INTERNET OF THINGS

Homework 3: Arduino Project for counting people

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Source code explanations:

In our experiment, we use two LEDs: one blue LED for less counted people and a red LED for many counted people. We also make use of a buzzer, an ultrasonic sensor and a I2C 16x2 LCD screen. Here is how our code works:

1- After importing the <LiquidCrystal_I2C.h> library, we create an LCD object called **lcd** using address 27, and with 16 columns for 2 rows of printing zone. After initializing all the used variables, we also create a variable **count** that is going to count the number of people passing in front of the ultrasonic sensor. Within the **setup()** method, we set our outputs, our inputs, and the serial monitor, as well as we initialize the screen with **lcd.init()** and **lcd.backlight().**

2- At the beginning of the ***void loop()*** function, all the LED are turned off and the screen is cleansed from its previous content with **lcd.clear()** method. The following block of instructions:

```
digitalWrite(trig, HIGH);
delayMicroseconds(1000);
digitalWrite(trig, LOW);
```

is used to enable the ultrasonic sensor capturing the variation of distances within the time frame of 1 second. Then **int distance = pulseIn(echo, HIGH) * 17 / 1000;** is a special formula to determine the distance in centimeters between the ultrasonic sensor and the object just in front of it.

3-
```
if (distance <= 30) {
      count=count+1;
 }
 Else (distance > 31 and distance <= 60){
      if (count<0){
         count=0;
       }
       else {
         count=count-1;
      }
}
```

This is just counting the occurrence of people passing in front of the sensor (less than 30cm of proximity from the sensor). However, if the count value gets lower than 0, the count variable will remain to 0 since there's never a negative amount of people somewhere.

4- While incrementing the value of the variable count, we constantly check whether its value is below or equal to 10 (**the blue LED is then turned ON**), otherwise if its values

is behond 31 and below 60, the count variable is decremented. Within this range, the **red LED is turned ON, the blue LED is turned OFF, and the Buzzer is biping.**

5- **lcd.setCursor (0,0);**
lcd.print("Counted people");

We set the position of the cursor to the first column of the first row, to start printing the message “counted people”.

```
lcd.setCursor (1,1);
Serial.print(distance);
Serial.println("cm");
Serial.print("There are ");
if (count<=0){
   lcd.print("0");
   Serial.print("0");
}
else{
   lcd.print(count);
   Serial.print(count);
}
 Serial.println(" people in the room.");
```

This block of instructions checks whether the decremented value of the variable **count** has gone below 0. If yes, instead of printing a negative number, we prompt Arduino to print 0 on the serial monitor and on the second column of the second row of the LCD screen.