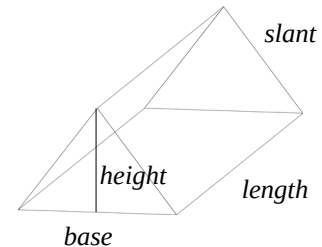**CS 218 – Assignment #5**

Purpose: Learn to use assembly language arithmetic instructions, control instructions, compare instructions, and conditional jump instructions.
Due: Friday (2/14)
Points: 50

Assignment:

Write a simple assembly language program to calculate some geometric information for a series of isosceles triangular prisms. Specifically, the program should find the surface areas and volume for each isosceles triangular prism in a set of isosceles triangular prisms. Once the values are computed, the program should find the minimum, maximum, middle value, sum, and average for the surface areas and volumes.

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 two middle values and then dividing by 2.

The formulas for lateral surface area and volume are as follows:

$$saAreas[i] = bases[i] \times heights[i] + 2 \times lengths[i] \times slants[i] + lengths[i] \times bases[i]$$

$$volumes[i] = \frac{bases[i] \times heighs[i]}{2}$$

Do **not** change the sizes/types of the provided data sets. All data is *unsigned*. As such, the DIV/MUL would be used (not IDIV/IMUL). Also, CDW/CWD/CDQ would be not used (as they are for signed data). The JA/JB/JAE/JBE must be used (as they are for unsigned data).

There is no provided main.
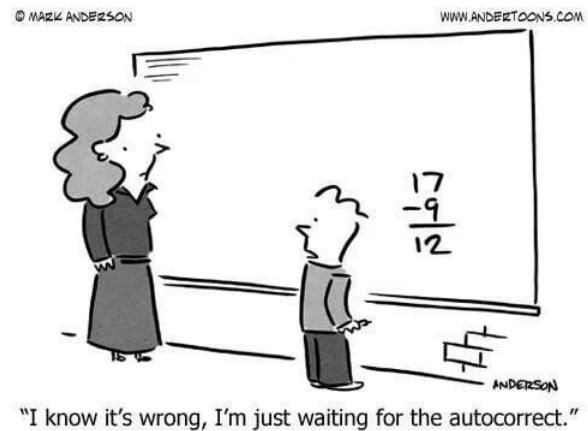You may declare additional variables as needed.

Hint:

Pay close attention to the data types. The *bases[]* array is byte sized, the *heights[]* and *slants[]* arrays are word sized, and the *lengths[]* array is double-word sized.

Submission:

When complete, submit:
- A copy of the ***source file*** via the class web page (assignment submission link) by 11:59 PM. Assignments received after the due date/time will not be accepted.

Assignment #5 Provided Data Set:

Use the following data declarations for assignment #5. *Note*, the assembler **is** case sensitive.

```
    ; -----
    ;   Provided Data

    bases       db      10,    14,    13,    37,    54,  31,    13,    20,    61,    36
                db      14,    53,    44,    19,    42,  27,    41,    53,    62,    10
                db      19,    28,    14,    10,    15,  15,    11,    22,    33,    70
                db      18,    17,    10,    27,    15,  12,    53,    20,    39,    25
                db      15,    23,    15,    63,    26,  24,    33,    10,    61,    15
                db      14,    34,    13,    71,    81,  38,    73,    29,    17,    93

    heights     dw      113,   114,   113,   121,   125,  134,   144,   156,   122, 159
                dw      147,   122,   135,   194,   143,  146,   117,   127,   166, 136
                dw      126,   123,   128,   186,   164,  155,   136,   155,   155, 154
                dw      124,   127,   122,   136,   134,  133,   141,   138,   144, 114
                dw      123,   124,   121,   111,   124,  111,   154,   119,   113, 123
                dw      126,   123,   128,   186,   136,  125,   139,   163,   168, 134

    slants      dw      133,   124,   173,   131,   115,  164,   173,   174,   123, 156
                dw      144,   152,   131,   142,   156,  115,   124,   136,   175, 146
                dw      113,   123,   153,   167,   135,  114,   129,   164,   167, 134
                dw      116,   113,   164,   153,   165,  126,   112,   157,   167, 134
                dw      126,   123,   128,   186,   135,  114,   129,   164,   167, 134
                dw      117,   114,   117,   125,   153,  123,   173,   115,   106, 113

    lengths     dd      1145, 1135, 1123, 1123, 1123, 1254, 1454, 1152, 1164, 1542
                dd      1353, 1457, 1182, 1142, 1354, 1364, 1134, 1154, 1344, 1142
                dd      1173, 1543, 1151, 1352, 1434, 1355, 1037, 1123, 1024, 1453
                dd      1353, 1457, 1182, 1142, 1354, 1364, 1134, 1154, 1344, 1142
                dd      1134, 2134, 1156, 1134, 1142, 1267, 1104, 1134, 1246, 1123
                dd      1235, 1263, 1267, 1273, 1225, 1233, 1237, 1244, 1221, 2233

    length      dd      60

    sAreaMin    dd      0
    sAreaEstMed dd      0
    sAreaMax    dd      0
    sAreaSum    dd      0
    sAreaAve    dd      0

    volMin      dd      0
    volEstMed   dd      0
    volMax      dd      0
    volSum      dd      0
    volAve      dd      0

    ; Uninitialized data

    section     .bss
    saAreas     resd  50
    volumes     resd  50
```

Note, the ".**bss**" section is for uninitialized data. The "**resd**" is used to reserve double-words.