

# μCONTROLLER PROGRAMMING

# OVERVIEW

## Reflexes and Memory Test

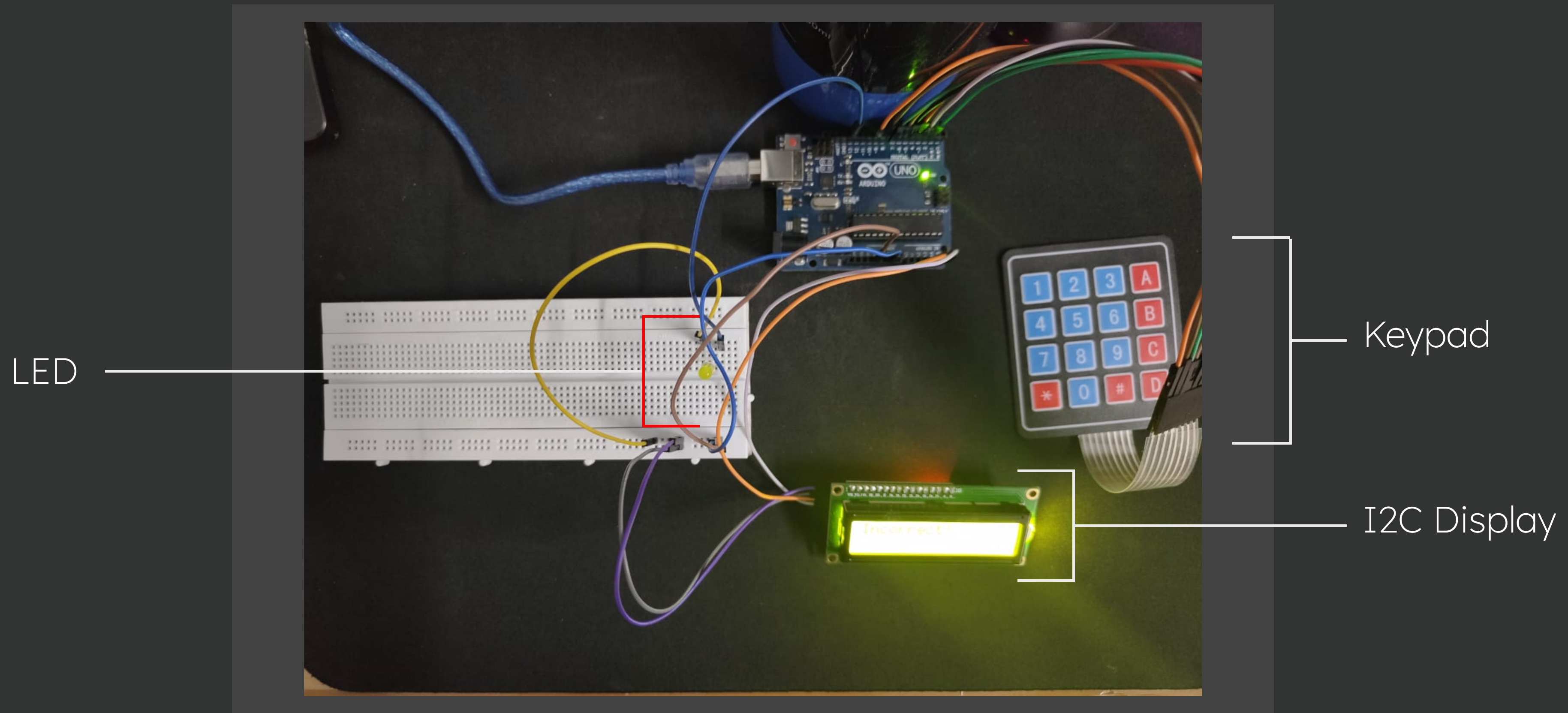
Simple test of memory and reflexes using an LED, a keypad and an I2C display.

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



# OVERVIEW

## The Circuit



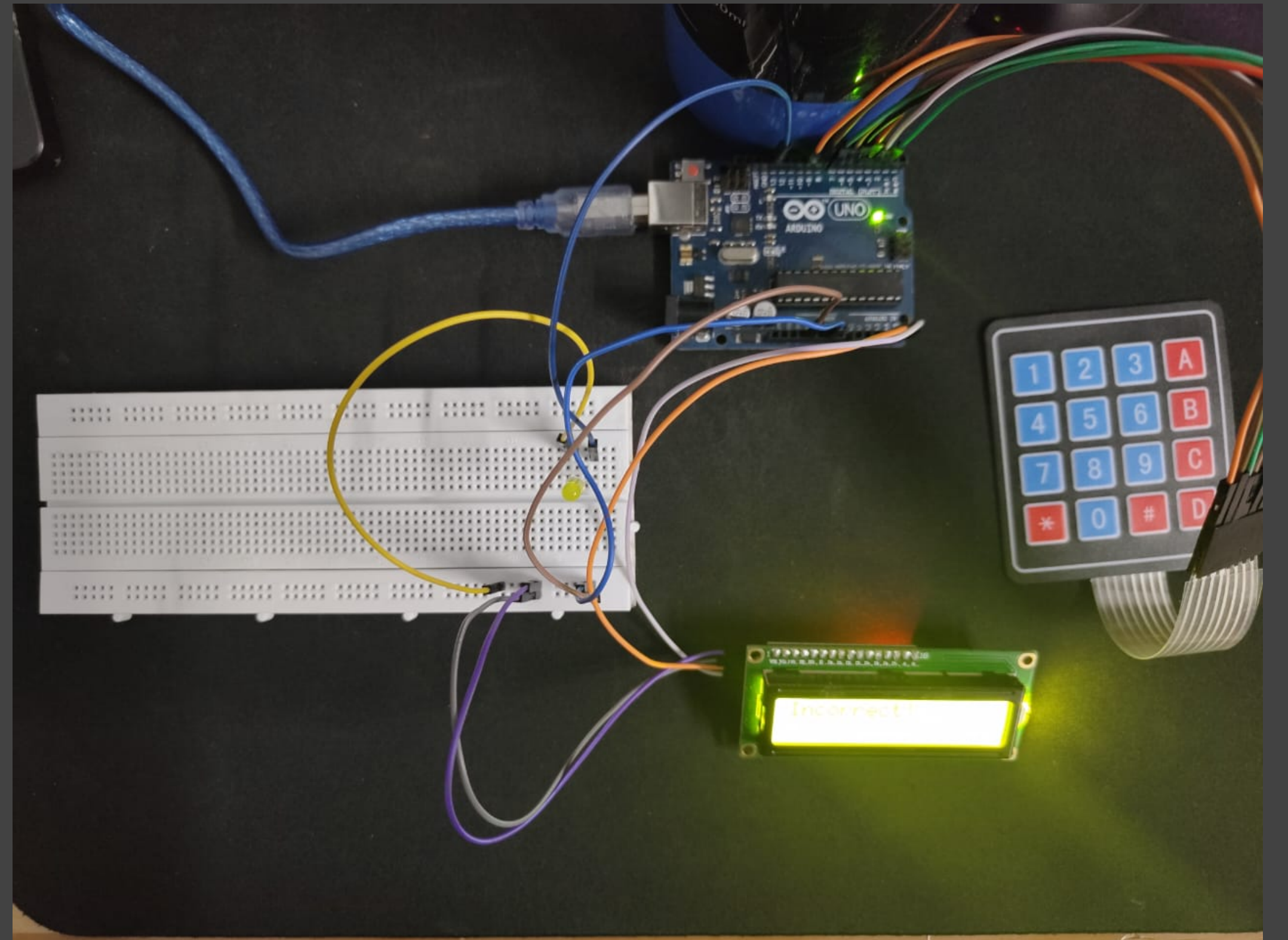


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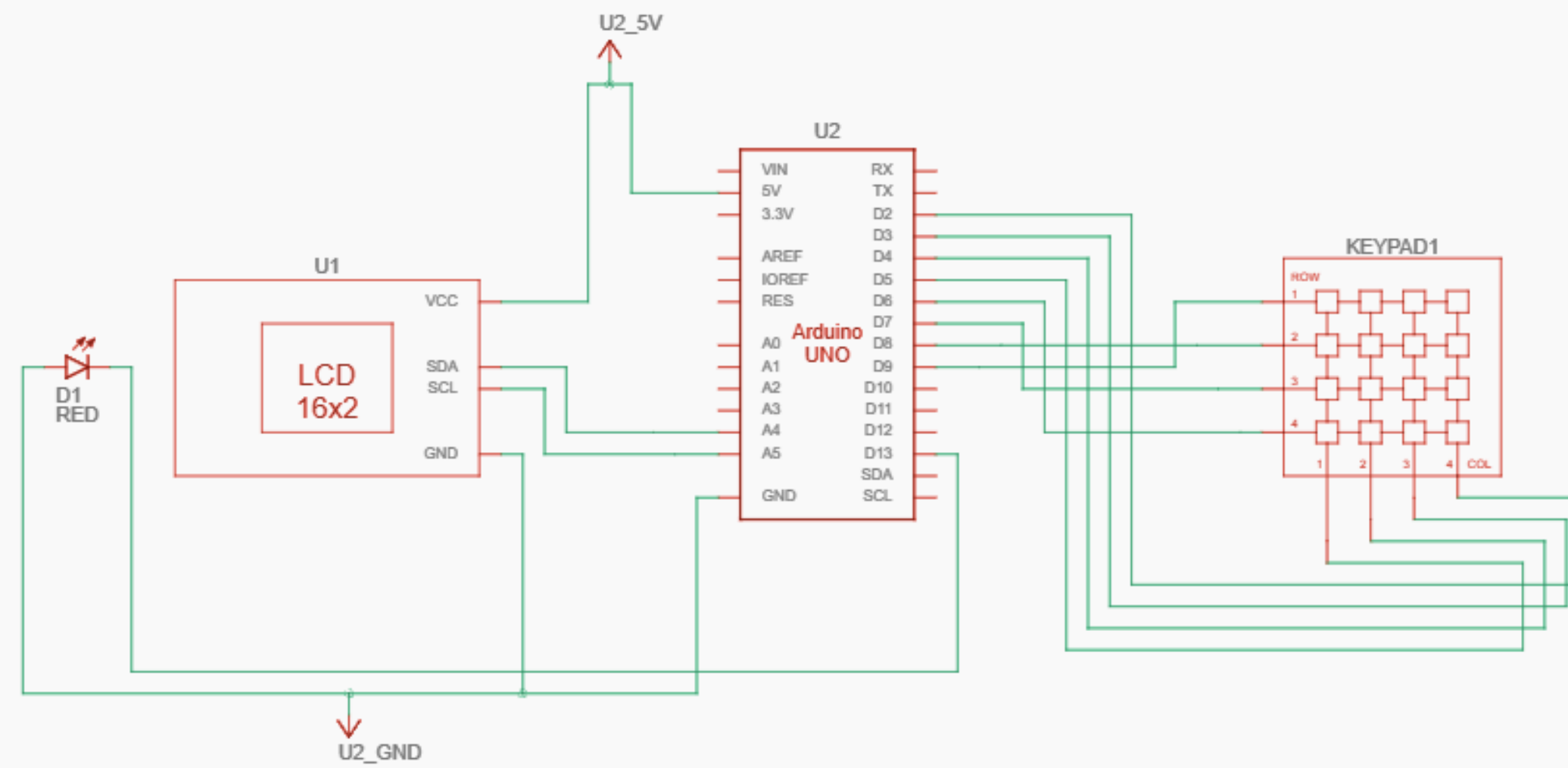
## The Circuit

The circuit combines 3 components

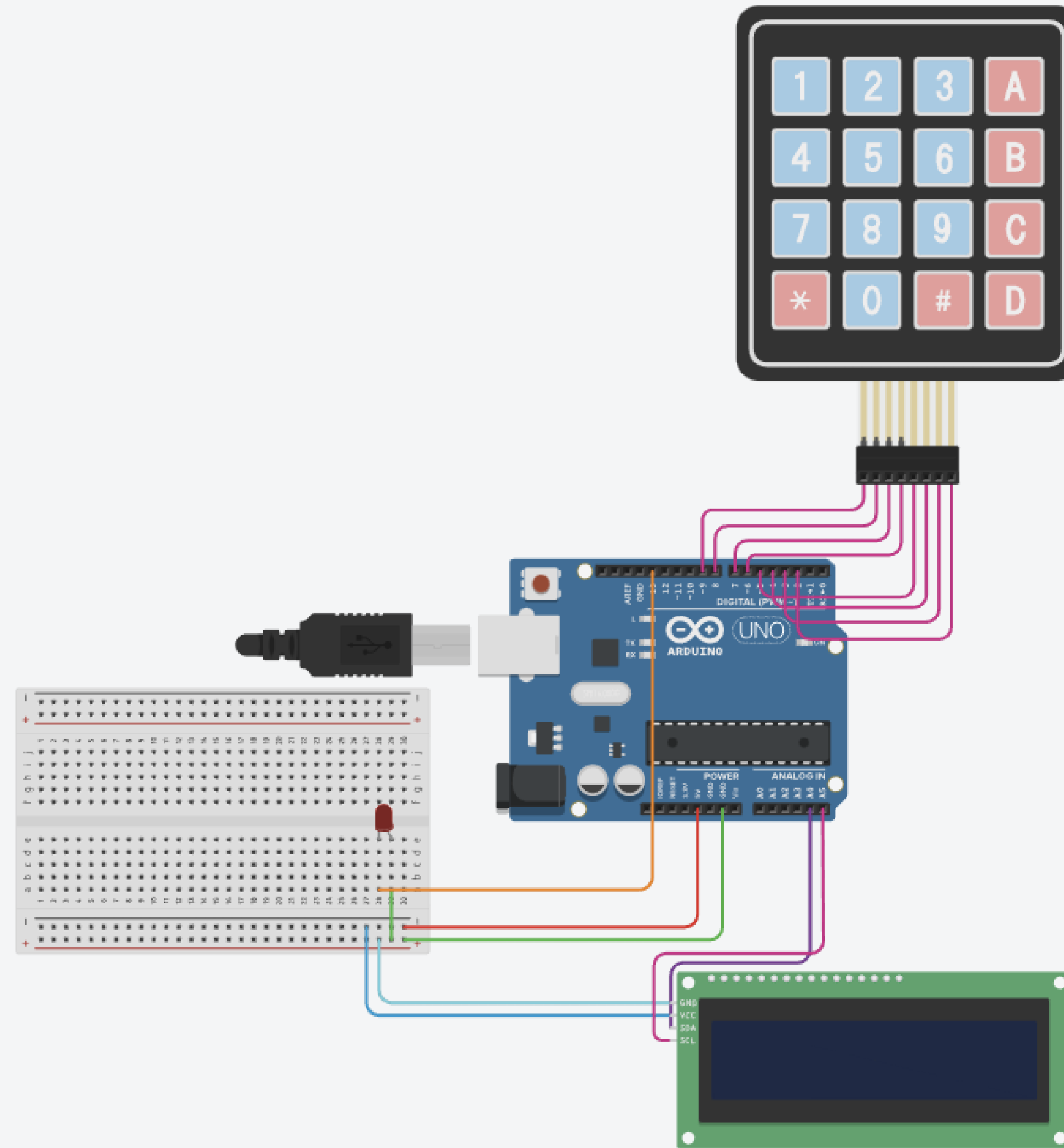
- LED - Blinks random number of times . (Range of 1-15)
- I2C LCD Display - For feedback on inputs
- Keypad - For inputting values/ answer



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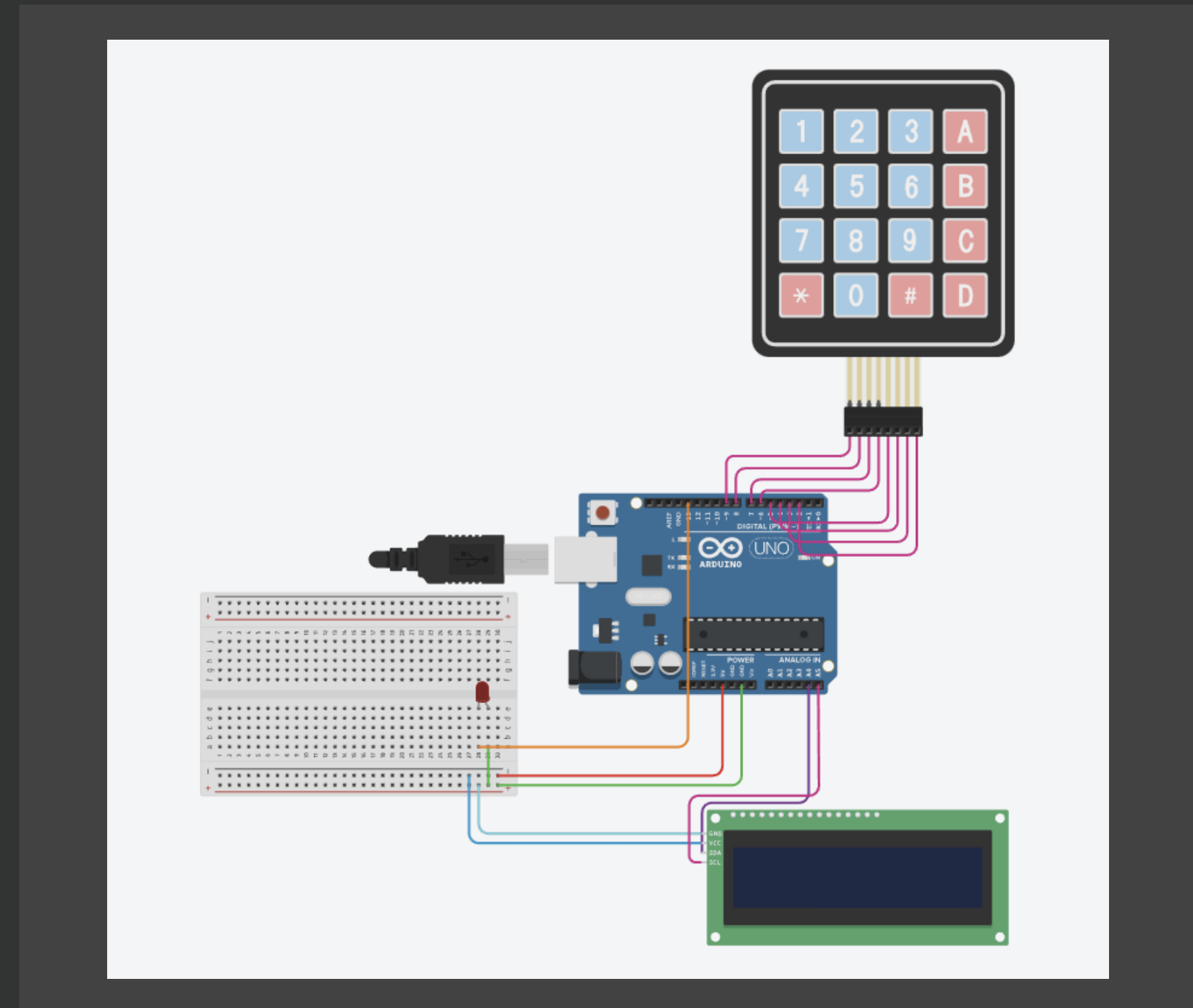


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## Wiring

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.





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## 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
36         delay(1000);
37         if (blinkCount == getNumber()) {
38             lcd.clear();
39             lcd.setCursor(0, 0);
40             lcd.print("Correct!");
41         } else {
42             lcd.clear();
43             lcd.setCursor(0, 0);
44             lcd.print("Incorrect!");
45         }
46         delay(1000);
47         blinkRandom();
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');
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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     return number;
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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sketch\_apr13a.ino

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71     digitalWrite(ledPin, HIGH);
72     delay(250);
73     digitalWrite(ledPin, LOW);
74     delay(250);
75   }
76 }
77 }
```

# DEMO

<https://youtu.be/CbPb2CVxdRU>

Source Code

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