

CS1100: Excel Lab 1

Filtering and Summarizing Data

To complete this assignment you must submit an electronic copy to BlackBoard by the due date. Use the data in the starter file. In this lab you are asked to filter and calculate various descriptive statistics on a data set about students at a university and calculate various descriptive statistics on a data set about loans and investments. In addition, you will solve a problem using induction.

Problem 1 (25 Points)

In the sheet “Problem 1” you are given the major and the GPA of a sample of students at a university.

Your task is:

1. Using **IF**, filter the data for these students by major. You will need to add a column for each major and then use the **IF** function to filter the data by major. Your formula should use proper anchoring so it is copyable *both* down and across.
2. Calculate the overall average GPA as well as the average GPA for each major.
3. Use conditional formatting to shade cells pink if a GPA is less than 2.2

Your solution must look like this (including the formatting):

Student	Major	GPA	BIOL	BUSN	CS	HIST	IS	MATH
Tom S.	CS	3.5			3.5			
Betty J.	IS	3.1					3.1	
Amy K.	MATH	2.9						2.9
Will B.	BIOL	3	3					
Jesse L.	BUSN	2.2		2.2				
Nancy S.	MATH	2.7						2.7
John M.	HIST	1.95				1.95		
Jeff G.	BUSN	3.3		3.3				
Luis R.	BUSN	3.2		3.2				
Liza J.	MATH	1.3						1.3
Amanda G.	HIST	3.7				3.7		
Liam B.	BUSN	2.03		2.03				
Zahra S.	CS	3.8			3.8			
Neil O.	IS	3.4					3.4	
John R.	MATH	2.9						2.9
James B.	BIOL	2.5	2.5					
<i>Average</i>		2.84	2.75	2.68	3.65	2.83	3.25	2.45

Your solution must take into account the possibility that the data could change, *i.e.*, do not “hard code” any data values. If the major of a student changes, your calculations should update to the correct values automatically. Additionally, if new rows are inserted or existing rows are deleted, your spreadsheet model should still work.

Problem 2 (40 Points)

In the sheet “Problem 2”, you are given information about a savings account. Use this information to create a savings calculator. Notice that some cells have been given names. Use these names in formulas where appropriate. You can view all named cells in the Name Manager under the Formulas tab.

1. Use formulas to fill in the columns as shown below, including the column for DepNo. Lookup the DATE formula to figure out how to fill in the Payment Date column. You may type in the Extra Deposits as they appear in the figure below.
2. In cell I7, calculate the total amount of scheduled deposits.
3. In cell I8, calculate the total amount of extra deposits.
4. In cell I9, calculate the total amount of interest earned.
5. In cell I10, calculate the percentage that the account has increased by.
6. In cell I11, use an IF statement to determine whether the goal has been reached at the end of the savings period.

Here is what your solution should look like:

Savings Account Calculator																																			
<table border="1"> <thead> <tr> <th colspan="2">Enter Values</th> </tr> </thead> <tbody> <tr> <td>Starting Balance</td> <td>\$ 10,000.00</td> </tr> <tr> <td>Annual Interest Rate</td> <td>4.00 %</td> </tr> <tr> <td>Savings Period in Years</td> <td>2</td> </tr> <tr> <td>Number of Deposits Per Year</td> <td>12</td> </tr> <tr> <td>Start Date of Account</td> <td>1/1/2012</td> </tr> <tr> <td>Goal</td> <td>\$ 16,000.00</td> </tr> </tbody> </table>				Enter Values		Starting Balance	\$ 10,000.00	Annual Interest Rate	4.00 %	Savings Period in Years	2	Number of Deposits Per Year	12	Start Date of Account	1/1/2012	Goal	\$ 16,000.00	<table border="1"> <thead> <tr> <th colspan="2">Account Summary</th> </tr> </thead> <tbody> <tr> <td>Scheduled Deposit</td> <td>\$200.00</td> </tr> <tr> <td>Total Scheduled Deposits</td> <td>\$ 4,800.00</td> </tr> <tr> <td>Total Extra Deposits</td> <td>\$ 1,070.00</td> </tr> <tr> <td>Total Interest</td> <td>\$ 1,062.24</td> </tr> <tr> <td>Percent Increase</td> <td>69%</td> </tr> <tr> <td>Goal Reached?</td> <td>Yes</td> </tr> </tbody> </table>				Account Summary		Scheduled Deposit	\$200.00	Total Scheduled Deposits	\$ 4,800.00	Total Extra Deposits	\$ 1,070.00	Total Interest	\$ 1,062.24	Percent Increase	69%	Goal Reached?	Yes
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DepNo.	Deposit Date	Beginning Balance	Deposit	Interest	Extra Deposit	Total Deposit	Ending Balance																												
1	2/1/2012	\$ 10,000.00	\$ 200.00	\$ 33.33		\$ 233.33	\$ 10,233.33																												
2	3/1/2012	\$ 10,233.33	\$ 200.00	\$ 34.11		\$ 234.11	\$ 10,467.44																												
3	4/1/2012	\$ 10,467.44	\$ 200.00	\$ 34.89		\$ 234.89	\$ 10,702.34																												
4	5/1/2012	\$ 10,702.34	\$ 200.00	\$ 35.67		\$ 235.67	\$ 10,938.01																												
5	6/1/2012	\$ 10,938.01	\$ 200.00	\$ 36.46	\$ 200.00	\$ 436.46	\$ 11,374.47																												
6	7/1/2012	\$ 11,374.47	\$ 200.00	\$ 37.91		\$ 237.91	\$ 11,612.39																												
7	8/1/2012	\$ 11,612.39	\$ 200.00	\$ 38.71		\$ 238.71	\$ 11,851.09																												
8	9/1/2012	\$ 11,851.09	\$ 200.00	\$ 39.50		\$ 239.50	\$ 12,090.60																												
9	10/1/2012	\$ 12,090.60	\$ 200.00	\$ 40.30	\$ 300.00	\$ 540.30	\$ 12,630.90																												
10	11/1/2012	\$ 12,630.90	\$ 200.00	\$ 42.10		\$ 242.10	\$ 12,873.00																												
11	12/1/2012	\$ 12,873.00	\$ 200.00	\$ 42.91		\$ 242.91	\$ 13,115.91																												
12	1/1/2013	\$ 13,115.91	\$ 200.00	\$ 43.72		\$ 243.72	\$ 13,359.63																												
13	2/1/2013	\$ 13,359.63	\$ 200.00	\$ 44.53		\$ 244.53	\$ 13,604.16																												
14	3/1/2013	\$ 13,604.16	\$ 200.00	\$ 45.35	\$ 250.00	\$ 495.35	\$ 14,099.51																												
15	4/1/2013	\$ 14,099.51	\$ 200.00	\$ 47.00		\$ 247.00	\$ 14,346.51																												
16	5/1/2013	\$ 14,346.51	\$ 200.00	\$ 47.82		\$ 247.82	\$ 14,594.33																												
17	6/1/2013	\$ 14,594.33	\$ 200.00	\$ 48.65		\$ 248.65	\$ 14,842.98																												
18	7/1/2013	\$ 14,842.98	\$ 200.00	\$ 49.48		\$ 249.48	\$ 15,092.46																												
19	8/1/2013	\$ 15,092.46	\$ 200.00	\$ 50.31	\$ 320.00	\$ 570.31	\$ 15,662.76																												
20	9/1/2013	\$ 15,662.76	\$ 200.00	\$ 52.21		\$ 252.21	\$ 15,914.97																												
21	10/1/2013	\$ 15,914.97	\$ 200.00	\$ 53.05		\$ 253.05	\$ 16,168.02																												
22	11/1/2013	\$ 16,168.02	\$ 200.00	\$ 53.89		\$ 253.89	\$ 16,421.92																												
23	12/1/2013	\$ 16,421.92	\$ 200.00	\$ 54.74		\$ 254.74	\$ 16,676.66																												
24	1/1/2014	\$ 16,676.66	\$ 200.00	\$ 55.59		\$ 255.59	\$ 16,932.24																												

Make sure that your

- formulas are “copyable”, *i.e.*, that they use absolute references (\$) wherever needed
- **IF** statements do not hard code amounts, but rather use cell references
- the cells are formatted as shown in the solution above

Problem 3 (35 Points)

In the sheet “Problem 3” you are to create various loan payment scenarios. The loan has an initial balance (cell C1) of \$30,000.

1. Create a column of years from 0 through 20 of the life of the loan. Use a formula starting in Year 1.
2. Create columns for 5 different interest rates: 2%, 4%, 6%, 7% and 8%.
3. Use the PMT formula to calculate the monthly payment due if the loan is paid in full at the end of each year. Make sure that your formulas use proper anchoring (\$) to allow the formulas to be copied. You should be able to copy the formula down and across without changing the formula.
4. Format the model exactly as shown.
5. Test your model with different initial balances and interest rates.
6. Add your first and last name to cell A28.

Your result should look like this:

	Initial Balance: \$ 30,000.00				
Year	2%	4%	6%	7%	8%
0	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00
1	(\$2,527.17)	(\$2,554.50)	(\$2,581.99)	(\$2,595.80)	(\$2,609.65)
2	(\$1,276.21)	(\$1,302.75)	(\$1,329.62)	(\$1,343.18)	(\$1,356.82)
3	(\$859.28)	(\$885.72)	(\$912.66)	(\$926.31)	(\$940.09)
4	(\$650.85)	(\$677.37)	(\$704.55)	(\$718.39)	(\$732.39)
5	(\$525.83)	(\$552.50)	(\$579.98)	(\$594.04)	(\$608.29)
6	(\$442.51)	(\$469.36)	(\$497.19)	(\$511.47)	(\$526.00)
7	(\$383.02)	(\$410.06)	(\$438.26)	(\$452.78)	(\$467.59)
8	(\$338.43)	(\$365.68)	(\$394.24)	(\$409.01)	(\$424.10)
9	(\$303.76)	(\$331.23)	(\$360.17)	(\$375.19)	(\$390.56)
10	(\$276.04)	(\$303.74)	(\$333.06)	(\$348.33)	(\$363.98)
11	(\$253.38)	(\$281.30)	(\$311.01)	(\$326.52)	(\$342.46)
12	(\$234.51)	(\$262.66)	(\$292.76)	(\$308.51)	(\$324.74)
13	(\$218.55)	(\$246.93)	(\$277.42)	(\$293.42)	(\$309.92)
14	(\$204.88)	(\$233.50)	(\$264.37)	(\$280.62)	(\$297.40)
15	(\$193.05)	(\$221.91)	(\$253.16)	(\$269.65)	(\$286.70)
16	(\$182.71)	(\$211.80)	(\$243.43)	(\$260.16)	(\$277.48)
17	(\$173.59)	(\$202.92)	(\$234.93)	(\$251.90)	(\$269.48)
18	(\$165.50)	(\$195.06)	(\$227.45)	(\$244.65)	(\$262.49)
19	(\$158.27)	(\$188.06)	(\$220.82)	(\$238.26)	(\$256.35)
20	(\$151.77)	(\$181.79)	(\$214.93)	(\$232.59)	(\$250.93)

Knowledge Needed

This lab requires the following Excel functions and techniques:

- Cell ranges, Named ranges, borders, number formatting
- **IF** function to filter data into male and female segments
- **AVERAGE** to calculate the average (or mean) of a range
- **COUNT** to count the number of rows in a range
- Conditional formatting
- Absolute vs. relative cell references
- Copying of formulas

GRADING RUBRIC

This rubric is intended to guide graders in their evaluation of the students' submissions.

Problem 1 (worth 25 points)

Criterion	Discussion	Grading
IF statements are used properly to segment GPAs by major	Students should not copy data values but rather use IF to filter the data.	-10 if IF not used -5 if IF statement was used but is incorrect, is not copyable both across and down, or contains hard coded major names
Average GPAs by major and overall average GPA	Students must calculate the average GPA score overall and for each major using AVERAGE	-5 if AVERAGE is not used -2 if the values are incorrect
Formatting	The students must format the output as shown Averages must be formatted (not rounded) to 2 decimals	-1 if no bold facing in header -1 if no shading in header -1 if no bottom border -1 if averages are not italicized -1 if averages not formatted to 2 decimals
Conditional formatting	GPAs under 2.2 should be shaded in pink using conditional formatting	-5 if conditional formatting not used
Resilient to data changes	The model must work if rows are inserted, deleted, or states are changed. It is acceptable if the model does not work when a students from a new state is added.	-5 if the model does not adjust properly to data changes

Problem 2 (worth 50 points)

Criterion	Discussion	Grading
Deposit Number (DepNo.)		-5 if formula is not used or not correct
Deposit Date		-5 if formula incorrect or not used
Beginning Balance, Interest, Total Deposit, Ending balance		5 points each
Total Scheduled Deposits, Total Extra Deposits, Total Interest		5 points each
Percent Increase, Goal Reached?		5 points each

Problem 3 (worth 25 points)

Criterion	Discussion	Grading
Year is calculated with a formula	Year range must change if first year changes	-5 if formula is not used
Correct calculation of payment each year for each rate	The payment must be calculated using the interest rates and the balance; balance must be referenced and not hard coded	-10 if formula incorrect or incorrect values -5 if balance is hard coded in formula -5 if initial balance value for the first year is hard coded in formula
Resilient to data changes and Formulas are copyable	The model must work if initial balance, interest rates, or year ranges are changed. Formulas must use locking of rows or columns in formulas	-5 if the model does not adjust properly to data changes
Formatting	Output must be formatted as shown	-1 if no bold facing in header -1 if no shading in header -1 if no borders
Formatting of values	Output must be formatted using accounting or currency format	-2 if not formatted correctly
Name	Student name is entered in cell A28	-5 if name is not added