Spreadsheet Case 5

Choice Coffee of the Month

Problem:	Develop a breakeven analysis model
Management skills:	Planning Deciding
PC skills:	Graphics Worksheet organization

File: COFFEE_Q.XLS

Choice Coffee of the Month is a newly-formed one-person company that markets choice coffees through a monthly subscription service. For an annual subscription fee, Coffee of the Month will send subscribers a different choice coffee, such as Colombian, Mocha Java or French Dark Roast, every month. Its founder, Martha Staunton, feels this service will appeal to coffee-loving young professional couples who like to experiment with new flavors and ideas.

Martha plans to place small ads in the back of various gourmet magazines, but is unsure of the response rate. Before she invests heavily in advertising, inventory, and office space, Martha needs to know if there is a future in this type of business and at what point it will produce a profit.

This is a classic problem for all businesses: determining what objectives must be met to produce a profit or to minimize losses. What Martha must do is utilize the managerial accounting concept of Breakeven Analysis. Breakeven Analysis establishes the breakeven point, which is the number of units that must be sold to yield no profit and incur no loss. Any units sold beyond the breakeven point will represent profit, and a sales volume below the breakeven point will put the firm at a loss.

In order to perform Breakeven Analysis, a company must examine its operating costs. Some of these costs are fixed and do not change significantly over the range of the operations activity. Variable costs, on the other hand, increase with increasing production, and decrease as production decreases.

In the case of Choice Coffee of the Month, fixed costs are Martha's rent for a one-room office-storage area ($6800 per year) and the costs of her initial advertising campaign ($3000). Martha's variable costs are the cost of purchasing the coffee, shipping costs, and ongoing advertising expenses. Martha has calculated that the cost of purchasing and shipping each pound of coffee is $4.75. Martha plans to sell the coffee on an annual subscription basis at a price of $100.00 per year and there is a pound of coffee shipped each month.

Martha won't be paying herself a salary right away. Until Choice Coffee of the Month starts producing a profit, Martha is planning to live off of her savings, which amount to $10,000.

Once a product's costs have been determined, the contribution margin per unit must be calculated. The contribution margin per unit is the difference between the selling price per unit and the variable costs per unit. (The contribution margin per unit = average selling price per unit -

variable costs per unit.) Once the contribution margin per unit has been determined, one can then calculate the breakeven point.

In a company such as Choice Coffee of the Month, which only produces one product, the formula for the breakeven point would be calculated by dividing the total fixed costs by the contribution margin per unit.

Often the best way to display the results of breakeven analysis is in graphic form. It is also useful to use breakeven analysis to generate pro forma income statements which convert unit data to dollars and display projected sales revenue.

Load the data file COFFEE_Q.XLS from your data diskette.

Tasks

There are 5 tasks in this case:

1. Create a worksheet that displays the total fixed cost, variable cost per unit, and average sale price for Choice Coffee of the Month and calculates the contribution margin per unit and the breakeven point. The breakeven point should be based on number of subscriptions Martha needs to sell before she can start earning a profit.

2. Use your results to generate pro forma income statements using the framework supplied on the data file. There should be two projections of sales and income below the breakeven point and two above it. There should also be a projection of sales and income right at the breakeven point. The income data below the breakeven point should reflect zero sales and sales at half of the breakeven units. The income data at the breakeven point should reflect sales at 1 times the breakeven units. The income data above the breakeven point should reflect sales at 1.5 and 2 times the breakeven units.

3. Create a line chart (graph) to display the most important data from the pro forma income statements and the breakeven point. The X-axis of the chart should display the range displaying units sold in your pro forma income statements. The first data series should display fixed cost (which will be constant). The second data series should display total cost figures. The third data series should display revenue figures. Give your chart (graph) a title and supply titles for the X and Y axes. Supply legends for all of the data series. The point on the chart where the data lines for total cost and revenue intersect is the breakeven point.

4.Be sure to name and save your graph as well as your worksheet. Print the graph and worksheet.

5.Examine your output. Write a one-paragraph statement analyzing the results of the breakeven analysis. Is Choice Coffee of the Month a worthwhile business venture for Martha?

Additional Problem

1. Martha has been told that packaging material costs will rise 10% in a few weeks. Packaging material costs account for approximately 5% of the baking and packaging cost for each package of muffins. What impact will this have on Martha's breakeven analysis?

Time Estimates

Expert: 45 minutes
Intermediate: 1 hour
Novice: 2 hours

Excel Tutorial For Spreadsheet Case 5

This case draws upon all of the skills acquired in previous Spreadsheet Cases plus new skills for creating and printing graphs, or Charts as they are known in Excel, with spreadsheet software. You will need to use COURSE.XLS again for this tutorial.

Creating Charts with Excel

Excel provides an excellent facility for generating charts to graphically display data on your worksheets. The facility is known as the ChartWizard. The idea behind Wizards is that the program helps you through a complicated process by splitting it into easy steps with clear instructions. The ChartWizard helps you through the process of creating a Chart in Excel in five easy steps.

Charts in Excel can be stored in separate chartsheets or be Embedded in worksheets. With the Chart embedded in the worksheet, you can instantly observe the effects of changes of the data in the worksheet, and create attractive documents with the chart accompanying the original data. The steps to achieve each of these graphs are identical.

The ChartWizard can be invoked in two ways: by selecting **Insert/Chart** from the menu or by pressing the ChartWizard Button on the Standard Toolbar. The ChartWizard Button will only embed a chart in a worksheet. The menu item will give you the choice of embedding the chart in the worksheet or creating a new chartsheet.

We will create a separate chartsheet for our chart. The information we want to graph is the grades of each assessment task for every student. It is easier to select the range containing the data before selecting the ChartWizard. However, currently the data headings are separated from the values in the worksheet by a row containing the "=" symbol, in Row 15. Since we want to include the headings as Labels in the chart, it would be easier if we deleted Row 15 and had a undivided range. Select Row 15 and select the **Edit/Delete** command to delete Row 15.

Select the range A14:E18. This range contains the values representing the Students' Grades and also the Students' Names and the Assessment Tasks. Now, select **Insert/Chart** from the menu.

Excel Chart Types

The **Area Chart** shows each data series as a shaded area, each added onto the previous area.

The **Bar Chart** shows the values as solid horizontal bars of differing lengths. This type is ideally suited to categorized data.

The **Column Chart** is similar to the Bar Chart except the bars are vertically aligned. Again, this type is ideally suited to categorized data.

The **Line Chart** show trends and values, typically over a time horizon at even intervals, representing each series as points connected by a line.

The **Pie Chart** shows values as a proportion of a whole or total. The values are represented as a slice of a circular pie. This is used when there is only a single data series.

The **Doughnut Chart** shows values as a proportion of a whole or total, similar to the Pie Chart, except more than a single data series can be represented. Each data series is shown as a concentric circle.

The **Radar Chart** shows each data series as a ring arranged on axes radiating from a central point. Each axis represents a data category. This chart type is suited for comparing data series against distinct categories.

The **XY (Scatter) Chart** shows the degree of a relationship between the numeric values on both the X and Y axes, for several data series. This chart type is useful since it represents data with uneven intervals on the axes.

The **3-D Area Chart**, the **3-D Bar Chart**, the **3-D Column Chart**, the **3-D Line Chart** and the **3-D Pie Chart** are three dimensional representations of the above chart types. These types can be attractive and sometimes more effective in conveying the information contained in the numbers. For example, in a 3-D Perspective Column Chart the values are represented by the vertical (Z) axis, the data categories are represented by the horizontal (X) axis, and the data series are represented by the depth (Y) axis.

The **3-D Surface Chart Type** represents the data as a continuous sheet of data across three dimensions. The three axes usually represent continuous values rather than categories, which permits a large amount of data to be portrayed clearly.

Instructions for Windows 95 Users

You should now be faced with the ChartWizard's first dialog box. This dialog box, titled "ChartWizard-Step 1 of 4" is asking for the chart type you want to display the data. Choose the Line type of chart by selecting it with the mouse or with the cursor keys. The different chart types are defined on the previous page. You can also select a specific format for your line chart from the samples in the Chart Sub-type section of the dialog box. When you have selected Line type and the format for your Line chart, press the "Next >" Button or the ENTER key.

The second dialog box appears. It asks for the range containing the data for graphing. Since we have already selected the range, it appears in this dialog box. This stage permits you to redefine the range if you wish. (This dialog box also asks you to specify whether the individual data series are in the rows or in the columns. The data series we want to graph should be specified as in columns.) When you are satisfied with the specified range, press the "Next >" Button or press ENTER.

The third dialog box deals with Chart Options. They include Titles, Axes, Gridlines, Legend, Data Labels, and Data Table. Make sure the Titles tab is selected so that you can add a Chart Title and Axis Titles. Opt to have the Title tab selected. Enter the Chart Title "Student Grades", the X-Axis Title "Assessment Types" and the Y-Axis Title "Grade". As you enter these titles, the sample chart will incorporate them. After you have specified these titles, press the “Next.” Button or press ENTER.

The fourth and final dialog box asks for the Chart Location. Here, you can specify how you want to store your chart—“As object in” and “As new sheet”. “As an object in” means that you want to store the chart as an embedded object on the current sheet . “As new sheet”means that you want to store the chart on a separate sheet. Since we want the chart on a separate sheet, select the "As new sheet" option. When you have finished, select the "Finish" Button.

The ChartWizard has now finished. Notice the Chart1 tab at the bottom of the screen. This is where the newly created chart is stored. To move between the chartsheet and the worksheet, simply press the respective tab at the bottom of the screen.

Instructions for Windows 3.1 Users

If you are using Excel with Windows 3.1, this will show two options: On This Sheet; As New Sheet. Since we want a separate sheet, select the "As New Sheet" option.

You should now be faced with the ChartWizard's first dialog box. This dialog box, titled "ChartWizard - Step 1 of 5", is asking for the range containing the data for graphing. Since we have already selected the range, it appears in this dialog box. This stage permits you to redefine the range if you wish. When you are satisfied with the specified range, press the "Next >" Button or press ENTER.

The second dialog box then appears. This second step is asking for the chart type you want to display the data. Choose the Line type of chart by selecting it with the mouse or with the cursor keys. The different chart types were defied earlier. When you have selected it, press the "Next >" Button or the ENTER key.

The third dialog box requires you to select a format of the chart type selected. Since you selected the Line chart in the previous step, you are now presented with ten different Line formats. If you had selected a different chart type, different formats would be offered in this step. Select format type 1 and press the "Next >" Button.

The fourth dialog box asks you to specify whether the individual data series are in the rows or in the columns, and how many rows and columns the Axis Labels take. Excel displays a sample chart of your data. Notice that currently the data series are assumed to be in rows;

that is, each student's grades are a data series, with each type of assessment representing an X-Axis category. This is the layout we want for the Student Grades. Excel has assumed the first row of the selection on the worksheet contains the X-Axis Labels and the first column of the selection contains the Text for the Legend. These settings are also what we want for the chart. Experiment by adjusting the settings, observing the effects on the sample chart. When you are satisfied with the settings, press the "Next >" Button.

The fifth and final dialog box asks you whether you want a Legend and permits you to add a Chart Title and Axis Titles. Opt to have the Legend. Enter the Chart Title "Student Grades", the X-Axis Title "Assessment Types" and the Y-Axis Title "Grade". As you enter these titles, the sample chart will incorporate them. When you have finished, select the "Finish" Button.

The ChartWizard has now finished. Notice the Chart1 tab at the bottom of the screen. This is where the newly created chart is stored. To move between the chartsheet and the worksheet, simply press the respective tab at the bottom of the screen.

Graph Formatting

Excel provides extensive features for formatting of objects within charts. Although the ChartWizard has produced an attractive chart, further enhancements can be made to improve certain aspects of it. You can select virtually any object in an Excel chart and adjust its features. You can select objects in a chart using the cursor keys to step through each of the object that can be changed, or simply select the object with the mouse.

Objects that can be selected are: Axis (X and Y), Axis Title, Chart Title, Chart Area, Plot Area, Data Series, Data Point, Legend, Legend Key, Legend Entry and <Chart Type> Group.

Once the object is selected you can choose **Format/Selected <Object>** from the menu or double click on the object. This will produce the **Format <Object>** dialog box containing different tabs for adjusting different aspects of the object.

For example, if you selected the Y-Axis by clicking on it (a black square will appear at each end of the axis when it is selected) and then selected **Format/Selected Axis ...** from the menu, you will be presented with a dialog box with tabs for Patterns, Scale, Font, Number and Alignment. These tabs can also be applied to other objects in the chart but in this context they refer to the Y-Axis. For example, the Patterns tab contains settings for the axis thickness, style, colour, tick type, tick location and a sample. The Patterns tab for other objects would have different settings. Other tabs, such as Scale, refer to this type of object alone.

Select the Scale tab. The settings here permit you to change the minimum value, the maximum value, the major interval value, and the minor interval value of the Axis. Other settings also let you specify where the X-Axis crosses, whether the scale is logarithmic, whether the values appear in reverse order and whether the X-Axis crosses at the maximum value.

Currently the graph has all the data points congregating at the top of the chart. It would be preferable for the data to be spread more evenly up the chart. In order to do this we would adjust the minimum value of the Y-Axis to 60. If you have not already done so, select the Y-Axis and choose **Format/Selected Axis ...** from the menu. Now select the Scale tab. To

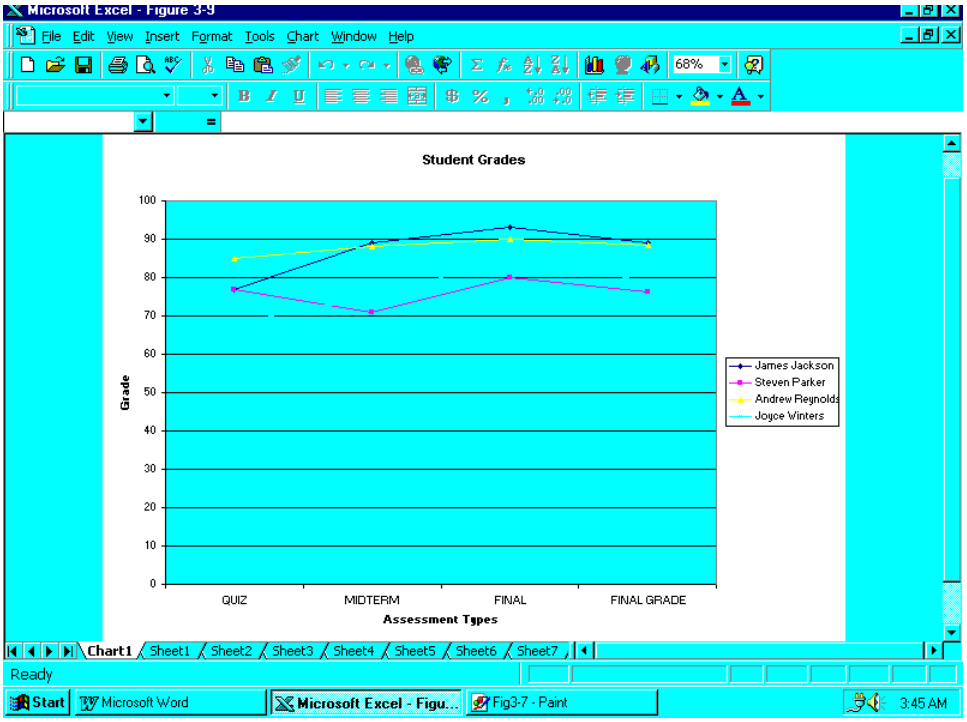
change the minimum value, first click the Auto Check box next to Minimum so a cross does not appear in the box. This permits manual entry of values. Now enter 60 in the Minimum value box and select the OK Button. Your chart should now resemble that in Figure 3-5.

The other tabs under various objects are:

Font - changing the appearance of text (size, font, style etc.)
Number - changing the presentation of values
Alignment - changing the arrangement and orientation of objects
Placement - changing the location of the Legend (Bottom, Corner, Top, Right, Left)
Y Error Bars - Lets you arrange error bars on data points
Axis - Lets you distinguish between primary and secondary axes
Data Labels - Lets you attach labels to data points
Names and Values - Lets you redefine the worksheet cells that contain the names and values of the current data series
X Values - Lets you redefine the worksheet cells that contain the X values
Subtype - Lets you define cumulative and percentage cumulative charts
Series Order - Lets you change the order of the data series
Options - further options for the current object, not included in other tabs

Most Excel chart objects can be changed merely by selecting it and double clicking to bring up object settings. Title text can be changed simply by selecting the object and placing the cursor where you want to insert or replace text.

Figure 3-5



Embedding a Chart in a Worksheet

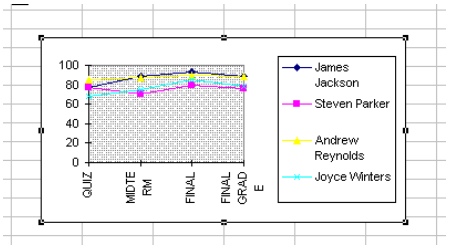
All the features discussed for a chart in a separate chartsheet apply equally to a chart embedded in a worksheet.

Users of Windows 95 could embed a chart by selecting "As object in" for their Chart Location when using ChartWizard dialog boxes.

If users of Windows 3.1 selected **Insert/Chart/On This Sheet** or used the ChartWizard Button, they would be required to define an area on the worksheet to contain the chart. Defining the chart area requires you to specify the diagonally opposite corners of the rectangular area. Do this by selecting the point for the first corner by locating the mouse cursor and depressing the left button. Select the diagonally opposite corner by dragging the mouse, keeping the button down. As this is done, you should observe the area growing and changing as you move the mouse. Release the button when you are satisfied with the defined area. ChartWizard's first dialog box will now appear.

At the completion of the ChartWizard users of both Windows 95 and Windows 3.1 will have the chart embedded in the worksheet. A selected embedded chart is identified by a thin border with black squares, known as handles, which permit you to resize the chart size. A selected chart can be seen in Figure 3-6.

Figure 3-6



To select an embedded chart, simply press it once with the mouse cursor. To resize the chart, grab one of the eight handles (on either the selected or activated chart) and drag it in the desired direction. To move the chart grab the selected chart anywhere inside the border and drag to the new location. To delete the selected chart, simply press the DEL or DELETE key.

Printing and Saving a Chart

Excel chartsheets can be printed in exactly the same way as Excel worksheets can, as described in the Tutorial for Spreadsheet Case 1. The **File/Print Preview** and **File/Page Setup** operations apply in the same way as for a worksheet also.

A chartsheet will be saved when the workbook it resides in is saved. Similarly, an embedded chart will be saved when the worksheet containing it is saved, described in the Tutorial for Spreadsheet Case 1.