# KEYPAD

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# Keypad Concept:

The keypad is a set of mechanical switches which are arranged into a Matrix.

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# Why Keypad?

If we want to use about 16 switches in our project, we will need about 16 input pins from our microcontroller and about half of GPIO pins. But, if we need about 49 switches, what shall we do?

In this case, we will need about 49 input pins for our switches. So, if they are arranged into a matrix of 7x7, we will need 14 pins only.

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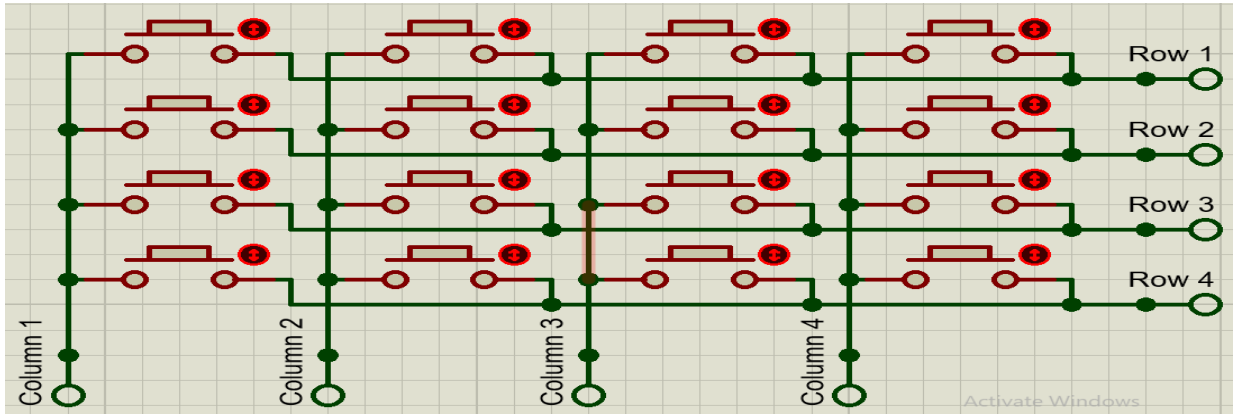
# Why Keypad?

In the figure below, the keypad is 4x4. So, we only need about 8 pins to connect these switches to our system.

So, the keypad concept is used to reduce the number of microcontroller pins.

But in this case, how does the keypad work?

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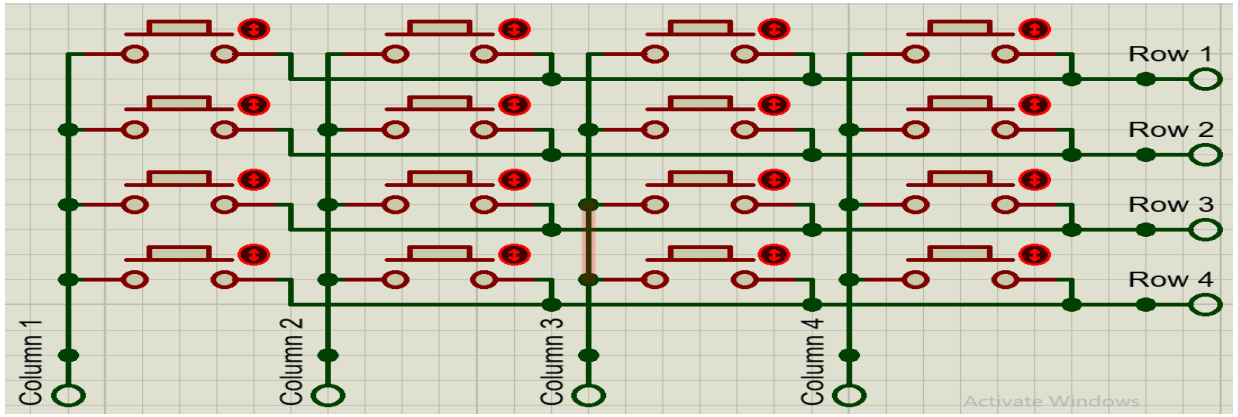
# How Keypad Works?

- After arranging the switches into a matrix, we will have four columns and four rows.

  So, we can assign any set of them as an output and the other as an input.
- Assume that the columns set is output and the rows set is input, what will be the kind

  of signals that must be written on these columns to easily indicate the pressed button?

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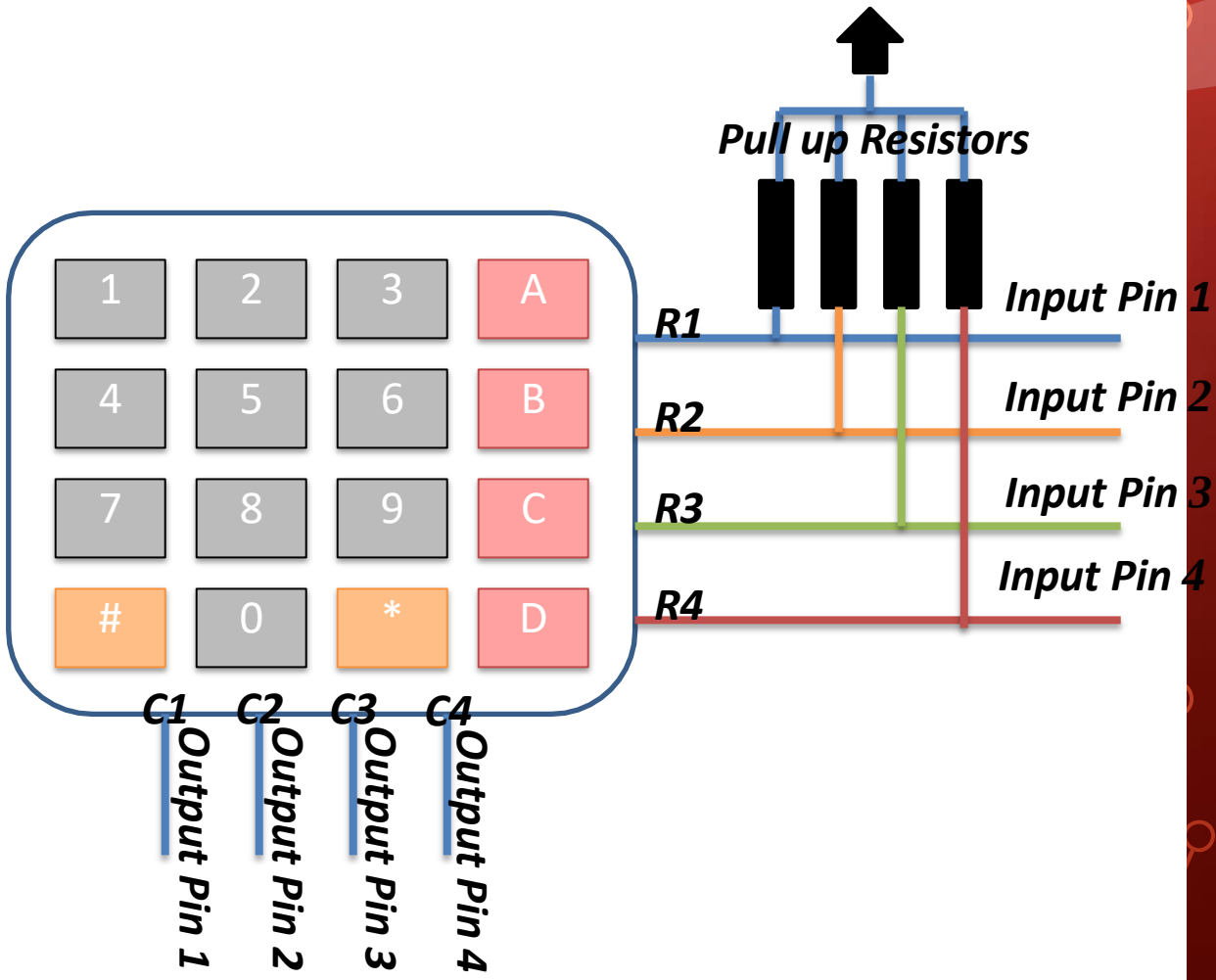
# How Keypad Works?

- The best sequence is to set all the columns by HIGH at first.
- Then, change the C1 signal to LOW. Then, check if any row reads Zero or not.
- Assume that R3 reads Zero signal. So, the pressed button will be C1R3.
- If not, turn C1 to HIGH again and set C2 to LOW. Then, check if any Row reads Zero or not.
- Repeat this sequence until you find zero on any row. Then, either return the pressed key or wait until columns are finished and the return keypad not pressed.



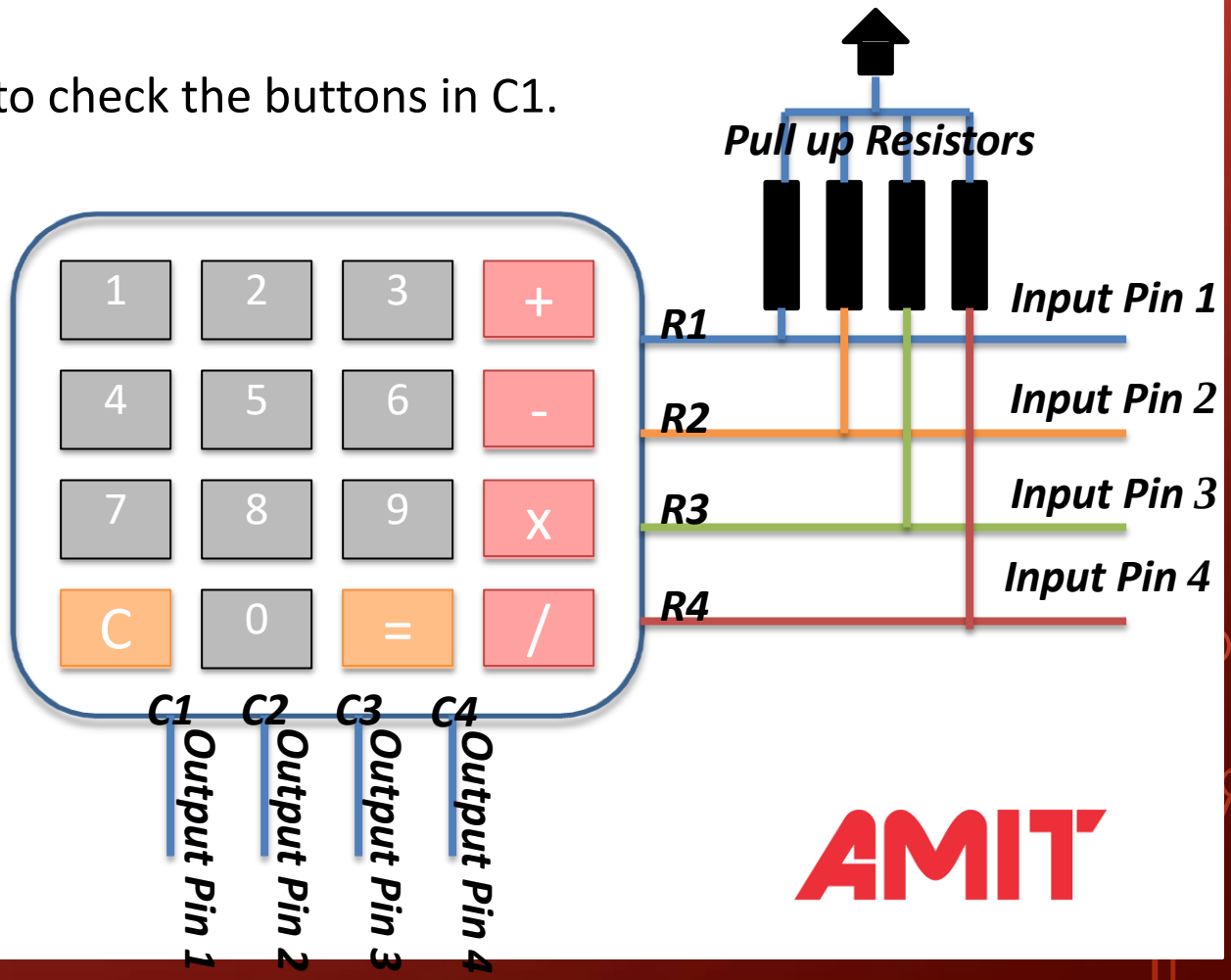
# Keypad Algorithm:

- Write on C1 To C4 “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.

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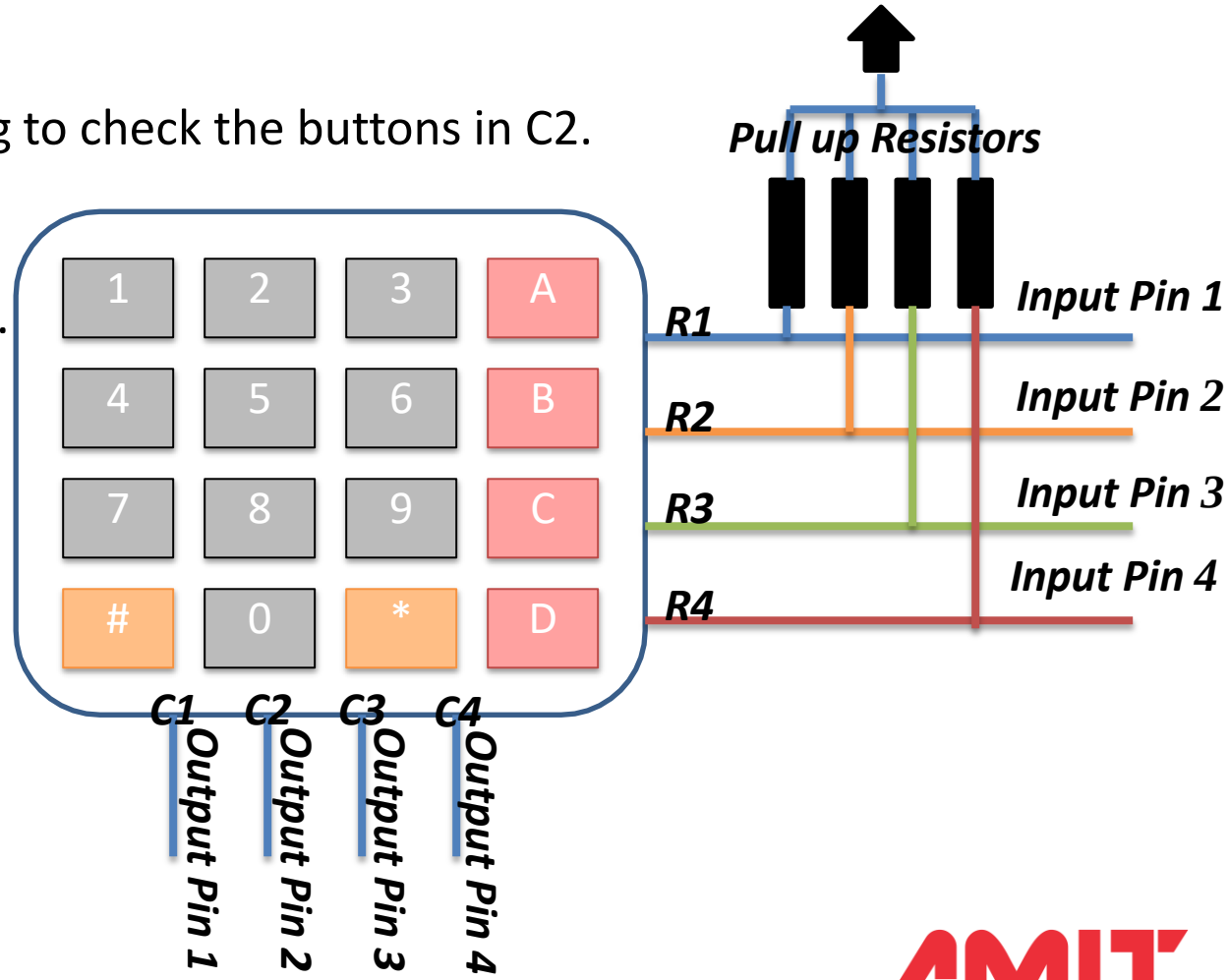
# Keypad Algorithm:

- Write on C1 To C4 “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.



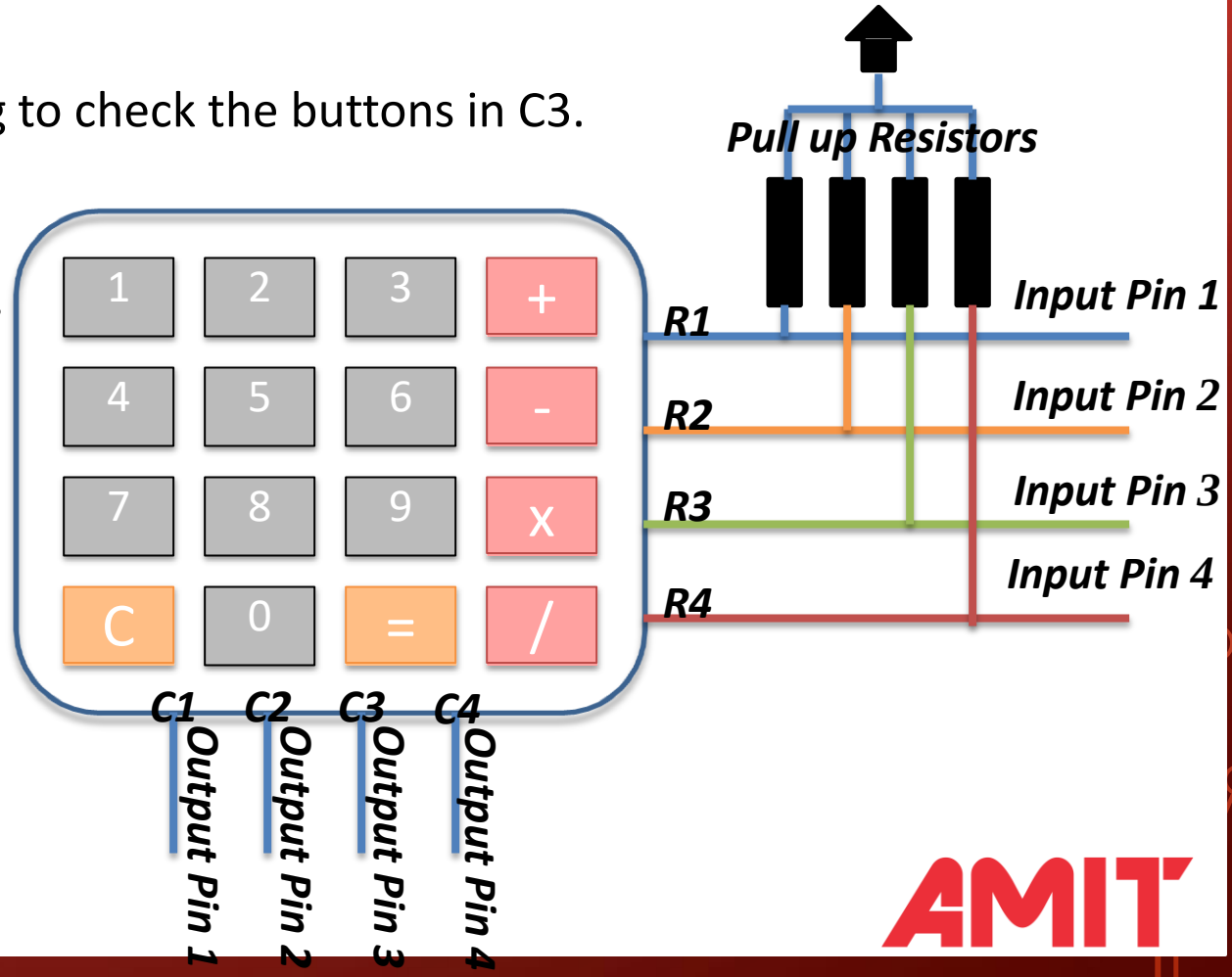
# Keypad Algorithm:

- Write on C1 To C4 “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.

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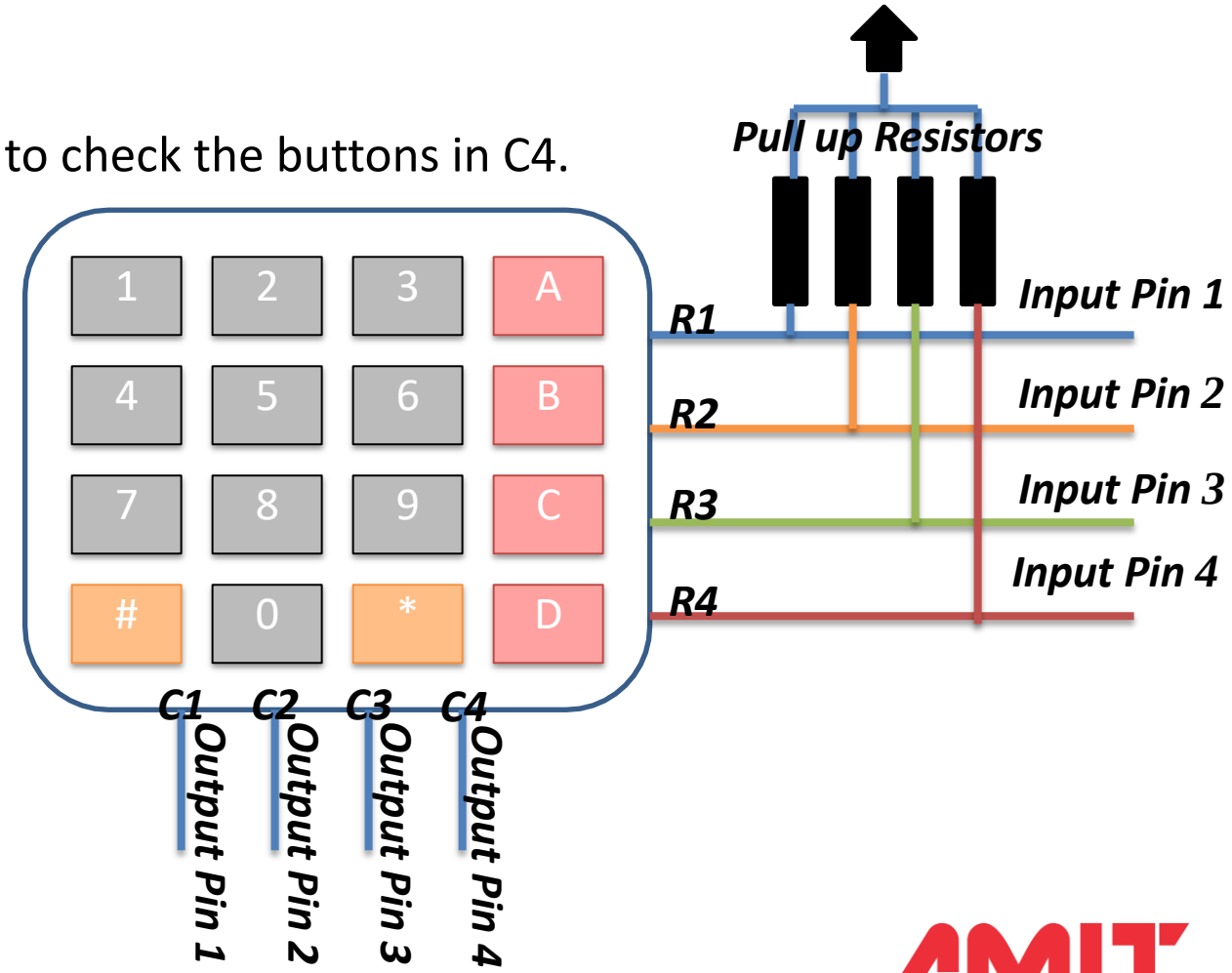
# Keypad Algorithm:

- Write on C1 To C4 “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.

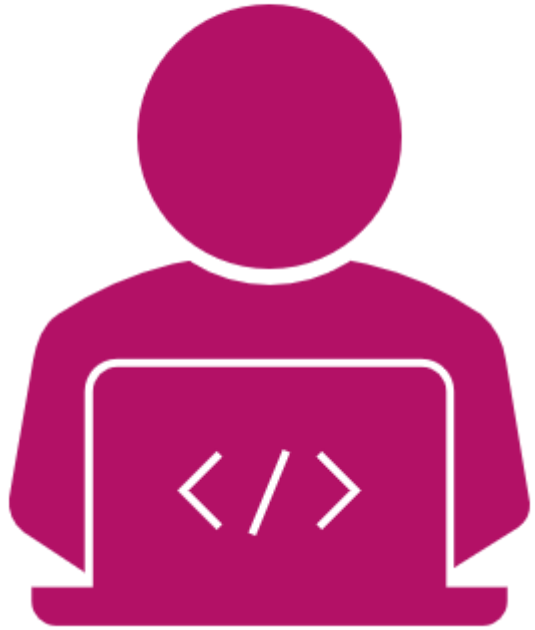
Then, the corresponding button in C1 is pressed.



# Keypad Driver:

**Now**, After understanding how to implement the Keypad matrix and the Algorithm of it,

Try to write its software module.



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# THANK YOU!