CS 240
Fall 2019

Project 3
More Procedures

Assigned: Monday, September 16, 2019
Due: 10:00 p.m., Sunday, September 22, 2019

There are four problems here. Do them, commenting neatly and copiously. Use `.8086` mode and 16-bit registers as usual. For each problem, write your procedure, any supporting procedures, and code that tests the procedures. The code you turn in should *not* include an entry point so it can linked to other code (using `makeasms`). Make wise choices about data types and memory usage. In all cases write the best code that you can.

1. Write the procedure `SaveMachineState` that saves the current state of the machine (registers and flags) for future comparison. The procedure takes no parameters (except, of course, for the machine state).

2. Write the procedure `CompareMachineState` that compares the current machine state with the state saved by `SaveMachineState`. Any differences should be reported with an informative message to the user:

   ```
   Register AX's value has changed. Old value: 00F2, new value: 0020.
   O Flag value has changed. Old value: set, new value: clear.
   ```

3. Write a procedure `HexOut` that takes (1) register `BX` as the address of an array of bytes, and (2) register `CX` as the length of the array. `HexOut` writes each byte to the screen, in hexadecimal. Follow each byte with a space for easy reading. *Hint:* to isolate the nybbles of each byte, consider these instructions: `and`, `shr`, and `shl`.

4. Write a procedure `PrintInt` that takes register `AX` as a signed word, and outputs that number in base 10. For example, if `AX` is `E168h`, the output is five characters: `-7832`. There is a very elegant recursive solution.

How to submit. Submit the following file: `procs.asm` using the standard course submission procedure below.

1. At the DOS prompt, remove the flash drive.

2. Reboot the computer into Windows (or your operating system)

3. Reinsert the flash drive.

4. Transfer the files to `gemini.cs.hamilton.edu` (if you don't know how to do this, you'll need to research it).

5. Log in to `gemini.cs.hamilton.edu`

6. `[user@gemini ~]$ cs240`

7. `[user@gemini ~]$ submit`

Submit will not be open until 24 hours before the assignment is due. You may submit as many times as you want up to the deadline. Your final submission will be used in grading.