Applying various "What-If" Analysis using Microsoft Excel

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Understanding a scenario

A scenario in Excel is a set of values that can be substituted automatically to cells that are used in aspects of calculations. For a single cell, you have the option of specifying multiple values and switch to see the effect of the different results. For example, you can have a set of values for best case, worst case, and normal case scenarios. If you are looking at a revenue based model, then the best case scenario will give you the highest revenue, and the worst case, the lowest revenue. This is done without changing the original values but stating these values within a scenario. To understand this, let us examine the following screen capture.

Current revenue model

The following example looks at the sales of a café selling primarily "*nasi lemak*" as its main source of revenue.

	A	B	
1	**Café Nasi Lemak**		
2			
3	**Nasi Lemak Pricing:**		
4	Normal	RM	2.50
5	Chicken	RM	5.50
6	Sotong	RM	6.50
7			
8	**Quantity required to sell per month:**		
9	Normal		1,000
10	Chicken		600
11	Sotong		500
12	Total:		2,100
13			
14	Total Revenue:	**RM**	**9,050.00**

In the above screen capture, let us assume that to break even on a monthly basis, the café need to sell a minimum of 1000 normal, 600 chicken, and 500 *nasi lemaks* every month, which generates a revenue of RM9050 per month.

Constraints within the revenue model

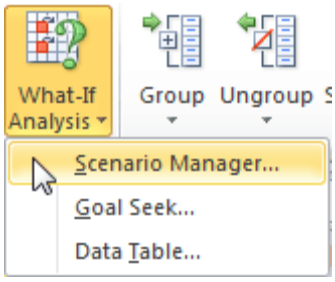
Before one applies any scenario to a model, you will need to clearly specify the constraints involved. For example, let us assume these are the following constraints for our revenue model above.

Constraints:		
Maximum	Normal	1,200
Maximum	Chicken	800
Maximum	Sotong	600

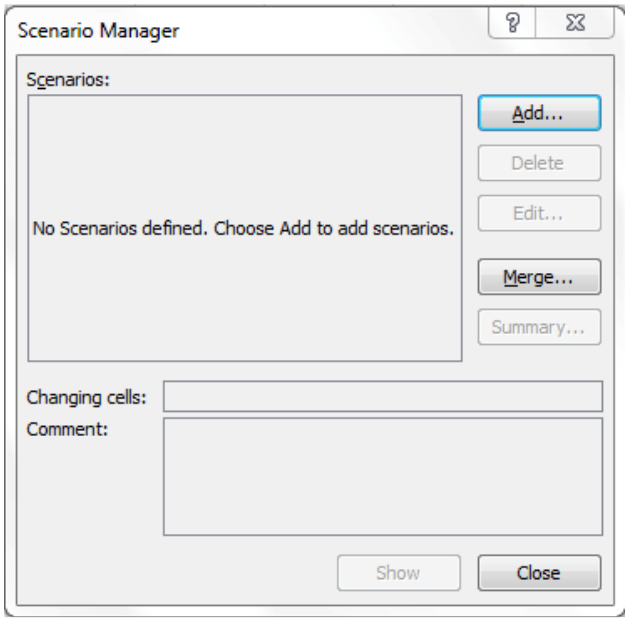
The above figures stated are our constraints on a monthly basis. In other words, the café can produce a maximum of 1200 normal; 800 chicken; and 600 sotong *nasi lemaks* per month.

Applying a scenario

To understand how scenarios work, let us apply a best and worst case scenario to the revenue model above. To do this in Excel, you will need to activate the Scenario Manager by clicking on the Data tab. Click on the What-If Analysis drop down arrow and choose Scenario Manager by clicking on it (as outlined below).

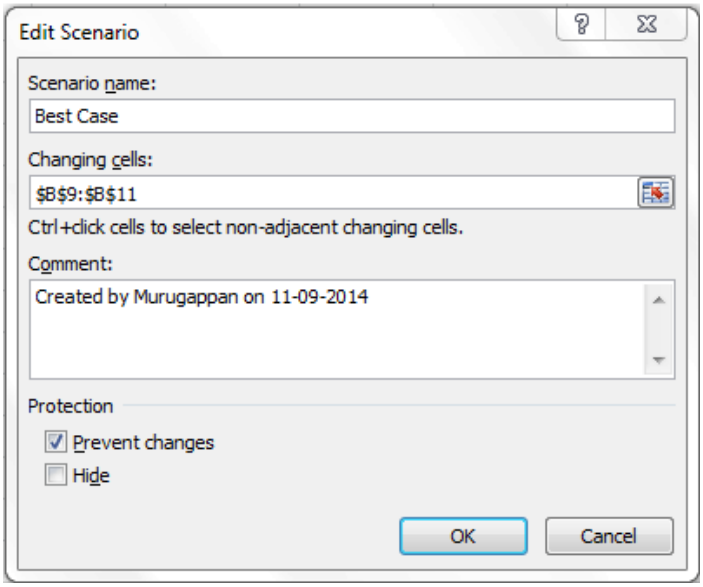


A blank Scenario Manager dialog box is opened.



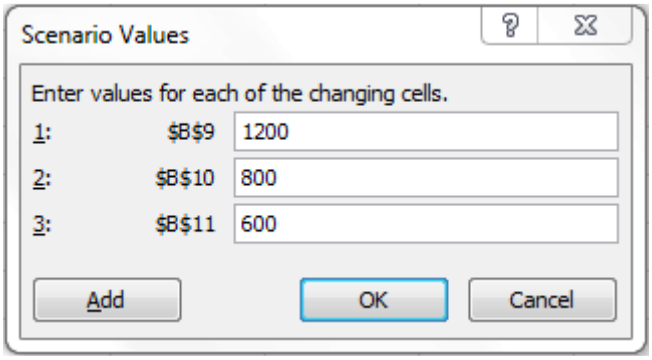
If the user had created any previous scenarios, it will be displayed inside the Scenarios section; otherwise you will see the message as above i.e. “No Scenarios Defined. Choose Add to add scenarios.”

To commence adding a scenario, click on the Add... button. In the Edit Scenario dialog box, type “**Best Case**” in the Scenario name text box. Highlight the cells **B9** to **B11** in the Changing cells text box, which reflects the current quantity required to be sold every month to break even.



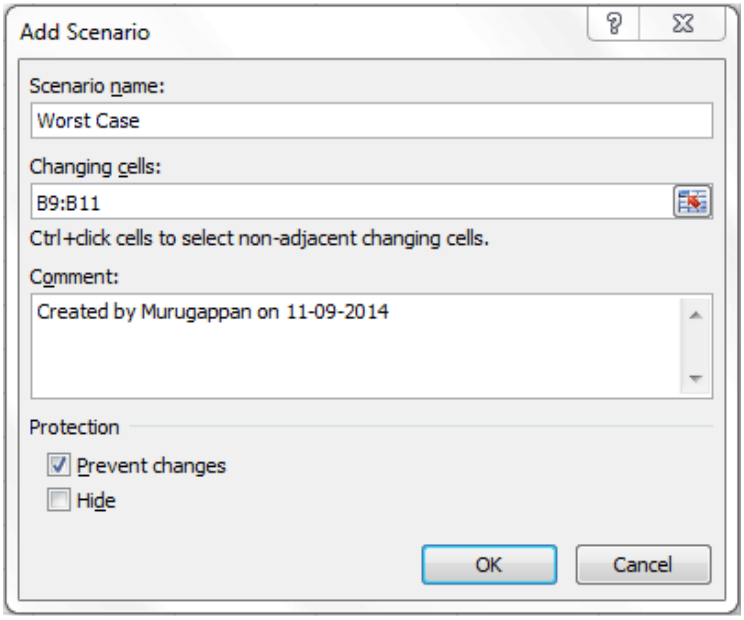
We have just created a scenario for the best case situation. To register the data entered, click on the OK button.

The Scenario Values dialog box is displayed. Here, key in the maximum values that can be produced for the normal, chicken, and sotong *nasi lemaks* in the respective text boxes as illustrated below.

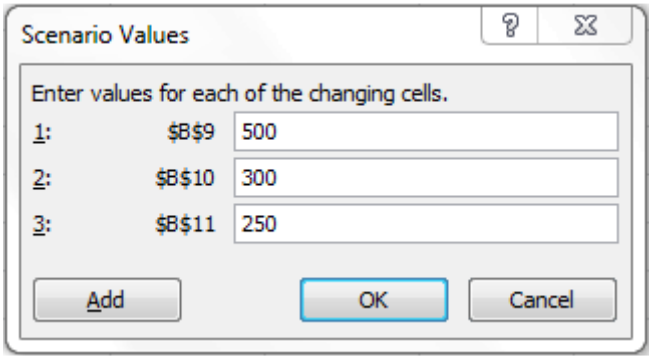


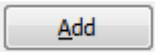
Upon keying in the figures, click on the Add button. The Best Case scenario has now been recorded. You will be returned to the Add Scenario dialog box next.

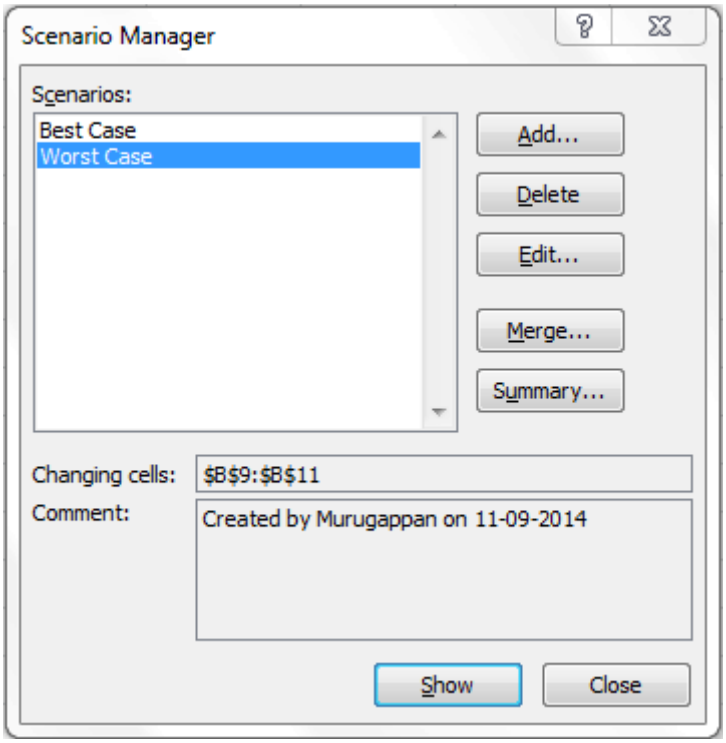
To record the Worst Case scenario, key in the following figures. Let us assume the worst case scenario is when manages to sell only half of the normal figures as illustrated.



Type **Worst Case** in the Scenario name text box. As you had selected the Changing cells earlier, you do not have to make changes here again to select the cells. Key in the following figures i.e. 500 in cell B9, 300 in cell B10, and 250 in cell B11.



Click the  button to register the figures you have just entered. As we are only considering two scenarios i.e. Best and Worst case scenarios, you should see the two displayed in the Scenarios section as illustrated.



Click on the Best Case scenario, followed by the Show button. As you can see, the revenue model figures are updated automatically to reflect the best case scenario.

Quantity required to sell per month:	
Normal	1,200
Chicken	800
Sotong	600
Total:	2,600
Total Revenue:	**RM 11,300.00**

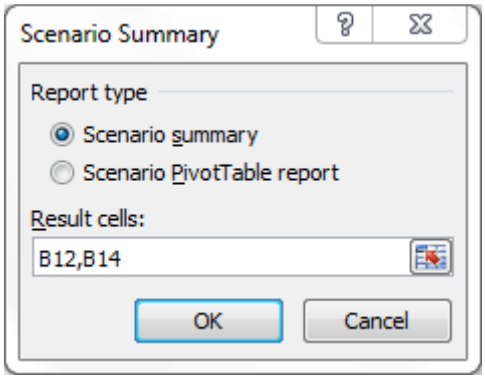
The café makes a best case total revenue of RM11,300 for the month.

Alternatively, if we had selected the Worst Case scenario and clicked on the Show button, the café's total revenue will be very low at RM4,525 for the month as in the diagram below.

Quantity required to sell per month:	
Normal	500
Chicken	300
Sotong	250
Total:	1,050
Total Revenue:	**RM 4,525.00**

Summarizing a scenario

Once you have seen the results of the best and worst case scenarios separately, you may opt to have a summary of both scenarios together in a separate sheet. To do this, click on the Summary... button. A Scenario Summary dialog box is displayed.

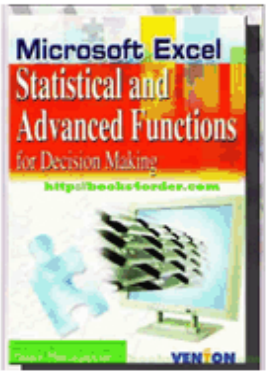
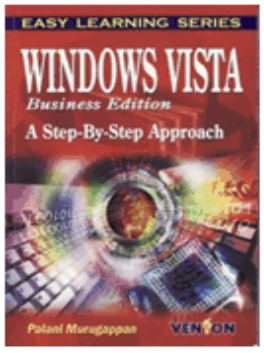
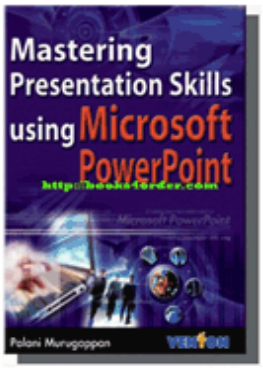
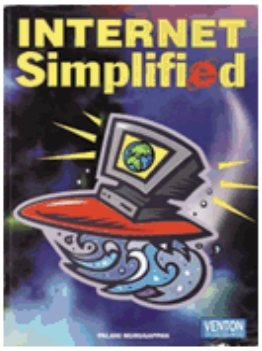


Click the OK button. A summary is created in a new sheet called Scenario Summary.

Scenario Summary			
	Current Values:	Best Case	Worst Case
Changing Cells:			
B9	1,200	1,200	500
B10	800	800	300
B11	600	600	250
Result Cells:			
B12	2,600	2,600	1,050
B14	RM 11,300.00	RM 11,300.00	RM 4,525.00

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

To recap, you can have as many scenarios as you want for various analysis. The Scenario Manager within Excel is one of the better ways to analyze the many scenarios that you may encounter in your day-to-day work.

The above examples and analysis are only a glimpse of what can be achieved utilizing Excel. Excel is one of the better tools to perform analysis of raw data. Many are users of Excel, but not many are exploiting Excel. As illustrated in the inventory system example above, once you are able to perform analysis, you can gather useful information from the raw data within the inventory system to enhance your decision making skills.

The examples illustrated above are a snapshot of what the author covers in some of his 2-days training sessions. Having been a corporate trainer for the last 14 years, Palani specializes in training participants how best to perform data analysis from company's raw data and concluding from the information gathered by harnessing Excel's built-in functions and features. A HRDF certified trainer and author of 51 books to-date on various software applications, Palani is passionate on what Excel can do, and how best to present data in different formats. More information is covered in his website www.avimursolutions.com. He can be reached at palani@avimursolutions.com