CS 218 – Assignment #4

Purpose: Learn to use arithmetic instructions, control instructions, compare instructions, and conditional jump instructions.
Due: Monday (6/17)
Points: 45

Assignment:
Write a simple assembly language program to find the minimum, middle value, maximum, sum, and integer average of a list of numbers. Additionally, the program should also find the sum, count, and integer average for the positive numbers. The program should also find the sum, count, and integer average for the numbers that are evenly divisible by 3. Do **not** change the data types (double-words) as defined below. Declare the values:

```
lst         dd     1246,  1116,  1542,  1240,  1677
            dd     1635,  2426,  1820,  1246, -2333
            dd     2317, -1115,  2726,  2140,  2565
            dd     2871,  1614,  2418,  2513,  1422
            dd    -2119,  1215, -1525, -1712,  1441
            dd    -3622,  -731, -1729,  1615,  1724
            dd     1217, -1224,  1580,  1147,  2324
            dd     1425,  1816,  1262, -2718,  2192
            dd    -1432,  1235,  2764, -1615,  1310
            dd     1765,  1954,  -967,  1515,  3556
            dd     1342,  7321,  1556,  2727,  1227
            dd    -1927,  1382,  1465,  3955,  1435
            dd    -1225, -2419, -2534, -1345,  2467
            dd     1315,  1961,  1335,  2856,  2553
            dd    -1032,  1835,  1464,  1915, -1810
            dd     1465,  1554, -1267,  1615,  1656
            dd     2192, -1825,  1925,  2312,  1725
            dd    -2517,  1498, -1677,  1475,  2034
            dd     1223,  1883, -1173,  1350,  1415
            dd      335,  1125,  1118,  1713,  3025
len         dd    100

lstMin      dd    0
lstMid      dd    0
lstMax      dd    0
lstSum      dd    0
lstAve      dd    0

posCnt      dd    0
posSum      dd    0
posAve      dd    0

threeCnt    dd    0
threeSum    dd    0
threeAve    dd    0
```

You may declare additional variables if needed. All data is *signed*. As such, the IDIV/IMUL would be used (not DIV/MUL). The JG/JL/JGE/JLE must be used (as they are for signed data). You may assume the second number in the list is evenly divisible by 3.

Note, for an odd number of items, the middle value is defined as the middle value. For an even number of values, it is the integer average of the two middle values. The 'middle value' does ***not*** require the numbers to be sorted.

Note, no template is provided. Create the program source file based on the previous assignments.

Submission:

When complete, submit:

- A copy of the ***source file*** via the class web page (assignment submission link) by class time. Assignments received after the due date/time will not be accepted.

Debugger Commands:

Due to the looping, when debugging assignment #4, you should learn to set breakpoints within the program.

Create an input file for the debugger. Some useful commands might include:

```
x/100dw &lst
x/dw &len
x/dw &lstMin
x/dw &lstMid
x/dw &lstMax
x/dw &lstSum
x/dw &lstAve
x/dw &posCnt
x/dw &posSum
x/dw &posAve
x/dw &threeCnt
x/dw &threeSum
x/dw &threeAve
```

The commands should be placed in a file (such as 'a4in.txt) so they can be read from within the debugger. The debugger command to read a file is "source <filename>". For example, if the command file is named 'a4in.txt',

```
(gbd) source a4in.txt
```

Based on the above commands, the output will be placed in the file 'a4out.txt'.