

Library Management System



Maryam Abd Alfatah

Mohammad Zohair Alorfahly

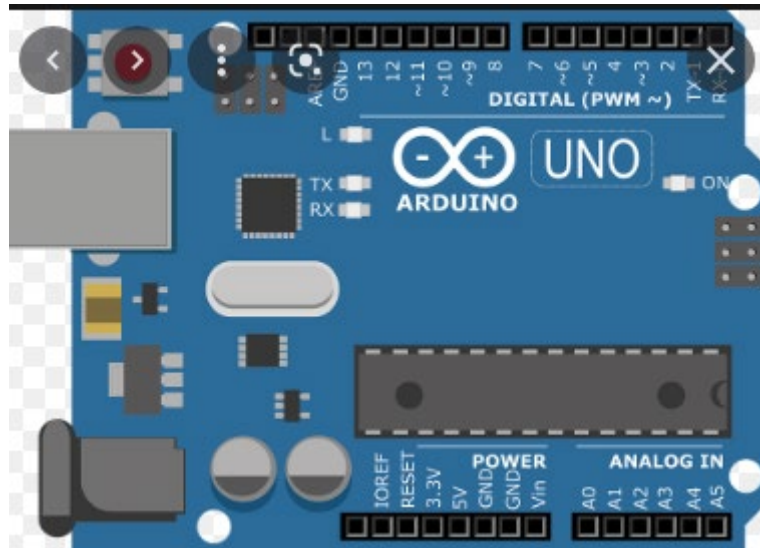
17/6/2022

With Arduino

we can manage library matters, including maintaining the calm of library patrons ,Protecting books from water damage and Regulating the placement of books on shelves and make sure there are manuscripts on the book shelf ,in addition to a digital clock system in the library .

Hardware components :

1 ArduinoUNO



The Arduino UNO is a microcontroller board ,which has 14 digital input/output pins ,6 analog inputs .This pins can be interfaced to various expansion boards and other circuits.

Microcontroller and developed by Arduino.cc

2 LCD



A Liquid Cristal Display is an electronic display module that uses the liquid crystals for its operation , it use in circuits .

The 16*2 LCD translates a display of 16 characters per line in 2 such lines.

3 SoundSensor



It is a digital sensor and contains 3 pins (VCC & GND & OUT) , it is used to capture audio signals

4 WaterSensor



It is an analog sensor and has 3 pins (VCC & GND & Signal) and measures the value of water depth .

5 PushButton



It has 4 legs ,When push button is pressed all 4 legs become connected and its output give 5V. it need a pull_down or pull_up resistor

6 Buzzer



A buzzer or beeper is an audio signaling device

Typical uses of buzzers include alarm devices, timers and train.

7 LED

(Light emitting diode)



8 Resistor

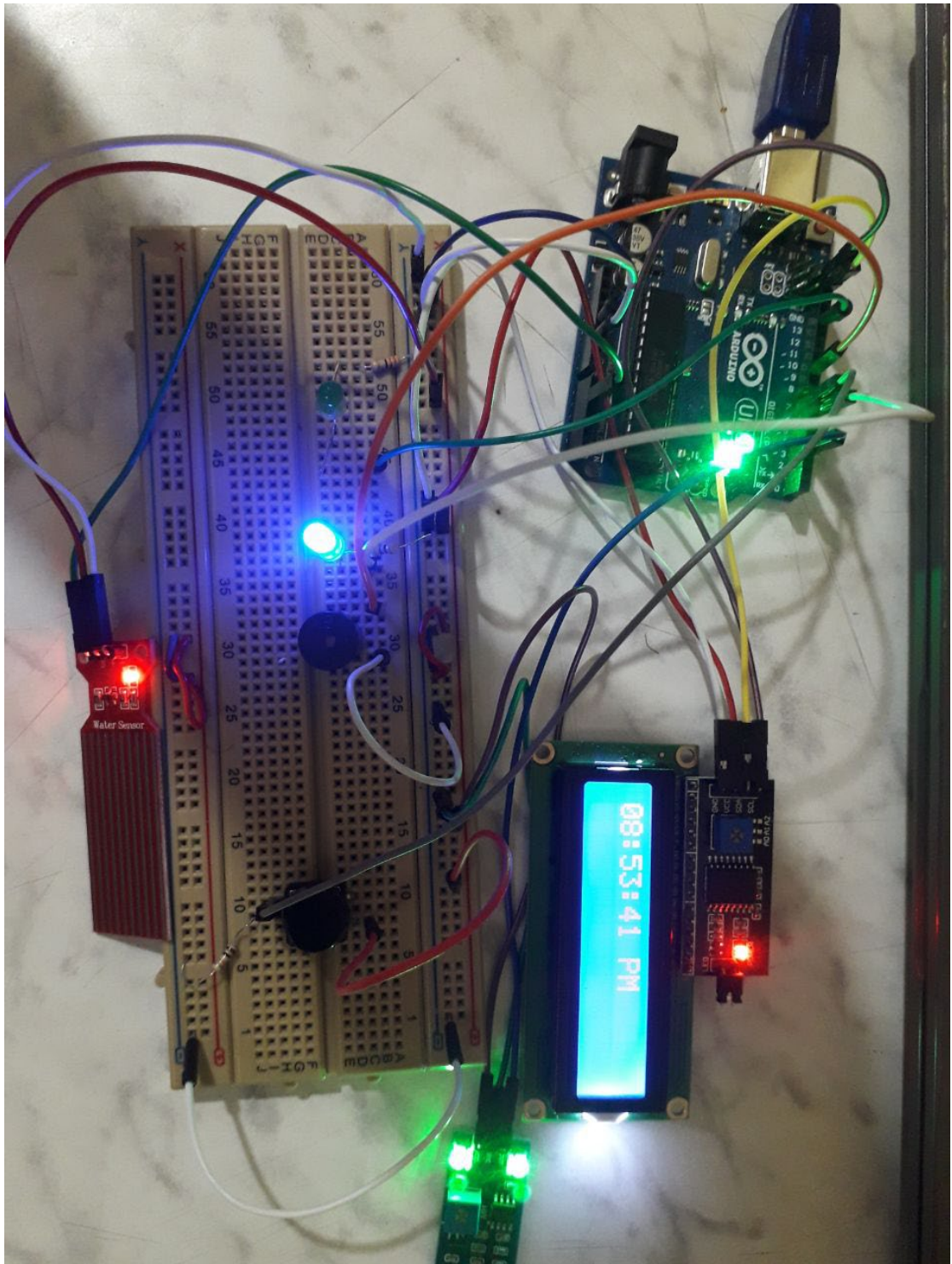


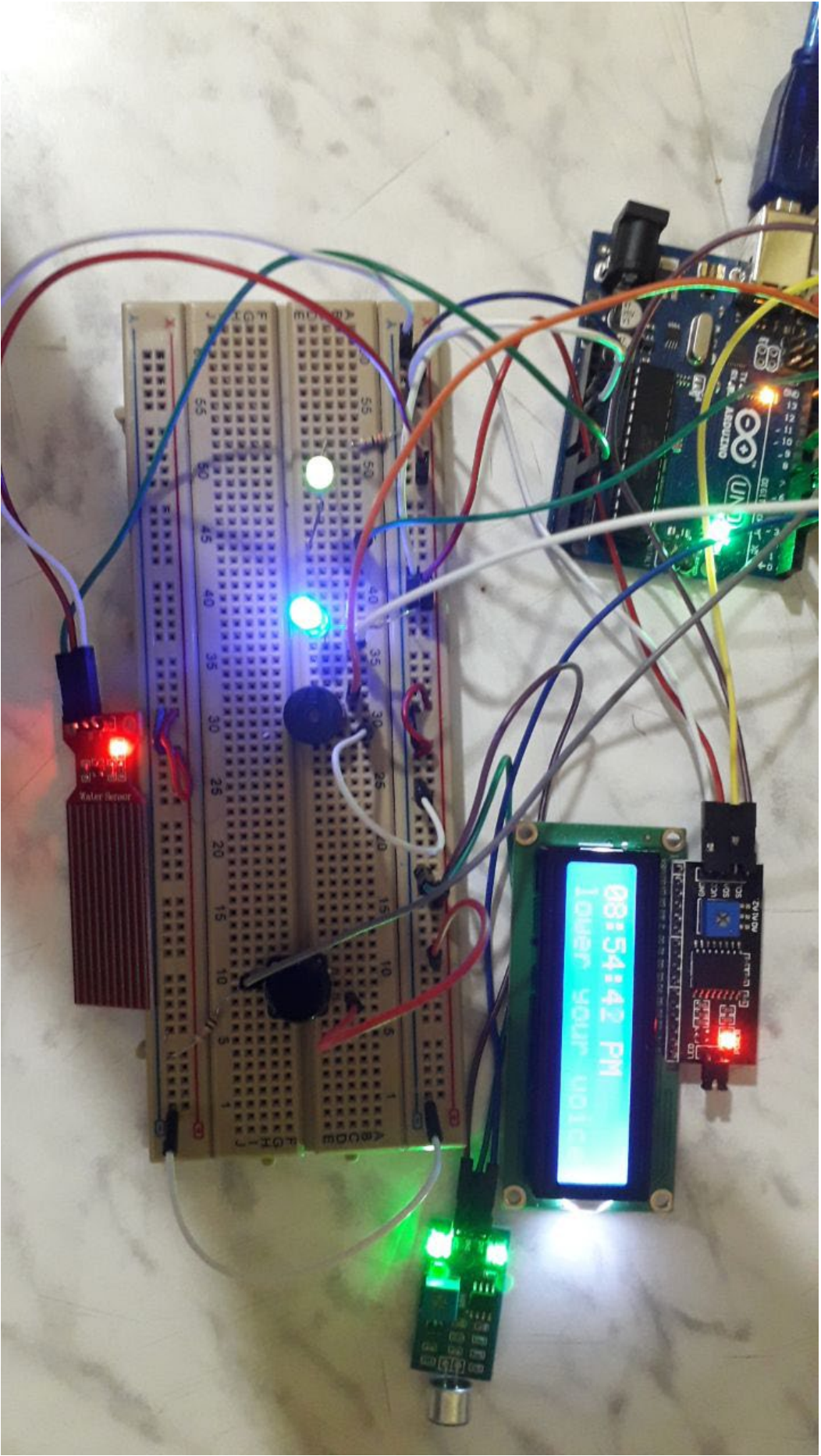
A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages and among other uses.

The circuit

The first picture is a warning that there is
no book on the shelf.

And the other for the previous reason with
picking up a sound signal





Software :

Code

```
# include "LiquidCrystal_I2C.h"
LiquidCrystal_I2C lcd(0x27,16,2);
int sl;
int ledPin=13;//for sound
int sensorPin=3;
int h=8;
int m=50;
int s=45;
int flag=1;
int button=7;
int buzzer=9;
int state_button;
int led=6;// for water
int sensorWater=A1;
int water;
static uint32_t last_time, now=0;
```

```
void setup(){
    lcd.init();
    lcd.backlight();
    pinMode(ledPin, OUTPUT);
    pinMode(sensorPin, INPUT);
    pinMode(button,INPUT);
    pinMode(led,OUTPUT);
    pinMode(sensorWater,INPUT);
    pinMode(buzzer,OUTPUT);

    Serial.begin (9600);
    now=millis();
}

void loop() {
    lcd.clear();
    state_button=digitalRead(button);
    if(state_button==LOW){
        { digitalWrite(led,HIGH); }
    else if(state_button==HIGH)
        { digitalWrite(led2,LOW); }
    sl=digitalRead(sensorPin);
    if(sl==HIGH) {
        digitalWrite(ledPin, HIGH);
        lcd.setCursor(0,1);
    }
}
```



```
        lcd.print("Please , lower your voice" ) ;}
else
    digitalWrite(ledPin, LOW);
water=analogRead(sensorWater);
    if(water>0)
        digitalWrite(buzzer,HIGH);
else {
    digitalWrite(buzzer,LOW);}
lcd.setCursor(0,0);
if(h<10)lcd.print("0");// always 2 digits
lcd.print(h);
lcd.print(":");
if(m<10)lcd.print("0");
lcd.print(m);
    lcd.print(":");
if(s<10)lcd.print("0");
    lcd.print(s);

if(flag==0) lcd.print(" AM");
if(flag==1) lcd.print(" PM");

while ((now-last_time) < 1000 ) // wait100
    {
        now=millis();    }
last_time=now; // prepare for next loop
s=s+1; //increment sec. counting
```

```

if(s==60){
    s=0;
    m=m+1; }
if(m==60) {
    m=0;
    h=h+1; }
if(h==13){
    h=1; }
if (h==1) {
    flag=flag+1;
    if(flag==2)flag=0; }
} //end loop

```

FlowChart

