

Microsoft Excel 2007: Functions and Data Analyses

Part 1: Logical Functions and Data Validation

INFORMATION TECHNOLOGY SERVICES
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Introduction

Microsoft Excel 2007: Functions and Data Analyses is designed to be an advanced course for students who use Excel extensively. In this two-part course, the basic structure and the use of various functions will be discussed. Explore the definition of Excel functions by learning various Date and Time functions, as well as advanced logical functions. Additionally, attendees will be taught how to use data validation, ending with applying the knowledge to create a checkbook register used in real life.

Add-ins

Add-ins are supplemental programs that add custom commands, features, and functions to Microsoft Office. Many features and functions require certain add-ins to be loaded for operation. The add-in programs listed in Table 1 - Default Add-ins are installed or can be located in the Microsoft Office installation CD.

Table 1 - Default Add-ins

| Add-in | Description |
|------------------------|---|
| Analysis ToolPak | Adds financial, statistical, and engineering analysis tools and functions |
| Analysis ToolPak VBA | Allows developers to publish financial, statistical, and engineering analysis tools and functions using Analysis ToolPak syntax |
| Conditional Sum Wizard | Creates a formula that sums data in a range if the data matches the criteria specified |
| Euro Currency Tools | Formats values as Euros, and provides the EUROCONVERT worksheet function to convert currencies |
| Internet Assistant VBA | Allows developers to publish Excel data to the Web by using Internet Assistant syntax |
| Lookup Wizard | Creates a formula to look up data in a range by using another known value in the range |
| Solver Add-in | Calculates solutions to what-if scenarios based on adjustable cells and constraint cells |

To ensure that the functions covered in the handout work properly, three add-ins must be loaded: **Analysis ToolPak**, **Lookup Wizard**, and **Solver Add-in**.

To load add-in programs:

1. Click the **Office Button** and click the **Excel Options** button. The *Excel Options* dialog box opens.
2. Click the *Add-Ins* category on the left. The list of active and inactive add-ins is displayed.
3. On the **Manage:** list box, select Excel Add-ins. Click on the **Go...** button.
4. In the **Add-Ins available:** list box (see Figure 1), select the check box next to the add-in to be loaded, ► **OK** button.
5. If the add-in selected is not installed on the computer, a **Setup** program will start and may prompt for the Microsoft Office CD.
6. Follow the instructions given by the setup program and finish the installation.

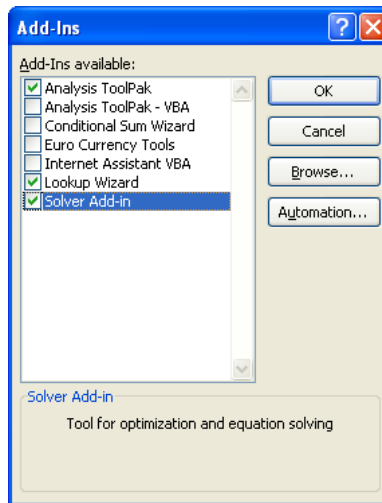


Figure 1 - Add-ins Available List Box

To unload add-in programs:

1. Click the **Office Button** and click the **Excel Options** button. The *Excel Options* dialog box opens.
2. Click the **Add-Ins** category on the left. On the *Manage:* list box, select Excel Add-ins. Click the **Go...** button. The *Add-ins* dialog box opens.
3. In the *Add-Ins available:* list box, clear the check box(es) next to the add-in(s) to unload, ► **OK** button.

Date & Time Functions

Excel turns most data into some numeric form, and time is no exception. Excel stores dates as the number of days past since 01/00/1900 and time is just a number representing a fraction of a day. For example: the date and time 01/01/2000 12:00 PM is stored as the number 36526.5, since 36526 days and 0.5 day (12 hrs) have passed since 01/00/1900.

Beginners often find that working with dates and times in Excel can be frustrating. This section presents some useful day and time tools, and demonstrates that time calculation is no more than basic addition and subtraction.

TODAY AND NOW FUNCTIONS

These two functions are time stamp tools. **TODAY()** returns the serial number of the current date. **NOW()** returns the serial number of the current date and time. Both are examples of functions that do not require any arguments, and no content is typed within the parentheses of the functions.

To use these date and time functions:

1. Open "*Date & Time Functions.xlsx*".
2. Type the formula [=today()] into cell A2 to show the current date (see Figure 2).
3. Type the formula [=now()] into cell D2 to show the current date and time (see Figure 3).

| | |
|----|---------------|
| D3 | |
| A | B |
| 1 | Today's date: |
| 2 | 5/9/2008 |

Figure 2 - Result of TODAY Function

| | | |
|---------------------------|---|---|
| fx | | |
| C | D | E |
| Today's Date and Time is: | | |
| 05/09/2008 13:47:32 | | |

Figure 3 - Result of NOW Function

EXTRACTING TIME INFORMATION USING FUNCTIONS

Excel has functions that extract specific information from a time stamp (see Table 2 - Time Functions). For example, the **YEAR** function is used to obtain a number corresponding to the year of a date.

For the following examples, cell D2 has the following date, “11/29/2007 17:53:01”. Type the following functions into different cells and compare the results.

Table 2 - Time Functions

| Function | Description | Result |
|---------------|----------------------------|--------|
| =YEAR (D2) | Returns year as a number | 2007 |
| =MONTH (D2) | Returns month as a number | 11 |
| =WEEKNUM (D2) | Returns week as a number | 48 |
| =DAY (D2) | Returns day as a number | 29 |
| =HOUR (D2) | Returns hour as a number | 18 |
| =MINUTE (D2) | Returns minute as a number | 1 |
| =SECOND (D2) | Returns second as a number | 7 |

CALCULATING DATE DIFFERENCES

By using the above list of functions, it is easy to calculate the difference between two dates. The year difference between two dates is the result of subtracting the year value of the first date and year value of the second date.

To calculate a year difference between dates:

1. Type the formula [=YEAR(A13)-YEAR(D13)] into cell C15.
2. If necessary, format cell C15 to display the result as a number.
 - a. Make sure cell C15 is selected. On the *Home* tab, click on the **Format** button under the *Cells* group. Select **Format Cells** from the list.
 - b. Click on the *Number* tab if necessary.
 - c. Select *General* in the **Category:** list box.

The month difference between dates is the result of subtracting the month value of the first date and the month value of the second date plus the difference in years.

To calculate the month difference between dates:

1. Type the formula [=MONTH(A13)-MONTH(D13)+(C15*12)] into cell C16.
2. If necessary, format cell C16 to display the result as a number.
 - a. Click on the *Home* tab. Under the *Cells* group, click on the **Format** button. Select *Format Cells...* from the list.
 - b. Click on the *Number* tab if necessary.
 - c. Select *General* in the **Category:** list box.

The number of days between two dates is the result of subtracting the first date and the second date.

To calculate the day difference between dates:

1. Type the formula [=A13 - D13] into cell C17.
2. If necessary, format cell C17 to display the result as a number.
 - a. Make sure cell C17 is selected. On the *Home* tab, click on the **Format** button under the *Cells* group. Select **Format Cells** from the list.
 - b. Click on the *Number* tab if necessary.
 - c. Select *General* in the **Category:** list.

Advanced Logical Formulas

IF functions are good tools for decision making in a worksheet. Nesting multiple levels of **IF** functions, or adding **AND**, **OR**, or **NOT** functions can increase their complexity. Besides the aforementioned, many other functions can be used in combination with the **IF** function in a single formula to create advanced logical formulas.

IS FUNCTIONS

Within the category of Information functions, there are some functions that all start with “**IS**”, called *IS* functions. *IS* functions check a cell and return TRUE or FALSE depending on the value in that cell. Table 3 below shows a short list of the most commonly used IS functions.

Table 3 - IS Functions

| Function Name | Description |
|---------------|---------------------------------------|
| ISBLANK | Returns TRUE if the value is blank |
| ISNUMBER | Returns TRUE if the value is a number |
| ISTEXT | Returns TRUE if the value is text |
| ISEVEN | Returns TRUE if the number is even |
| ISODD | Returns TRUE if the number is odd |
| ISERROR | Returns TRUE if the value is an error |

To test the IS function with an odd number:

1. Open “*Logical Functions.xlsx*”.
2. Type an odd number in cell D2 (see Figure 4).
3. Type in the following list of formulas. Note that the results of the functions are either “TRUE” or “FALSE”.
 - a. [=ISBLANK(D2)] in cell B4.
 - b. [=ISNUMBER(D2)] in cell B6.
 - c. [=ISTEXT(D2)] in cell B7.
 - d. [=ISEVEN(D2)] in cell E6.
 - e. [=ISODD(D2)] in cell E7.

| | A | B | C | D | E |
|---|--------------------------------|-------|---|--------|-------|
| 1 | IS FUNCTIONS | | | | |
| 2 | Type Text or number in the box | | | 51 | |
| 3 | | | | | |
| 4 | ISBLANK | FALSE | | | |
| 5 | | | | | |
| 6 | ISNUMBER | TRUE | | ISEVEN | FALSE |
| 7 | ISTEXT | FALSE | | ISODD | TRUE |

Figure 4 - IS Function with an ODD Number

| | A | B | C | D | E |
|---|--------------------------------|-------|---|--------|-------|
| 1 | IS FUNCTIONS | | | | |
| 2 | Type Text or number in the box | | | 52 | |
| 3 | | | | | |
| 4 | ISBLANK | FALSE | | | |
| 5 | | | | | |
| 6 | ISNUMBER | TRUE | | ISEVEN | TRUE |
| 7 | ISTEXT | FALSE | | ISODD | FALSE |

Figure 5 - IS Function with an EVEN Number

- Type an even number in cell D2. The results of the functions change automatically (see Figure 5).
- Test with a text string by typing **[test]** in cell D2. Note that the result of the functions ISEVEN and ISODD changes to #VALUE because the functions ISEVEN and ISODD only accept numbers in their arguments. Any other type of value will return this error.

AVOIDING ERROR MESSAGES

Excel worksheets often contain functions that take in arguments from user inputs or from results of other functions. Sometimes, these functions return error messages instead of valid results. This occurs because of invalid argument types, invalid reference to cells, or wrong number of arguments.

One way to prevent the display of these error messages is by using the functions **IF** and **ISERROR** to find and filter those errors. By using the **ISERROR** function nested in the **IF** function, a formula can be set to only display the result when it is correct and hide any error values that may occur.

The function **ISERROR(value)** takes in a single value to be tested. If *value* is an error value (#N/A, #VALUE!, #REF!, #DIV/0!, #NUM!, #NAME? or #NULL), then the function will return TRUE. Otherwise, it will return FALSE. The result of this function is usually used as the condition of an IF function to perform the filtering.

To filter the errors caused by an invalid argument type:

- Type in the formula [=IF(ISERROR(E6), "ERROR!!!", "Contains no error")] in cell F6. This formula will evaluate the cell E6, which contains the function "ISEVEN(D2)" (see Figure 6). If the cell does not contain any error message, then the IF function returns the text "Contains no error". Otherwise, it returns the text "ERROR!!!".
- Type formula [=IF(ISERROR(E7), "ERROR!!!", "Contains no error")] in cell F7 to filter the error message in E7.

| | A | B | C | D | E |
|---|--------------------------------|-------|---|--------|-------|
| 1 | IS FUNCTIONS | | | | |
| 2 | Type Text or number in the box | | | 52 | |
| 3 | | | | | |
| 4 | ISBLANK | FALSE | | | |
| 5 | | | | | |
| 6 | ISNUMBER | TRUE | | ISEVEN | TRUE |
| 7 | ISTEXT | FALSE | | ISODD | FALSE |

Figure 6 - Message with a Valid Argument Type

COUNTIF

The **COUNTIF** function counts the number of cells within a range that meet the given criteria. It has the following syntax:

=COUNTIF (range, criteria)

range: The range of cells to count cells from.

criteria: A comparison criteria which must be in the form of a number, expression, or text. See Table 4 below for different types of criterion.

Table 4 - COUNTIF Criteria Types

| Type | Example | DESCRIPTION |
|--------|---------------------|--|
| Number | =COUNTIF(range, 25) | Counts all cells containing a numeric value 25 |

| Type | Example | DESCRIPTION |
|----------------|----------------------------|---|
| Text | =COUNTIF(range, "TEXT") | Counts all cells containing a textual value "TEXT" |
| Cell Reference | =COUNTIF(range, B2) | Counts all cells containing the same value as cell B2 |
| Expression | =COUNTIF(range, ">200") | Counts all cells having a value >200 |
| Function | =COUNTIF(range, SQRT(100)) | Counts all cells containing a value of 10 (SQRT(100)) is 10 |

A table of numbers is given in the current sheet ranging from cells A10 to C15. To count the number of occurrences of the number "34" in the given table:

1. Type the formula [=COUNTIF(A10:C15, 34)] in cell E11 (see Figure 7).

| | | | | |
|----|-----|-----|----|-----------------------------------|
| 10 | 23 | 34 | 56 | Number of occurrence for 34 |
| 11 | 412 | 23 | 45 | 3 |
| 12 | 35 | 42 | 34 | Sum of all number larger than 200 |
| 13 | 34 | 53 | 12 | |
| 14 | 12 | 234 | 54 | |
| 15 | 42 | 23 | 11 | |

Figure 7 - Result of COUNTIF Function

SUMIF

The *SUMIF* function adds the cells within a range that meet the given criteria. It has the following syntax:

=SUMIF (range, criteria, [sum_range])

range: The range of cells to evaluate the criteria.

criteria: The condition or criteria in the form of a number, expression, or text that defines which cells will be added. It uses the same criteria type as the *COUNTIF* function.

[sum_range]: The actual cells to sum if the corresponding number in the range meets the criteria. This parameter is optional and if it is not specified, the *SUMIF* function will apply the criteria and add the cells given in the **range** argument.

NOTE: **range** and **sum_range** MUST be of same size and shape. However, they can be located in different parts of a worksheet, as well as in different worksheets.

To add all numbers in the given table that is larger than 200:

1. Type the formula [=SUMIF(A10:C15, ">200")] in cell E13 (see Figure 8).

| | | | | |
|----|-----|-----|----|-----------------------------------|
| 10 | 23 | 34 | 56 | Number of occurrence for 34 |
| 11 | 412 | 23 | 45 | 3 |
| 12 | 35 | 42 | 34 | Sum of all number larger than 200 |
| 13 | 34 | 53 | 12 | 646 |
| 14 | 12 | 234 | 54 | |
| 15 | 42 | 23 | 11 | |

Figure 8 - Result of SUMIF Function

REFERENCE TO CELLS NOT IN CURRENT WORKSHEET

Reference to cells in worksheets other than the currently active one or even to a worksheet in another Excel file is possible. It can be accomplished by specifying the file name, the worksheet name, and the cell reference in the worksheet. Table 5 shows the correct way to refer to a cell in a different location.

Table 5 - Remote Location Cell References

| Location | Reference |
|---|---|
| Other worksheet in the same workbook | =Lookup!A2 |
| Other workbook with one word file name | = [PivotTable.xls]Data1!A1 |
| Other workbook with spaces in file name | = '[RiskAnalysis with formulas.xls]ABC'!A13 |

NAMING CELLS AND RANGES

A better way to refer to a cell or a range of cells is by using a descriptive name. Instead of referring to a cell by using the aforementioned ways, a descriptive name can be applied to represent a specific cell or range of cells. A defined name in a formula can make it easier to understand the purpose of the formula. For example, the purpose of the formula: $=SUM(FirstQuarterSales)$ might be easier to identify than $=SUM(C20:C30)$.

Names are an absolute reference to cells and they are available to any sheet within a workbook. For example, the name *ProjectedSales* refers to the range A20:A30 on the first worksheet in a workbook. When *ProjectedSales* is used in any other sheet in the same workbook, it will refer to the range A20:A30 from the first worksheet.

To create a name to represent a formula or a constant:

1. Select the cell range A10:C15.
2. On the *Formulas* tab, click on **Define Name** button under the *Define Names* group.
3. In the *Name:* box, enter "*First_Quarter_Sales*" (see Figure 9).

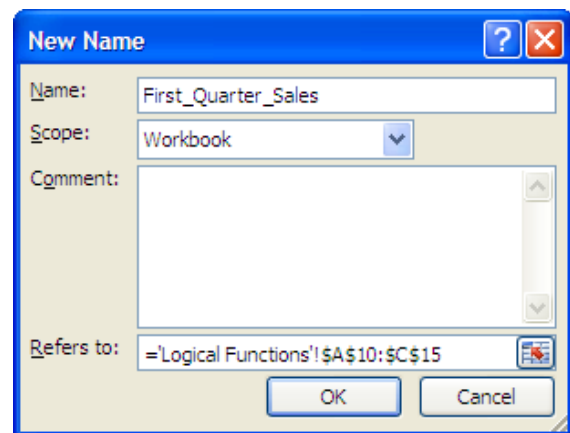


Figure 9 - Define Name Dialog Box

NOTE: If a range of cells is not already selected, type [=], followed by the cell reference or constant value in the *Refers to:* box.

To change or delete a defined name:

1. On the *Formulas* tab, click on the **Name Manager** button under the *Define Names* group.
2. Select the range you want to edit. Click on the **Edit...** button.
3. Do one of the following:
 - a. Change the name.
 - i. Type the new name for the reference inside the *Name:* text box, and click the **OK** button.

- b. Change the cell, formula, or constant represented by a name.
 - i. Change it in the ***Refers to:*** text box. After changing, click the **OK** button.
4. Select a range to delete and click on the **Delete** button.
5. Click on **Close** to close the *Name Manager* dialog box.

NOTE:

- The first character of a name must be a letter or an underscore character. The remaining characters in the name can be letters, numbers, periods, and underscore characters.
- Names cannot be the same as a cell reference, such as Z\$100 or R1C1.
- Spaces are not allowed. Underscore characters and periods may be used as word separators (e.g., Sales_Tax or First.Quarter).
- A name can contain up to 255 characters.
- Names can contain uppercase and lowercase letters. Microsoft Excel does not distinguish between uppercase and lowercase characters in names. For example, if you have created the name Sales and then create another name called SALES in the same workbook, the second name will replace the first one.

Data Validation by Using a List

Many times, when data is entered into a worksheet, there are some errors in the input that can go unnoticed. These input errors can cause major problems in the calculation of an entire worksheet. Fortunately, Excel has addressed this problem by providing data validation features that can validate data at the moment of input. One way to validate data entry is to limit the values to be entered by using a list of predefined values, which will automatically reject any input not on the list.

CREATING A VALIDATION LIST BY USING DATA IN THE SAME WORKSHEET

The list of data values can be located in the same worksheet or in a different worksheet. The instructions below will demonstrate how to create a validation list with data located in the same worksheet.

To create a validation list with the data located in the same worksheet:

1. Open "***Validation.xlsx***".
2. Select cell E5.
3. Click on the *Data* tab, click on the upper part of **Data Validation** button under the *Data Tools* group. The *Data Validation* dialog box opens.
4. Select the *Settings* tab to set the type of validation to be used for the cell.
 - a. Click on the ***Allow:*** list box and select *List*.
 - b. Click in the ***Source:*** textbox. Type in range [=A\$2:A\$10] if necessary, to set the values on the list.
 - c. If available, check ***Apply these changes to all other cells with the same settings*** checkbox. This will apply the input messages and error messages displayed in this dialog box to other cells having the same data validation settings (see Figure 10).
5. Select the *Input Message* Tab to type the message to be display when this cell is selected (see Figure 11).
 - a. Type [SELECT YOUR NAME] in the ***Title:*** textbox.
 - b. In the ***Input message:*** textbox, type the following message: [Click on the drop down arrow to select a name].

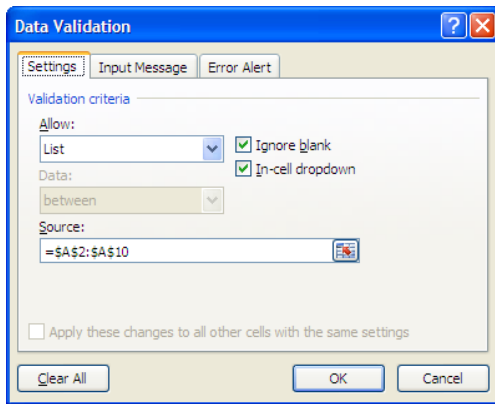


Figure 10 - Creating a Data Validation List Dialog Box

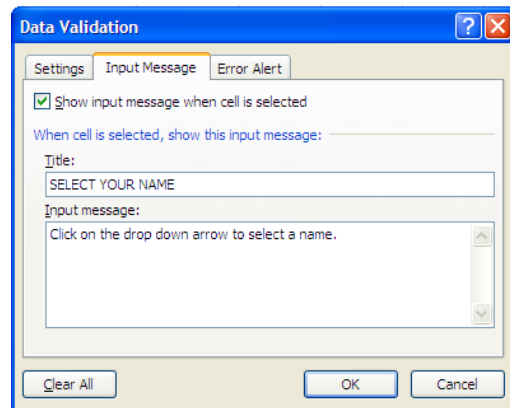




Figure 11 - Creating an Input Message Dialog Box

- Click the **OK** button. Cell E5 will display a drop-down arrow  to the right of the cell whenever it is selected.
- Click cell E5 and use the drop-down arrow  to change the name selected. Observe that the lookup values change accordingly (see Figure 12).

| | | | | | | |
|----|---------|--------------|-----------------------|------|------------|--------------------|
| 1 | NAME | PHONE | EMAIL | | | |
| 2 | James | 323-555-0000 | John@somewhere.com | | | |
| 3 | Jane | 323-555-1111 | Jane@somewhere.com | | | |
| 4 | Jessie | 323-555-2222 | Jessie@somewhere.com | | | |
| 5 | John | 323-555-3333 | John@somewhere.com | NAME | PHONE | EMAIL |
| 6 | Mary | 323-555-4444 | Mary@somewhere.com | Tony | 3-555-9999 | Tony@somewhere.com |
| 7 | Michael | 323-555-5555 | Michael@somewhere.com | | | |
| 8 | Peter | 323-555-6666 | Peter@somewhere.com | | | |
| 9 | Tiffany | 323-555-7777 | Tiffany@somewhere.com | | | |
| 10 | Tony | 323-555-9999 | Tony@somewhere.com | | | |

Figure 12 - Using Validation List with Formulas

CREATING A VALIDATION LIST BY USING DATA IN A DIFFERENT WORKSHEET

The basic concept is the same as before. However, the process of creating a validation list with data located in a different worksheet is a little bit more complicated.

When typing in the source for the values in the list, only cell references in the same worksheet can be input into the **Source:** textbox. Ranges located in other worksheets can be referred to only by using named cell references.

To create a name for a cell range:

- Select the “**Lookup DATA**” worksheet.
- Highlight the cell range A1:A9.
- Type [**Names**] in the **Name Box**.
Now, the cell range 'lookup DATA!A1:A19 has been assigned with this name and it can be referenced from anywhere in the workbook by using this name (see Figure 13).

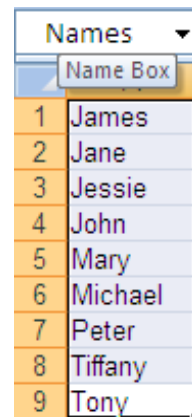



Figure 13 - Naming Cells Range

To create a validation list using data in a different worksheet:

1. Select the “**Validation**” worksheet.
2. Select the cell E5.
3. Click on *Data* tab, click on the upper part of **Data Validation** button under the **Data Tools** group. The *Data Validation* dialog box opens.
4. Select the *Settings* tab to set the type of validation to be used for the selected cell (see Figure 14).
 - a. Click on the **Allow:** drop-down list and select *List*.
 - b. Click in the **Source:** textbox. Type [=Names] to set the range of values to be included in the list.
5. Click the **OK** button to close the dialog box.
6. Click cell E5 and use the drop-down arrow  to change the name selected. Observe that the lookup values change accordingly.

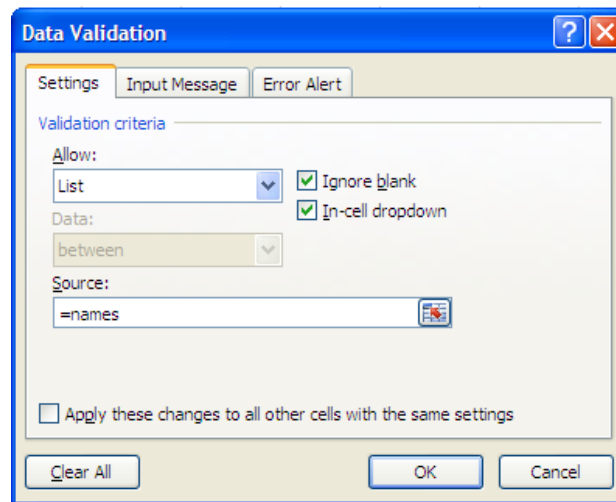


Figure 14 - Data Validation Using Range Name

Creating a Check Register

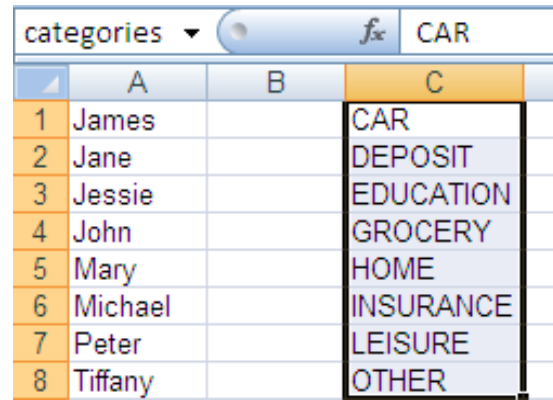
Formulas and functions in Excel enable the spreadsheet to update automatically whenever data is changed within a sheet. This makes it perfect for accounting purposes, like keeping a checkbook or balance sheet. This check register example combines all the features introduced in part 1.

CREATING A VALIDATION LIST FOR EXPENSES CATEGORIES

For the many categories of expenses, the easiest way to input data is by creating a validation list. By categorizing the expenses, it makes creating a summary of expenses a much easier task.


To create a validation list:

1. From “*Checkbook.xls*” select the *Lookup DATA* worksheet.
2. Create a name for the range of cells that contain all the expense categories.
 - a. Select the range C1:C8. This range has a list with some expense categories: CAR, UTILITIES, GROCERY, LEISURE, DEPOSIT, OTHER, etc.
 - b. Type a name for the range of cells into the *Name* Box. E.g., [**categories**] (see Figure 15).



| | A | B | C |
|---|---------|---|-----------|
| 1 | James | | CAR |
| 2 | Jane | | DEPOSIT |
| 3 | Jessie | | EDUCATION |
| 4 | John | | GROCERY |
| 5 | Mary | | HOME |
| 6 | Michael | | INSURANCE |
| 7 | Peter | | LEISURE |
| 8 | Tiffany | | OTHER |

Figure 15 - Renaming Expenses Range

3. Create a list with all the categories to select from in the categories column of the checkbook.
 - a. Switch to the “*checkbook*” worksheet by clicking the tab, and select cell C8.
 - b. Click on *Data* tab, click on the upper part of **Data Validation** button under the *Data Tools* group. The *Data Validation* dialog box opens.
 - c. From the *Data Validation* dialog box, select the *Settings* tab if necessary.
 - i. Click on the **Allow:** drop-down arrow and select *List*.
 - ii. Click in the **Source:** textbox. Type the name of the range [=categories] to apply the category values to the list (see Figure 16).
 - iii. Click the **OK** button. Cell C8 will display a drop-down arrow  to the right whenever the cell is selected.
4. Fill the range C9:C25 by copying C8 to apply the validation list to them as well.

NOTE: In case these rows are not enough, simply extend the range to include as many rows as needed. Remember, the same range must be applied to all steps that follow.

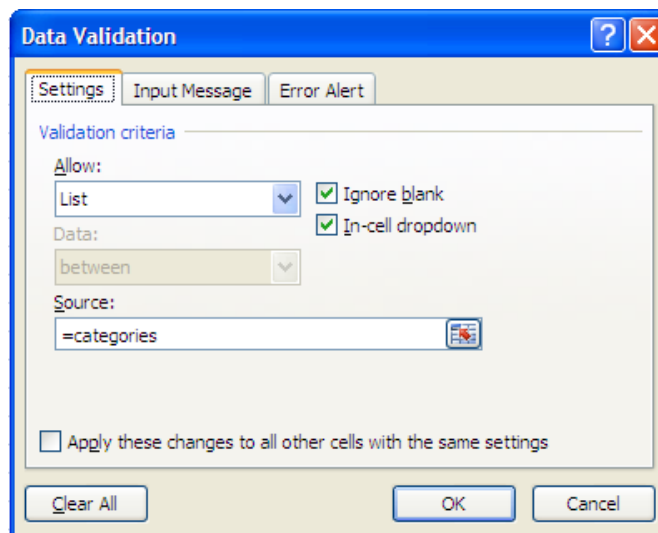


Figure 16 - Data Validation Dialog Box

- Since this is a deposit, the \$2000 amount should go into the credit column. Type [2000] into cell F8. Notice that the balance changes accordingly.

To record check #122 for \$45.57 paid to Albertson's for grocery on the date 01/07/08:


- In cell A9, type [122] as the check number.
- Type [01/07/2008] into cell B9. This is the date of the transaction.
- Select cell C9, and use the  drop-down arrow to select *GROCERY* from the list. In cell D9, type [Albertsons] for the description.
- This is an expense, so it will be recorded in the debit column. Type [45.57] into cell E9.
- Practice by entering the following table of expenses into the checkbook register and compare the results (see Figure 18).

Table 6 - Sample List of Expenses

| Check # | Date | Expense Detail | Amount |
|---------|----------|----------------------------|--------|
| 123 | 01/12/08 | Payment for apartment rent | 600.00 |
| 124 | 01/15/08 | Buy grocery at VONS | 60.00 |
| 125 | 01/15/08 | Books for Winter Quarter | 285.00 |
| 126 | 01/20/08 | Pay Phone Bills | 30.00 |
| 127 | 01/21/08 | Car payment | 350.00 |

| | A | B | C | D | E | F | H |
|----|--------------------|-----------|------------------|-------------------|-----------|-------------|-----------|
| 1 | Checkbook Register | | | | | | |
| 2 | | | | | | | |
| 3 | Current Balance | | Summary | # of transactions | Debit | Credit | |
| 4 | \$ 1,088.36 | | GROCERY | 2 | 105.57 | 0 | |
| 5 | | | | | | | |
| 6 | Check # | Date | Category | Details | Debit | Credit | Balance |
| 7 | | 1/1/2008 | Previous Balance | | | \$ 458.93 | \$ 458.93 |
| 8 | 122 | 1/5/2008 | DEPOSIT | | | \$ 2,000.00 | 2458.93 |
| 9 | | 1/7/2008 | GROCERY | Albertsons | \$ 45.57 | | 2413.36 |
| 10 | 123 | 1/12/2008 | HOME | Monthly Rent | \$ 600.00 | | 1813.36 |
| 11 | 124 | 1/15/2008 | GROCERY | VONS | \$ 60.00 | | 1753.36 |
| 12 | 125 | | EDUCATION | Books for Winter | \$ 285.00 | | 1468.36 |
| 13 | 126 | 1/20/2008 | HOME | Phone Bills | \$ 30.00 | | 1438.36 |
| 14 | 127 | 1/21/2008 | CAR | Car Payment | \$ 350.00 | | 1088.36 |
| 15 | | | | | | | |

Figure 18 - Data Entry Result

CREATING A SIMPLE SUMMARY

A simple summary can be created to clearly show the current balance and a summary regarding each category of expenses.


To display the current balance:

- Type [=G25] in cell A4.

NOTE: Recall in “Calculating balance using formula” (step-by-step on page 13), formulas were used in column “G” to calculate the balance. So the last row of column “G” has the current balance value. Even though column “G” is hidden, it still contains the values calculated by the formulas, and all the cells in the column can still be referred from other formulas.

NOTE: The value G25 might be different depending on the number of rows created previously.

To create a summary of the number of checks used for “HOME” transactions:

1. Create a validation list with the expense categories in cell C4. This drop-down list will be used to choose the category for the summary to be displayed.
 - a. Select cell C4 and create a validation list by using the same categories list used for the checkbook’s category column (refer to the “Creating a Validation List for Expenses Categories” section if necessary).
2. Display the number of transactions in cell D4 for the category chosen in cell C4. COUNTIF is the perfect function to be used in this case.
 - a. Type the formula [=COUNTIF(C8:C25,C4)] in cell D4. This will count the number of occurrences of the category selected in cell C4 in all the expenses.
3. Calculate sum of debits and credits for the category selected in cell C4. SUMIF function is used to accomplish this.
 - a. For the sum of debits, type the formula [=SUMIF(C8:C25,C4,E8:E25)] in cell E4. This will look for the category selected in cell C4 in the checkbook’s category column and add the values in the debit column that has same category.
 - b. For the sum of credits, type the formula [=SUMIF(C8:C25,C4,F8:F25)] in cell F4. This will look for the category selected in cell C4 in the checkbook’s category column and add the values in the credit column.
4. Click cell C4 and use  to select *HOME* from the list. Notice that the # of transactions, Debit total and Credit total automatically update their values accordingly (see Figure 19).

| C | D | E | F |
|--------------------|-------------------|-----------|-------------|
| Checkbook Register | | | |
| Summary | # of transactions | Debit | Credit |
| HOME | 2 | 386.88 | 0 |
| Category | Details | Debit | Credit |
| Previous Balance | | | \$ 458.93 |
| DEPOSIT | | | \$ 2,000.00 |
| GROCERY | Albertsons | \$ 45.57 | |
| HOME | Monthly Rent | \$ 350.00 | |
| GROCERY | Vons | \$ 67.90 | |
| EDUCATION | Books for Winter | \$ 253.62 | |
| HOME | Phone Bill | \$ 36.88 | |
| CAR | Car Payment | \$ 200.99 | |

Figure 19 - Summary of Checkbook Register

USING CONDITIONAL FORMATTING

From the above example, both instances of “HOME” expenses were easily found. But as the list grows, it may be difficult to look for certain categories of transactions. Conditional formatting can be applied to the cells under the checkbook’s category column so that the format of the cells will change if they meet a given condition. In this case, the conditional formatting will change the cell color and font settings of the cells that contain the category specified under “summary”.

To apply conditional formatting:

1. First, select all the cells to which conditional formatting should be applied (in this case the range C8:C25).
2. Click on the *Home* tab, select **Conditional Formatting** command under the *Styles* group.
3. From the **Conditional Formatting** list, point to *Highlight Cells Rules* and click *Equal to*. In the **Format cells that are EQUAL to:** text box, type [= \$C\$4] (see Figure 20).

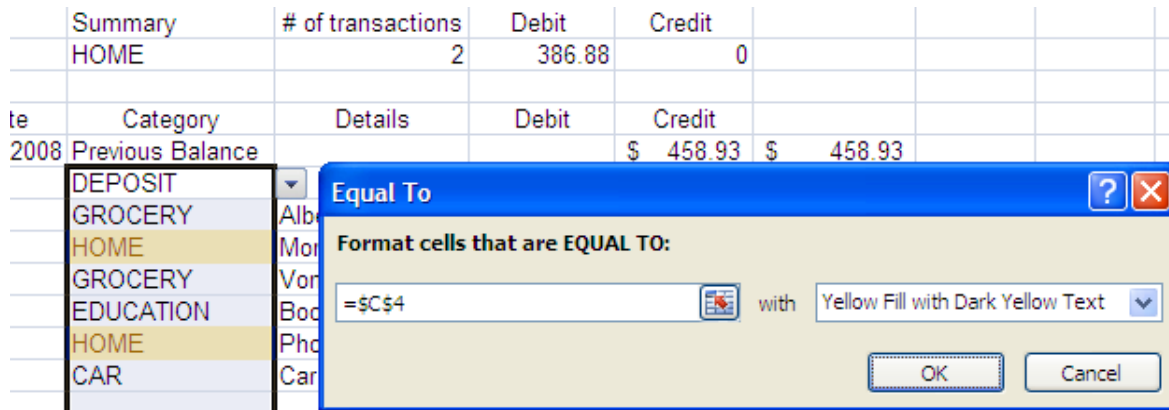


Figure 20 - Conditional Formatting Dialog Box

4. Click on the drop-down arrow of the *with* list box. Select *Custom Format...*
5. Apply a bold effect, found under the *Font* tab (see Figure 21).
6. Choose a background color to be applied under the *Fill* tab.
7. Click the **OK** button to close the dialog box.

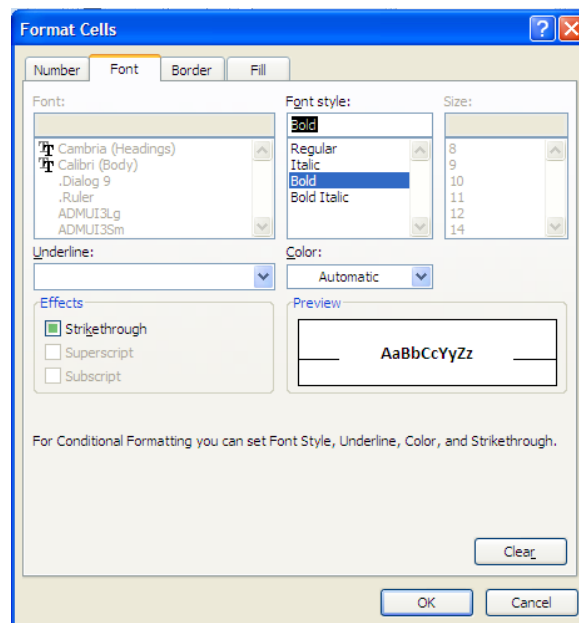


Figure 21 - Format Cells Dialog Box

8. Click the **OK** button to close the *Conditional Formatting* dialog box and apply the changes. Notice that all expenses categorized as “HOME” are bolded and highlighted (see Figure 22).

| Summary | # of transactions |
|------------------|-------------------|
| HOME | 2 |
| | |
| Category | Details |
| Previous Balance | |
| DEPOSIT | |
| GROCERY | Albertsons |
| HOME | Monthly Rent |
| GROCERY | Vons |
| EDUCATION | Books for Winter |
| HOME | Phone Bill |
| CAR | Car Payment |

Figure 22 - After Applying Conditional Formatting