

COS 335 Spring 2009
Assignment 5 Due Thursday March 19

1. (1 pt) Text, Problem 6.3 on page 199.

2. (2 pts) Write a program in DEBUG that does the four additions in HW2 Question 5: "Assuming an 8-bit representation, list 4 pairs of bit strings whose binary interpretations as unsigned and 2's complement numbers have the following properties: a) Both signed and unsigned addition is correct; b) Signed addition is correct, but unsigned is not; c) Unsigned addition is correct, but signed is not; d) Neither signed nor unsigned addition is correct." Since incorrect unsigned addition is represented by the Carry Flag set (CY) and incorrect signed addition is represented by the Overflow flag set (OV) you will be able to see these flags as you trace the program in Debug. Trace the program and submit a screen dump of the Debug trace showing the flags in each of the four cases, as well as a screen dump showing your program with the U command.

Example: correct for signed and unsigned interpretations:

```
mov al, 1
add al, 1
```

3. (1 pt) Write a short program consisting of a single MOV instruction followed by a series of 4 ADD instructions that will set each of the flags in this order: CF, SF, OF, ZF. In other words the first ADD should set CF and you don't have to worry about CF, OF, ZF. The second ADD should set SF, etc. Trace the program and submit a screen dump of the Debug trace showing the flags in each of the four cases, as well as a screen dump showing your program with the U command.

3. (2 pts) Write and assemble a program, using the data definition below, that will reverse a string "in place." This means that no additional storage is used aside from registers.

```
thestring db 'COS 335 Spring 2009 [your name here]'
slen equ $-thestring
db '$'
```

Use DOS function 9 to display the string before and after reversal. To reverse the string:

- a. Load a pointer to the start (e.g., in si)
- b. Load a pointer to the last char (e.g., in di)
- c. Swap the bytes
- d. Adjust the pointers.
- e. compare pointers to determine if we're done yet

Submit source code and a screen dump showing output.

4. (4 pts) Adapt disptim1.a86 (the version with a bin2dec routine) to display the current date rather than the current time, using function 2Ah (Get Date). Here is the definition of int 21h function 2Ah from the OS function handout:

FUNCTION 2AH: Get System Date Returns the system date

Parameters: NONE

Returns: AL Day of Week (Sunday = 0) CX Year (1980-2099)
DH Month (1-12) DL Day (1-31)

Note that the year is a 16-bit integer, unlike the month and day. (Hint: look at the parameters used by bin2dec). Also modify the program to show your name. Submit sample output from a screen dump and a program listing. Note: you do not need to display the day of the week. Just display a date such 02-29-2008 or 02/23/2009.