

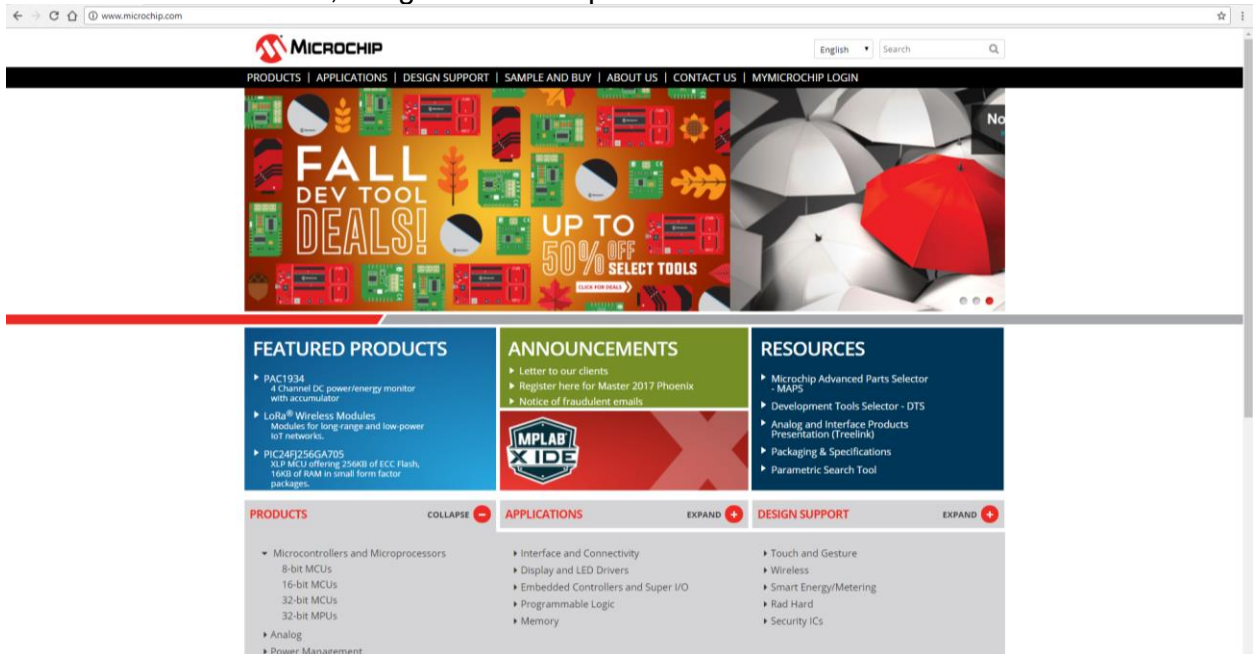
ICE 4M0 *TUTORIAL #3: PIC SCAVENGER HUNT* Name: _____

Objective:

To educate oneself on how to find answers about the *P16F684* and *Assembler*

Procedure

- Go to <http://www.microchip.com> and download the latest full version of **MPLAB IDE** onto your PC at home. Also load *PICC-Lite* when it prompts you after loading *MPLAB*. This is the 'C' compiler you can use if writing in 'C'.
- If the download page cannot be found, search **MPLAB IDE** on google, and download. MPLAB IDE download will show MPLAB IPE, Integrated Programming Environment; and MPLAB X IDE, Integrated Development Environment. The necessary part for this tutorial is MPLAB X IDE, Integrated Development Environment.



- Use **MPLAB IDE**, and “**The PIC Package**” to answer the following questions:
If the package cannot be found on the website, search it on google.

1. How many available **GPRs** are there in **Bank 0** of the **16F684**?
2. What is the **first available address** (in hex) in the **GPR**? The last?
3. Which **programmers** can you use with the **P16F684**? (hint: see "Configure" menu in MPLAB IDE)
4. How large is the instruction set in MPASM (Microchip PIC Assembler)?
5. For the instruction **movlw k**, what does **k** represent?
6. Where must all data first be written to before going to any other register?
7. For the instruction **addwf f,d**, what does **f** represent?
8. For the instruction **addwf f,d**, what does **d** represent?
9. Using *Notepad*, open the header file *p16f684.inc* (run a search). What values are assigned (EQU) to **W** and **F** registers. Why?
10. What are the **two address** locations of the **Status Register**?
11. What would have to happen in order to set (logical 1) the **Z** bit of the Status Reg?
12. What would have to happen in order to set (logical 1) the **C** bit of the Status Reg?
13. Which bit in the **STATUS Register** is responsible for **bank selecting**?
14. Which **bank** is being selected if the **Status Reg** had a value of **00100110**?
Is the value of the **Digit Carry bit** set (logical 1) or cleared (logical 0)?
15. What is the address of the "**Reset Vector**"?
16. What do **bits 6 and 7** represent in both **PORTA** and **PORTC**?
Why?

17. **asmSecond**

Make a new project and name it *asmSecond.mcp*, saving it in a folder called *asmSecond*. Write a program that adds the contents of 2 different *GPR* registers, subtracts this sum from the contents of another register, and finally stores the result in the *WREG* (i.e. $(10 + 13) - 5 = 18$). Remember to utilize the template when coding and use *MPLAB SIM* to view the results of your code in the *Watch* window.
Note: if the subtraction doesn't work, try different method until it works. The answer page will have a working method given.