Northeastern University
College *of* Computer and Information Science

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 a list of festivals, their locations and the seasons that they fall in.

Your task is:

1. Using **IF**, filter the data for these festivals by season. You will need to add a column for each season and then use the **IF** function to filter the data by season. Your formula should use proper anchoring so it is copyable *both* down and across.
2. Calculate the total number of festivals each season as well as the percentage of festivals that fall in each season.

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

Festival	Location	Season	Winter	Spring	Summer	Fall
Carnival	Rio de Janeiro, Brazil	Winter	1			
Oktoberfest	Munich, Germany	Fall				1
Dia de los Muert	Oaxaca, Mexico	Fall				1
Albuquerque Ba	Albuquerque, USA	Fall				1
Mardi Gras	New Orleans, USA	Winter	1			
Il Palio	Siena, Italy	Summer			1	
La Tomatina	Bunol, Spain	Summer			1	
San Fermin Fes	Pamplona, Spain	Winter	1			
Pingxi Lantern F	Pingxi, Taiwan	Winter	1			
Carnival of Venic	Venice, Italy	Spring		1		
Saint Patrick's D	Dublin, Ireland	Spring		1		
White Nights Fe	St. Petersburg, Russia	Spring		1		
		Total	*4*	*3*	*2*	*3*
		Percentage	*33%*	*25%*	*17%*	*25%*

Your solution must take into account the possibility that the data could change, *i.e.*, do not "hard code" any data values. If the season of a festival 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.
7. Use conditional formatting to shade cell I11 green if the goal has been reached and red if it has not been reached.

Here is what your solution should look like:

Savings Account Calculator

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

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

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 <u>not</u> 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 $50,000.

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%, 8% and 10%.
3. Use the PMT formula to calculate the **monthly payment due** if the loan is paid in full at the end of each period. For instance, the monthly payment of a loan with a 2% interest rate that is to be paid in 5 years would be $876.39. Make sure that your formulas use proper anchoring ($) to allow the formulas to be copied. You should be able to copy the formula down and across without changing the formula.
3. Format the model exactly as shown.
4. Test your model with different initial balances and interest rates.
5. Add your first and last name to cell A28.

Your result should look like this:

	Initial Balance:	$ 50,000.00			
	Monthly Payments Due				
Year	**2%**	**4%**	**6%**	**8%**	**10%**
0	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00	$ 50,000.00
1	($4,211.94)	($4,257.50)	($4,303.32)	($4,349.42)	($4,395.79)
2	($2,127.01)	($2,171.25)	($2,216.03)	($2,261.36)	($2,307.25)
3	($1,432.13)	($1,476.20)	($1,521.10)	($1,566.82)	($1,613.36)
4	($1,084.76)	($1,128.95)	($1,174.25)	($1,220.65)	($1,268.13)
5	($876.39)	($920.83)	($966.64)	($1,013.82)	($1,062.35)
6	($737.52)	($782.26)	($828.64)	($876.66)	($926.29)
7	($638.37)	($683.44)	($730.43)	($779.31)	($830.06)
8	($564.04)	($609.46)	($657.07)	($706.83)	($758.71)
9	($506.26)	($552.05)	($600.29)	($650.94)	($703.93)
10	($460.07)	($506.23)	($555.10)	($606.64)	($660.75)
11	($422.30)	($468.83)	($518.35)	($570.77)	($625.99)
12	($390.84)	($437.76)	($487.93)	($541.23)	($597.54)
13	($364.25)	($411.56)	($462.36)	($516.54)	($573.92)
14	($341.47)	($389.17)	($440.62)	($495.66)	($554.10)
15	($321.75)	($369.84)	($421.93)	($477.83)	($537.30)
16	($304.52)	($353.00)	($405.72)	($462.46)	($522.95)
17	($289.32)	($338.20)	($391.55)	($449.13)	($510.61)
18	($275.83)	($325.10)	($379.08)	($437.48)	($499.92)
19	($263.78)	($313.44)	($368.04)	($427.25)	($490.63)
20	($252.94)	($302.99)	($358.22)	($418.22)	($482.51)

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 festivals by season**	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
Total and percentages of festivals in each season	Formulas should be copyable across	-5 if total number of festivals is hardcoded in percentage formula -2 if the values are incorrect
Formatting	The students must format the output as shown	-1 if no bold facing in header -1 if no shading in header -1 if no bottom border -1 if sums & percentages are not italicized -1 if percentages not formatted as percents
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?, Conditional Formatting		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