IS 628, Computer-Based Information Systems
Assignment – Building a DSS in Excel

The following assignment is intended to be a brief introduction to how a spreadsheet application such as Microsoft Excel may be used as a Decision Support System for sensitivity analysis ("What if…?" analysis). You are to follow the instructions to complete and submit the assignment as **individuals**. You will have to complete the DSS tool. The Income Statement for FY2015 is shown below, as are some descriptions of the relationships between data items contained in the Income Statement. You are to use this data and the descriptions to complete the Model of the DSS from the relationships described.

Income Statement Fiscal Year Ending September 30, 2015

Income		
Gross Sales	$2,250,000	
Returns and Allowances	$90,000	
Net Sales		$2,160,000
Expenditure		
Labor	$315,000	
Materials	$517,500	
Fixed Overhead	$80,000	
Variable Overhead	$233,100	
Cost of Goods		$1,145,600
Profit and Taxes		
Gross Profit	$1,014,400	
M, M and G	$388,800	
Profit Before Tax		$625,600
Federal Tax	$168,912	
State Tax	$50,048	
Profit After Tax		$406,640
Net Income		$406,640

A company is producing and selling several products for gross sales (income) of 2.25 million dollars (for FY2015). Returns and allowances are 4 percent of gross sales, reducing the income to net sales. Marketing, management, and general expenses (MM&G) are figured to be 18% of the net sales. Cost of goods sold is the sum of labor (14% of sales), materials (23% of sales) and overhead. Overhead is figured to be variable overhead (28% of the combined cost of labor and materials) plus fixed overhead ($80,000).

Gross profit is the difference between net sales and cost of goods sold. To figure the profit before tax, MM&G expenses need to be subtracted from the gross profit. Finally, there is the 27% Federal taxes and 8% state taxes that need to be considered, but these are only assessed if there is indeed a profit; if the profit before tax is zero or below (a loss from operations), the tax is zero (you will need to use the IF function here).

Your Assignment:

Create the DSS tool in Excel starting with the DSS_ASSN.xlsx spreadsheet I have provided. Note that the worksheet has three areas, the Database, Model, and Representation. These correspond to the three major components of a DSS. The Database shall contain only numbers while the Model will contain the formulas that define the association between the Database values and provides the output values used in analysis. The Representation acts as an interface between the DSS and user, placing the data and results in a format that can be easily interpreted by the user. It is important that you retain appropriate separation between the components.

Enter the data values identified in the problem statements above. You will alter the Database values to perform your sensitivity analysis. That is to say, when you change the value in the Database section, these changes should be reflected in the Model and the Results column of the Representation. There shall be only numeric values in the Database; that is, no computations shall be performed in the Database.

Build in the formulas as necessary to create the Model. You need to identify and build into the Model each association between variables described in the problem statements above. There shall only be formulas in the Model, meaning there shall be no constants in any of the formulas. Each formula should be as simple as possible. If a value needed in a formula is calculated elsewhere in the Model, use the value from the cell where it is calculated rather than re-calculating the value.

Within the Representation, each cell of the Results column that corresponds to a Base Year column value, shall draw its displayed value from the Database and Model as appropriate; that is, there should be no constants or calculations performed in the Results column. A simple calculation will need to be performed in the Change column to display the difference between corresponding values of the Base Year and Results columns.

The Database values are also known as the "independent variables" such that they may be changed independent from any of the other values. The values displayed in the Model as a result of the computations are dependent variables where whatever value is displayed is dependent upon the Database value(s) and their association to one another. When you change a value in the Database section, the change will be reflected in the dependent variables of the Model.

The Results of the Representation will change without any other intervention on your part whenever a value in the Database or Model changes. All monetary values shall be displayed to the nearest dollar, and other numbers in the database, subsequently used in calculations, should be displayed to the nearest whole number (the various fractions should be displayed as percent).

That data values and relationships described in the above problem statements form the base year assumptions that reflect actual data relationships used to construct the DSS tool. Once the DSS tool has been completed, you are ready to perform the sensitivity ("What if…?") analysis. The analysis is performed by answering the fourteen questions below. For each question, you are to change the assumptions, then derive the answers to the questions. Your spreadsheet, if built correctly, will return correct answers to these questions. All of the questions are independent of one another. Therefore, you need to **be sure to return to the base assumptions before attempting the next question.** You may want to use the Excel Goal Seek tool for scenarios that look for a specific dependent variable value to be reached (questions 12 – 14). Please only provide the dollar value of your response (i.e., do not phrase your response as a sentence). Also note that appropriate responses to questions may come from either the Results column or the Change column of the Representation depending on how the question is framed. Be sure your answer is the value from the appropriate column.

1. What will be the profit after tax if gross sales decline to $2.0 million?
2. Assume that the Federal tax rate is 40% and gross sales total $3,000,000, what would the change be in net income?
3. As in question 3, assume that the Federal tax rate is 40%; but this time, assume that gross sales are only $2,500,000. What will be the change in net income (from the base year, not question 3)?
4. What will the change in net income be for a scheme estimated to reduce returns and allowances to 3% of gross sales but would likely increase the MMandG fraction to 19%?
5. What is the change in net income resulting from a plan that would reduce the materials cost fraction to 20% per year but would increase labor costs to 16%?
6. What would be the change in net income if fixed overhead is doubled?
7. If State taxes triple, what would be the after tax profit?
8. What would the net income (or loss) be if sales dropped to $500,000, and Fixed Overhead increased to $100,000?
9. Assume that the Return Fraction increases to 7%. What would be the Profit After Tax?
10. New, more efficient equipment can be purchased that would lower the variable overhead cost fraction to 25% but would raise the fixed overhead to $150,000. What would be the net income if the equipment were purchased?
11. What would be the change in net income if gross sales were $300,000?

Goal-Seeking Questions:

12. What amount would gross sales have to be in order for the company to show a net income of zero (the break-even sales point)?
13. What gross sales are needed to generate an after tax profit of $1,000,000?
14. What would the change in gross sales be if the company had a net income **loss** of $10,000?

Submission Instructions:

You are to do the following:

- Create a one-page word-processed document on which you have answered each of the above questions.
  - For your answers, all I need is a numbered list of the dollar amounts, double-spaced, with the values expressed in *currency* format with no decimal.
  - I do not need or want answers in a sentence format and please do not repeat the question.
  - On the document, enter your name in First then Last format in the upper-left corner of the page.
- You will turn in a hardcopy of this document (the answer sheet) at the beginning of class on the due date posted on the course schedule page.
- Your completed DSS tool (the completed Excel spreadsheet file) must use specific filename formatting
  - Rename the file using your last name followed by your first name as the filename.
  - For example, if I were to turn in a file, the file name would be MillerDavid.xlsx[1].
  - Make sure that you have inserted your name into the appropriate cell of the spreadsheet.
- The file, set to the base assumptions, is to be emailed to your instructor (david.w.miller@csun.edu).
  - For the Subject line enter, "IS628: DSS Assignment".
- The DSS tool file needs to be emailed by the beginning of the class session on the due date for the assignment posted on the course schedule page.
  - If, for some reason, you re-send the file I will use the latest copy received.

[1] Note that the file extension will be displayed only if the folder option on the computer you are using is set to show the file extension—the default is for it to not show. Do not add an extension if this option is not set.