Plant Monitor

CODRINA-VICTORIA IGNAT

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Cuprins

Obiectivul proiectului

- Monitorizarea temperaturii ambientale din apropierea unei plante
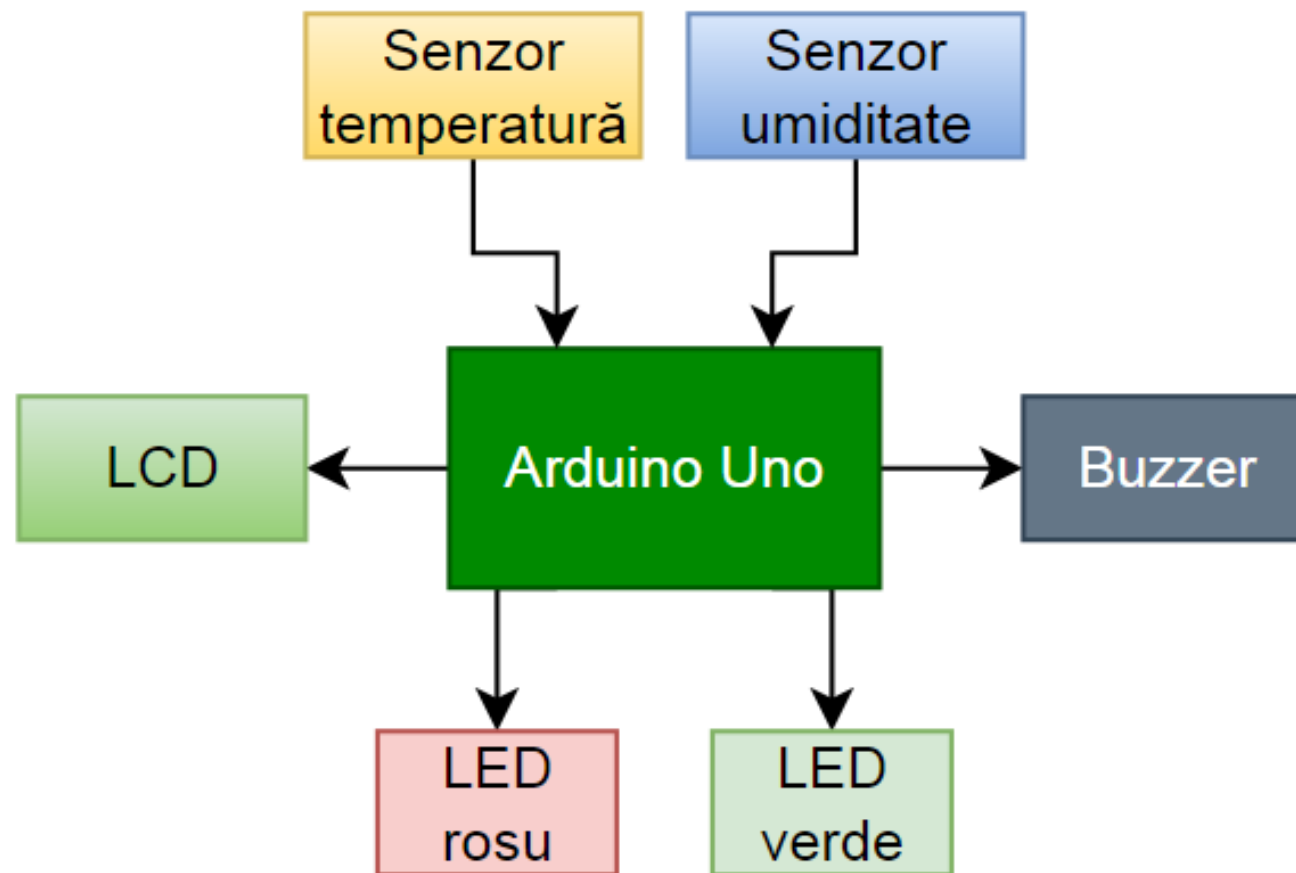- Monitorizarea umidității solului acelei plante
- Starea plantei este evidențiată printr-un LED și un mesaj afișat
- Umiditatea solului prea mică sau prea mare și temperatura prea mică sau prea mare sunt semnalate acustic printr-un buzzer
- Repere:
  - Temperatura adecvată: maxim 35°C, minim 10 °C
  - Umiditatea solului adecvată: între 20 și 80%.
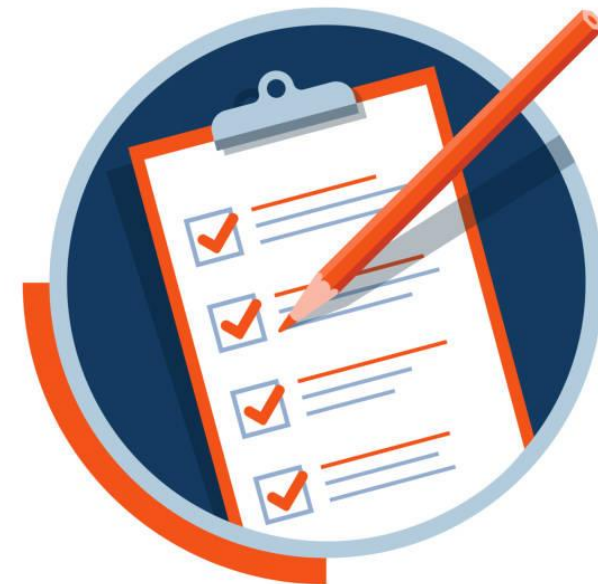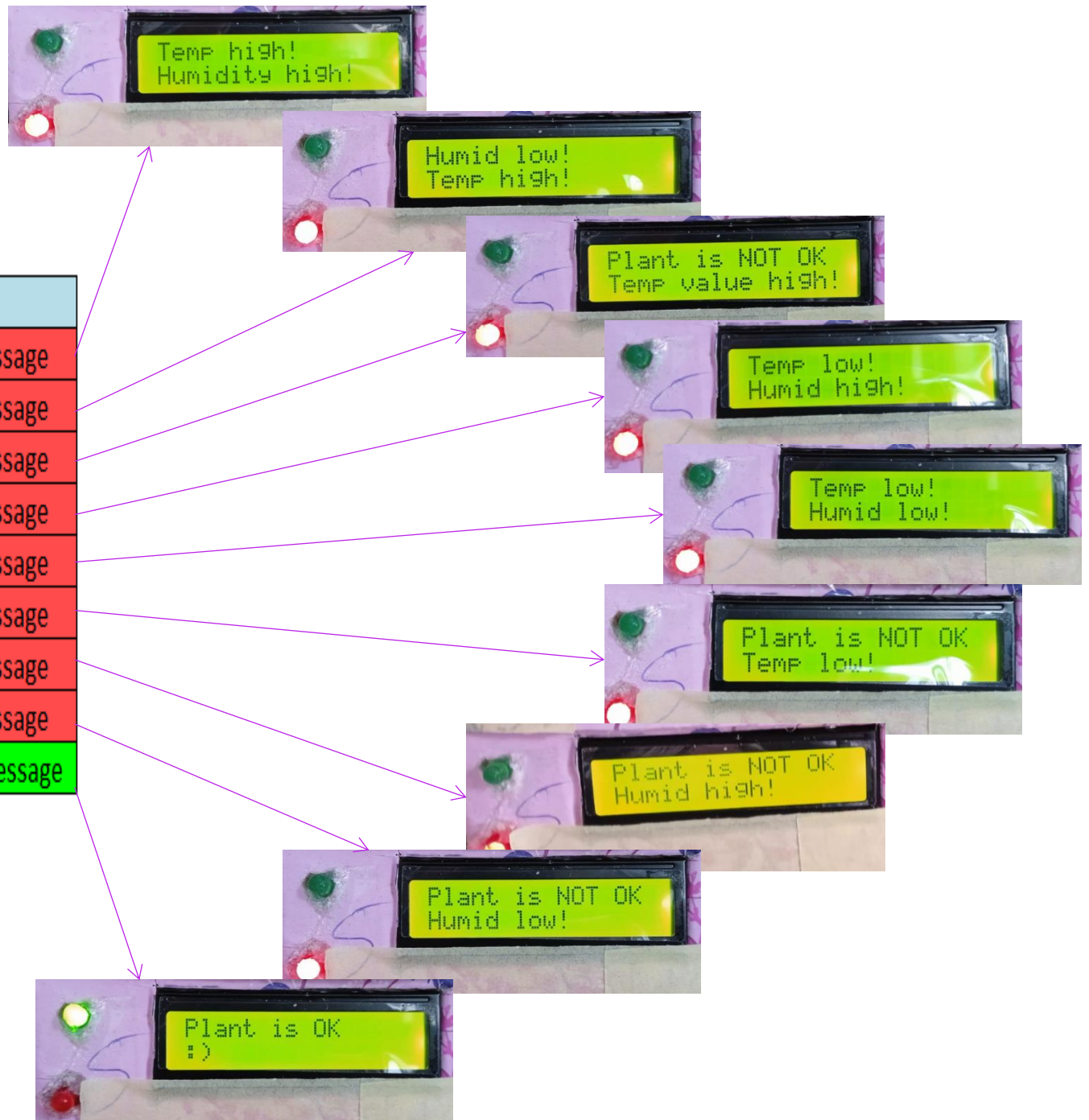
Schema bloc

Schema de conexiuni
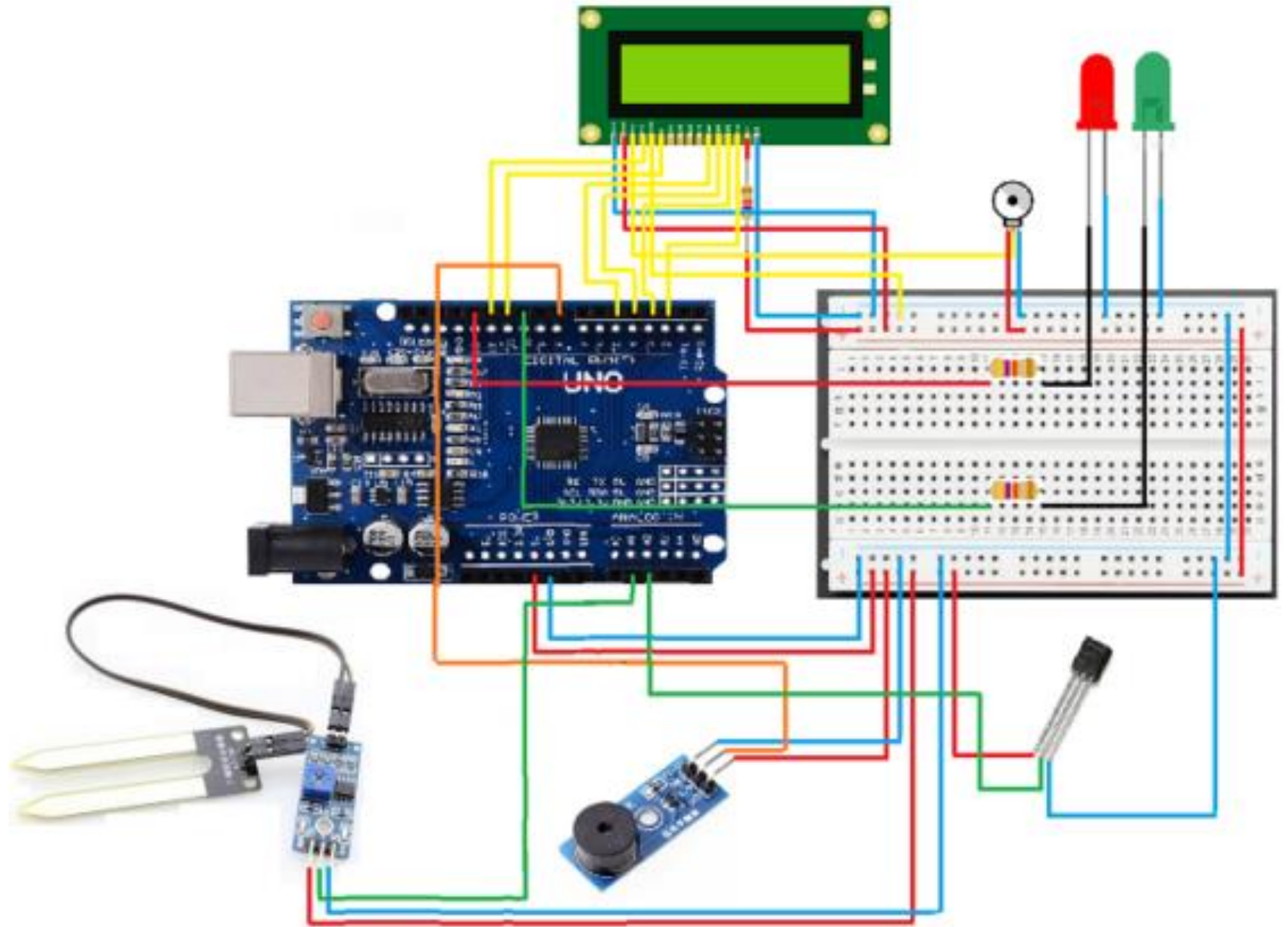
Functionare

Temperature	Humidity	Result
>= 35	>80%	RED Led ON, buzzer ON, display negative message
	<20%	RED Led ON, buzzer ON, display negative message
	>=20 & <=80%	RED Led ON, buzzer ON, display negative message
<10	>80%	RED Led ON, buzzer ON, display negative message
	<20%	RED Led ON, buzzer ON, display negative message
	>=20 & <=80%	RED Led ON, buzzer ON, display negative message
>=10, <35	>80%	RED Led ON, buzzer ON, display negative message
	<20%	RED Led ON, buzzer ON, display negative message
	>=20 & <=80%	GREEN Led ON, buzzer OFF, display positive message

Simulări

Temperature	Humidity	Result
>= 35	>80%	RED Led ON, buzzer ON, display negative message
	<20%	RED Led ON, buzzer ON, display negative message
	>=20 & <=80%	RED Led ON, buzzer ON, display negative message
<10	>80%	RED Led ON, buzzer ON, display negative message
	<20%	RED Led ON, buzzer ON, display negative message
	>=20 & <=80%	RED Led ON, buzzer ON, display negative message
>=10, <35	>80%	RED Led ON, buzzer ON, display negative message
	<20%	RED Led ON, buzzer ON, display negative message
	>=20 & <=80%	GREEN Led ON, buzzer OFF, display positive message

Codul

```
#include <LiquidCrystal.h>
#define redLED 13
#define greenLED 10
const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
int buzzer = 8;
int hygrometer = A1;
int HumidValue;
int pinTemp = A2;

void setup()
{
  pinMode (buzzer, OUTPUT);
  pinMode (redLED, OUTPUT);
  pinMode (greenLED, OUTPUT);
  pinMode (pinTemp, INPUT);
  pinMode (hygrometer, INPUT);
  lcd.begin(16,2);
}
```

```
void loop()
{
  HumidValue = analogRead(hygrometer);
  HumidValue = constrain(HumidValue, 400, 1023);
  HumidValue = map(HumidValue, 400, 1023, 100, 0);

  delay(200);
  float temp;
  int counter = 25;
  int avg = 0;
  for (int i = 0; i< counter; i++)
  {
    avg += analogRead(pinTemp);
  }
  avg = avg / counter;
  temp = avg * (5000 / 1024.0); //converting from reading into
voltage
  temp = temp / 10; //converting the voltage into the temperature in
degree Celsius
```

```
 lcd.clear();
 lcd.setCursor(0,0);
 lcd.print("Temp:");
 lcd.print(temp);
 lcd.print(" deg.");
 lcd.print("C");
 lcd.setCursor(0,1);
 lcd.print("Humidity:");
 lcd.print(HumidValue);
 lcd.print("%");
 delay(5000);
if (temp >= 35 & HumidValue > 80)
{
 digitalWrite (redLED, HIGH);
 digitalWrite (buzzer, HIGH);
int i;
 for (i = 0; i<200; i++)
 {
     digitalWrite (buzzer, HIGH) ;
     delay (2) ;
     digitalWrite (buzzer, LOW) ;
     delay (2) ;
   }
   digitalWrite (greenLED, LOW);
 lcd.clear();
   lcd.begin(16,2);
   lcd.setCursor(0,0);
   lcd.print("Temp high!");
   lcd.setCursor(0,1);
   lcd.print("Humidity high!");
   delay(2000);
}
```

```
else if (temp >= 35 & HumidValue>=20 & HumidValue
<=80)
 {
 digitalWrite (redLED, HIGH);
   digitalWrite (buzzer, HIGH);
   int i;
   for (i = 0; i <200; i++)
   {
       digitalWrite (buzzer, HIGH) ;
       delay (2) ;
       digitalWrite (buzzer, LOW) ;
       delay (2) ;
   }
 digitalWrite (greenLED, LOW);
   lcd.clear();
   lcd.begin(16,2);
   lcd.setCursor(0,0);
   lcd.print("Plant is NOT OK");
   lcd.setCursor(0,1);
   lcd.print("Temp value high!");
   delay(2000);
}
 else if (temp >= 35 & HumidValue < 20){
  digitalWrite (redLED, HIGH);
   digitalWrite (buzzer, HIGH);
   int i;
   for (i = 0; i <200; i++)
   {
       digitalWrite (buzzer, HIGH) ;
       delay (2) ;
       digitalWrite (buzzer, LOW) ;
       delay (2) ;
   }
```

```
 digitalWrite (greenLED, LOW);
   lcd.clear();
   lcd.begin(16,2);
   lcd.setCursor(0,0);
   lcd.print("Humid low!");
   lcd.setCursor(0,1);
   lcd.print("Temp high!");
   delay(2000);
  }
 else if (temp <10 & HumidValue > 80){
  digitalWrite (redLED, HIGH);
   digitalWrite (buzzer, HIGH);
   int i;
   for (i = 0; i <200; i++)
   {
       digitalWrite (buzzer, HIGH) ;
       delay (2) ;
       digitalWrite (buzzer, LOW) ;
       delay (2) ;
   }
 digitalWrite (greenLED, LOW);
   lcd.clear();
   lcd.begin(16,2);
   lcd.setCursor(0,0);
   lcd.print("Temp low!");
   lcd.setCursor(0,1);
   lcd.print("Humid high!");
   delay(2000);
}
```

```
else if (temp <10 & HumidValue < 20){
  digitalWrite (redLED, HIGH);
   digitalWrite (buzzer, HIGH);
   int i;
   for (i = 0; i <200; i++)
   {
      digitalWrite (buzzer, HIGH) ;
      delay (2) ;
      digitalWrite (buzzer, LOW) ;
      delay (2) ;
   }
   digitalWrite (greenLED, LOW);
   lcd.clear();
   lcd.begin(16,2);
   lcd.setCursor(0,0);
   lcd.print("Temp low!");
   lcd.setCursor(0,1);
   lcd.print("Humid low!");
   delay(2000);
}
else if (temp <10 & HumidValue <= 80 &
HumidValue >= 20){
  digitalWrite (redLED, HIGH);
   digitalWrite (buzzer, HIGH);
   int i;
   for (i = 0; i <200; i++)
   {
      digitalWrite (buzzer, HIGH) ;
      delay (2) ;
      digitalWrite (buzzer, LOW) ;
      delay (2) ;
   }
   digitalWrite (greenLED, LOW);
```

```
 lcd.clear();
   lcd.begin(16,2);
   lcd.setCursor(0,0);
   lcd.print("Plant is NOT OK");
   lcd.setCursor(0,1);
   lcd.print("Temp low!");
   delay(2000);
}
else if (temp >= 10 & temp <35 & HumidValue >
80){
  digitalWrite (redLED, HIGH);
   digitalWrite (buzzer, HIGH);
   int i;
   for (i = 0; i <200; i++)
   {
      digitalWrite (buzzer, HIGH) ;
      delay (2) ;
      digitalWrite (buzzer, LOW) ;
      delay (2) ;
   }
   digitalWrite (greenLED, LOW);
   lcd.clear();
   lcd.begin(16,2);
   lcd.setCursor(0,0);
   lcd.print("Plant is NOT OK");
   lcd.setCursor(0,1);
   lcd.print("Humid high!");
   delay(2000);
}
```

```
else if (temp >= 10 & temp < 35 & HumidValue <
20){
   digitalWrite (redLED, HIGH);
   digitalWrite (buzzer, HIGH);
   int i;
   for (i = 0; i <200; i++)
   {
      digitalWrite (buzzer, HIGH) ;
      delay (2) ;
      digitalWrite (buzzer, LOW) ;
      delay (2) ;
   }
   digitalWrite (greenLED, LOW);
   lcd.clear();
   lcd.begin(16,2);
   lcd.setCursor(0,0);
   lcd.print("Plant is NOT OK");
   lcd.setCursor(0,1);
   lcd.print("Humid low!");
   delay(2000);
}
else
{
   digitalWrite (redLED, LOW);
   digitalWrite (buzzer, LOW);
   digitalWrite (greenLED, HIGH);
   lcd.clear();
   lcd.begin(16,2);
   lcd.setCursor(0,0);
   lcd.print("Plant is OK");
   lcd.setCursor(0,1);
   lcd.print(":)");
   delay(1000);
}
}
```

Bill of materials

- Arduino Uno

- Display LCD

- Breadboard

- LED-uri

- LM35 senzor temperatură

- Modul buzzer

- Modul senzor de umiditate a solului

- Rezistori

- Fire
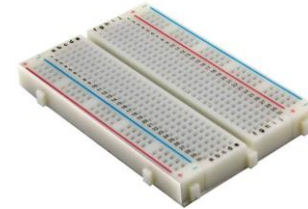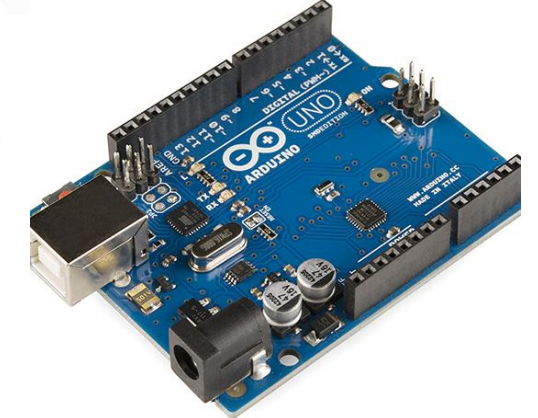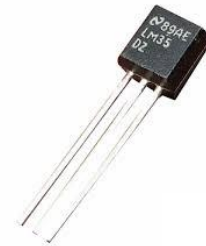
Îmbunătățiri viitoare

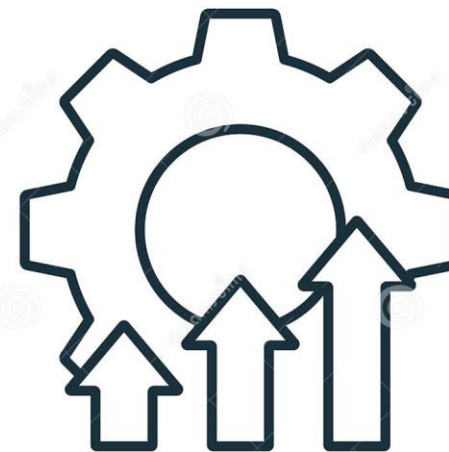Aplicație mobilă / website de monitorizare a parametrilor

Opțiunea de a opri buzzer-ul de la distanță

Posibilitatea de a uda planta de la distanță

Umiditatea și temperatura optimă sunt specifice fiecărei plante în mod diferit. Dispozitivul ar putea avea butoane de reglaj pentru limitele acestora.

IMPROVEMENT

Bibliografie

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