Faculty of
Electronic Engineering
كلية الهندسة الإلكترونية
جامعة المنوفية

Student :- Zainab Ashraf Zahran
Academic number :- 2000164
Section :- 2
Prof.Dr.Eng.Mohamed Esmail Karar

Glucose Alarm

9/5/2025

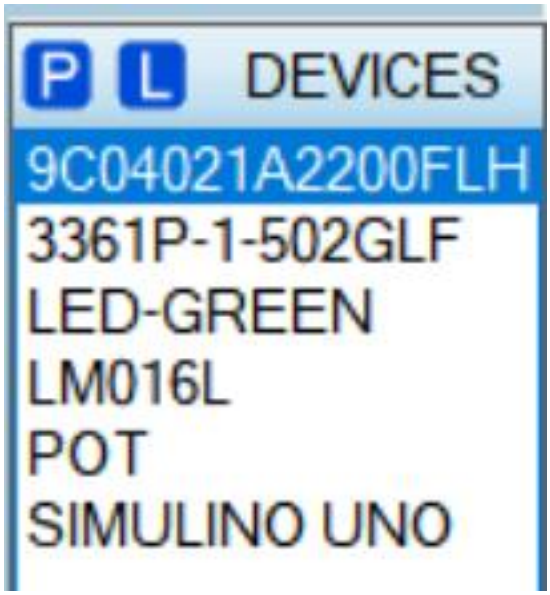
1. Main idea

A medical system to monitor the glucose level in the blood ranging from (0 : 150ml/dl)and sends a signal through a controller to alarm the person if the glucose level in the blood is below a certain level (70ml/dl) hypoglycemia.

2. Software used

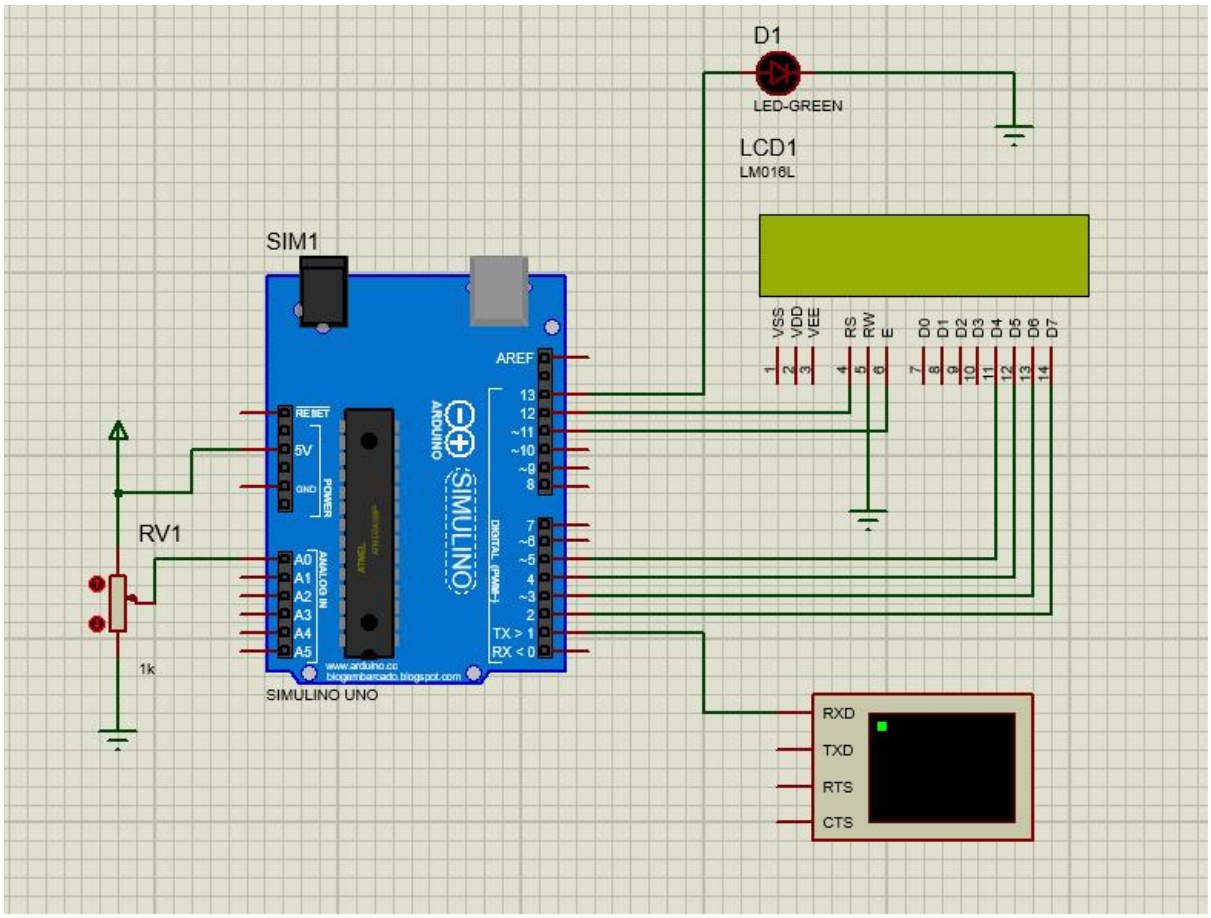
Proteus
Arduino IDE

3. System components



4. Circuit diagram

- Based on the following diagram the potentiometer represents the glucose level in the blood.
- The voltage range is sent to the Arduino analog pin A0 (from 0 : 5v) the Arduino scales this value { (0:1023) -> (0:150) }.
- A predefined threshold value 70 -> 477 is set through the code and it indicates a decrease in blood sugar also it sets the alarm (LED) on.

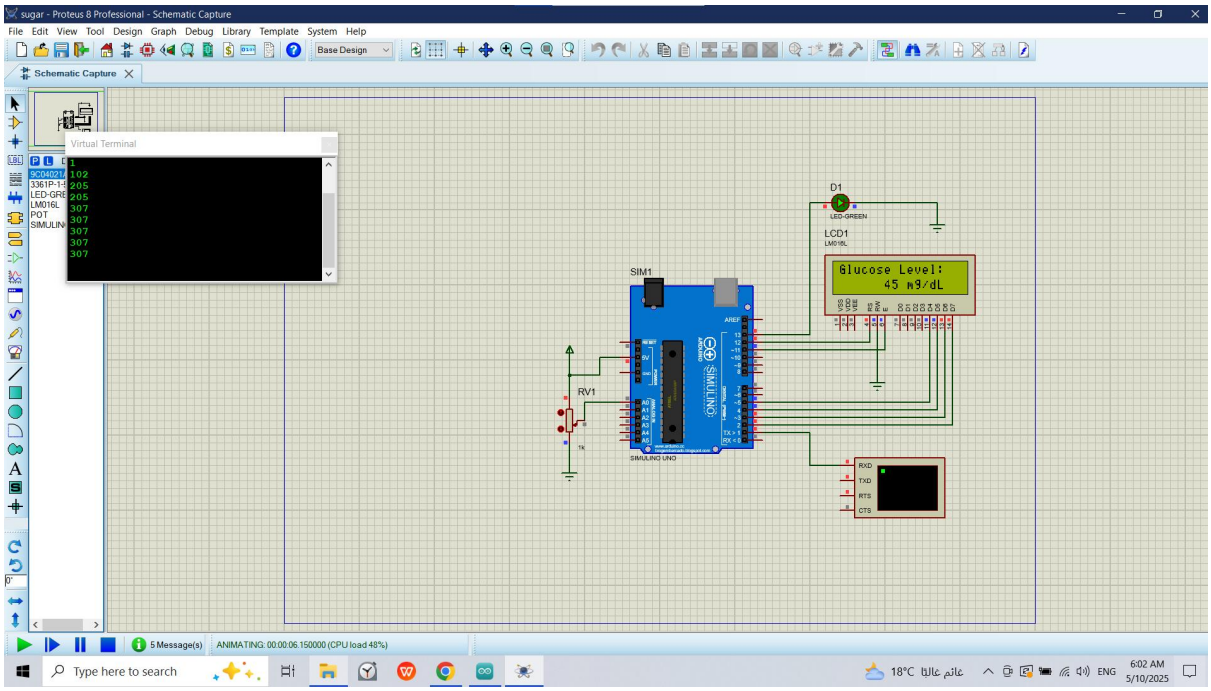


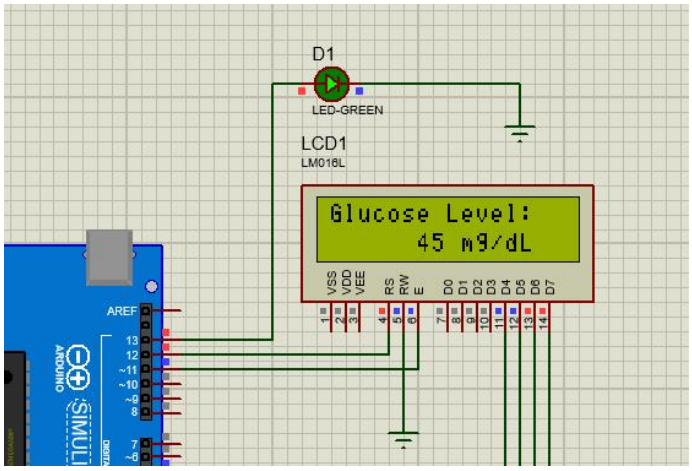
5. Arduino code

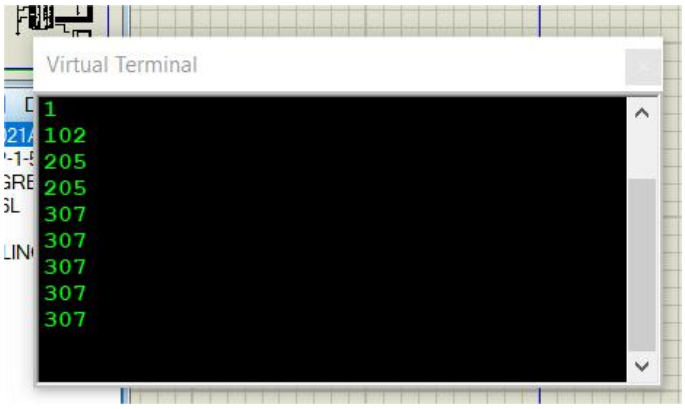
- Based on the code the Arduino receives a reading from the potentiometer .
- Scales it .
- Then shows this scaled value on the serial monitor .
- Based on the given value it either turns the LED on or off .

```
#include <LiquidCrystal.h>
const int potentiometerPin = A0;
const int ledPin = 13;
const int threshold = 70;
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

void setup() {
  pinMode(ledPin, OUTPUT);
  lcd.begin(16, 2);
  lcd.print("Glucose Level: ");
}

void loop() {
  int sensorValue = analogRead(potentiometerPin);
  int glucoseLevel = map(sensorValue, 0, 1023, 0, 150);
  Serial.begin(9600);
  Serial.println(sensorValue);
  lcd.setCursor(0, 1);
  lcd.print("      ");
  lcd.print(glucoseLevel);
  lcd.print(" mg/dL");
  if (glucoseLevel < threshold) {
    digitalWrite(ledPin, HIGH);
  } else {
    digitalWrite(ledPin, LOW);
  }
  delay(500);
}
```

6. When the glucose level in the blood is below threshold the led turns on

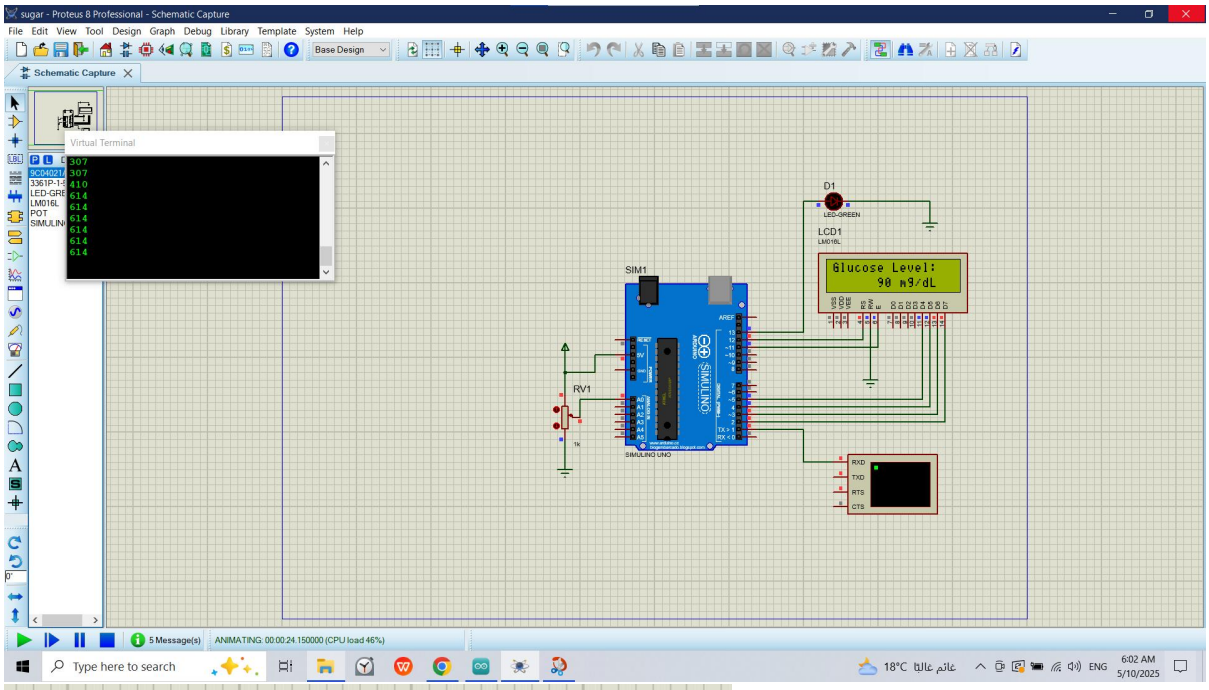


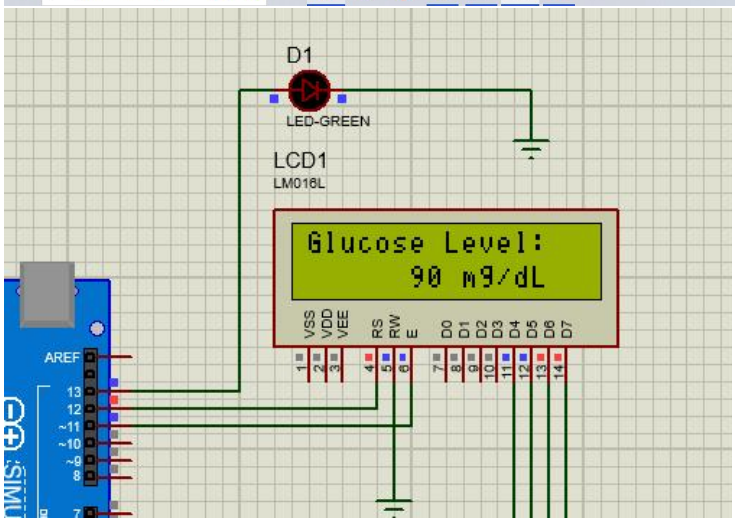


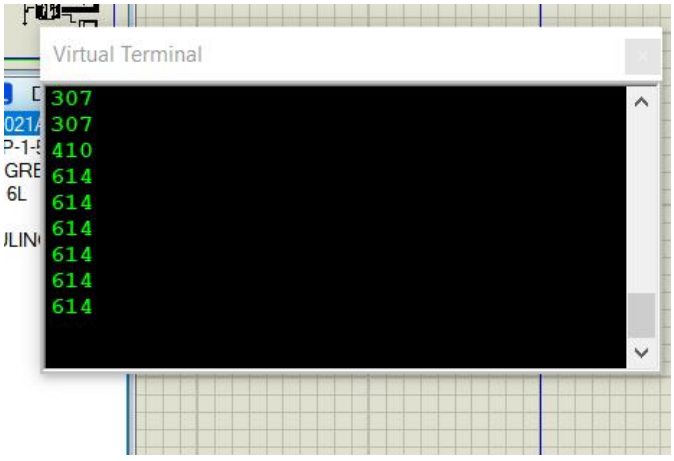


7.

When the glucose level in the blood is above threshold the led turns







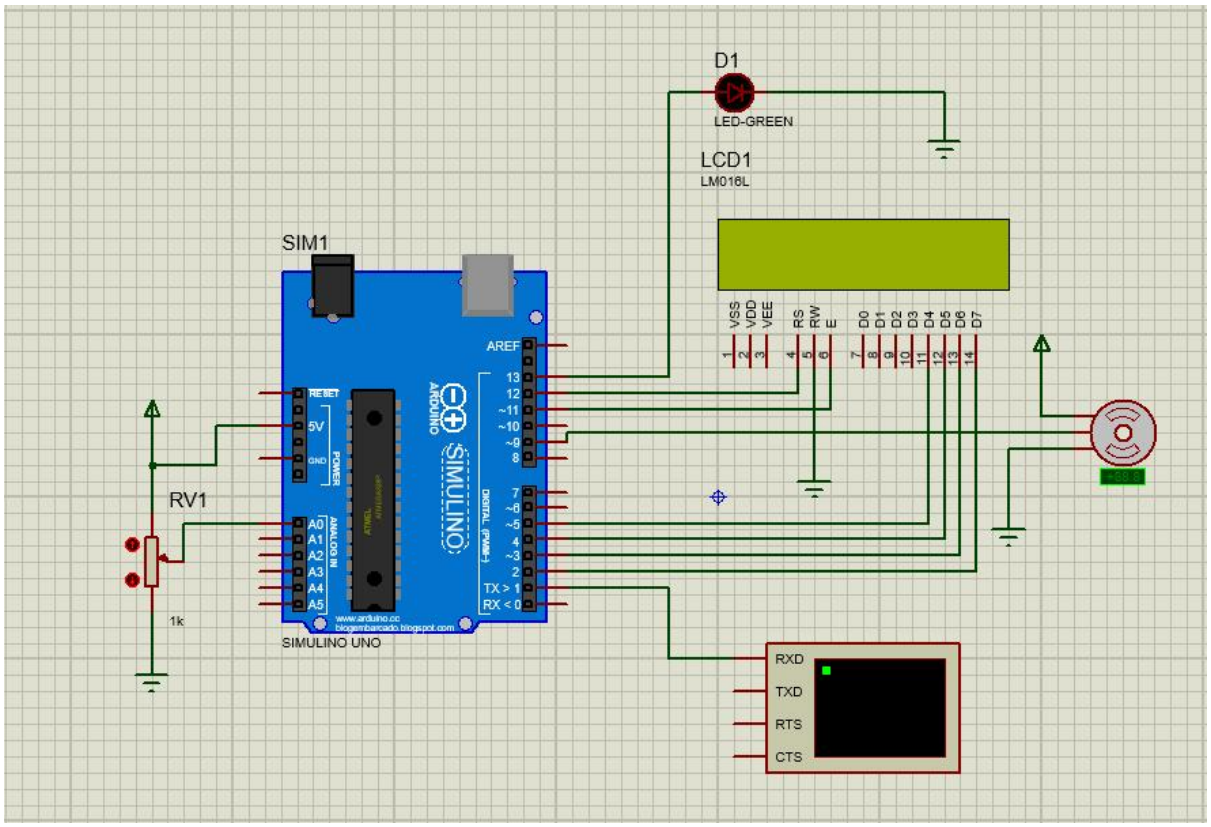
8. This is an open loop system To make a closed loop system :-

An automatic glucose injector is added represented by a servo motor .

So now if the glucose level drops to 70 the glucose is injected to blood to maintain a normal blood sugar .

9. Modefied circuit

a servo motor is added representing the injector

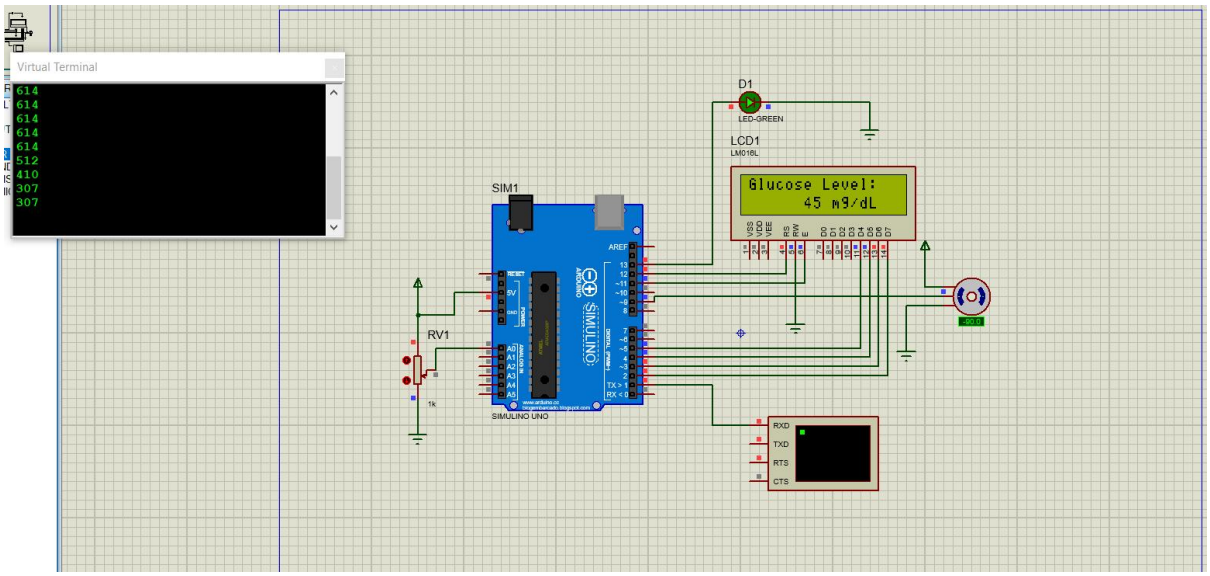


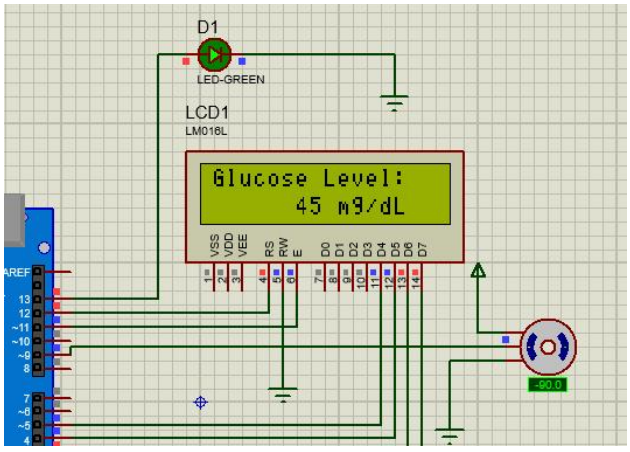
10. Modefied code

the if condition now not only turn the led on and off but it also turns on the injector for a period of time to provide the glucose to blood then turns off .

```
if (glucoseLevel < threshold) {
  digitalWrite(ledPin, HIGH);
  delay(5000);
  injector.write(90); // Move servo to inject
  delay(1000);
  injector.write(0);
} else {
  digitalWrite(ledPin, LOW);
}
delay(500);
```

Glucose level below 477 (70 ml/dl)
Led -> ON
Moor -> ON for 1000 ms





Drive link with the contents
https://drive.google.com/drive/folders/1tY9fE8rBXrloSQbh8oj9r6nVp8DdeEhM?usp=sharing

github link :-
https://github.com/narcissus1212/blood-sugar-monitor.git