INTERFACE KEYPAD(4X4 or 4X3 membrane)

with ARDUINO

1	2	3	A
4	5	6	B
7	8	9	C
*	0	#	D

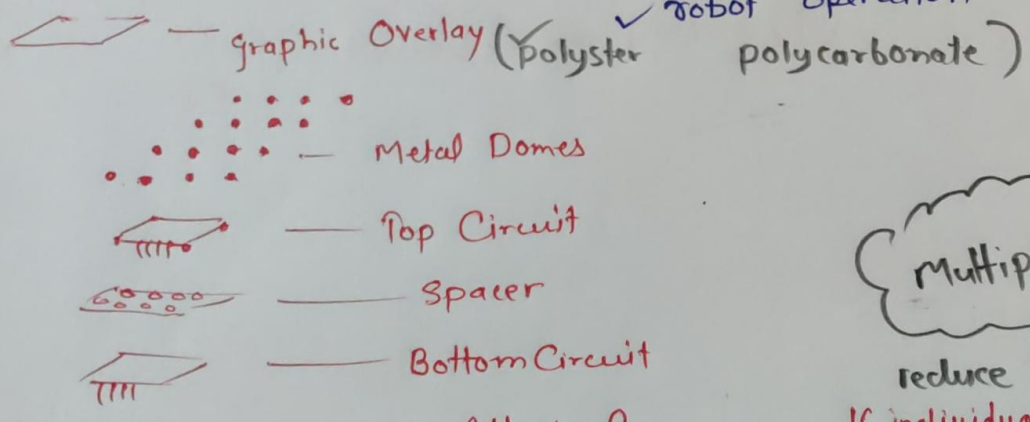
(RXC)
(4X4)
16 keys

1	2	3
4	5	6
7	8	9
*	0	#

(RXC)
4X3
12 keys

→ Program that require user input.

- ✓ menu Selection
- ✓ Password Entry
- ✓ robot operation



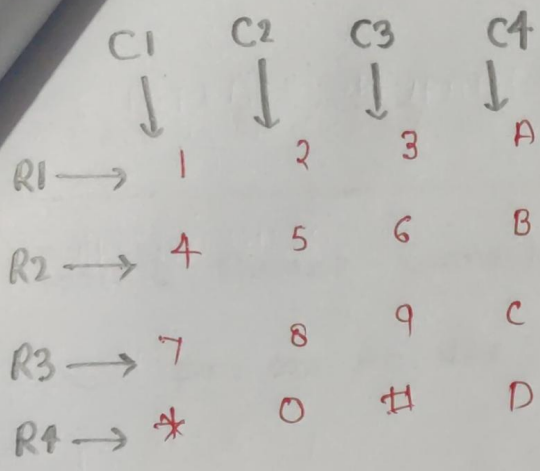
Multiplexing

reduce I/o Connection

16 individual pushbuttons

17 I/o pins one for each pushbutton & one for GND

For 4X4 – 8 pins Require



(4x4) ⇒ 8 pins

One pin for Row } → One Pushbutton
One pin for Column }
One pin for GND } → GND.

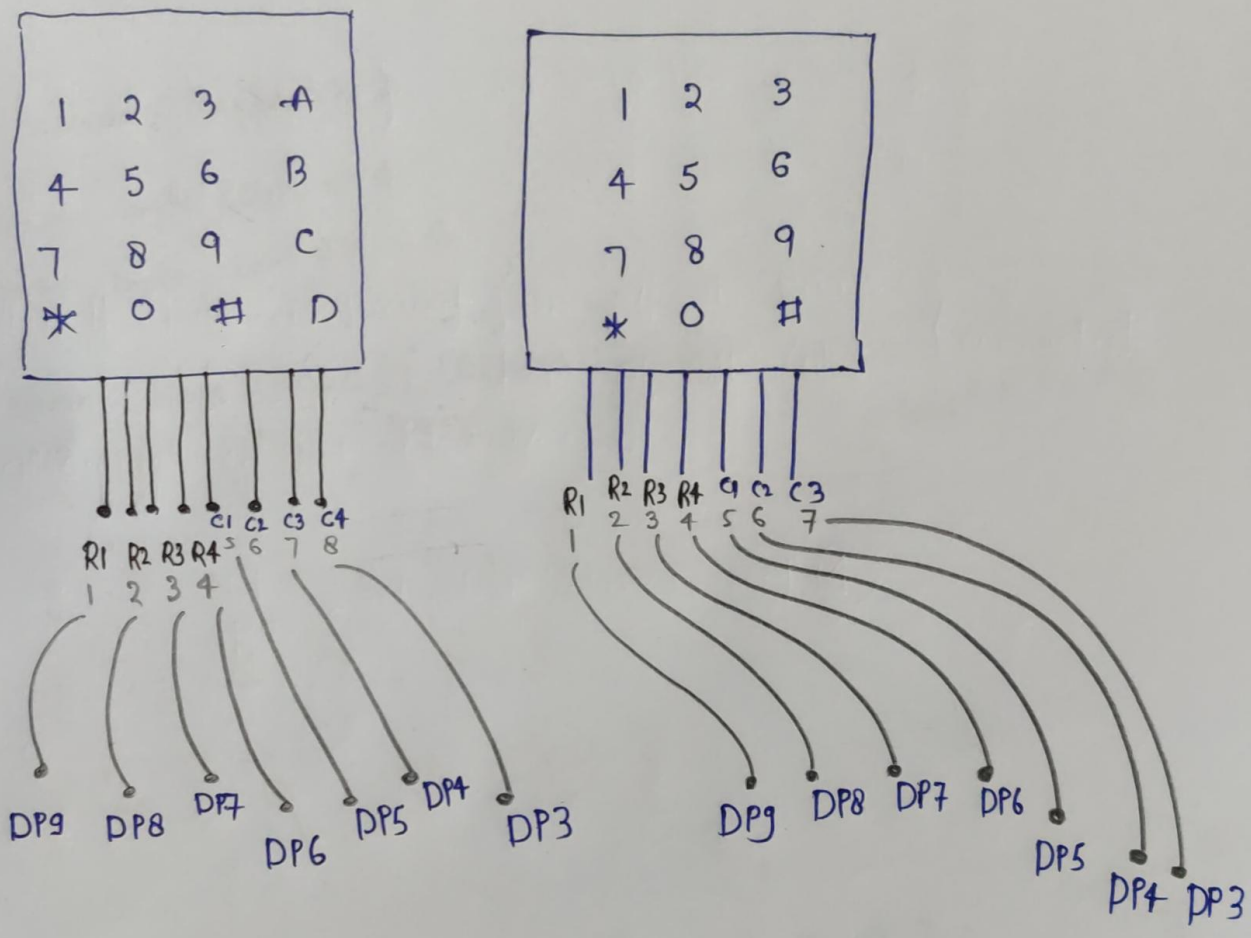
When the button is pressed { one of the ROWS / one of the Column } connected allowing current flow b/w them.

Ex : C1, R2 > activated when pressed (4)

4x4 & 4x3 Keypad Pin Out

female Dupont Connector.

row pins are on the left (dark strip).



8 pin Male to Male Dupont ribbon Cable

STALLING KEYPAD LIBRARY

```
#include <Keypad.h>          //mark stanley
```

Sketch > Include Library > Manage Libraries.

```
#include<Keypad.h>

const byte ROWS = 4
const byte COLUMNS = 4

char Keys[ROWS][COLUMNS] ={
  {'1','2','3','A'}
  {'4','5','6','B'}
  {'7','8','9','C'}
  {'*','0','#','D'}
                    };

byte rowPins[ROWS] = { 9, 8, 7, 6 };
byte colPins[COLUMNS] = { 5, 4, 3, 2 };
```

Key Pad Pin def.

Arduino Pin def.

```
Keypad keypad = Keypad(makeKeymap(keys), rowPins, colPins, ROWS, COLS);
```

- `makeKeymap(keys)` — 2D Array
- `rowPins` — DP Row Array
- `colPins` — DP Column Array
- `ROWS` — keypad Row Size - 4
- `COLS` — keypad Column Size - 4

```
void setup()
{
  Serial.begin(9600);
}

Void loop()
{
  char key = keypad.getkey();

  if (key)
    {
      Serial.print("Key Pressed: ");
      Serial.print(key);

    }
}
```

Read the key

Some Useful functions for <Keypad.h>

char waitForKey()

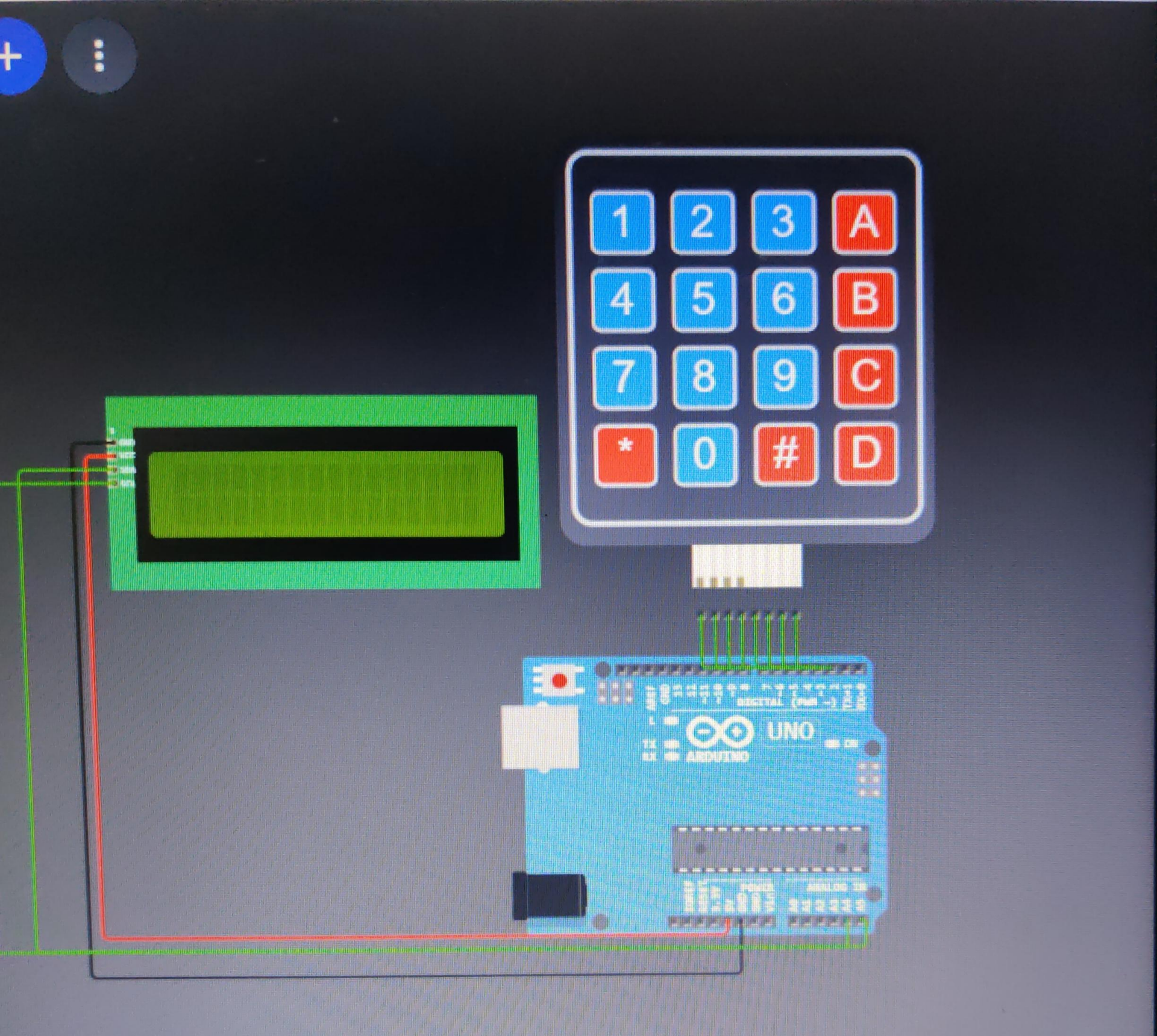
KeyState getState() — returns the current State of Key
- IDLE.
- PRESSED.
- RELEASED.
- HOLD.

boolean keyStateChanged()

setHoldTime(unsigned int time)

setDebounceTime(unsigned int time)

addEventListner(KeypadEvent) — triggers an event if the Keypad is used.


1 2 3 A
4 5 6 B
7 8 9 C
* 0 # D
UNO
ARDUINO

wokwi.com

WOKWI SHARE read_input_from_KEYPAD_PRINT_ON_L
by himanshu4665

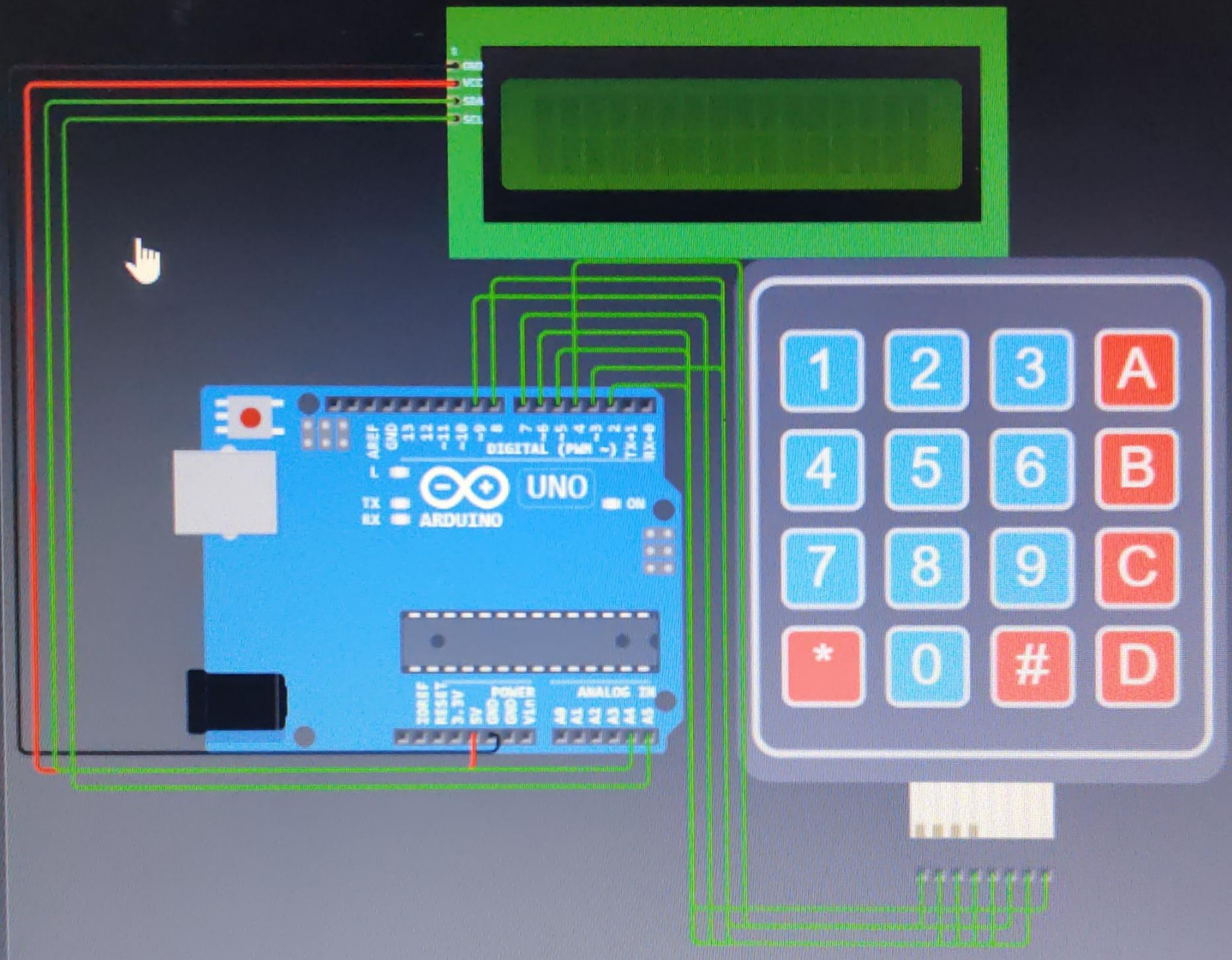
sketch.ino | diagram.json | libraries.txt | Library Manager

```ino
#include <Keypad.h>
#include <LiquidCrystal_I2C.h>
#include <Wire.h>>
const byte ROWS = 4; //four rows
const byte COLS = 4; //four columns

char keys[ROWS][COLS] = {
  {'1','2','3','A'},
  {'4','5','6','B'},
  {'7','8','9','C'},
  {'*','0','#','D'}
};

byte rowPins[ROWS] = {9, 8, 7, 6}; //connect to the row pinouts of the keypad
byte colPins[COLS] = {5, 4, 3, 2}; //connect to the column pinouts of the keyp

//Create an object of keypad
Keypad keypad = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS );
LiquidCrystal_I2C lcd(0x27,16,2);

void setup(){
  lcd.init();
  lcd.clear();
  lcd.backlight();

}

void loop(){
  lcd.setCursor(1,0);
  char key = keypad.getKey();// Read the key
```

sketch.ino | diagram.json | libraries.txt | Library Manager

```
Keypad keypad = Keypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS );
LiquidCrystal_I2C lcd(0x27,16,2);

void setup(){
  lcd.init();
  lcd.clear();
  lcd.backlight();

}

void loop(){
  lcd.setCursor(1,0);
  char key = keypad.getKey();// Read the key

  // Print if key pressed
  if (key){
    lcd.print("Key Pressed : ");
    lcd.println(key);
  }
}
```

Simulation



ENG
13:02
11-12-2023

```ino
#include <LiquidCrystal_I2C.h>
#include<Wire.h>
#include <Keypad.h> //Header file for Keypad from https://github.com/Chris--A/

const byte ROWS = 4; // Four rows
const byte COLS = 4; // Three columns


char keys[ROWS][COLS] = {


  {'1','2','3','A'},


  {'4','5','6','B'},


  {'7','8','9','C'},


  {'*','0','#','D'}


};


byte rowPins[ROWS] = { 9,8,7,6};
// Connect keypad ROW0, ROW1, ROW2 and ROW3 to these Arduino pins.
byte colPins[COLS] = { 5,4,3,2 };
// Connect keypad COL0, COL1 and COL2 to these Arduino pins.
```