Using Excel for a Gradebook:
Advanced Gradebook Formulas

Objective 1: Review basic formula concepts.

Review Basic Formula Concepts

- Entering a formula by hand: Always start with an equal sign, and click to place cell references rather than values into the calculations.
- Use the auto sum button (**Σ**) to add up a series of numbers across a row, or down a column.
- Use the paste function button (**f_x**) to choose a function such as Average. You can click and drag over various cells to fill in the "arguments" of the function.
- Be aware of the difference between the value 85.3 and the value 85.3%(0.853). A value can be displayed as a percent only if it is actually stored as the decimal equivalent of that percent.

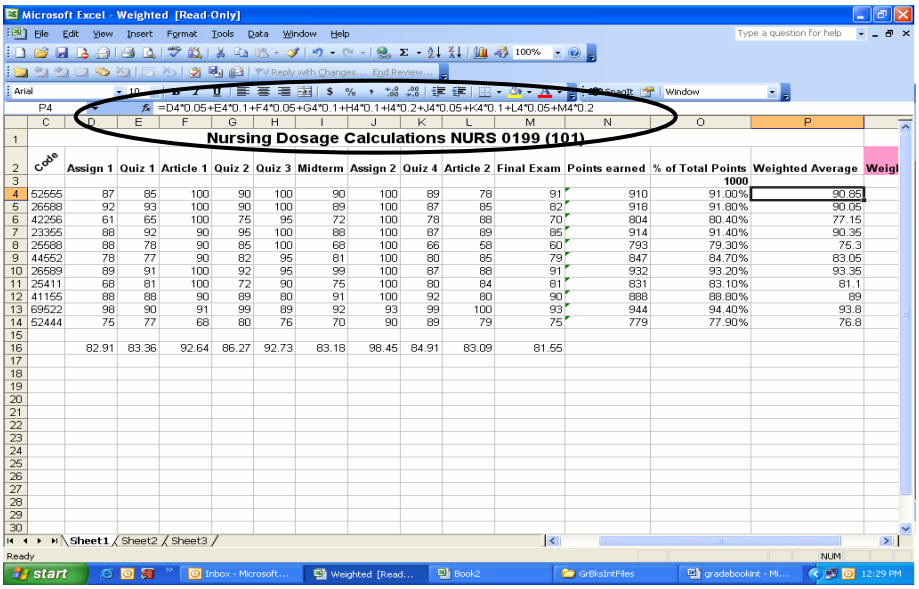
Objective 2: Create a formula to calculate a weighted average.

Calculating a Weighted Average

Some grading policies give each assignment a percentage weight so that a mid-term and final exam count more toward the final grade average than single homework assignments.
The formula for determining the final grade this way is a little more involved, essentially, we have to multiply each assignment's score by the desired percentage, and then add all those products together.

<u>To Create a Formula to Calculate a Weighted Average</u>

1. Place the cursor in the cell that you wish to enter the formula in.
2. Press the "=" **Equal key** on the keyboard.
3. Click on the cell holding the first/next assignment score



4. Press the **Shift key** and the "8" **Eight key** simulatneously to enter "*" into the formula.
5. Enter the percent value for that assignment as a decimal number. (For example, if the assignment was worth 5%, you would enter 0.05.)
6. Press the **Shift key** and the "=" **Equals key** simulatneously to enter "+" into the formula.

7. Repeat steps 3 – 6 until the last assignment. (Excluding the "+" after the last assignment.)
8. Press the **Enter key** on the keyboard to calculate and display the result.
9. Use AutoFill to copy this formula to the other cells in the column.

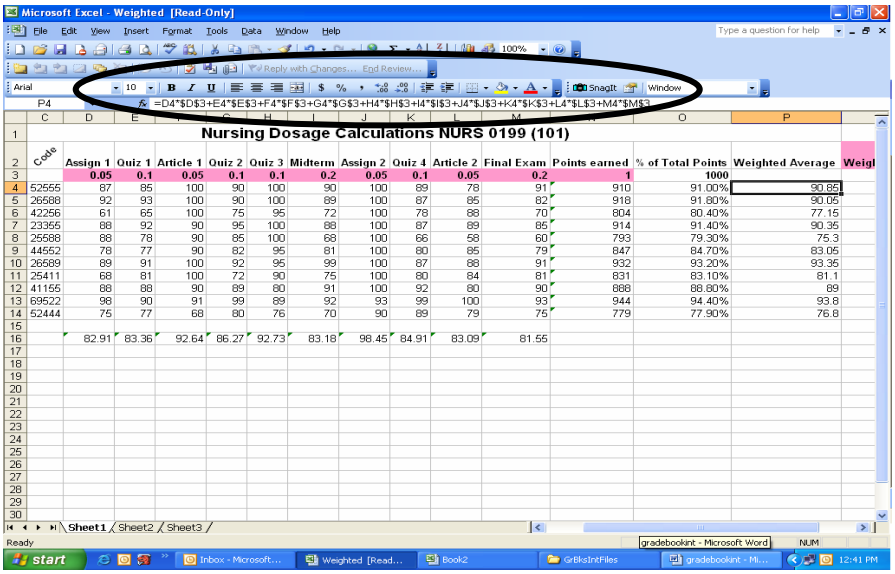
Store Percentage values in Spreadsheet, not in Formula

Another valuable use for the Absolute reference is here in this weighted average formula. What if you ever wanted to adjust the percentage weight for one of the assignments? How difficult it would be to interpret that formula again to make sure you adjusted the correct number?

Why not store the percentage values in their own cells, and make the formula reference them? This will make changes much easier. Of course we have to be careful to set them as absolute references!

<u>To Use Absolute References in the Weighted Average Formula</u>

1. Store the percentage values (as a decimal) of each assignment/test/quiz/etc in their own cells.
2. Place the cursor in the cell that you wish to enter the formula in.
3. Press the "=" **Equal key** on the keyboard.
4. Click on the cell holding the first/next assignment score
5. Press the **Shift key** and the "8" **Eight k**ey simulatneously to enter "*" into the formula.
6. Click the cell that holds the percentage value associated with the assignment.
7. Press the Shift key and the "=" **Equals key** simulatneously to enter "+" into the formula.
8. Repeat steps 4 – 7 until the last assignment (excluding the "+" after the last one)
9. Press the **Enter key** on the keyboard to calculate and display the result.
10. Before we fill down the rest of the column, we must specify all references to the percent values as absolute references by placing the dollar signs "$" before the column letters and row numbers. (For example, change the reference D3 to D3, E3 to E3, etc.)
11. Use AutoFill to copy this formula to the other cells in the column.



Weighted Average of Assignment Categories

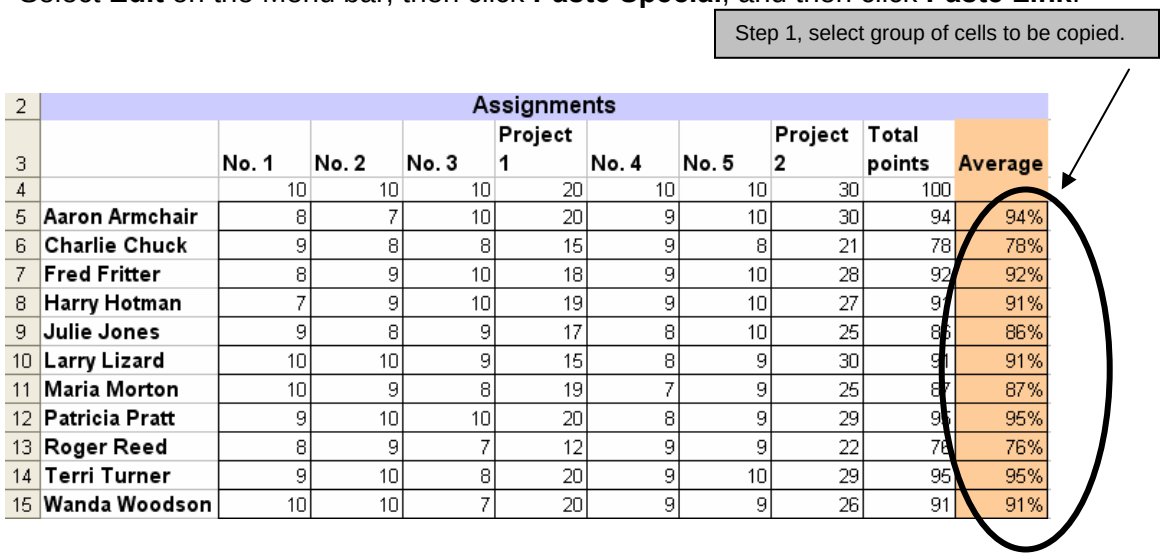
When your grading system uses weighted percentages for assignment categories as opposed to individual assignments (i.e. Homework 20%, Quizzes 30%, Tests 50%) to determine a student's final grade, there is a particular set-up for a gradebook that seems to be the most efficient in Excel. This set-up involves using separate worksheets to determine the average of each category, and then summarizing those averages on another worksheet to calculate the final grade according to the percentages. This type of gradebook setup involves linking.

Linking Averages to the Summary Page

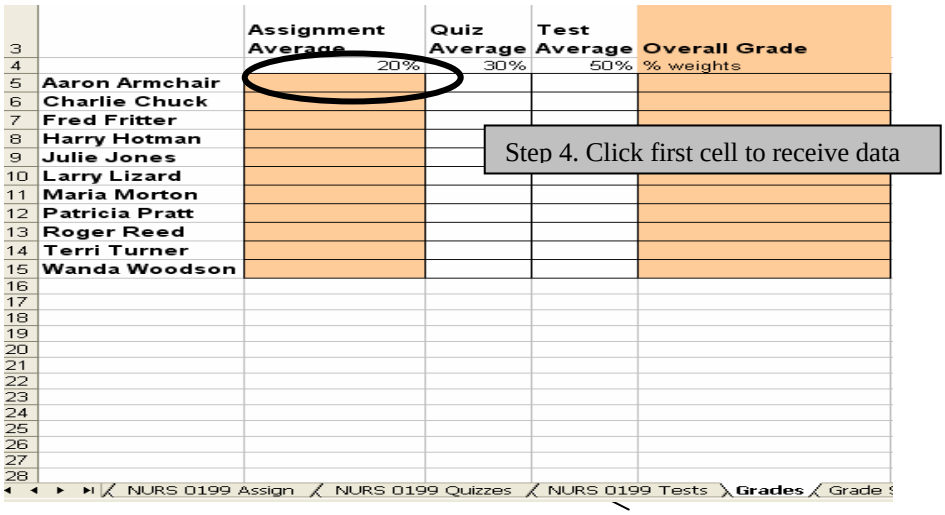
A major advantage of Excel is its ability to take several worksheets and link them together. It is possible to include cell references from one worksheet in a formula on another worksheet. The advantage of this is that any change made to a particular cell on a particular page will automatically adjust every formula that references that cell within the workbook.

To Link Data from One Sheet to Another

1. Highlight the cell or group of cells to be copied to another sheet.
2. Click the **Copy button** on the Standard toolbar.
3. Select the tab of the worksheet to copy the cell(s) to.
4. Click to select the first cell that is to receive the data.
5. Select **Edit** on the Menu bar, then click **Paste Special**, and then click **Paste Link**.



	Assignments								
		No. 1	No. 2	No. 3	Project 1	No. 4	No. 5	Project 2	Total points	Average
		10	10	10	20	10	10	30	100	
	Aaron Armchair	8	7	10	20	9	10	30	94	94%
	Charlie Chuck	9	8	8	15	9	8	21	78	78%
	Fred Fritter	8	9	10	18	9	10	28	92	92%
	Harry Hotman	7	9	10	19	9	10	27	91	91%
	Julie Jones	9	8	9	17	8	10	25	86	86%
	Larry Lizard	10	10	9	15	8	9	30	91	91%
	Maria Morton	10	9	8	19	7	9	25	87	87%
	Patricia Pratt	9	10	10	20	8	9	29	95	95%
	Roger Reed	8	9	7	12	9	9	22	76	76%
	Terri Turner	9	10	8	20	9	10	29	95	95%
	Wanda Woodson	10	10	7	20	9	9	26	91	91%

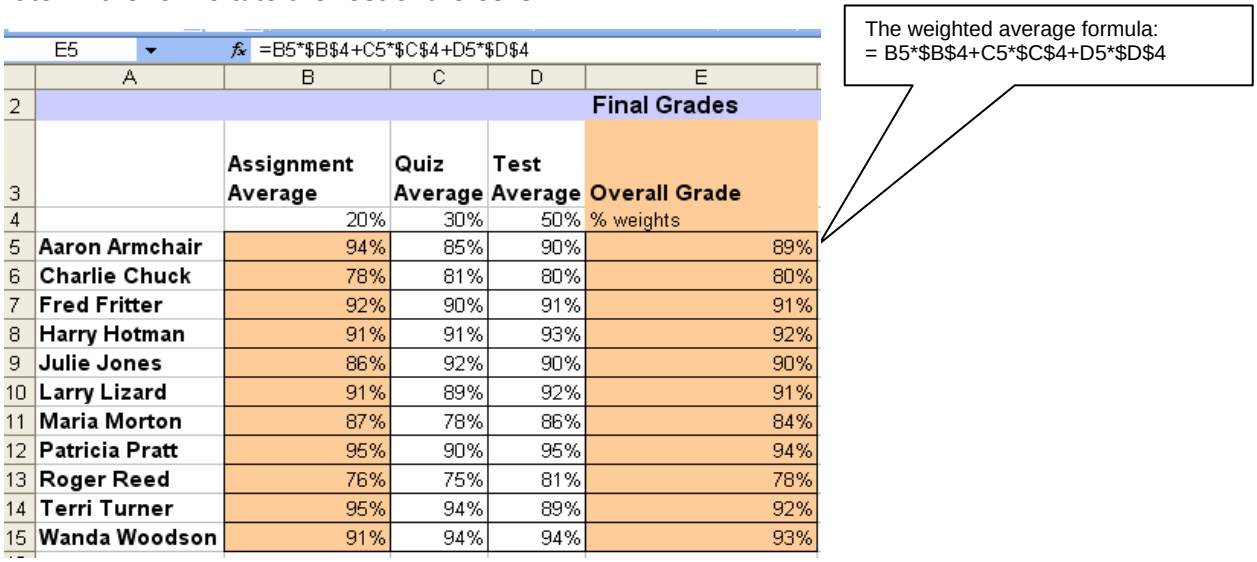


The Weighted Average Grade Formula

In the figure shown above, the percentage of each category is stored as a value in a cell of the spreadsheet to allow for those to be adjusted without changing the formula that calculates grades. In general, the formula for finding the weighted average is the total of all the products calculated from multiplying the category average times it's associated percent. The total of these products will represent a percentage grade.

To Create a Weighted Average Grade Formula

1. Click the first cell that is to hold the weighted average.
2. Press the "=" **Equals key** on the keyboard to begin the formula.
3. Click on the cell that contains the category average.
4. Press the **Shift key** and "8" **Eight key** on the keyboard simultaneously.
5. Click on the cell that contains the percentage for that category.
6. Press the **Shift key** and the "=" **Equals key** on the keyboard simultaneously.
7. Repeat steps 3-6 until all categories are included (skip step 6 for the last one).
8. Press the **Enter key** on the keyboard to calculate the value.
9. Now, using the formula bar, change the cell addresses containing the percentages to absolute references.
10. AutoFill the formula to the rest of the cells.



	A	B	C	D	E
2					Final Grades
3		Assignment Average	Quiz Average	Test Average	Overall Grade
4		20%	30%	50%	% weights
5	Aaron Armchair	94%	85%	90%	89%
6	Charlie Chuck	78%	81%	80%	80%
7	Fred Fritter	92%	90%	91%	91%
8	Harry Hotman	91%	91%	93%	92%
9	Julie Jones	86%	92%	90%	90%
10	Larry Lizard	91%	89%	92%	91%
11	Maria Morton	87%	78%	86%	84%
12	Patricia Pratt	95%	90%	95%	94%
13	Roger Reed	76%	75%	81%	78%
14	Terri Turner	95%	94%	89%	92%
15	Wanda Woodson	91%	94%	94%	93%

Objective 3: **Display a percentage as a letter grade based on your grading scale.**

Converting a Percentage to a Letter Grade

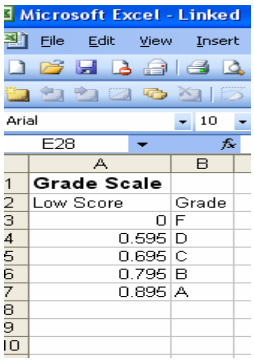
It is possible to set-up a formula to automatically convert a percentage grade to the associated letter grade according to your grading scale.

Using a Vlookup Table and Function

There is a function called VLOOKUP that can be used to convert one type of value to a completely different value. For a grading scale conversion, a table must be setup somewhere in the workbook to store the range of values associated with each letter grade according to your grading scale. The values must be in ascending order.

For example, the table for the following grading scale is show below.

0 – 59	F
60 – 69	D
70 – 79	C
80 – 89	B
90 and above	A



NOTE: If you round percentages up or down based on your own criteria when determining letter grades your table needs to reflect your rounding criteria. For example, if you round 79.5 or greater to an 80 then your grading scale should look like:

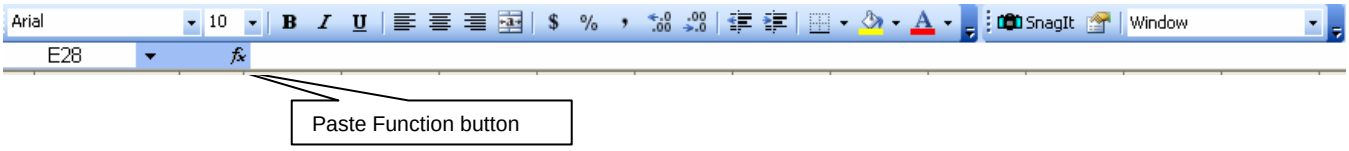
0-59.4	F
59.5-69.4	D
69.5-79.4	C
79.5- 89.4	B
>=89.5	A

<u>To Create the VLOOKUP Table</u>

1. Click **Insert** on the Menu bar, and then click **Worksheet**.
2. Double click the tab for the worksheet you just inserted. Type **Grading Scale** and press the **Enter key** on the keyboard.
3. Click cell **A1** and enter **Low Score**.
4. Click cell **B1** and enter **Letter Grade**.
5. Column **B** contains the letters “F”, “D”, etc.
6. Column **A** contains a list of the lowest value in the range associated with that letter grade. (i.e. “0” for F, “0.6” for D, “0.7” for C, etc. since our values in this example are stored as decimal equivalents to the percents) See the figure above for details.

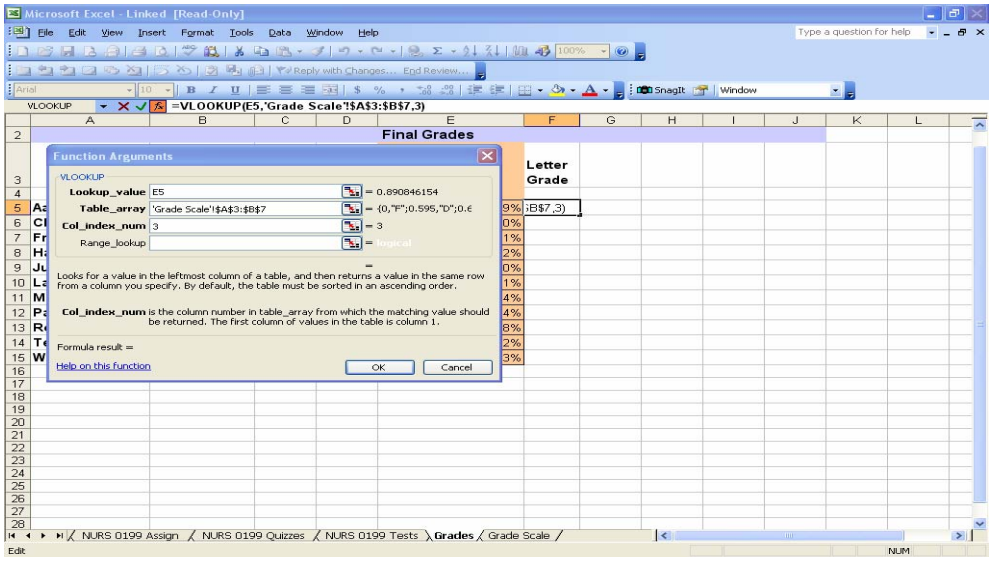
<u>To Use the VLOOKUP Function</u>

1. Click the tab for the sheet you wish to display the letter grades on. Click to select the cell that will display the letter grade.
2. Click the **Paste Function button** on the Standard toolbar.



3. Select **Lookup & Reference** from the Function category list. Then select **VLOOKUP** from the Function name list.
4. Click **OK**.
5. Click to insert your cursor in the **Lookup_value** box. Then click the cell that contains the percentage grade.
6. Click to insert your cursor in the **Table_array box**. Then click the tab that represents the worksheet where you created you lookup table. Highlight the table values, but not the headings.
7. Edit the cell references in the Table_array box and make them absolute references.

8. Click to insert your cursor in the **Col_index_num box**. Enter the column number from the lookup table that contains the information you wish to appear. (For example, in the table shown earlier, we would enter 2 so that the letter grades are displayed.)
9. Click **OK**.
10. Use AutoFill to copy the function to the remaining cells.



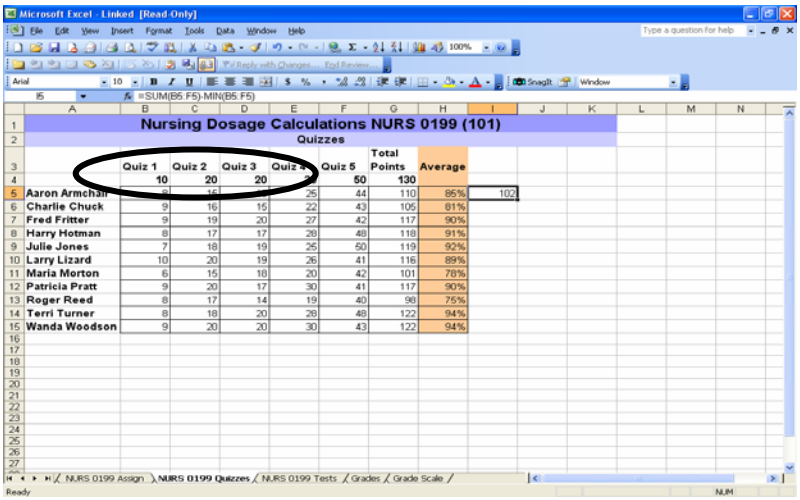
Objective 4: Create a formula that will calculate the total points earned minus the lowest score.

Drop the Lowest Grade

It is possible to figure an average by disregarding one of the items

Dropping the Lowest Grade

Essentially dropping the lowest grade involves the following: Add the total of all the tests/quizzes/assignments/etc., and then subtract the lowest score of all these items to calculate the total points.



<u>To Drop the Lowest Grade</u>

1. Click the tab of the sheet that contains the tests/quizzes/assignments/etc that you need to drop the lowest score from.
2. Click to select the cell that is to contain the sum of the tests/quizzes/assignments/etc minus the lowest score.
3. Click the **Auto Sum button** on the standard toolbar, and highlight the tests/quizzes/assignments/etc.
4. Then click beyond the closing parenthesis in the formula bar, press the "-" **Minus key** on the keyboard, and click the **Paste Function button** on the standard toolbar.
5. Select **Statistical** from the Function category list. Then select **MIN** from the Function name list.
6. Drag over the same scores as in step 3.
7. Press the **Enter key** on the keyboard to calculate the new value of total points earned.
8. To use this new total points earned, you may need to adjust the total possible points.