



HW SW Co-Design

Lecture Four

Keypad

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## 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.

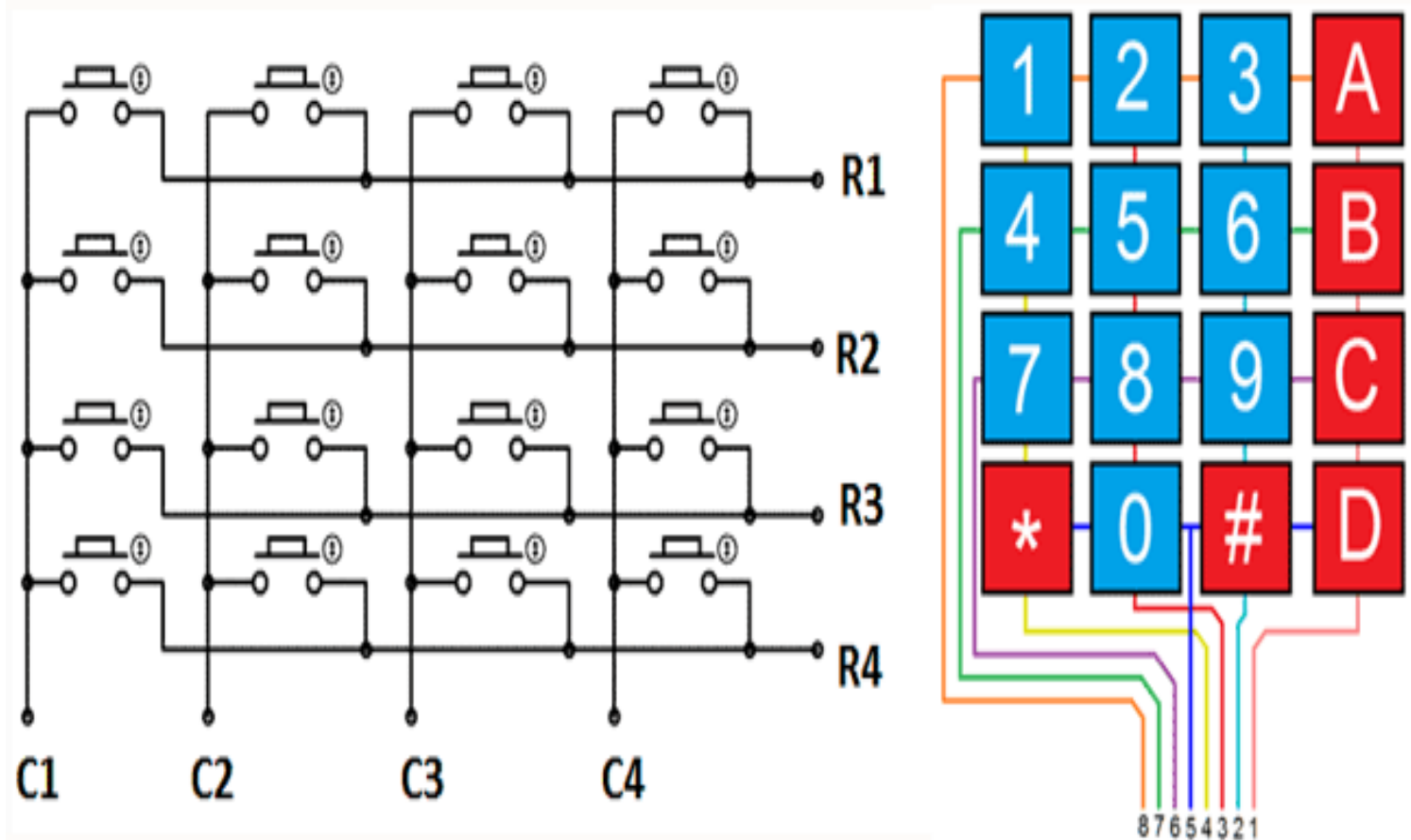
### *For example:*

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.

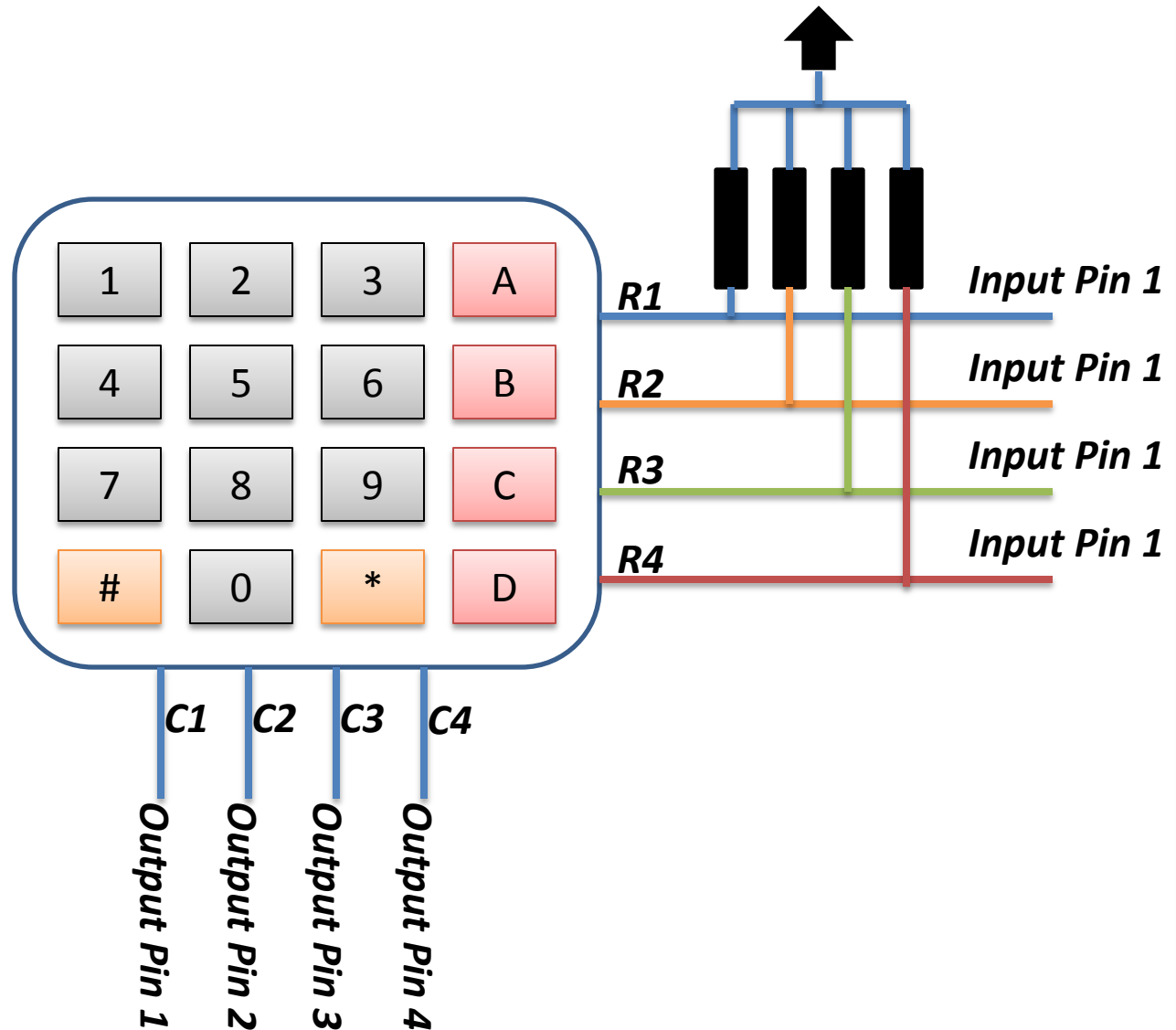


## Keypad Connection



## 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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