TEJ4M0 TUTORIAL #8: Counters Name:_____

Objective:

To create a PIC interface that will act as a Mod16 counter using 4 LEDs attached from RC0:RC3.

Procedure:

1. Create new project:
    a. Create a new project/workspace called *asmMod16* in a new folder with the same name.
    b. Open *asmLEDFlash_B.asm* (version B); re-save it as *asmMod16.asm.*
    c. Add the file to the project's source code.
2. Change the *Title* section (see code attached):
    a. Change the title, and what the program does.
    b. *Hardware Notes*: Change it to specify which ports are outputs and which devices (i.e. LEDs) are attached to which port (i.e.RC0, RC1).
3. Modify and Build:
    a. Change code in the *mainline* so it matches the code below.
    b. Add any other code you think is necessary.
    c. Build the code and debug any problems.
4. Setup your Workspace appropriately (i.e. arrange all windows):
    a. Open *MPLAB SIM.* Arrange all windows as per Tutorial #7 (Open your *Project,* Out*put*, Stopwatch, *Watch* windows: *CMCON0, STATUS, ANSEL, TRISC, WREG, PORTC).*
    b. Add your breakpoints next to the *nop* instruction.
5. Run the *Simulator*:
    a. Verify SFRs.
    b. Verify outputs and delays are correct.
    c. You should see ***bit 1*** of the *STATUS* being set (i.e. goes to a 1) when *PORTC* resets from 1111 to 0000. Why does it do this???
6. Program Your *PIC* and test on breadboard. (Don't forget resistors with your LEDs!)
7. Make a new program**:**
    a. Construct a new program called ***asmMod16d*** which counts down from 1111 to 0000, then automatically resets (hint: use one of the flags to assist you).
    b. Setup your workspace to include all relevant windows: *Project, Output, Stopwatch, Watch (including all SFRs* and relevant *PORTS*).

Conclusion:

Why does ***bit 1*** of the *STATUS* set (i.e. goes to a 1) when *PORTC* resets from 1111 to 0000?

```
start:
clrf PORTC    ; add in your own comments
counter:      ; which describe what is happening to the HARDWARE
       nop
       Dlay 250000
movlw 1
addwf PORTC,f
btfss STATUS,DC
goto counter
goto start
```