Lesson 13 Membrane Switch Module

Introduction

In this lesson, we will go over how to set up a keypad on an Arduino so that the UNO R3 can read the keys being pressed by a user.

Hardware Required

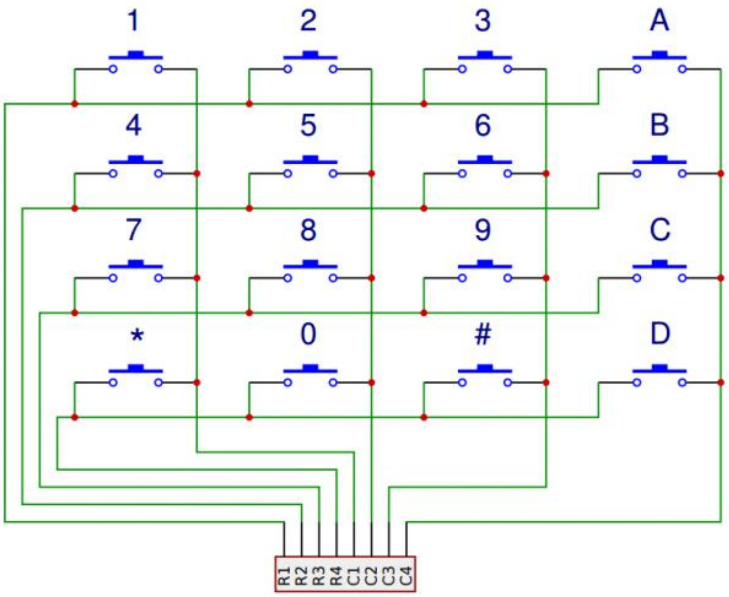
- ✓ 1 * RuiiGuu UNO R3
- ✓ 1 * Membrane Switch module
- ✓ 8 * M-M Jumper Wires

Principle

Membrane Switch Module（Keypads）

Membrane Switch Module（Keypads）is a great way to let users interact with your project. You can use them to navigate menus, enter passwords, and control games and robots. Pressing a button closes the switch between a column and a row trace, allowing current to flow between a column pin and a row pin.

The schematic for a 4X4 keypad shows how the rows and columns are connected:



Code interpretation

const byte ROWS = 4; **//four rows**

const byte COLS = 4; **//four columns**

//define the symbols on the buttons of the keypads

char hexaKeys

{'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 keypad

//initialize an instance of class NewKeypad

```
Keypad customKeypad = Keypad( makeKeymap(hexaKeys), rowPins, colPins, ROWS, COLS);

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

void loop(){
  char customKey = customKeypad.getKey();
  if (customKey){
    Serial.println(customKey);
  }
}
```

Experimental Procedures

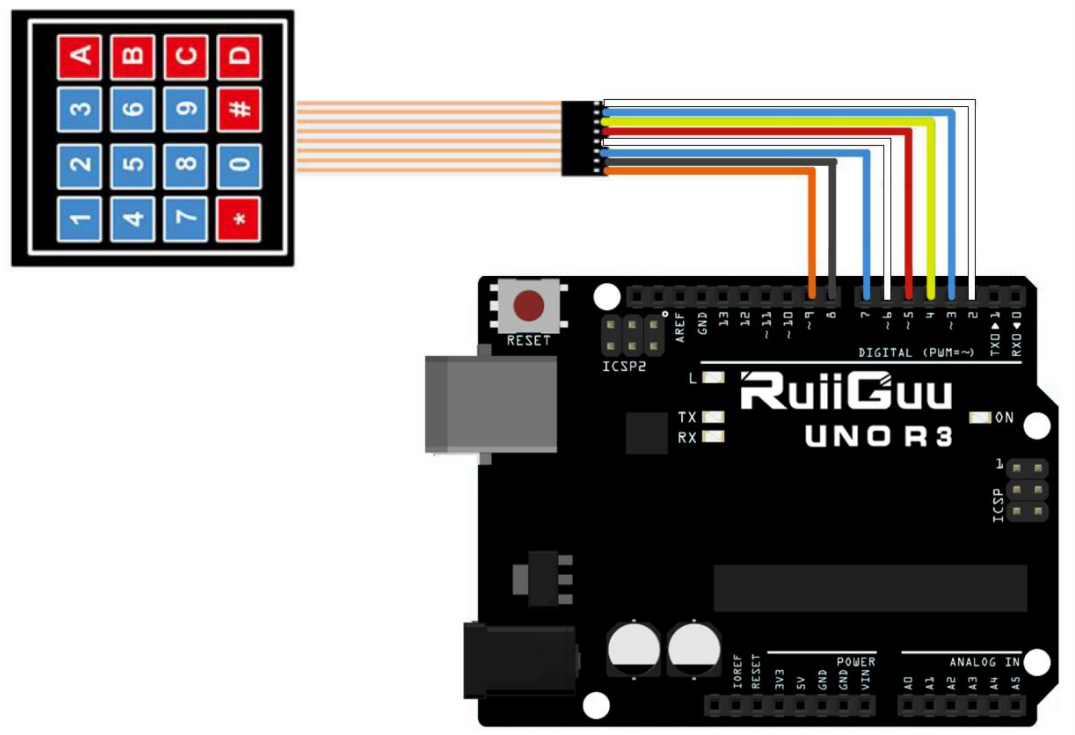
Step 1: Build the circuit

When connecting the pins to the UNO R3 board, we connect them to the digital output pins, D9-D2. We connect the first pin of the keypad to D9, the second pin to D8, the third pin to D7, the fourth pin to D6, the fifth pin to D5, the sixth pin to D4, the seventh pin to D3, and the eighth pin to D2.

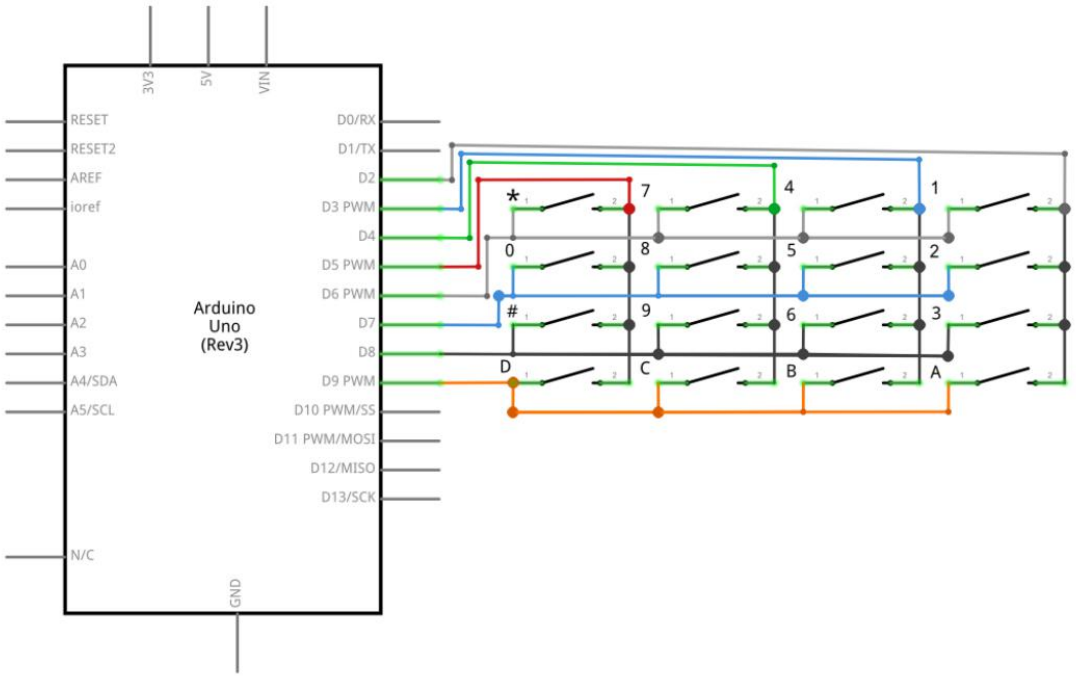
These are the connections in a table:

Keypad Pin	Connects to Arduino Pin
1	D9
2	D8
3	D7
4	D6
5	D5
6	D4
7	D3

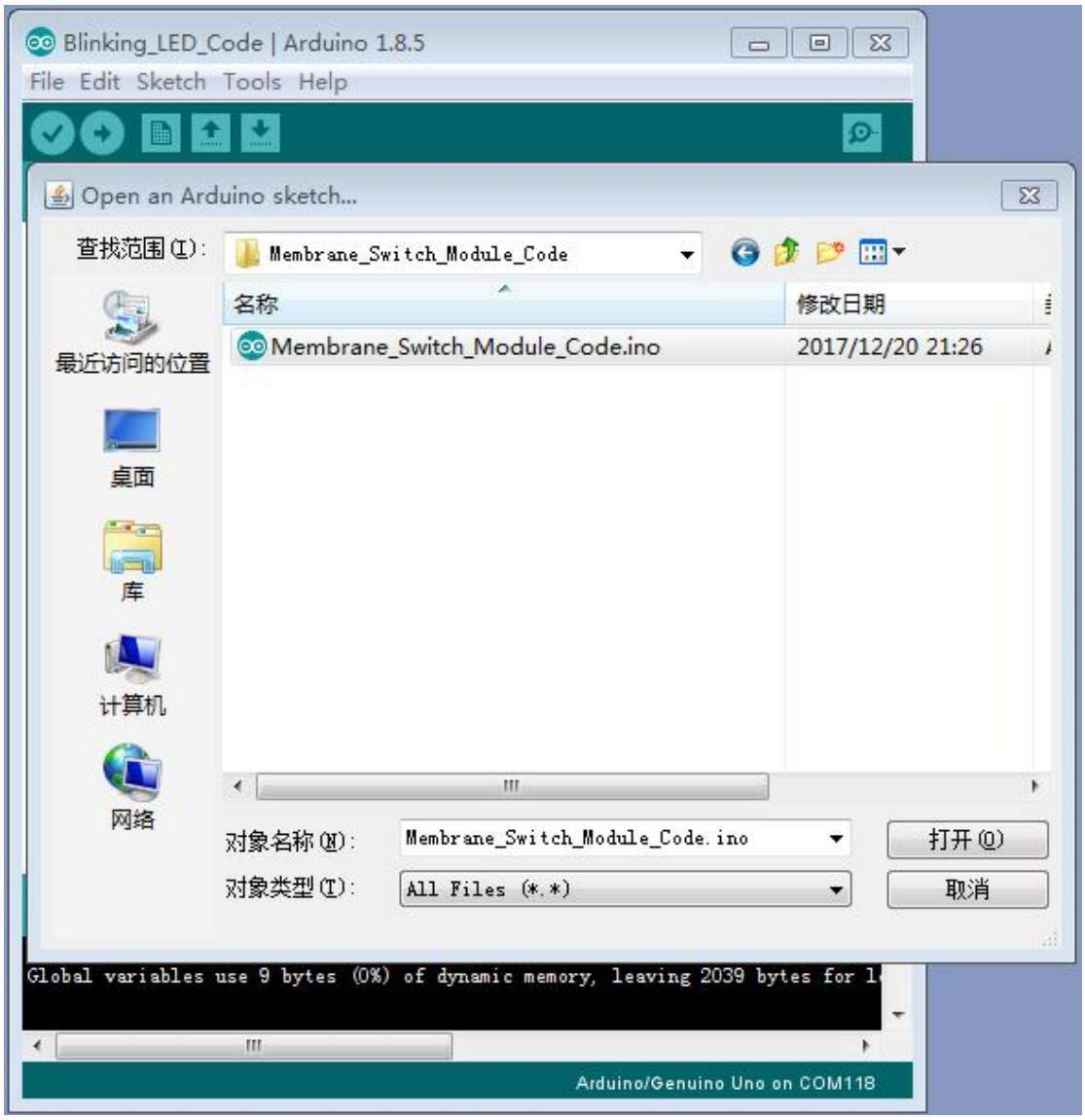
8	D2



Schematic Diagram

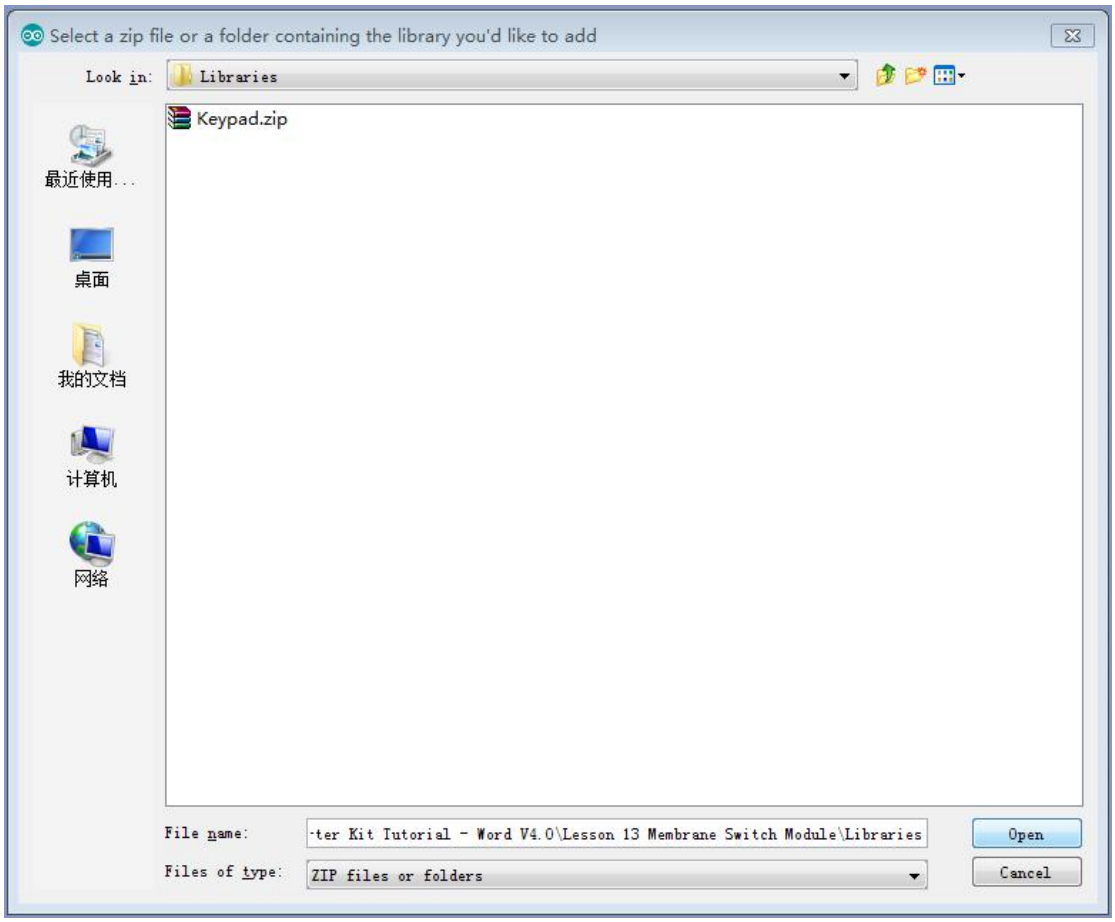


Step 2: Open the code:Membrane_Switch_Module_Code



Step 3: Attach Arduino UNO R3 board to your computer via USB cable and check that the 'Board Type' and 'Serial Port' are set correctly.

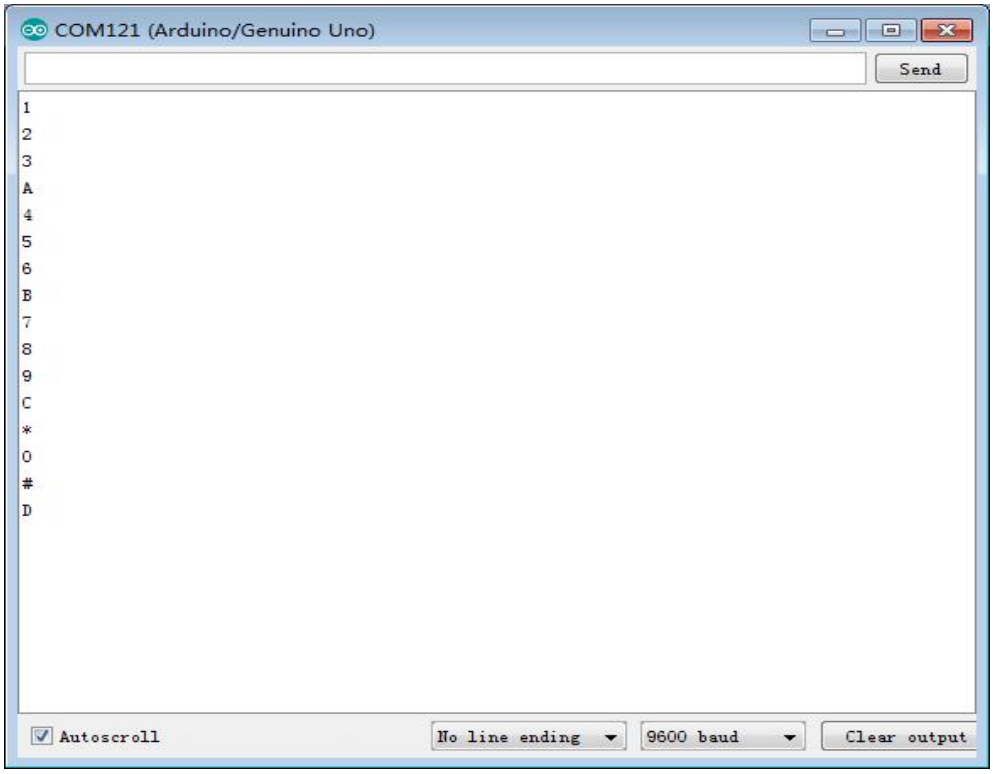
Step 4: Load the Libraries: Keypad



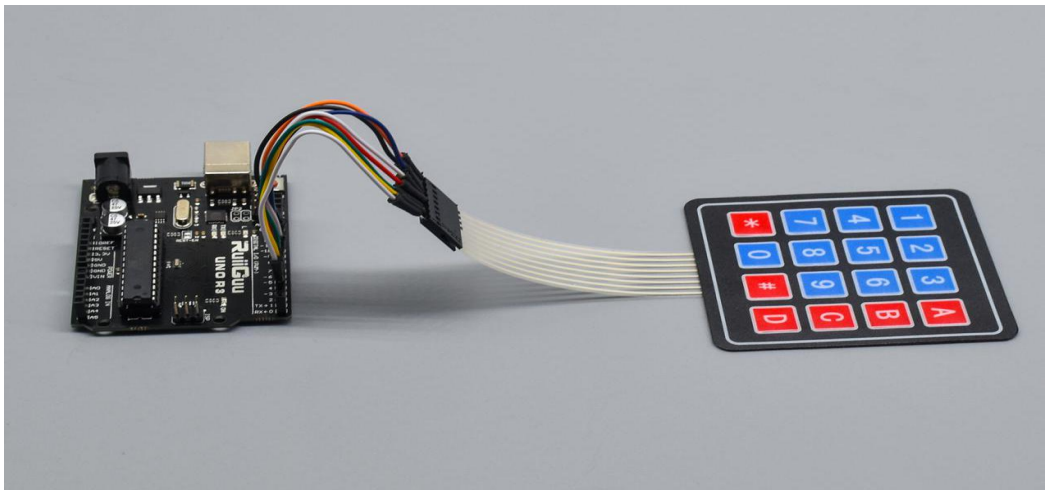
Step 5: Upload the code to the RuiiGuu UNO R3 board.

Step 6: Open the Serial Monitor then you can see the data as below:

(How to use the Serial Monitor is introduced in details in Lesson 0 Preface)



Then, when you press the Membrane Switch Module (Keypads), you can see the corresponding numbers and symbols on the monitor



If it isn’t working, make sure you have assembled the circuit correctly, verified and uploaded the code to your board. For how to upload the code and install the library, check Lesson 0 Preface.