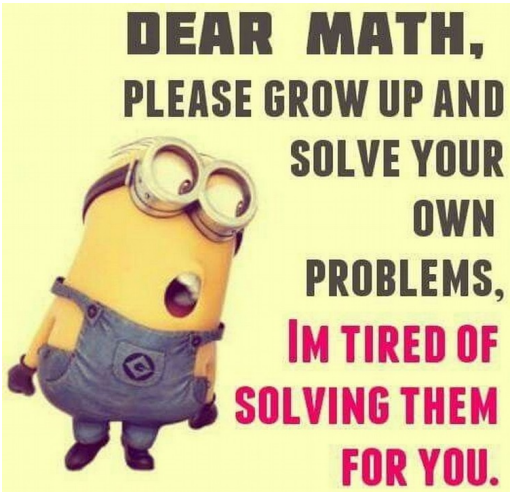
CS 218 – Assignment #4

Purpose: Learn to use arithmetic instructions, control instructions, compare instructions, and conditional jump instructions.
Due: Thursday (2/07)
Points: 45

Assignment:

Write a simple assembly language program to find the minimum, estimated median 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 odd numbers. The program should also find the sum, count, and integer average for the numbers that are evenly divisible by 12.



Since the list is not sorted, we will estimate the median value. Since the list length is even, the estimated median will be computed by summing the first, last, and two middle values and then dividing by 4.

Do **not** change the data types (double-words) as defined below.

```
list        dd      1240,  1116,  1542,  1240,  1677,  1632,  2426,  1820,  1246,   333
            dd      2304,   215,  2726,  1140,  2565,  2871,  1614,  2418,  2513,  1422
            dd       119,  1215,  1525,   712,  1441,  3622,   731,  1729,  1615,  2724
            dd      1217,   224,  1580,  1147,  2324,  1425,  1816,  1262,  2718,  1192
            dd      1435,   235,  2764,  1615,  1310,  1765,  1954,   967,  1515,  1556
            dd      1342,  7321,  1556,  2727,  1227,  1927,  1382,  1465,  3955,  1435
            dd       225,  2419,  2534,  1345,  2467,  1615,  1961,  1335,  2856,  2553
            dd      1035,  1835,  1464,  1915,  1810,  1465,  1554,   267,  1615,  1656
            dd      2192,   825,  1925,  2312,  1725,  2517,  1498,   677,  1475,  2034
            dd      1223,  1883,  1173,  1350,  2415,   324,  1128,  1116,  1704,  3024
length      dd      100

lstMin      dd      0
estMed      dd      0
lstMax      dd      0
lstSum      dd      0
lstAve      dd      0

oddCnt      dd      0
oddSum      dd      0
oddAve      dd      0

twelveCnt   dd      0
twelveSum   dd      0
twelevAve   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/JGE/JL/JLE must be used (as they are for signed data).

Note 1, no template is provided. Create the program source file based on the previous assignments.
Note 2, no debugger input file is provided. Create the debugger input 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 (Section 001, 5:30 PM and Section 002, 2:30 PM). 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 &length
x/dw &lstMin
x/dw &estMed
x/dw &lstMax
x/dw &lstSum
x/dw &lstAve
x/dw &oddCnt
x/dw &oddSum
x/dw &oddAve
x/dw &twelveCnt
x/dw &twelveSum
x/dw &twelveAve
```

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
```

Refer to the debugger input files from the previous assignments for examples. This will include outputting the results to a file.