

HW04 - Due Wednesday 17 February 2016 before  
1:00 PM

Dr. Touma

February 14, 2016

Write a C program (call it *class\_stats.c*) that lets the user input the grades for a number of students (a variable) and computes the following:

1. the average of the grades ( $\mu$ )
2. the variance of the grades ( $\sigma^2$ )
3. the median
4. the highest grade
5. the lowest grade
6. a table showing the distribution of grades (use my grading scale for this)

You need to use looping constructs, if and if-else or select-case. Go back to the first lecture and see the code on how to nicely format the output.

In your code you should have at least these 4 functions with the following prototypes (the function main is always there so I am not counting it):

1. float calculate\_mean(int grades[], int n);
2. float calculate\_variance(int grades[], int n);
3. float calculate\_median(int grades[], int n);
4. void sort\_array(int grades[], int n);

The calculate\_variance function should call the calculate\_mean function to obtain the mean, and calculate\_median should call sort\_array as it computes the median (in other words you don't need to pass it a sorted array, it's job is to sort it before it computes the median by calling the sort function).

You can optionally break up the other parts of the code into functions: get user input, put the grades in bins, and print out the table and results.

Basically this is the same code as HW03 except for the addition of the median and sort functions and for breaking up the code into functions. You can use my code as basis for this code or the code you wrote last week for HW03. I will try to get the graded homework to you by Monday night.

Here are the formulas for the mean and variance for a sequence of numbers (array)  $x_i$

$$\mu = \frac{\sum_{i=1}^n x_i}{n}$$
$$\sigma^2 = \frac{\sum_{i=1}^n x_i^2}{n} - \mu^2$$