IoT Assignment-2

Subject: IoT

Course: B-tech

Team

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Implementation of physical computing project using sensors/ actuators/ microcontrollers/ microprocessors.

a. <u>Identification of a use case for physical computing project.</u>

In a classroom where there are many students, counting becomes a hectic task and also to check if there are more than the required strength in the class.

This device helps us overcome that problem. A device which counts the strength of the classroom and signals when the limit is exceeded.

<u>Few other applications of our device would be:</u>
- Employee count in company
- In busses to maintain the permissible limit
- In malls and shopping centres
- And also, to count number of vaccinations at centres

b. <u>Listing the features planned.</u>
- Counts the number of people in a room.
- Locks the door of the room when limit is reached.
- If any person enters when the limit is already reached it sounds an alarm.
- Touch sensor to increment the count and to control the door.

c. <u>Listing the requirements of SW and HW components to realise the project</u>
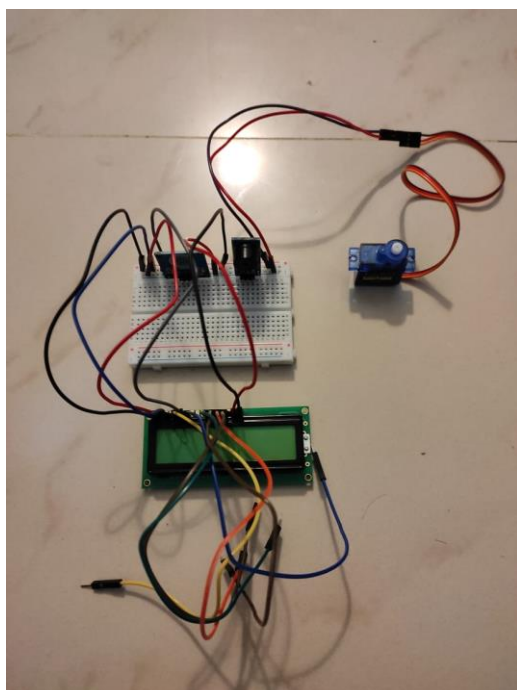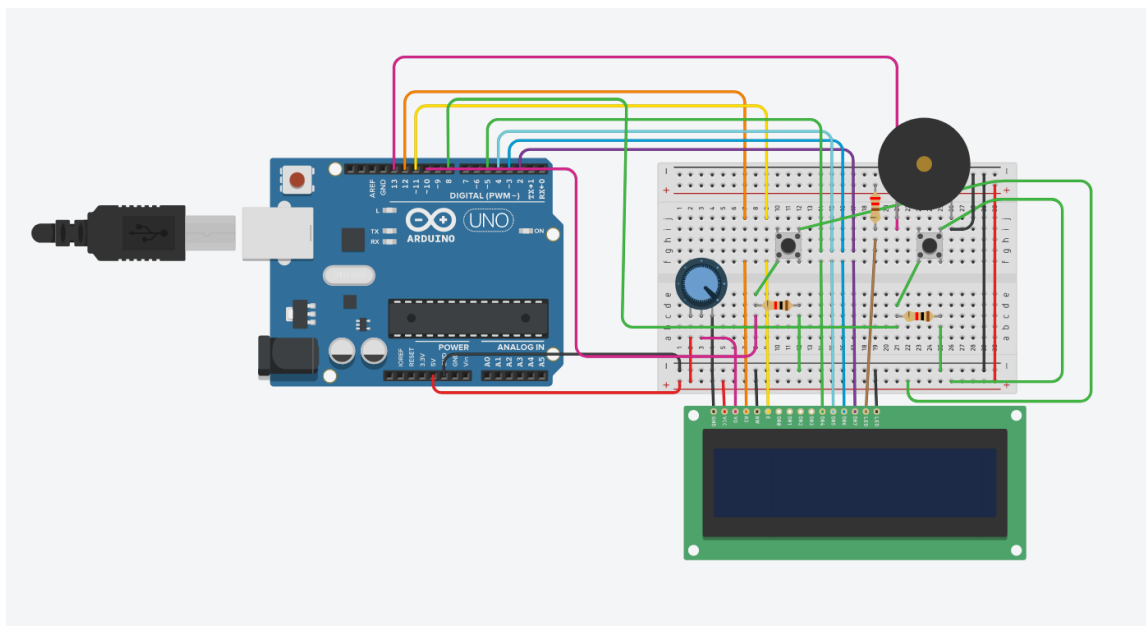
<u>Software Components:</u>
- Arduino Software (IDE)
- Headers

Hardware Components:

- Arduino UNO
- Touch Sensor
- Servo Motor
- 16x2 LCD display
- Buzzer

d. Coming up with the circuit design for the project.

e. Coming up with the necessary logic to implement all the listed features in (b).

```
/*
  LiquidCrystal Library - Hello World

  Demonstrates the use a 16x2 LCD display.  The LiquidCrystal
  library works with all LCD displays that are compatible with the
  Hitachi HD44780 driver. There are many of them out there, and you
  can usually tell them by the 16-pin interface.

  This sketch prints "Hello World!" to the LCD
  and shows the time.

  The circuit:
 * LCD RS pin to digital pin 12
 * LCD Enable pin to digital pin 11
 * LCD D4 pin to digital pin 5
 * LCD D5 pin to digital pin 4
 * LCD D6 pin to digital pin 3
 * LCD D7 pin to digital pin 2
 * LCD R/W pin to ground
 * LCD VSS pin to ground
 * LCD VCC pin to 5V
 * 10K resistor:
 * ends to +5V and ground
 * wiper to LCD VO pin (pin 3)

  Library originally added 18 Apr 2008
  by David A. Mellis
  library modified 5 Jul 2009
  by Limor Fried (http://www.ladyada.net)
  example added 9 Jul 2009
  by Tom Igoe
  modified 22 Nov 2010
  by Tom Igoe

  This example code is in the public domain.
```

```
 http://www.arduino.cc/en/Tutorial/LiquidCrystal
 */


// include the library code:
#include <LiquidCrystal.h>
#include<servo.h>
const int button=8;
const int button2=10;
const int buzzer=13;
const int TOUCH_SENSOR_PIN = 7; // Arduino pin connected to touch sensor's pin
const int SERVO_PIN       = 9; // Arduino pin connected to servo motor's pin
Servo servo; // create servo object to control a servo
// variables will change:
int angle = 0;         // the current angle of servo motor
int lastTouchState;    // the previous state of touch sensor
int currentTouchState; // the current state of touch sensor
int val;
int Val;
int count=0;
int p;
int limit=0;



// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

void setup() {
  // set up the LCD's number of columns and rows:
  lcd.begin(16, 2);
  // Print a message to the LCD.
  lcd.print("Person count: ");
    Serial.begin(9600);               // initialize serial
  pinMode(TOUCH_SENSOR_PIN, INPUT); // set arduino pin to input mode
  servo.attach(SERVO_PIN);          // attaches the servo on pin 9 to the servo object
```

```
  servo.write(angle);
  currentTouchState = digitalRead(TOUCH_SENSOR_PIN);
}

void loop(){
  limit=count;
  //set the buzzer in such a way when the value reaches limit it beeps
  if(limit>=10){
    tone(buzzer,600);
  //set the cursor to column 12, line 1 and print 'Full'
    lcd.setCursor(12,1);
    lcd.print("Full");
  }
  else
  {
    noTone(buzzer);
    //set the cursor to column 12, line 1 and print nothing
    lcd.setCursor(12,1);
    lcd.print("     ");
  }
  // set the cursor to column 0, line 1
  // (note: line 1 is the second row, since counting begins with 0):
  //val=digitalRead(button);
  //if(val==HIGH){
  // p=++count;
   // delay(40);
  //}
  //Val=digitalRead(button2);
  //if(Val==HIGH){
  // if(count<=0)
  //   {
  //   lcd.setCursor(2,1);
  //    lcd.print(0);
  //   }
```

```
//   else{
//   p=--count;
//   delay(40);
//   }
   lastTouchState    = currentTouchState;               // save the last state
currentTouchState = digitalRead(TOUCH_SENSOR_PIN); // read new state

if(lastTouchState == LOW && currentTouchState == HIGH) {
  Serial.println("The sensor is touched");
  p=++count;
  delay(40);


  // change angle of servo motor
  if(angle == 0)
    angle = 90;
  else
  if(angle == 90)
    angle = 0;

  // control servo motor arccoding to the angle
  servo.write(angle);
}

lcd.setCursor(0,0);
// print the number of seconds since reset:
//lcd.print(millis() / 1000);
lcd.setCursor(1,1);
if(p<10){
  lcd.print(" ");
}
lcd.print(p);
}
```

f. Testing and packaging the circuit.