HW SW Co-Design

Lecture Four

Keypad

Introduction To Keypad

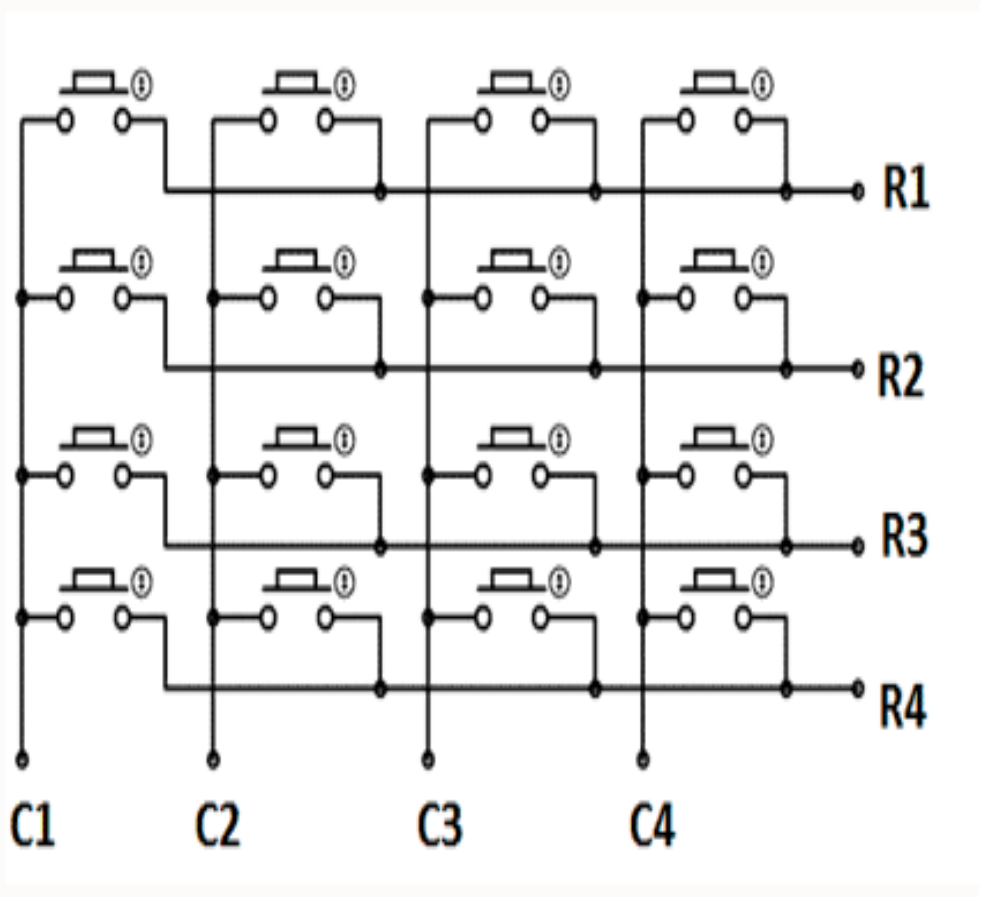
A **keypad** is a set of mechanical switches that are arranged in a Matrix to minimize the number of the used pins.

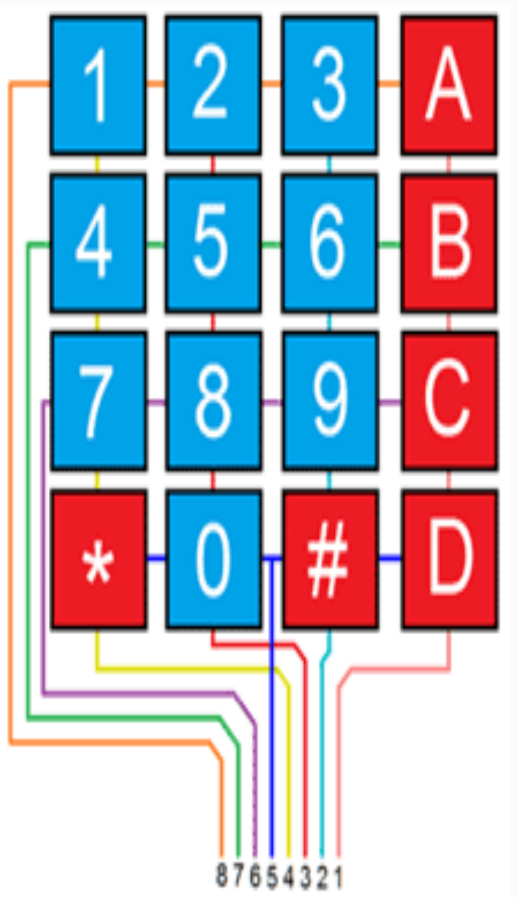
For example:

If we are going to implement a system that contains 16 switches, in the traditional way, each switch needs 1 input digital pin from the microcontroller. This means that the switches in the system would consume 16 pins. But if we applied the keypad concept, it would use only 8 pins of the microcontroller !

Simply, keypad is a way of minimizing the used pins of the mechanical switches.

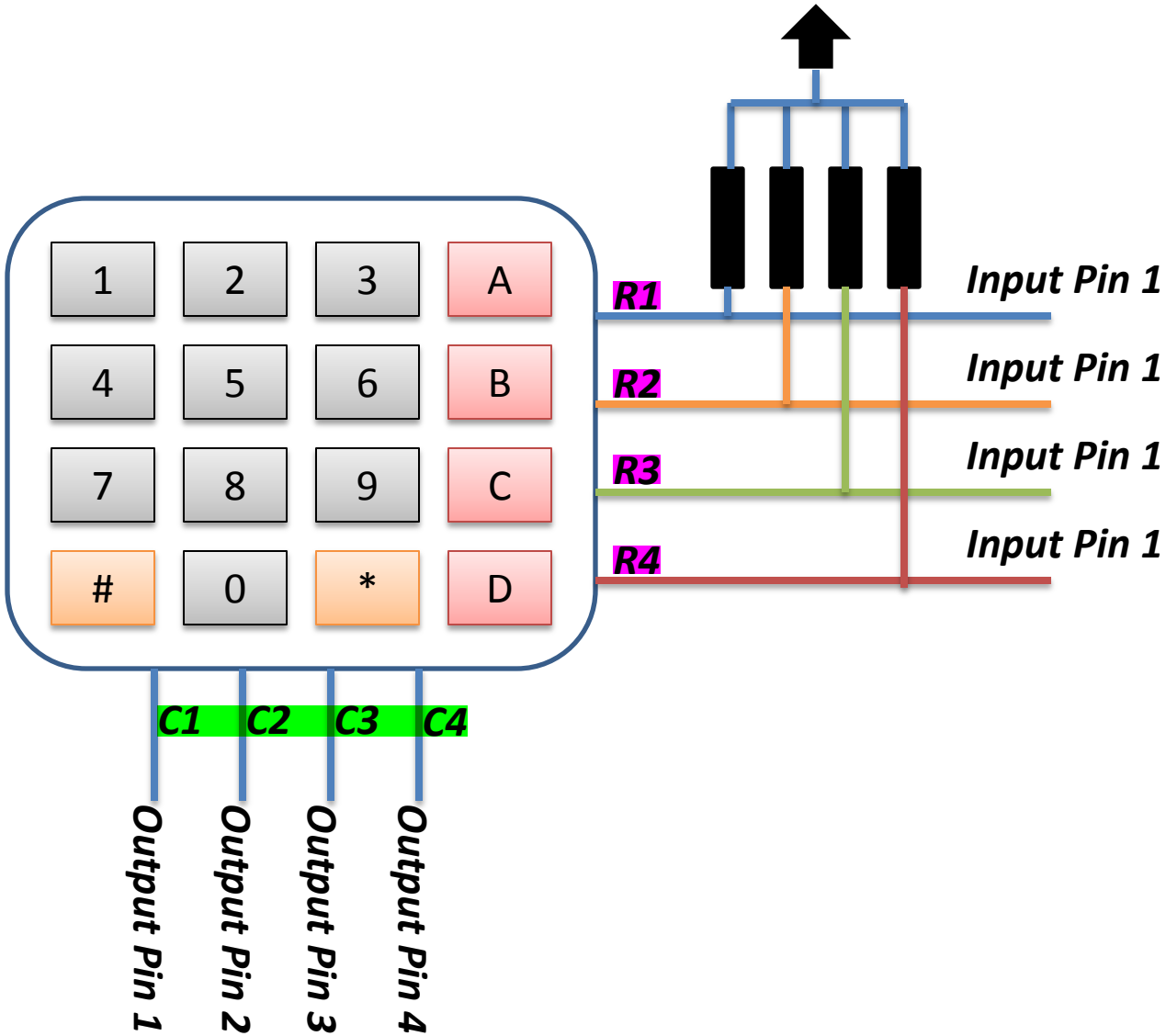
Keypad Connection





Interfacing Algorithm

- Connect the Columns C1 To C4 to 4 Output Pins of the Microcontroller
- Connect the rows R1 To R4 to 4 Input Pins of the Microcontroller while enabling the pull up resistors, it means that the rows are in normal conditions set to high.



Interfacing Algorithm

1- Set C1 To C4 by: 0111
This means that C1 is activated, and we are going to check the buttons in C1
If any row of the rows R1 to R4 is set to 0, then the corresponding button in C1 is pressed.

2- Set C1 To C4 by: 1011
This means that C2 is activated, and we are going to check the buttons in C2
If any row of the rows R1 to R4 is set to 0, then the corresponding button in C1 is pressed.

3- Set C1 To C4 by: 1101
This means that C4 is activated, and we are going to check the buttons in C3
If any row of the rows R1 to R4 is set to 0, then the corresponding button in C1 is pressed.

2- Set C1 To C4 by: 1110
This means that C4 is activated, and we are going to check the buttons in C4
If any row of the rows R1 to R4 is set to 0, then the corresponding button in C1 is pressed.

Write a code that uses 3x3 keypad and 1 7-Segment Display to display the number of the pressed button on the 7-segement (1 To 9)

Time To Code

The End …

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