

# ECE 376 - Homework #5

Keypads in C, Stepper Motors, NeoPixels in C. Due Monday, September 26th

## NeoPixel Flashlight

1) Requirements: Specify the inputs / outputs / how they relate.

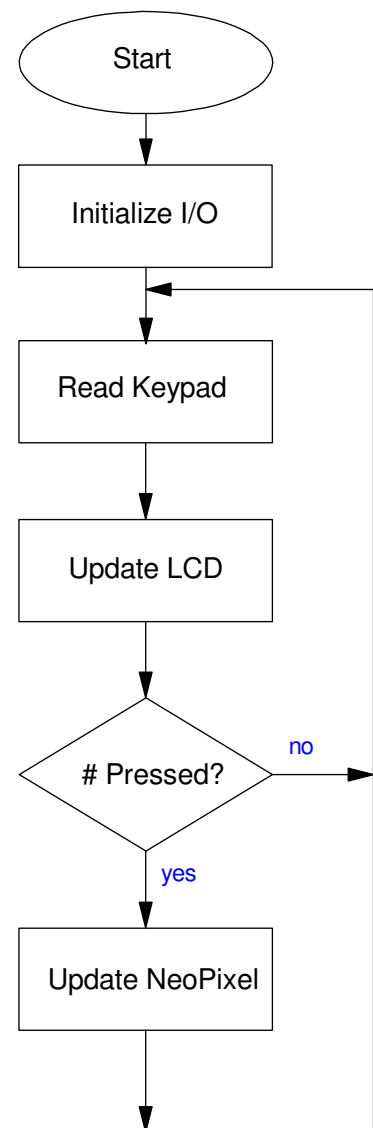
- Input a number from 0..255 using the keypad
- Press RB0
- The NeoPixel then lights up with a white light at that brightness level (0..255)

2) C code, flow chart, and resulting number of lines of assembler

Code: Main Loop

```
RED = 0;
GREEN = 0;
BLUE = 0;

while(1) {
    :
    :
    C Code
    :
    :
}
}
```



## Compiler Results

### Memory Summary:

Program space	used	F14h ( 3860)	of 10000h bytes	( 5.9%)
Data space	used	2Ch ( 44)	of F80h bytes	( 1.1%)
EEPROM space	used	0h ( 0)	of 400h bytes	( 0.0%)
ID Location space	used	0h ( 0)	of 8h nibbles	( 0.0%)
Configuration bits	used	0h ( 0)	of 7h words	( 0.0%)

3) Validation: Collect data in lab to verify you met the requirements.

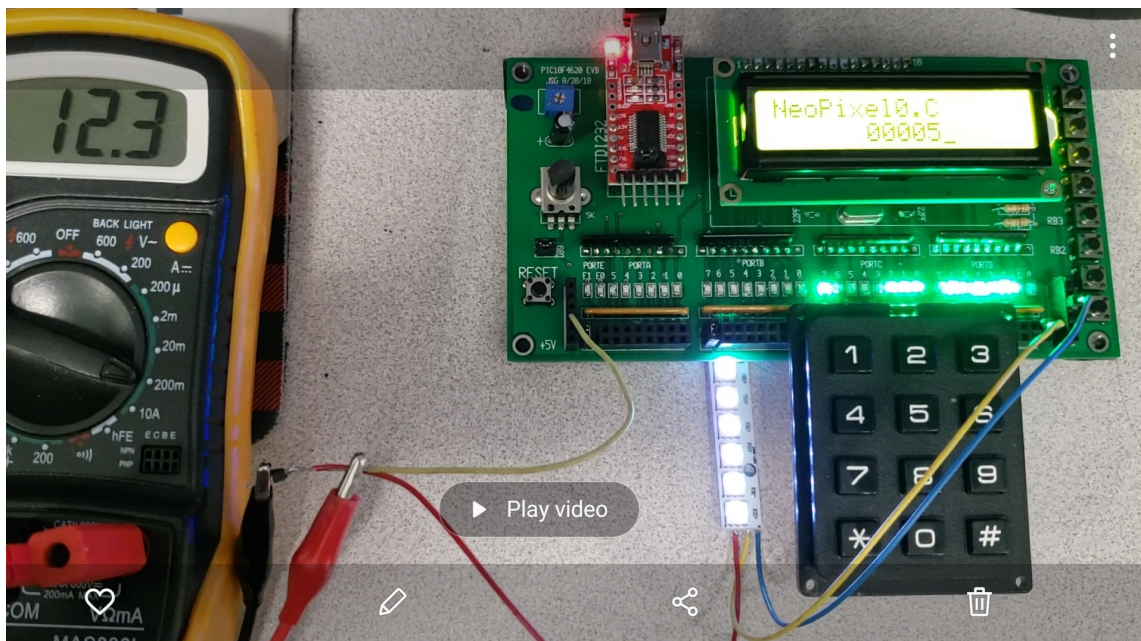
Requirement: Input a number from 000 to 255 using the keypad

- Input 000 (works)
- Input 255 (works)
- Input 123 (works)

Requirement: Press #. The NeoPixel goes to that brightness (255 = 100%)

Input Number	NeoPixels	Current (mA)	% Full Scale theory	% Full Scale measured
0	off	7.1	0%	0.0%
5	dim	12.0	1.9%	1.9%
50		58.9	19.6%	20.48%
100		110.0	39.2%	40.69%
255	really bright	260	100%	100.0%

4) Demo. Video or in person.



## Stepper Motor Angle Control

5) Requirements: Specify the inputs / outputs / how they relate.

Input:

- Keypad with numbers 000 to 999

Output:

- Stepper Motor

Relationship

- Input a number from 000 to 999 using the keypad
- Press #
- The stepper motor then moves to that number of steps
- At a rate of 20ms / step, +/- 5ms

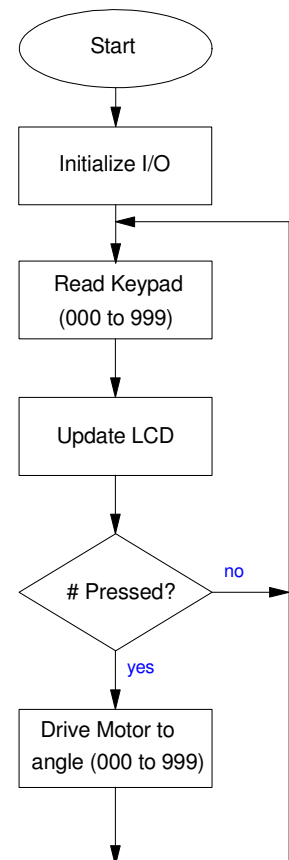
6) C code, flow chart, and resulting number of lines of assembler

Main Loop

```
while(1) {  
    :  
    :  
    C Code  
    :  
    :  
}
```

Compilation Results

Memory Summary:			
Program space	used	F20h ( 3872)	of 10000h
bytes ( 5.9%)			
Data space	used	2Ah ( 42)	of F80h
bytes ( 1.1%)			
EEPROM space	used	0h ( 0)	of 400h
bytes ( 0.0%)			
ID Location space	used	0h ( 0)	of 8h
nibbles ( 0.0%)			
Configuration bits	used	0h ( 0)	of 7h
words ( 0.0%)			



7) Validation: Collect data in lab to verify you met the requirements.

Requirement: Input numbers 000 to 999 with the keypad

- Input 000 (works)
- Input 999 (works)
- Input 456 (works)

Requirement: Press # and the motor goes to that angle

Input	Went To..
0	0
50	50 steps (90 degrees)
100	100 steps (180 degrees)
200	200 steps (360 degrees)

Requirement: At a rate of 20ms / step, +/- 5ms

- 500 steps took 9.3 seconds (using stopwatch)
- Time = 18.6ms / step

8) Demo. Video or in person.

