

μCONTROLLER PROGRAMMING

OVERVIEW

Reflexes and Memory Test

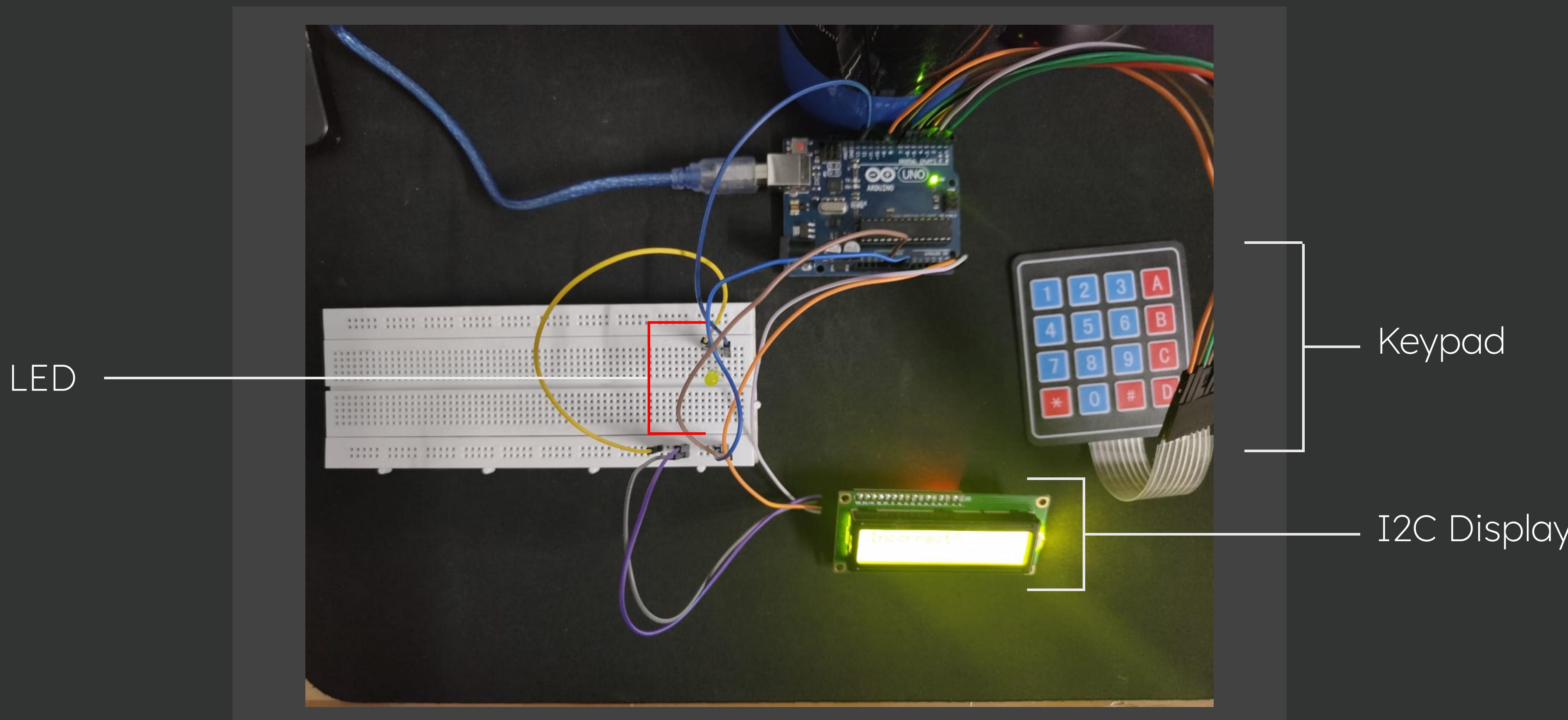
Simple test of memory and reflexes using an LED, a keypad and an I2C display.

The rules of the game are simple, the user has to observe and memorize an LED blinking a random number of times and enter it through the keypad

ARDUINO

OVERVIEW

The Circuit



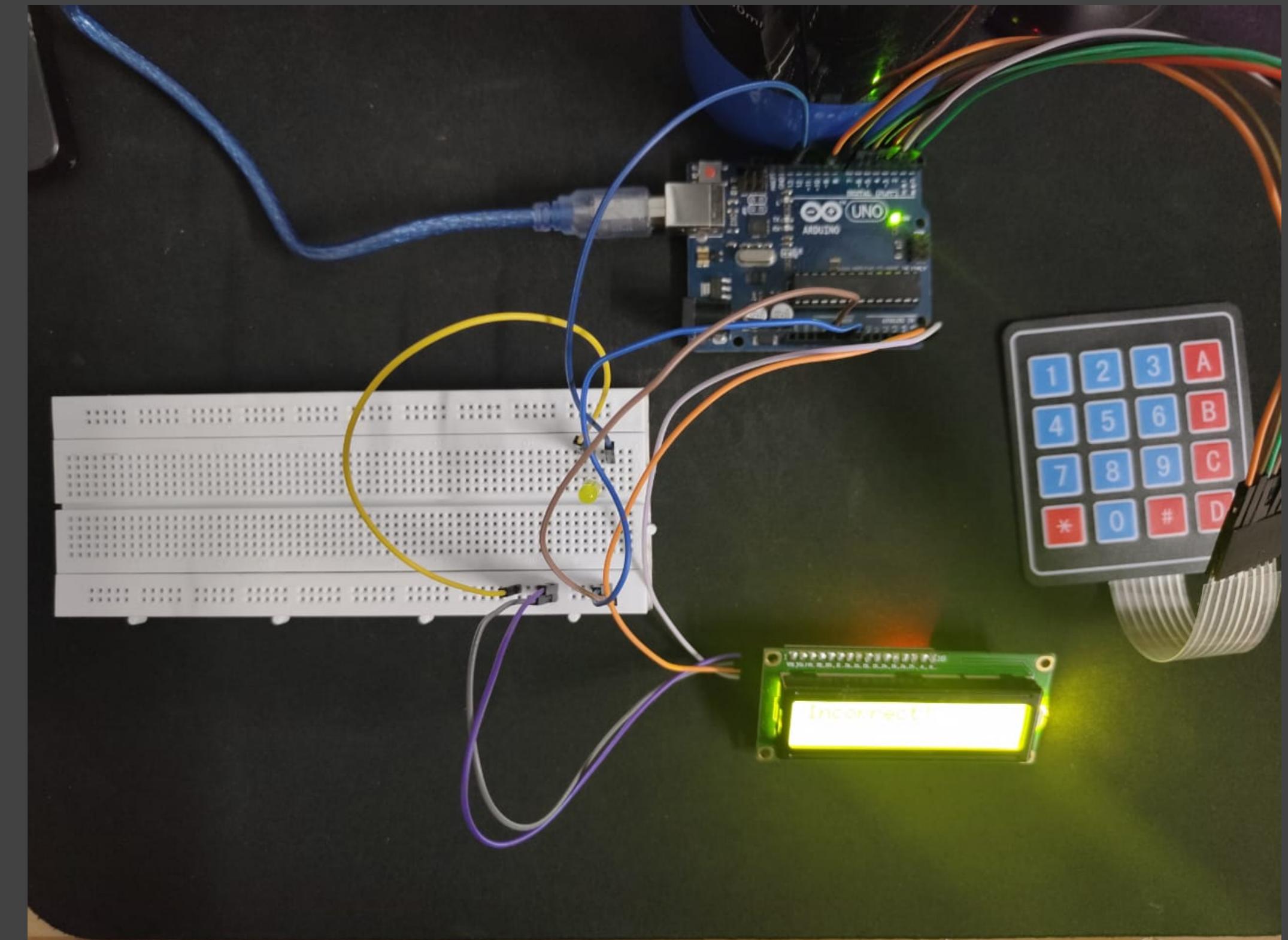
ARDUINO

OVERVIEW

The Circuit

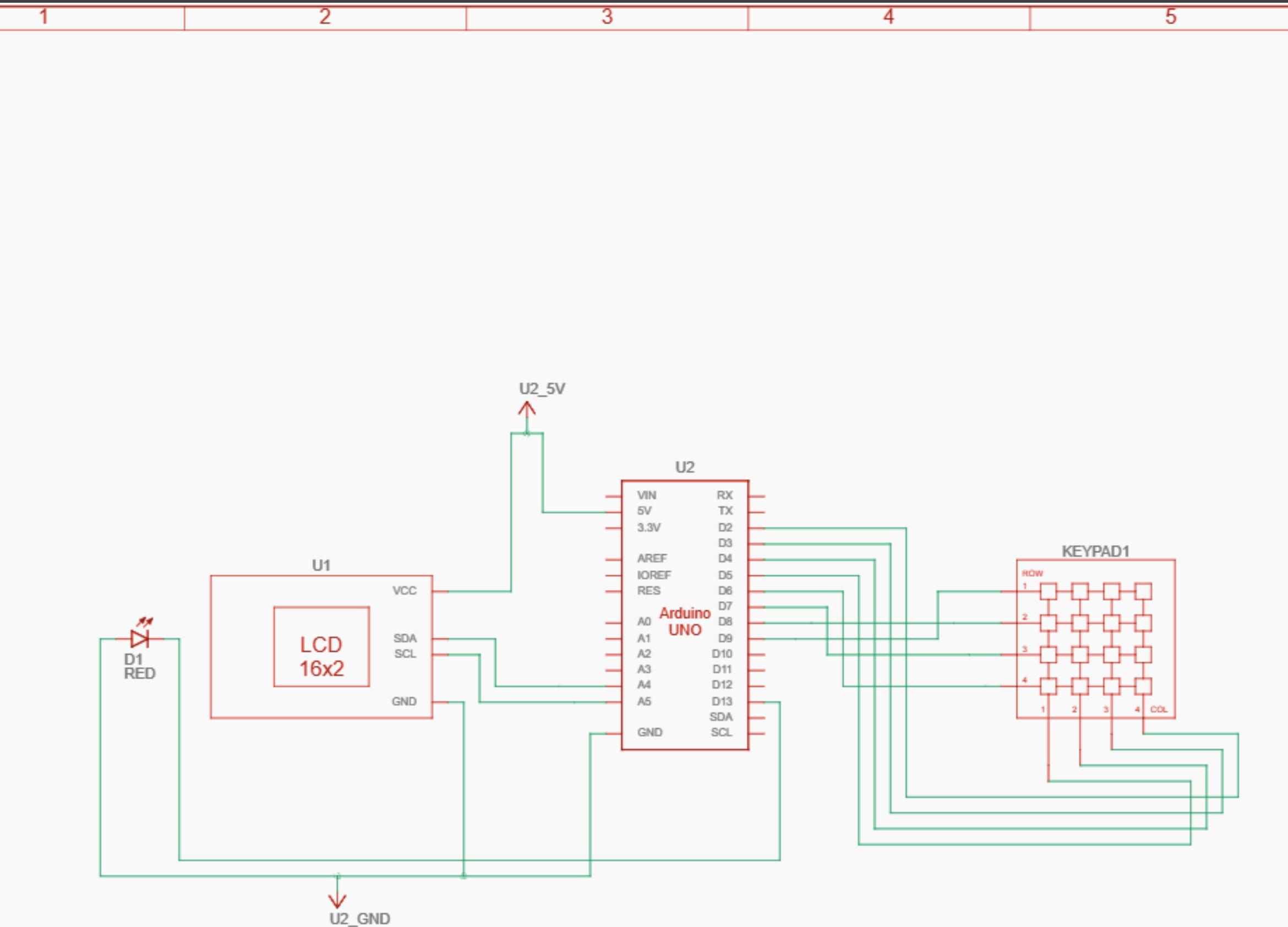
The circuit combines 3 components

- LED - Blinks random number of times . (Range of 1-15)
- I2C LCD Display - For feedback on inputs
- Keypad - For inputting values/ answer



ARDUINO

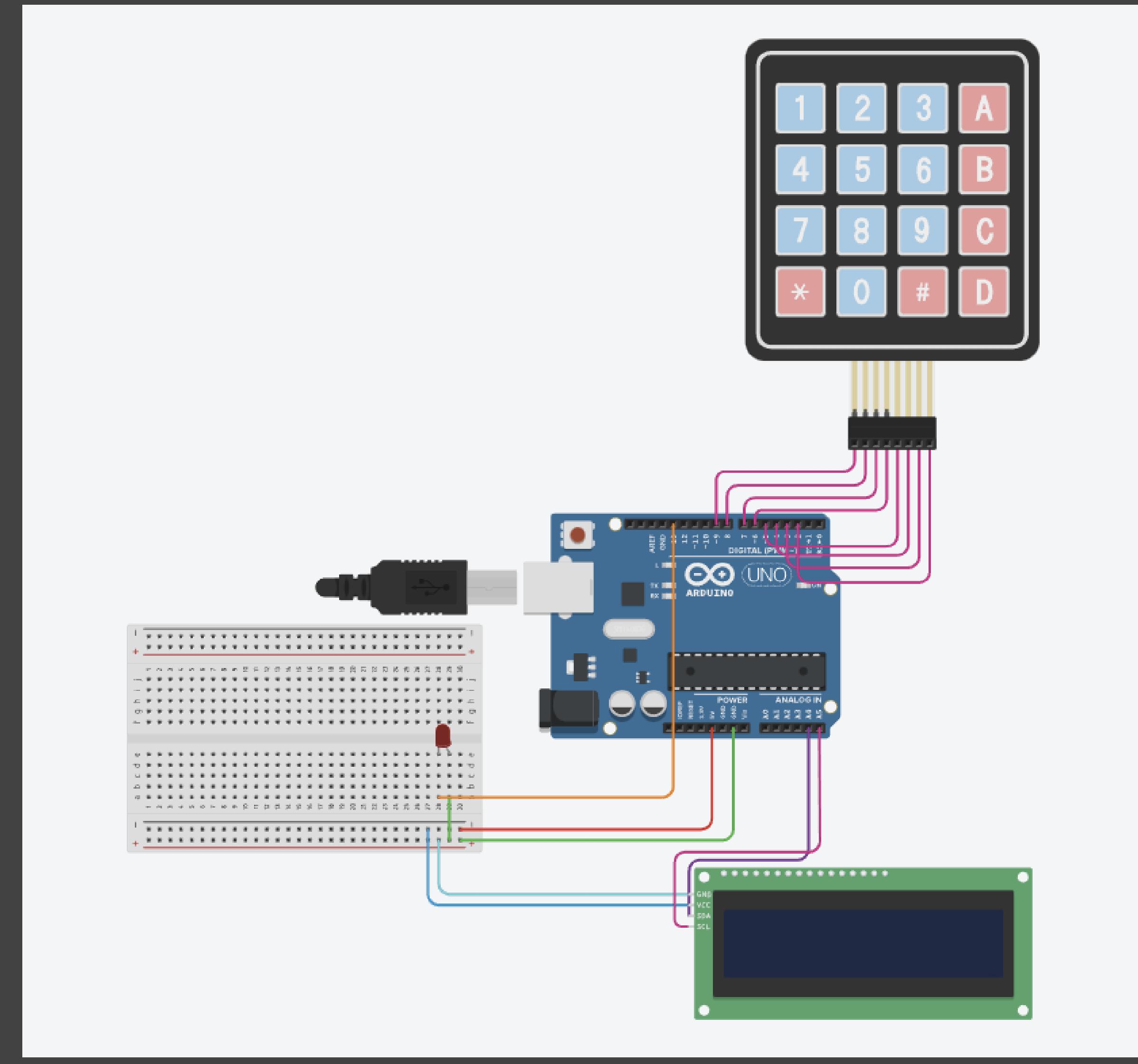
OVERVIEW



Title: Fantabulous Leelo-Inari

Date: 4/28/2023, 3:15:32 AM

OVERVIEW

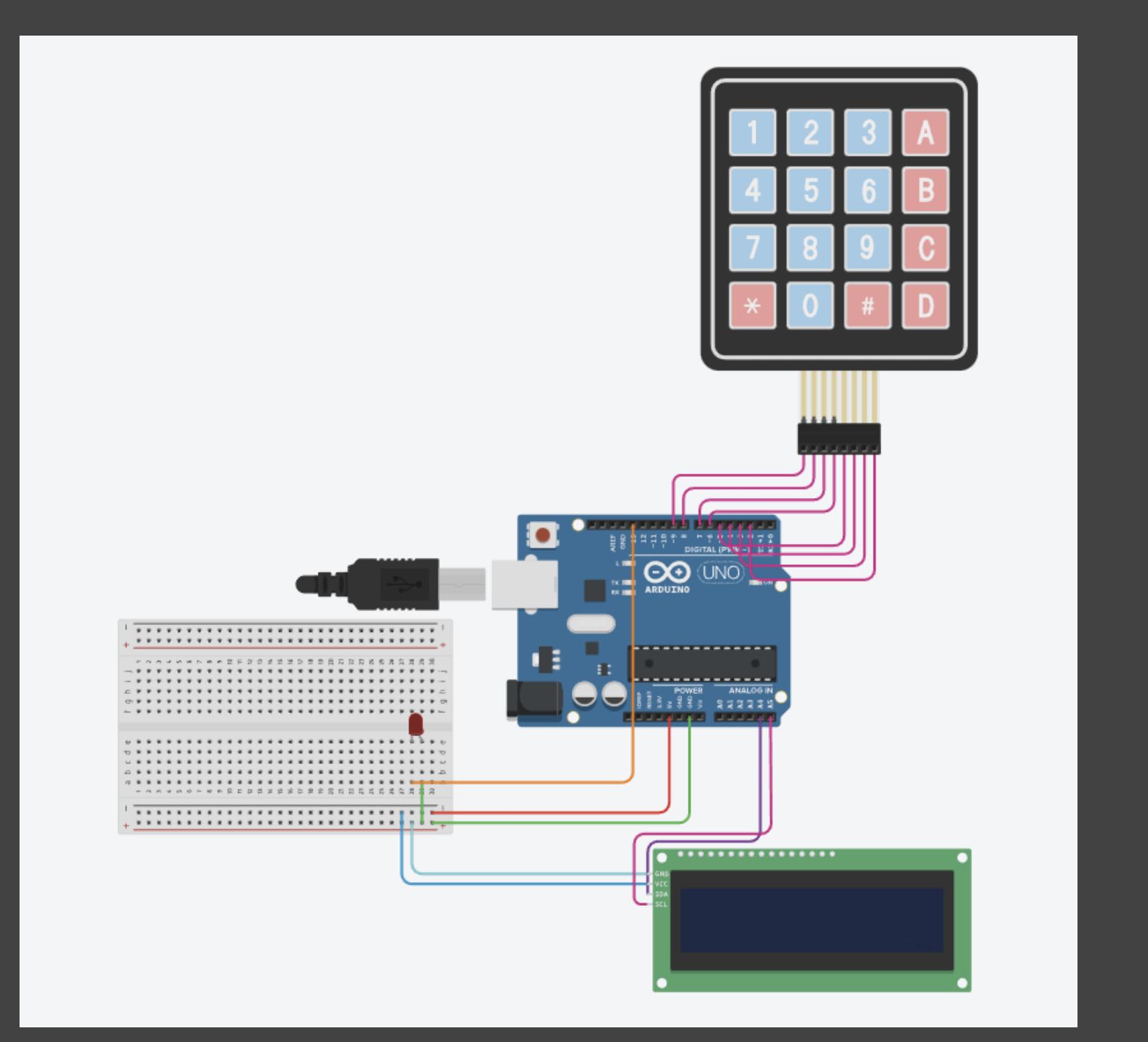


OVERVIEW

Wiring

The wiring in the circuit has an LED, with pins connected to the board at 13, a keypad connected to the board at slots 9-6 (R1-R4) and 5-2 (C1-C4), and an I2C display.

It involves integration of the three components to generate a memorable experience for the user and test their memory's limits.



OVERVIEW

Code

The Code for the circuit follows the following basic logic guidelines:

- **Initialize the LED, LCD display, and keypad objects.**
- Define a function to read and return a number from the keypad
- Define a function to blink the LED a random number of times.
- In the setup() function, initialize the pins and display a welcome message on the LCD display.
- In the loop() function, call the blinkRandom() function to blink the LED a random number of times and call the getNumber() function to read the number from the keypad.
- If the number entered by the user matches the blink count, display a success message on the LCD display. Otherwise, display a failure message.
- Wait for a few seconds before starting the loop again.

```
sketch_apr13a.ino
1 #include <Wire.h>
2 #include <LiquidCrystal_I2C.h>
3 #include <Keypad.h>
4
5 LiquidCrystal_I2C lcd(0x27, 16, 2);
6 const byte ROWS = 4;
7 const byte COLS = 4;
8 char keys[ROWS][COLS] = {
9     {'1', '2', '3', 'A'},
10    {'4', '5', '6', 'B'},
11    {'7', '8', '9', 'C'},
12    {'*', '0', '#', 'D'}
13};
14 byte rowPins[ROWS] = {9, 8, 7, 6};
15 byte colPins[COLS] = {5, 4, 3, 2};
16 Keypad keypad = Keypad(makeKeymap(keys), rowPins, colPins, ROWS, COLS);
17
18 const int ledPin = 13;
19 int blinkCount = 0;
20
21 void setup() {
22     lcd.begin();
23     lcd.backlight();
24     pinMode(ledPin, OUTPUT);
25     randomSeed(analogRead(0));
26     blinkRandom();
27
28 void loop() {
29     char key = keypad.getKey();
30     if (key == '#') {
31         lcd.clear();
```

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```
28 < void loop() {  
29     char key = keypad.getKey();  
30     if (key == '#') {  
31         lcd.clear();  
32         lcd.setCursor(0, 0);  
33         lcd.print("Please Wait...");  
34         lcd.setCursor(0, 1);  
35         delay(1000);  
36         if (blinkCount == getNumber()) {  
37             lcd.clear();  
38             lcd.setCursor(0, 0);  
39             lcd.print("Correct!");  
40         } else {  
41             lcd.clear();  
42             lcd.setCursor(0, 0);  
43             lcd.print("Incorrect!");  
44         }  
45         delay(1000);  
46         blinkRandom();  
47     }  
48 }  
49 }  
50 int getNumber() {  
51     int number = 0;  
52     char key = keypad.getKey();  
53     lcd.clear();  
54     lcd.setCursor(0, 0);  
55     lcd.print("Enter number:");  
56     while (key != '#') {  
57         if (key >= '0' && key <= '9') {  
58             number = number * 10 + (key - '0');
```

OVERVIEW

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55    lcd.print("Enter number:");  
56    while (key != '#') {  
57      if (key >= '0' && key <= '9') {  
58        number = number * 10 + (key - '0');  
59        lcd.setCursor(0, 1);  
60        lcd.print("          ");  
61        lcd.setCursor(0, 1);  
62        lcd.print(number);  
63        key = keypad.getKey();  
64      }  
65    }  
66  }  
67  
68  
69  void blinkRandom() {  
70    blinkCount = random(1, 15);  
71    for (int i = 0; i < blinkCount; i++) {  
72      digitalWrite(ledPin, HIGH);  
73      delay(250);  
74      digitalWrite(ledPin, LOW);  
75      delay(250);  
76    }  
77  }
```

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53         lcd.clear();
54         lcd.setCursor(0, 0);
55         lcd.print("Enter number:");
56         while (key != '#') {
57             if (key >= '0' && key <= '9') {
58                 number = number * 10 + (key - '0');
59             }
60             if (key >= '0' && key <= '9') {
61                 number = number * 10 + (key - '0');
62             }
63             key = keypad.getKey();
64         }
65         return number;
66     }
67
68
69     void blinkRandom() {
70         blinkCount = random(1, 15);
71         for (int i = 0; i < blinkCount; i++) {
72             digitalWrite(ledPin, HIGH);
73             delay(250);
74             digitalWrite(ledPin, LOW);
75             delay(250);
76         }
77     }
```

DEMO

<https://youtu.be/CbPb2CVxdRU>

Source Code

<https://github.com/shagore/ard4/blob/main/assignment4.ino>