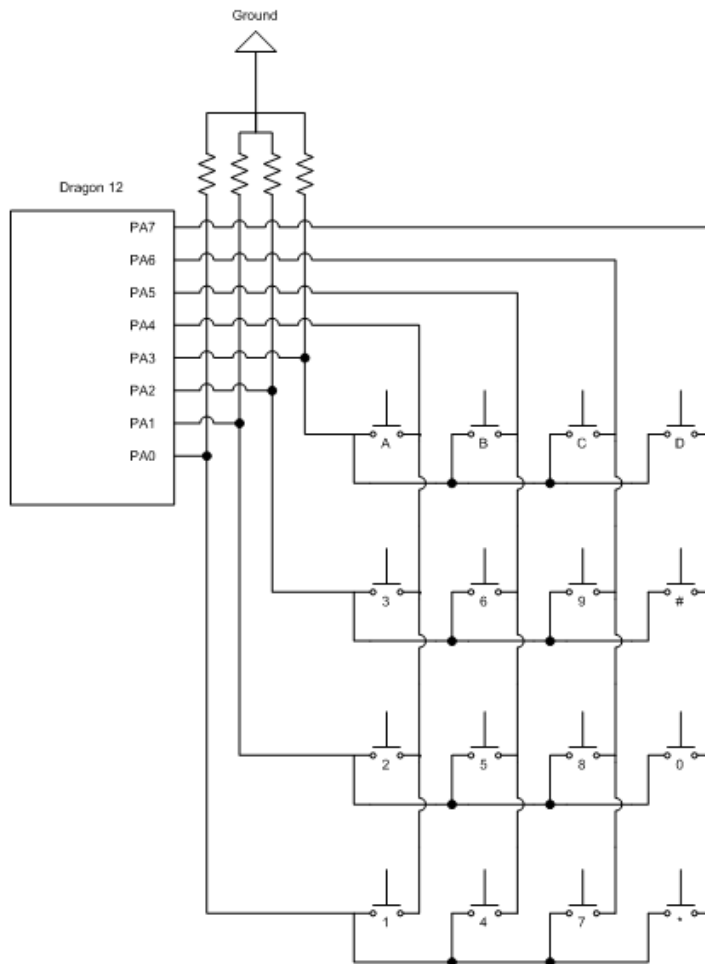


ME 4370, Spring 2016

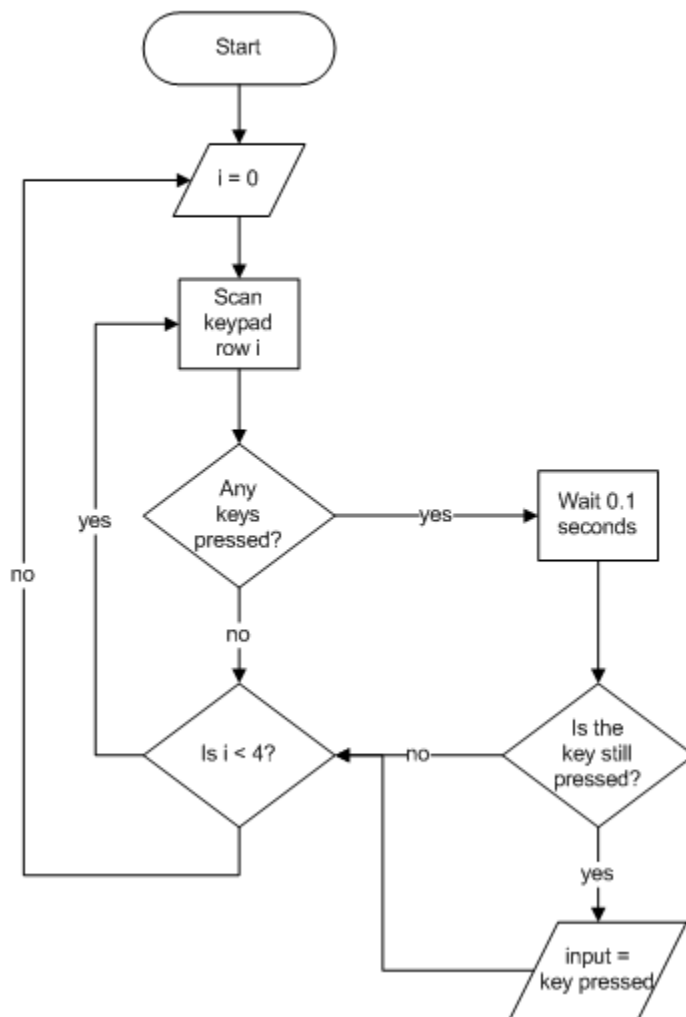
The HEX keypad

Electrical Schematic



Algorithm for reading

For the keypad to work, you need to set the upper four bits of DDRA as output and the lower four bits as input (0xf0). If you then set PA4 high and PA5-PA7 low, you can see that the voltage across each button in the first row (buttons 0, 1, 2, and 3) is 0V. Therefore, PA0-PA3 are all low when no keys are pressed. Pressing any of the buttons in the first row will connect the pin corresponding to that button to PA4 which is high. If you pressed any of the keys not in the first row, you would be connecting the corresponding pin to low (PA5, PA6, or PA7), and you would not be able to detect the keypress. To detect keys in another row, you need to set PA4 low and set either PA5, PA6, or PA7 high. Setting more than one of PA4, PA5, PA6 or PA7 high would make it impossible to detect exactly which key is pressed since all the keys in a column are connected to a single pin.



Pseudocode

From the flowchart above, you can see that to get input from the keypad, you need to do the following:

1. Scan a row of keys to see if any are pressed.
2. If a key is pressed, perform software key debouncing:
 - a. Wait a short period of time to allow key to settle.
 - b. Confirm key is still pressed (Original keypress is not just noise).
 - c. If key is still pressed, input is valid.
3. Repeat step 1 with the next row of keys.