

**COS 335 Spring 2009 Assignment 7**  
**Due Thursday April 9**

1. (3 pts) Many high level languages provide an abs() function (absolute value). The absolute value of a positive integer is the integer itself; the absolute value of a negative integer is its additive inverse. Write an assembler version of abs() that accepts a 16-bit number in AX and returns its absolute value in AX. Use the sample data definitions below. Your main program should call abs with each of the numbers in the array below and store the results in AbsN. (Hint: consider the NEG instruction).

```
N    dw  -1, 1, 0, 42, -42, 32767, -32767
AbsN dw 7 dup (?)
```

2 (3 pts) Write a 32-bit version of abs() which accepts a 32-bit number in DX:AX and returns its absolute value in DX:AX. For this version you will need to use the SBB (subtract with borrow) instruction. Change the sample data definitions to from DW to DD. The calling sequence might look like this:

```
mov bx, offset N
mov di, offset AbsN
mov ax, [bx]           ; get low word in AX
mov dx, [bx+2]        ; get high word in DX
call abs
mov [di], ax          ; store low word
mov [di+2], dx        ; store high word
```

For the 32-bit version you can't use NEG. You can however compute ABS() for a negative number by subtracting it from 0.

**Submit the following for each of 1 and 2:**

- a. Screen dump showing both arrays in memory after the filling absN array.
- b. Source code.

3. (4 pts) Write a program that defines an array of 12 word integers, and then uses register indirect addressing in a loop to compute separate 16-bit sums of the positive and negative integers. Use the following data: definitions:

```
array dw 1234h, 0FF0Fh, 5, 9, -17, BEADh
      dw 0DEEDh, 0FEEDh, 0BADh, 335, 335h, 0F230h
PosSum DW 0
NegSum DW 0
```

For this program produce printed output in decimal:

```
Sum of the positive integers is -nnnnn
Sum of the positive integers is nnnnn
```

This will require you to adapt the bin2asc routine in assembler notes #3 to handle signed integers. We will discuss this issue in class on Thursday, April 2.