Table 1:
1st Year University Schedual

			CLASS DURATION (HOURS)								
			PER DAY							PER WEEK	
	SUBJECT	**TYPE***	**S**	**M**	**T**	**W**	**T**	**F**	**S**	**CLASS**	**HOMEWORK**
1.	physics	LEC LAB[1]		1 3[1]		1		1		3 3[1]	
2.	engineering	LEC			1½	 3	1½			3 3	
3.	chemistry	LEC (LAB/TUT)[1]		1		1	 3[1]	1		3 3[1]	
4.	mathematics			1		1	 3[1]	1		3	
5.	English	LEC		1		1		1		3	

* Types: Lab = Laboratory, Lec = Lecture, HM = homework, TUT = tutorial
1 Occurs semi-monthly (ie. not every week).

DEFINITIONS:

high average: assumes that all semi-monthly items occur weekly instead of semi-monthly as is actually the case. (This allows for the calculation of the busiest possible week.)

low average: assumes that all semi-monthly items do not occur, ever. (This allows for the calculation of the least busiest possible week.)

CALCULATIONS:

Note: Data used below is from preceding table. Assume that all data has an infinite number of significant digits.

$$\text{high average class length} = \frac{\text{total maximum \# of class hours}}{\text{total maximum \# of classes}}$$

$$= \frac{(6+6+6+3+3)}{(4+3+4+3+3)} \frac{\text{h}}{\text{class}}$$

$$= \frac{24}{17} \frac{\text{h}}{\text{class}}$$

$$= 1.4117\ldots \ \text{h/class}$$

$$\text{low average class length} = \frac{\text{total minimum \# of class hours}}{\text{total minimum \# of classes}}$$

$$= \frac{(3+6+3+3+3)}{(3+3+3+3+3)} \frac{\text{h}}{\text{class}}$$

$$= \frac{18}{15} \frac{\text{h}}{\text{class}}$$

$$= 1.2 \ \text{h/class}$$

<u>Average class length (METHOD 1):</u>

$$\text{average class length} = \frac{\text{total average \# of class hours}}{\text{total average \# of classes}}$$

$$= \frac{(\text{total minimum \# of class hours} + \text{total maximum \# of class hours})/2}{(\text{total minimum \# of classes} + \text{total maximum \# of classes})/2}$$

$$= \frac{(18\,\text{h} + 24\,\text{h})/2}{(15\,\text{class} + 17\,\text{class})/2}$$

$$= \frac{21}{16} \frac{\text{h}}{\text{class}}$$

$$= 1.3125 \ \text{h/class}$$

Average class length (METHOD 2):

$$\text{average class length} = \frac{\text{total average \# of class hours}}{\text{total average \# of classes}}$$

$$= \frac{(\text{low average class length}) + (\text{high average class length})}{2}$$

$$= \frac{\left(1.2 + \frac{24}{17}\right)\ \text{h/class}}{2}$$

$$= 1.3058...\ \text{h/class}$$

MY QUESTION:
Why isn't the answer from method 1 equal to the answer from method 2? It seems like both methods should give you the correct answer but I don't understand why they don't. Can someone please explain it?

My only point of reference for a discrepancy like this occurring is from physics problems involving the calculation of the average velocity of an object.

You cannot calculate the average velocity of an object by adding all the separate velocities and then averaging them by the total number of intervals (imagine a graph). This almost always gives wrong answers. As far as I know, you can *only* do this if all the time intervals for each velocity change are equal; otherwise, it will not work. The best procedure, that always works, is to calculate the total distance traveled and divide by the total time.

In trying to understand why my two averages for hours per class are not equal, I tried approaching my calculations as if it was a physics problem, similar to calculating average velocity. IMPORTANT: A distance-time graph has the distance on the y-axis and the time on the x-axis, therefore, the slope, which gives the speed, is in units of distance/time. In my problem, the units are somewhat reversed, with time being on top and class on the bottom: h/class. My point is this: for my graph, which is a #-of-hours vs #-of-classes graph, the classes will always increase by a unit of 1—in other words, there will never be half a class, 3.3 classes, etc.. So, because the x-axis intervals for each point of data are equal I though that by rights calculating my overall average by both methods should produce the same answer. I subsequently realize that mathematically the methods are not equivalent but I cannot understand why they are not.

Please help me if you can. If you need me to clarify something or provide more data, please, do not hesitate to ask. I will do my best to oblige.

Thanks again.