Spreadsheet Case 6

Paragon Computer Office Equipment Inc.

Problem: Develop an inventory control system

Management skills: Organizing
Controlling

PC skills: Spread sheet control
Logical functions

File: PARA_Q.XLS

Paragon Computer Office Equipment Corporation, located in Easton, Pennsylvania, manufactures computer-related office equipment, such as computer tables, printer tables, and monitor stands. Paragon sells this furniture to discount and retail department store chains, which in turn market it under their own brand name. Paragon buys prefabricated components, such as legs and tops for computer tables, from other vendors and then assembles them into finished office computer furniture.

The computer office supply business is highly competitive. Paragon has acquired an impressive roster of clients by producing well-crafted computer office furniture within the budgetary limits specified by clients.

Because the company is fairly new, Harold Moyer, the production manager, has been tracking the components by hand using a ledger sheet. This process is time consuming and errors have, at times, resulted in missed production deadlines due to inadequate supplies of furniture components. In response, Harold has increased the level of component safety stock in order to avoid running out in the future. But this raises operating costs, and Paragon needs to keep these down in order to remain competitive. Harold has decided to implement his own inventory control system using a PC and spreadsheet software.

A good inventory control system will maintain an inventory level that is neither overstocked nor understocked to ensure most efficient utilization of funds. It will match existing inventory levels against desired levels so that understocked items can be reordered.

There are two basic models for accomplishing this. One is to use a *reorder level system*, which merely makes sure that required items are ordered with sufficient lead time to arrive when they are needed in the production process. The other is to use a system that determines the least expensive quantity to order, or most economic quantity. This approach is based on the *economic order quantity model*, which strikes a balance between carrying costs, such as taxes and insurance, and procurement costs, such as ordering, shipping, and receiving costs.

Ordering in large quantities reduces procurement costs but raises carrying costs. The *economic order quantity* represents the number of units where procurement costs equal carrying costs. The exact size of the economic order quantity is dependent upon the estimated amount of the product needed each year, its unit cost, the fixed cost of placing and receiving an order for the

item, and the carrying cost for the item in inventory, expressed as a percentage of inventory value. The formula for calculating an item's economic order quantity is:

$$EOQ = \frac{2\,FU}{CP}$$

where

EOQ = the item's economic order quantity
F = the fixed cost of ordering the item
U = the amount of the product needed each year
C = the item's carrying cost, expressed as a percentage of inventory value
P = the item's unit cost

The calculation of the economic order quantity often results in a fractional amount that must be rounded to the next whole number to determine the economic order quantity.

Load the data file PARA_Q.XLS from your data diskette. This file contains a list of the computer office furniture components stored by Paragon Computer Office Equipment, balance on hand, balance on order, unit cost per item, estimated annual usage per item, and the order point. The order point is the number of units of an item in inventory that triggers the decision to order more items. There is usually a lead time period (say, of two weeks) between the time an order is placed and when it is actually fulfilled. Having some items in inventory while reordering reduces the possibility of a stockout.

Order cost is assumed to be a fixed cost of $90.00 for all items in this problem.

Inventory carrying cost is assumed to be 21% of inventory value for all items in this problem.

Tasks

There are 4 tasks in this case:

1. Assign an area to hold assumptions for this model at the upper lefthand portion of the worksheet.

2. Expand the worksheet to track:
(a) Balance available which can be calculated by adding balance on hand + balance on order.
(b) Order quantity for those items in need of reordering. If the balance available is less than the order point, calculate the economic order quantity. If the balance available is greater than the order point, put a zero in the column for order quantity. Format the Order Quantity column to comma format with zero decimal places.

3. Develop a method to identify any stock items that need reordering on the worksheet. (Hint: One way is to use an asterisk to flag items that need reordering.)

4. Write a short paragraph suggesting some enhancements to this application to make it a better management tool.

Time Estimates

Expert: 1 hour
Intermediate: 1.5 hours
Novice: 2 hours

Excel Tutorial For Spreadsheet Case 6

This case draws upon all of the skills acquired in previous Spreadsheet Cases plus new skills for using the logical functions of your spreadsheet software and the =SQRT function. You will need to use COURSE.XLS again for this tutorial.

Excel includes a set of logical functions which allow the software to perform conditional tests and evaluate a condition in your worksheet. Depending on whether the condition is true or false, different values will be returned to cells.

The most important conditional function in Excel is =IF. The =IF function allows you to test one or more conditions in your worksheet and perform different tasks, depending on the outcome of the test. The form for the =IF function is:

=IF(condition, action if true, action if false)

This tests the "condition" to determine if specific results or cell contents are true or false. If the result of the test is true, the "action if true" portion contains specific instructions to execute. If the result is false, the "action if false" portion contains another set of instructions to execute. The instructions to be executed can return cell contents that are labels as well as values.

To perform conditional tests, the =IF function and other conditional functions require logical operators. These operators help establish the relationship between two numbers, strings or cell references.

Logical Operators

Operator	*Meaning*
=	Equal
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
<>	Not equal

To establish relationships between two or more conditional tests, Excel provides Logical Functions.

Logical Functions	
AND(*logical1*, *logical2*, ...)	Returns TRUE if each *logical* condition is true; returns FALSE otherwise
OR(*logical1*, *logical2*, ...)	Returns TRUE if any *logical* condition is true; returns FALSE otherwise
NOT(*logical*)	Returns TRUE if *logical* is FALSE; returns FALSE otherwise
TRUE()	Returns TRUE always
FALSE()	Returns FALSE always

The logical functions NOT, AND and OR contain conditional tests to result in a single TRUE or FALSE. The following are examples of logical statements using =IF ,the logical operators and the logical functions:

=IF(A5>20,B5,0) means that if the value in cell A5 is greater than 20, use the value in cell B5. Otherwise, assign the number zero.

=IF(AND(B11<>0,G11=1),10,0) means that if the value in cell B11 is not equal to zero and the value in cell G11 is equal to 1, assign the number 10. Otherwise, assign the number 0.

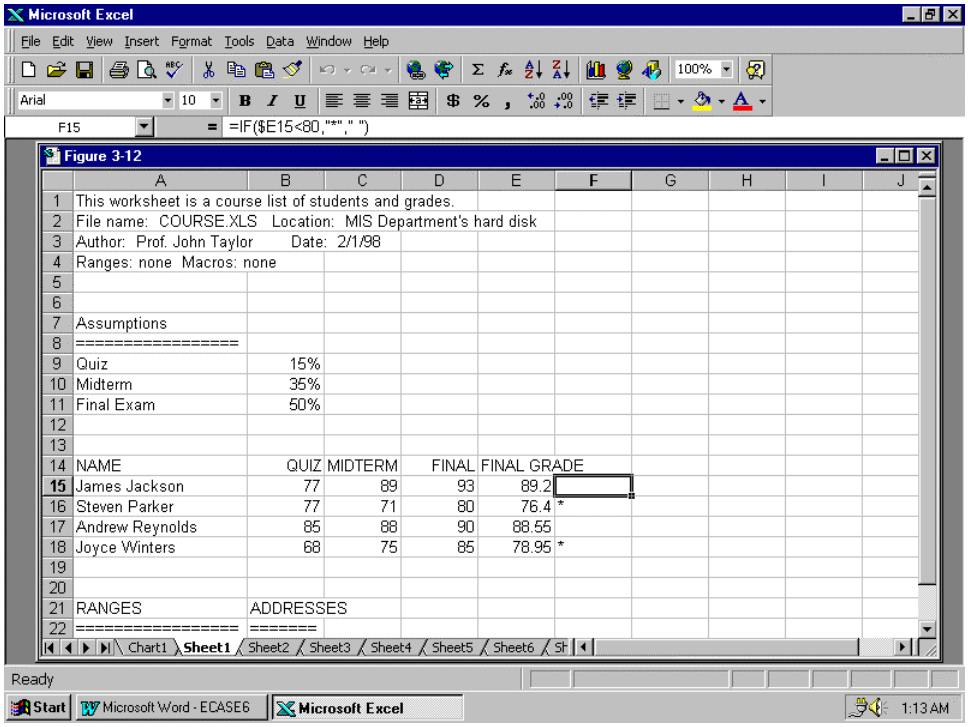
=IF(OR(E13="Profit",F15>=G15),"Surplus","Deficit") means that if either cell E13 contains the label "Profit" or the contents of cell F15 are greater or equal to the contents of cell G15, assign the label "Surplus". Otherwise, assign the label "Deficit".

The second and third examples show how logical functions can be used to have more than a single condition as the =IF conditional test.

For your student roster you can develop a conditional test to print an asterisk (*) after the name of any student whose final grade is less than 80. In cell F15, add a formula that will examine the student's final grade. If the grade is less than 80, an asterisk will be placed in the cell next to the final grade. If the grade is greater than or equal to 80, a character string consisting of a blank space will be placed in the cell. The formula for this would be:
=IF($E15<80,"*"," ")

Copy this formula into range F17:F19. Observe on your screen and in Figure 3-7 that the final grades for students Parker and Winters will be followed by an asterisk. The final grades for the other students will be left blank.

Figure 3-7



	A	B	C	D	E	F	G	H	I	J
1	This worksheet is a course list of students and grades.									
2	File name: COURSE.XLS Location: MIS Department's hard disk									
3	Author: Prof. John Taylor Date: 2/1/98									
4	Ranges: none Macros: none									
5										
6										
7	Assumptions									
8	==========									
9	Quiz	15%								
10	Midterm	35%								
11	Final Exam	50%								
12										
13										
14	NAME	QUIZ	MIDTERM	FINAL	FINAL GRADE					
15	James Jackson	77	89	93	89.2					
16	Steven Parker	77	71	80	76.4	*				
17	Andrew Reynolds	85	88	90	88.55					
18	Joyce Winters	68	75	85	78.95	*				
19										
20										
21	RANGES	ADDRESSES								
22	==========	=======								

The =SQRT Function

The =SQRT function is one of a series of functions that perform mathematical, statistical and trigonometric operations. The =SQRT function calculates the square root of a positive number. The form of this function is:

=SQRT(number or cell reference)

For example the square root of the average of James Jackson's quiz and midterm grades would be =SQRT((B15+C15)/2)

You do not need to save COURSE.XLS with the modifications you made during this tutorial session.

FunctionWizard

Excel provides a facility to make retrieving and entering functions easier, called FunctionWizard. It can be activated by selecting **Insert/Function** from the menu, or by selecting the FunctionWizard Button on the Standard Toolbar:

Press the FunctionWizard Button now. The first dialog box asks you which function you want to use. The left window contains all the function categories and the right window contains all the functions in the category selected in the left window. For example, if you wanted the tangent function, select "Math & Trig" from the Category window and then scroll down the list in the Function Name window until TAN appears. Select TAN and then select the "Next >" Button.

The second and final dialog box permits you to enter the parameters for the formula selected. If the parameter is compulsory the word "required" appears next to the parameter box. Excel permits you to enter additional functions as the parameters of the original function and the FunctionWizard Button is available to enter a further function. Entering functions as parameters for further functions is known as nesting. Excel permits seven levels of nesting. When you have satisfied the parameter requirements, select the Finish Button.