW);
    int duration=pulseIn(echoPin,HIGH);
    return ((duration/2)/29.1);

}

int timeoutCounter=0;
int currentPeople=0;
String sequence="";

int distance1, distance2;

```

```

int initialDistance = 30;

void sendMessage(char* message){

    // Data to send with HTTP POST
    String url = "https://api.callmebot.com/whatsapp.php?phone=" +
    phoneNumber + "&apikey=" + apiKey + "&text=" +
    urlEncode(message);
    HTTPClient http;
    http.begin(url);

    // Specify content-type header
    http.addHeader("Content-Type", "application/x-www-form-
    urlencoded");

    // Send HTTP POST request
    int httpResponseCode = http.POST(url);
    if (httpResponseCode == 200){
        Serial.print("Message sent successfully");
    }
    else{
        Serial.println("http response code error: ");
        Serial.println(httpResponseCode);
    }
    http.end();
}

void setup() {
    // put your setup code here, to run once:
    WiFi.begin(ssid, password);
    Serial.println("Connecting");
    while(WiFi.status() != WL_CONNECTED) {
        delay(100);
        Serial.print(".");
    }
}

```



```

}
Serial.println("");
Serial.print("Connected to WiFi network with IP Address: ");
Serial.println(WiFi.localIP());

// Send Message to WhatsApp
sendMessage("hello we are iot rookies");

for(int i=0;i<7;i++)pinMode(LED[i],OUTPUT);

pinMode(trigPin1,OUTPUT);
pinMode(echoPin1,INPUT);
pinMode(trigPin2,OUTPUT);
pinMode(echoPin2,INPUT);
Serial.begin(115200);

}

void loop() {
delay(700);
// put your main code here, to run repeatedly:
distance1=measureDistance(trigPin1,echoPin1);
distance2=measureDistance(trigPin2,echoPin2);

if(distance1 < initialDistance && sequence.charAt(0)!='1'){
    sequence += "1";
}else if(distance2 < initialDistance && sequence.charAt(0)!='2'){
    sequence += "2";
}

if(sequence.equals("12")){
    currentPeople++;
    sequence="";
    delay(100);
}

```

```

    }else if(sequence.equals("21") && currentPeople>0){
        currentPeople--;
        sequence="";
        delay(100);
    }

    //Reset the sequence if it is invalid or timeouts
    if(sequence.length()>2 || sequence.equals("11") ||
sequence.equals("22") || timeoutCounter >200){
        sequence="";
    }

    if(sequence.length()==1){
        timeoutCounter++;
    }else{
        timeoutCounter=0;
    }

    Serial.println("Number of people in the room : ");
    Serial.println(currentPeople);

    if(ssd>9){
        ssd=0;
    }

    switch(currentPeople){
        case 1:
            for(int i=0;i<7;i++)digitalWrite(LED[i],one[i]);
            delay(20);
            break;

        case 2:
            for(int i=0;i<7;i++)digitalWrite(LED[i],two[i]);
            delay(20);

```

```

    break;
case 3:
for(int i=0;i<7;i++)digitalWrite(LED[i],three[i]);
delay(20);
    break;
case 4:
for(int i=0;i<7;i++)digitalWrite(LED[i],four[i]);
delay(20);
    break;
case 5:
for(int i=0;i<7;i++)digitalWrite(LED[i],five[i]);
delay(20);
    break;
case 6:
for(int i=0;i<7;i++)digitalWrite(LED[i],six[i]);
delay(20);
    break;
case 7:
for(int i=0;i<7;i++)digitalWrite(LED[i],seven[i]);
delay(20);
    break;
case 8:
for(int i=0;i<7;i++)digitalWrite(LED[i],eight[i]);
delay(20);
    break;
case 9:
for(int i=0;i<7;i++)digitalWrite(LED[i],nine[i]);
delay(20);
    break;
case 0:
for(int i=0;i<7;i++)digitalWrite(LED[i],zero[i]);
delay(20);
    break;
}

```

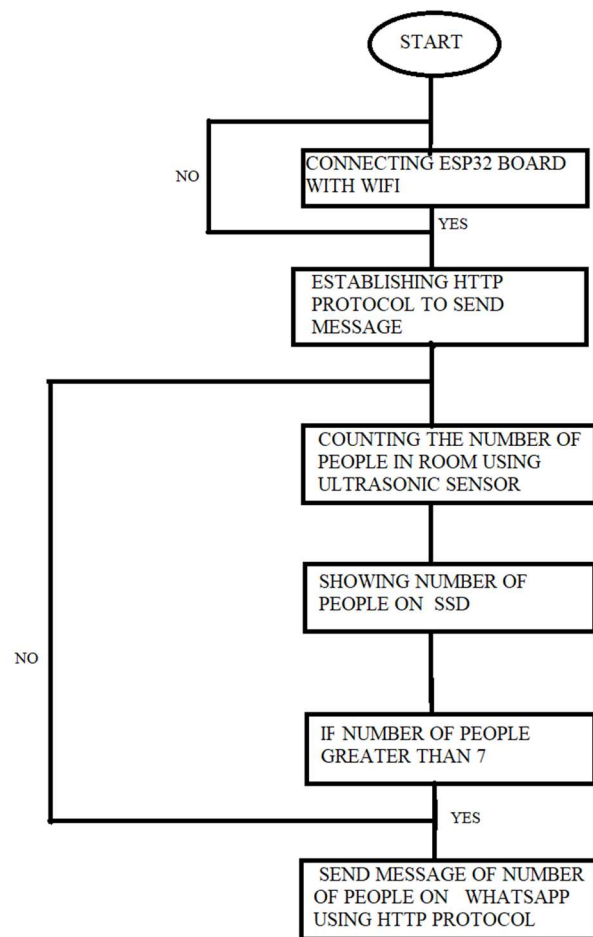
```

Serial.println(distance1);
Serial.println(distance2);

if(currentPeople>7){
    sendMessage("number of people exceeds the limit of 5 people");
}
}

```

### Flowchart:



## Code Explanation:

Start

Connect to WiFi network



Send WhatsApp message



Setup pins and variables



Repeat Forever



Measure distance 1 and distance 2



Check if distance 1 is less than initial distance



Check if sequence does not start with '1'

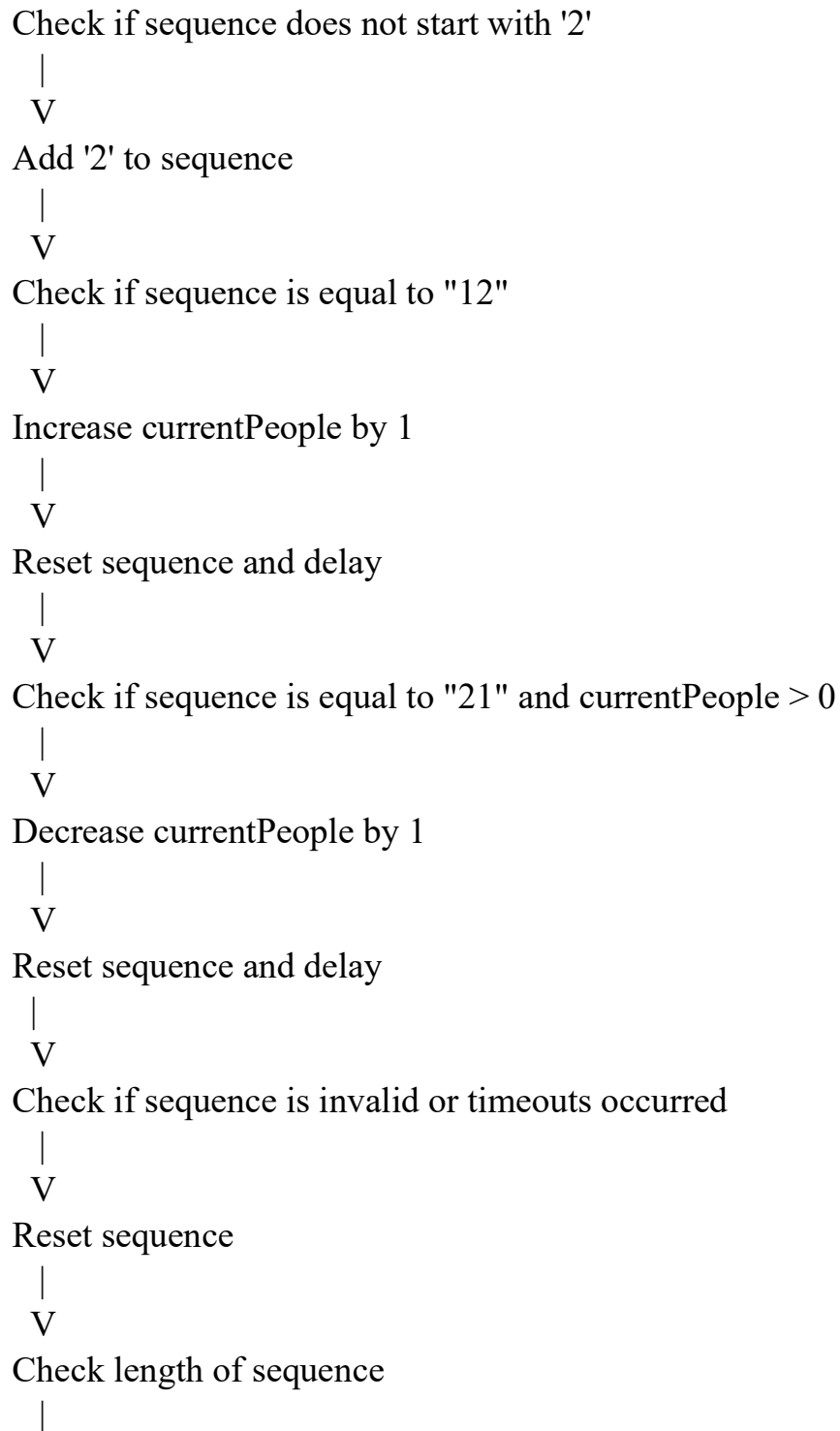


Add '1' to sequence



Check if distance 2 is less than initial distance





V  
If length is 1, increase timeoutCounter  
|  
V  
If length is not 1, reset timeoutCounter  
|  
V  
Print current number of people in the room  
|  
V  
Check if currentPeople is greater than 9  
|  
V  
Reset currentPeople to 0  
|  
V  
Set LEDs based on currentPeople  
|  
V  
Delay  
|  
V  
Print distance1 and distance2  
|  
V  
Check if currentPeople is greater than 7  
|  
V  
Send WhatsApp message about exceeding the limit  
|  
V  
Repeat loop

## References:

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[www.randomnerdtutorials.com](http://www.randomnerdtutorials.com)

[techtonious.com](http://techtonious.com) [turbologo.com](http://turbologo.com)

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<https://www.youtube.com/live/T>

[WhzdVcyKs?feature=share](https://www.youtube.com/live/TWhzdVcyKs?feature=share)

[Wokwi - Online Arduino and ESP32  
Simulator](http://Wokwi.com)