Unit 7 Focus on Analysis

7.0 Introduction

The auto recalculation power of Excel provides another feature - What-if-Analysis. For example, you enter the values in two cells and the formula to add these values in the third cell. Any change in the values of the first two cells will change the result in the third cell.

Thus, we can say that, what-if-analysis means "What would the result be, if the cell value changes". Creating Data Tables is one way of analysing the data. Other tools available for what-if-analysis are :

Goal Seek - determine the input required to produce the desired result.
Solver - to find solutions to problems involving multiple variables and constraints.
Scenario Manager - allow you to create different set of values that produce different results.

7.1 Objectives

After going through this unit, you will be able to

Use the goal seek tool which determines the input required to produce the desired result
Use the solver tool which find solutions to problems involving multiple variables and constraints
Create a scenario, display the scenario, edit the scenario and delete the scenario.

7.2 Goal Seek

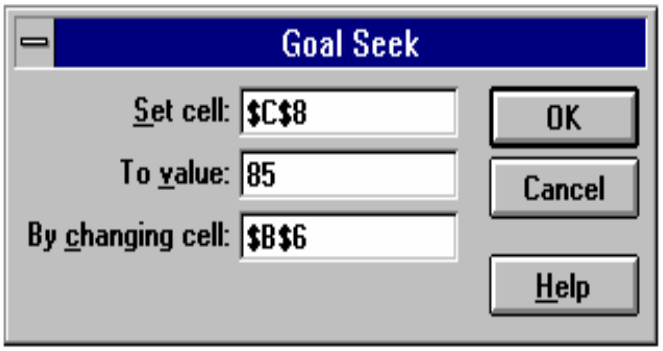
Often you know the result you want a formula to return but not the input values the formula needs to reach that result. To solve such a formula, you can use goal seeking. With this, MS-Excel varies the value in a cell you specify until a formula dependent on that cell returns the result you want.

Goal Seek saves you from performing time-consuming trial-and-error analysis. To seek a specific solution to a formula :-

1. Enter the data as given below:

	A	B	C
1	**SUBJECTS**	**MARKS**	
2	ENGLISH	76	
3	MATHS	94	
4	BIOLOGY	88	
5	CHEMISTRY	91	
6	PHYSICS		
7			
8	**PERCENTAGE =**		69.8
9			

2. Choose **Tools -> Goal Seek...** command. The **Goal Seek** dialog box is displayed.
3. In the **Set cell** box, enter the reference or the name of the cell containing the formula for which you want to find a specific solution.
4. In the **To value** box, enter the value you want as the result.
5. In the By changing cell box, enter the reference of the cell containing the value to be changed in solving for the result that you want as shown below:



7. Choose the **OK** button.

7.3 Solver

Microsoft Excel Solver is a powerful optimisation and resource allocation tool. It can help you to uncover the best uses of scarce resources so that desired goals such as profit can be maximised, or undesired goals such as cost can be minimised. Microsoft Excel Solver answers questions such as:

What product price or promotion mix will maximise profit?
How can I live within the budget?
How fast can we grow without running out of cash?

Instead of guessing over and over, you can use Microsoft Excel Solver to find the best answer. When you solve a problem using Solver, you:

1. Specify the target cell that you want to minimise, maximise, or set to a certain value.
2. Specify the changing cells that you want to be adjusted until a solution is found.
3. Specify constraint cells that must fall within certain limits or satisfy target values.

If the Solver command does not appear on the Tools menu, you need to install the Solver add-in. Add-ins are commands or functions that add special capabilities to Microsoft Excel. To install an add-in, choose the Add-ins command from the Tools menu. Once you install an add-in, its commands or functions become an integrated part of Microsoft Excel until you remove it. To use solver follow the given steps :

1. Enter the data shown below.

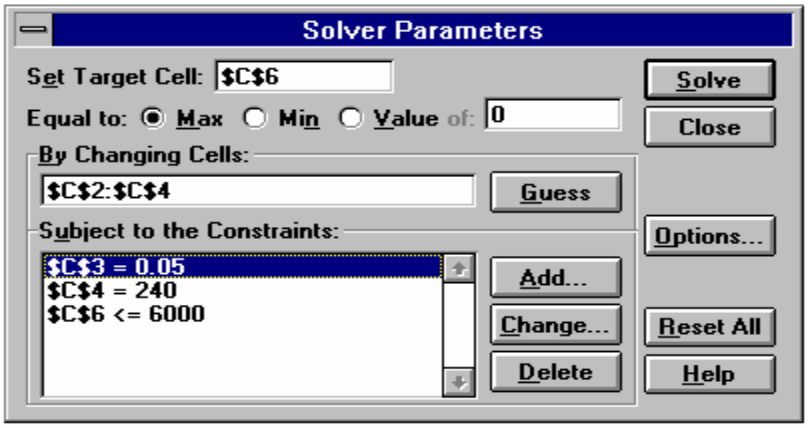
C6		=PMT(C3,C4,C2)
	A	B	C
1			
2	LOAN AMOUNT		100,000.00
3	INTEREST RATE		5%
4	NO. OF PAYMENTS		240
5			
6	MONTHLY PAYMENT		5,000.04
7			

2. Choose **Tools -> Solver...** command.

3. In the **Set Target Cell** box, enter a cell reference or name for the target cell. Select :
Max option button - if you want the target cell's value to be as large as possible.
Min option button - if you want the target cell's value to be as small as possible.
Value of option button - if you want the target cell to have a certain value.

4. In **By changing cells** box, enter the name or reference for each changing cell. If you enter more than one reference, separate the references with commas.

5. In the **Subject to the constraints** box, add any constraints you want to apply. Constraints can be applied to the target cell, the changing cell or any cell that is directly or indirectly related to the problem.



6. Click on **Solve** button to get the results.
To see the reports, select the report from the dialog box, and click on **OK**.

Microsoft Excel 5.0c Answer Report
Worksheet: [BOOK1.XLS]Sheet2
Report Created: 16/1/97 16:06

Target Cell (Max)

Cell	Name	Original Value	Final Value
C6	MONTHLY PAYMENT	5,000.04	6,000.00

Adjustable Cells

Cell	Name	Original Value	Final Value
C2	LOAN AMOUNT	100,000.00	119,999.01
C3	INTEREST RATE	5%	5%
C4	NO. OF PAYMENTS	240	240

Constraints

Cell	Name	Cell Value	Formula	Status	Slack
C6	MONTHLY PAYMENT	6,000.00	C6<=6000	Binding	0.00
C4	NO. OF PAYMENTS	240	C4=240	Binding	0
C3	INTEREST RATE	5%	C3=0.05	Binding	0%

7.4 Scenario Manager

In Microsoft Excel, you can create and save sets of input values that produce different results as scenarios. A scenario is a group of input values called changing cells saved with a name you provide. Each set of changing cells represents a set of what-if assumptions that you can apply to a workbook model to see the effects on other parts of the model. You can define up to 32 changing cells per scenario.

7.4.1 Creating a Scenario

Let's take an example of a condition where you are planning to buy a new vehicle. You have two choices for vehicle - one is worth Rs. 350,000 and the other is worth Rs. 400,000. The following situations apply to both kinds of vehicle :

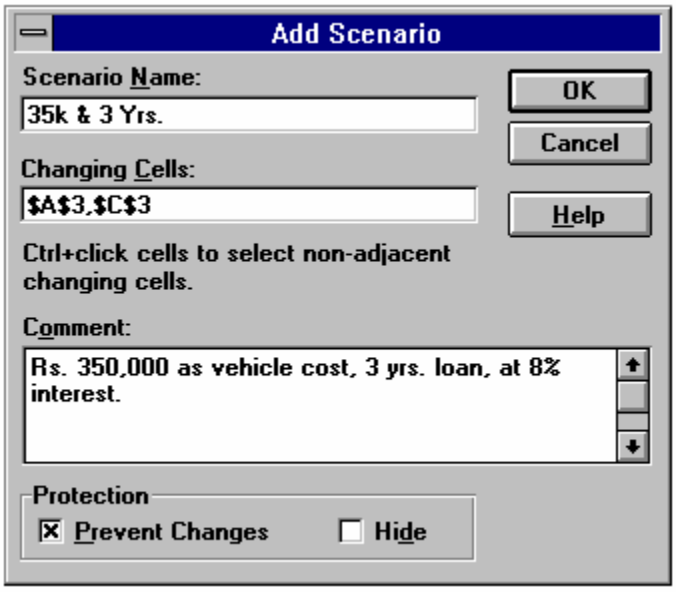
1. The interest rate is 8%, and 25% down payment is required.
2. The term of the loan can be either 3 Yrs. or 5 Yrs.

You can create 4 different scenarios - either the Rs. 350,000 vehicle or Rs. 400,000 vehicle, with either 3 yrs. loan or 5 yrs. loan. For this,

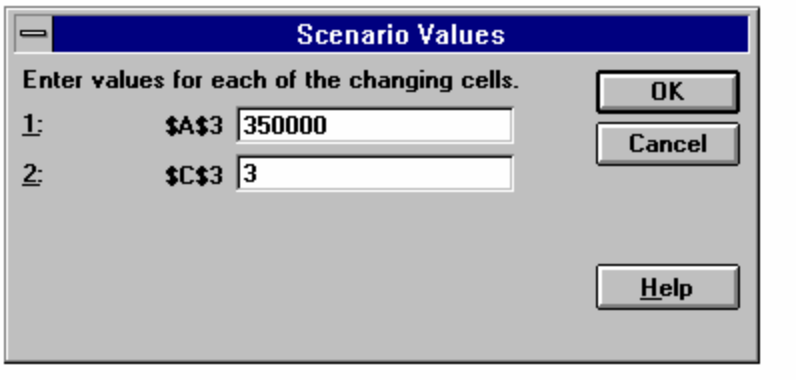
1. First enter the given data in the blank worksheet :

	A	B	C	D
1		INTEREST		LOAN
2	PRICE	RATE	TERM	AMOUNT
3	350,000.00	8%	3	280,000.00
4				
5				
6	PAYMENT			
7	29,870.64			
8				

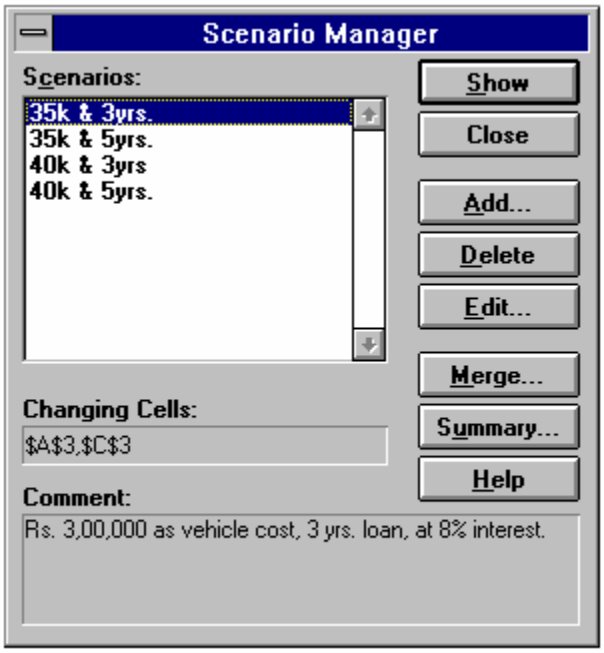
2. In cell D3, enter the formula **=A3*0.8**.
3. In cell A7, enter the formula **=PMT(B3, C3*12, A3)**.
4. Choose **Tools->Scenarios...** command.
5. Click on the **Add** button. **Add Scenario** box appears.



6. In the **Scenario Name** box, type the name of the scenario as **35k & 3 Yrs.**
7. Select the cells or type the cell references in the **Changing Cells** box as A3 and C3.
8. If you want, edit the text in the **Comment** box.
9. If you want, select **Protection** option.
10. Click on **OK** button. **Scenarios Values** dialog box appears.



11. Enter the value for each changing cell as given in Figure 7.8.
12. Click on **OK** button.
13. To add the scenario to the list and then create additional scenarios, choose the **Add** button. This returns you to the **Add Scenario** dialog box. Type 35K & 5 Yrs. as the scenario name. Edit the values in the changing cells as 350,000 and 5. Create the other 3 scenarios as shown in Figure 7.9. To add the scenario to the list and return to the **Scenario Manager** dialog box, choose the **OK** button.



To return to the **Scenario Manager** dialog box without adding the current scenario, choose the **Cancel** button.

7.4.2 Displaying the Scenario

To display the different scenarios that have been created, follow the given steps :

1. Choose **Tools->Scenarios**... command.
2. In the **Scenario Manager** dialog box, select the scenario that you want to display.

3. Choose the **Show** button. The changing cell values for the selected scenario appear in the changing cells on the worksheet. The worksheet is recalculated to reflect the new values.
4. Repeat steps 2 and 3 to display other scenarios.
5. Choose the **Close** button.

7.4.3 Editing the Scenario

The need may arise to modify the scenarios that have been created. The changes could be in the name given to the scenario, the cell references or the values of the changing cells. To make modifications in the scenarios, follow the given steps :

1. Choose **Tools->Scenarios...** command.
2. In the **Scenario Manager** dialog box, select the scenario you want to edit.
3. Click on the **Edit** button. The **Edit Scenario** dialog box appears.
4. In the **Scenario Name** box, type the new name, if you want.
5. Edit the **Changing cell** references, if you want.
6. Edit text in the **Comment** box, if you want.
7. Click on the OK button. The **Scenario Values** dialog box appears. Make the required changes.
8. To save the changes made to your scenario, choose the **OK** button.

7.4.4 Deleting a Scenario

To delete the scenarios, follow the given steps :

1. Choose **Tools->Scenarios...** command.
2. In the **Scenario Manager** dialog box, select the scenario that you want to delete.
3. Choose the **Delete** button.
4. To delete additional scenarios, repeat steps 2 and 3.
6. Click on the **Close** button.

7.5 Summary

In this unit, you learned,

1. Besides Data Tables, MS-Excel provides different tools to analyse data in an effective way.
2. Goal Seek determines the input required to produce the desired result.
2. Solver finds solutions to problems having multiple variables and constraints
3. Scenario Manager creates different set of values that produce different results.

7.6 Exercise

1. Explain the features of the following, in detail, with example :
   Goal Seek
   Solver
   Scenario Manager