CS 1301

Lab 4 – Introduction to Excel

Due: Friday April 2nd before 6 PM
Out of 100 points

Files to submit: **1. lab4.xls**

For Help:

- TA Helpdesk – Schedule posted on class website.
- Email TAs

Notes:

- **Don't forget to include the required comments and collaboration statement (as outlined on the course syllabus).**
- **Do not wait until the last minute** to do this assignment in case you run into problems.
- If you find a significant error in the assignment, please let a TA know immediately.

Objectives

1. To learn how to use a spreadsheet program such as Microsoft Excel.

2. To learn precision and general formatting in spreadsheets.

3. To learn how to do formulaic calculations within spreadsheets.

4. To learn both absolute and relative cell referencing.

5. To learn conditional formulation within a spreadsheet.

6. To learn how to create and configure different types of graphs in spreadsheets.

Intro. to Excel:

Microsoft Excel is a spreadsheet and database application, which makes use of cells in order to organize and work with data. Excel has many uses; from pure number-crunching, to graphical presentations, to organization of information in a grid layout. It can also handle several higher-level mathematical functions for those who really want to do such things but also want to avoid purchasing Maple or Mathematica (Athough I do not suggest Excel as any kind of true replacement). Anyway, enough introduction, now to the lab.

By the way, *cells* are those little boxes where the data of a spreadsheet goes.

The Lab:

Step 1:
To begin, download the lab4.xls file from the Labs page of the class website. This is the template – you will be filling out the required information then turning the lab4.xls file back in.

Once you open the file, you will discover what looks like a half-filled out grade book. Your first job (perhaps you are a graduate student, aka minion) is to fill out the columns for Project Average, Test Average, and Original Final Average. But how to do this, quickly?

Of course, you could hand-compute each students' averages, but this time consuming, and we've got Excel to do lots of math for us. Let's start with Project Average. You can see that this average will be the sum of the project grades divided by 3. Select the empty cell for the first student's project average (cell **I2**). In the equation box (white box along the top of the spreadsheet) type:

=(B2+C2+D2)/3

This will add the 3 project grades together, divide them 3, and store the result in **I2**. Once you've typed this, hit ENTER, and Bobby Tables' project average will appear in the box. Hooray!

Now, how to apply this to all students? Well, you could retype this equation for all 25 remaining students, changing the "2" to the appropriate row value. But this is time consuming, so here's a shortcut. Select the computed average cell (**I2**), click the lower-right corner, and drag the bottom of the box down to cell **I27**. Once you unclick, you will see the project averages have been computed for all the students. If you click on a particular cell and look in the equation bar, you will see that the average equation we used has been updated for that particular row.

Using this same process, compute Test Average for all students. I'll wait here for you.

Once this is done, please format all your values to two decimal places. To do this:

Select all the values in the appropriate column
Click Format -> Cells
Click the Numbers Tab
Select "Number", and the set the number of decimals places to 2.
Exit the menu

Step 2:
Got some Test Averages computed? Awesome. Now it's time to compute the original final average (before a curve) for the students. Assuming the grading portion of the syllabus has these weights:

Tests: 60% (20% each)
Projects: 30% (10% each)
Participation: 10%

Using the equation bar as before, multiply the appropriate cell by the appropriate weight, and store those results in the Original Final Average column. Your formula will look something like:

finalAvg = .6*(Test Avg) + .3*(Project Average) + .1(Participation)

but replace the names with the appropriate cells, and then apply the formula to each student.

Step 3:
Now, before we computer the curved final average, we need to know how the class did overall. See the "Overall Class Average" row beneath the students list? We need to get the class averages for each column. Here is where yet another nifty feature of Excel comes in. Excel has a built in function called SUM(), which takes in numbers and sums them. You can either pass it a collection of numbers individually, or a range. This can be done by selecting values within a column or row. So, select cell **B29**, and type this:

=SUM(B2:B27)/B30

In the equation bar. The colon between B2 and B27 indicates I want all the values in cells B2 – B27 to be summed. Now, what's this "B30" notation. Remember how when we were computing the averages up there, and Excel auto-incremented each row when we dragged the result cell down? Well, the $ gives us a way to tell Excel not to do that. Placing a $ before the B says I always want the column to be B, and placing one before the $ 30 says I always want the row to be 30. If you check in cell B30, you'll find the class size stored, since computing all your class averages will require dividing by this value.

Repeat this process (remember the click and drag? Works for rows, too) to get the class averages for the remaining columns (EXCEPT the "Curved Final Average" column).

Step 4:
Before we make a curved final average, we want to make a graph of how the class' grades rose and fell during the semester. Using a graph, plot the class average for each

assignment.

Steps to do this:
Highlight cells B29 – K29 (the class averages) – This will be one axis
While holding down CTRL:
    Highlight cells B1 – K1 (the names of the assignments) – The other axis
Click Insert -> Chart
Select a graph of your choice.
Click Finish

You should now have a spiffy chart with the cell entry names on one axis, and the score values on the other.

Step 5:

Now it's time to fill out the curved final average, but before we can do that, we need the format the original final average values to be integers (similar to formatting precision earlier, but now choose the decimal places to be appropriate for an integer – Note: "General" seems like what you want, but it doesn't round values where appropriate.). Now, on to the curving!

The curve for this class is weird, perhaps the professor is a little crazy. Here's the Python code for how the professor chose to curve:

```
If studentFinalAvg >= classFinalAvg + 6: # Greater than one standard deviation, perhaps
    studentFinalAvg = 98
else:
    studentFinalAvg += 5
```

Now, you can't just copy this into Excel, because it will be sad and error at you. Excel has their own conditional syntax, like this:

=IF(logic_test,value_if_true,value_if_false)

Note the single equal sign. Figure out how to change the above Python code into Excel syntax, and compute the curved final average for the each the student, as well the new curved overall class average. Once this is finished, please format these values as integers as well.

Step 6:

You're almost done! Now the only thing left to do is to make it easy for the professor to export grades. Since most grade entry systems are in alphabetical order by student last name, you should sort your data in this way. To achieve this:

Select all of your student data (not the overall class average, or the assignment names at the top). This includes their name and all of their grades
Click Data -> Sort
On the new menu that comes up, in the first "Sort By", select "Student Name" and ascending order.
Hit Ok

Now your students should be in alphabetical order by last name! Yay, you're done!

Turn – In:

Just turn in your completed lab4.xls file to T-Square by the deadline. Please DO NOT submit an .xlsx file! (Export to Office 2003 or 97 format if needed to convert to .xls)

Then give yourself a pat on the back for excelling at Excel. (Oh, the pun, it hurts.)

Grading Rubric:
10 points – Project Average is computed correctly
5 points – Project Average is rounded to 2 decimal places
10 points – Test Average is computed correctly
5 points – Test Average is rounded to 2 decimal places
10 points – Original Final Average is computed correctly
5 points – Original Final Average is rounded to 0 decimal places (an Integer)
15 points – Class Averages for each column are computed correctly
15 points – Chart is present and created with proper data
15 points – Curved Final Average is computed correctly
10 points – Data is sorted alphabetically by last name

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