

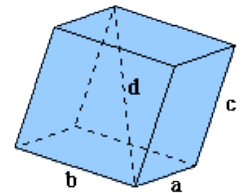
CSC 218

Homework, Asst. #5

Purpose: Learn to use arithmetic instructions, control instructions, compare instructions, and conditional jump instructions.
Due: Tuesday (6/14)
Points: 50

Assignment:

Write a simple assembly language program to calculate the some geometric information for a series of cubes; areas and volumes. The information for the cubes are stored in an array. Once the areas and volumes are computed, the program should find the minimum, maximum, middle value, sum, and average for the areas and volumes.



The formulas for cube area and volume are as follows:

$$\begin{aligned} \text{cubeAreas}[i] &= 6 * \text{sides}[i]^2 \\ \text{cubeVolumes}[i] &= \text{sides}[i]^3 \end{aligned}$$

Where *i* represents the specific cube information in the array (i.e., the index).

The side lengths are stored in a word-sized array named *sides*. The cube areas must be calculated and stored into the word-sized array named *cubeAreas*. The areas sum, *caSum*, must be calculated and stored as a double-word. The cube volumes must be calculated and stored into the double-word sized array named *cubeVolumes*.

All data must be treated as unsigned values (i.e., must use of MUL and DIV, not IMUL or IDIV).

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 is just the middle value of the array and as such is not statistically meaningful.

Do **not** change the sizes/types of the provided data sets. You may declare additional variables as needed.

Submission:

When complete, submit:

- A copy of the **source file** via the class web page.
Assignments received after the start time of class will not be accepted.

Assignment #5 Provided Data Sets:

Use the following are the provided data declarations for assignment #5.

Note 1, a copy of the data set is provided on the class web site.

Note 2, the assembler **is** case sensitive.

```
; -----  
;   Provided Data Set  
  
sides      dw    10, 14, 13, 37, 54  
            dw    14, 29, 64, 67, 34  
            dw    31, 13, 20, 61, 36  
            dw    14, 53, 44, 19, 42  
            dw    44, 52, 31, 42, 56  
            dw    15, 24, 36, 75, 46  
            dw    27, 41, 53, 62, 10  
            dw    33,  4, 73, 31, 15  
            dw     5, 11, 22, 33, 70  
            dw    15, 23, 15, 63, 26  
            dw    16, 13, 64, 53, 65  
            dw    26, 12, 57, 67, 34  
            dw    24, 33, 10, 61, 15  
            dw    38, 73, 29, 17, 93  
            dw    64, 73, 74, 23, 56  
            dw     9,  8,  4, 10, 15  
            dw    13, 23, 53, 67, 35  
            dw    14, 34, 13, 71, 81  
            dw    17, 14, 17, 25, 53  
            dw    23, 73, 15,  6, 13  
  
length     dd    100  
  
caMin      dw     0  
caMid      dw     0  
caMax      dw     0  
caSum      dd     0  
caAve      dw     0  
  
cvMin      dd     0  
cvMid      dd     0  
cvMax      dd     0  
cvSum      dd     0  
cvAve      dd     0  
  
; -----  
;   Uninitialized data  
  
section     .bss  
  
cubeAreas  resw   100  
cubevolumes resd   100
```

Note, the “.bss” section is for uninitialized data. The “resd” is used to reserve double-words and the “resw” is used to reserve words.