EXCEL 2002 (XP)

FOCUS ON: DATABASE MANAGEMENT

December 16, 2005

ABOUT GLOBAL KNOWLEDGE, INC.

Global Knowledge, Inc., the world's largest independent provider of integrated IT education solutions, is dedicated to improving the way companies and individuals learn, use, and master technology. The company's educational solutions empower customers with choice, allowing them to determine when, where, and how they want their IT education programs to be designed and delivered. Global Knowledge's blended IT education solutions combine vendor-authorized content with Global Knowledge developed curricula and deliver this through the right mix of intensive hands-on classroom training and interactive e-learning. Global Knowledge has a large, growing portfolio of e-learning content, products, and services. For large businesses, the company offers complete program management including enrollment, assessment, progress tracking and certification.

COPYRIGHT & TRADEMARKS

DISCLAIMERS

FOCUS ON: DATABASE MANAGEMENT

LESSON 1 -
WORKING WITH DATABASES

In this lesson, you will learn how to:

- Use a database

- Create a database

- Modify a database

- Sort records by multiple fields

- Use data validation

- Validate data using a list

- Create a custom error message

- Remove data validation

- Create subtotals in a list

- Remove subtotals from a list

USING A DATABASE

☝ Discussion

A database is a collection of information arranged in such a way as to make it easy to access. For example, a telephone book is a static database arranged in alphabetical order; however, because it is static, you cannot rearrange the information. In the business world, you need the capability to manipulate a database. This capability is known as database management. The computer makes the concept of database management possible by enabling you to create, store, and manipulate a database.

Excel has built-in database management capabilities. You can treat a worksheet or portions of a worksheet as a database. Using an Excel database, you can enter, edit, locate, sort, and analyze information.

In Excel, you can define any list as a database, since a list is simply a range of cells made up of columns and rows. The columns contain the field data and the rows contain the record data. Additional rows can be inserted as records are added to the database. In Excel, any list can be used as a database. A valid list does not contain any blank columns or rows.

In addition to creating your own database, Excel can retrieve information from an external database. You can import information from database programs such as Microsoft Access, dBase, FoxPro, Paradox, and SQL Server. The **Microsoft Query** feature (which includes the Query Wizard) must be installed in order to perform this operation.

> 📖   You can also work with lists created in other Office XP
>   programs by copying and pasting the lists into Excel.

CREATING A DATABASE

☝ Discussion

You can create an Excel database. Before creating a database, however, you must consider the specific information you want to collect (that is, the fields or types of information you want to track). You might, for example, need to track a client name, address, city, state, zip code, telephone number, invoice number, date of invoice, amount of invoice, and the sales representative's commission. You can create one field for each type of information.

A field occupies a single column of a database and contains a single piece of information in each record. For example, a **Salary** field might contain salary information for each employee record. You can enter text, numbers, formulas, dates, or functions into a field. A computed field contains formulas or functions. Excel uses the top row of the list (the column labels) as the field names.

A little planning can save hours of additional work at a later date. For example, to sort a database by last name, you must create two fields (one for the first name and one for the last name). You cannot enter the first and last names in a single field if you want to sort by last name.

Once you have entered the field names for a database, you can enter the records. Each row of a database contains one record. A record contains all the information related to one entry. For example, an employee record could contain the name, address, telephone number, and salary information of a single employee. Although each record contains all the fields in the database, you do not have to enter data into every field.

You may want to start with a small model of your database to test its design and usability. You can enter a few records and verify that you can store and retrieve the data as needed.

Creating a database

✓ **Procedures**

1. Select the cell where you want to enter the first column label.

2. Type the desired column label.

3. Press **[Right]** to move to the next cell in the row.

4. Enter additional database field labels as needed.

MODIFYING A DATABASE

Discussion

Maintaining a database involves modifying database objects. You can modify a database by adding and deleting records and fields.

New records can be added at the end of your database, or you can insert a new row in the database in order to add a record in a particular area. You can also delete records by deleting the row that contains the record. When you delete a row, Excel adjusts any database ranges as needed. If you simply clear the contents of the record, the blank row can cause problems with sorting and locating records.

After you have created a database, you may discover that you need to track additional information. You can insert columns into the database to create additional fields as needed. Conversely, you can delete fields you no longer need to track. Deleting unnecessary fields produces a more efficient database and faster sorts and queries.

A valid database list does not contain any blank columns or rows.

You can also modify a database by editing the information in the same way as you would edit any worksheet. You can change the information in any field by editing it on the formula bar or by typing over the old information in the cell. You can also copy information from one cell to another.

> You can format a database using any of the Excel formatting features.

> When you delete a row, all the information in that row is deleted across the entire worksheet. Before you delete a row, you should make sure that there is no information in the row you want to retain.

✅ Procedures

1. Right-click the column or row you want to modify.

2. Select the **Insert** or **Delete** command to modify the column or row as desired.

SORTING RECORDS BY MULTIPLE FIELDS

Discussion

In Excel, you can arrange a list of records alphabetically or numerically (according to the contents of the column or row). Unless otherwise specified, Excel automatically sorts from top to bottom.

In order to sort records, you must select the sort keys. Sort keys define the column(s) by which you want to sort to place the records in a specific order. For example, if you want to arrange the database according to the information in the **Last Name** field, then the **Last Name** field is the primary sort key.

Frequently, many records contain the same information in the primary sort key field. For example, if you sort by the **Department** field, several employees may be in the same department. You can refine a search using a secondary sort key. To sort records by last name within a department, you can use the **Department** field as the primary sort key and the **Last Name** field as a secondary sort key. In addition, you can add a third sort key (such as the **First Name** field).

You can sort in either ascending or descending order. By default, Excel performs an ascending sort in the following order: numbers, text, logical values, error values, and blanks.

If the top row of the list does not contain field labels, you should select the **No Header Row** option in the Sort dialog box. Excel then considers the top row in the range as data to be sorted, not as field labels.

Sorting records by multiple fields

📖   To reverse a sort, you can use the **Undo** feature immediately
     following the sort operation.

📖   You can sort on a single field by selecting a cell in the field
     and clicking the **Sort Ascending** or **Sort Descending** button
     on the **Standard** toolbar.

✔ Procedures

1.   Select any cell in the database.

2.   Select the **Data** menu.

3.   Select the **Sort** command.

4.   Select the **Header row** or **No header row** option, as applicable.

5.   Select the **Sort by** list.

6.   Select the field for the primary sort key.

7.   Select the **Ascending** or **Descending** option as desired.

8.   Select the upper **Then by** list.

9.   Select the field for the secondary sort key.

10. Select the **Ascending** or **Descending** option as desired.

11. Select the lower **Then by** list.

12. Select the field for the tertiary sort key.

13. Select the **Ascending** or **Descending** option as desired.

14. Select **OK**.

USING DATA VALIDATION

Discussion

Databases can contain incorrect information due to data entry errors. One method of controlling the accuracy of data entered is to place validation limits on the type of data to be entered and to decide whether or not blank entries are allowed.

Using data validation, you can restrict the type of data allowed in a cell and the minimum, maximum, or upper and lower limits for whole numbers, decimals, dates, or times. If the cell will contain text, you can set an upper and lower limit for the number of characters permitted.

When a user enters an invalid entry into a cell that contains data restrictions, Excel opens a message box, called an alert, which explains that the entry is not valid and only restricted values can be entered into this cell.

Using data validation

📖   You can copy the data validation from one cell to another using the **Validation** option in the Paste Special dialog box.

📖   Selecting **Custom** from the **Allow** list on the **Settings** page in the Data Validation dialog box allows you to enter or refer to a formula. The formula calculates to a true or false result, with true results being valid entries and false results being invalid entries.

✔ Procedures

1. Select the cells with the data entry you want to restrict.

2. Select the **Data** menu.

3. Select the **Validation** command.

4. Select the **Settings** tab.

5. Select the **Allow** list.

6. Select the desired option.

7. Select the **Data** list.

8. Select the desired option.

9. Select the first box for the restriction you want to set.

10. Type the restriction.

11. Select additional boxes as necessary.

12. Type additional restrictions.

13. Select **OK**.

VALIDATING DATA USING A LIST

☞ Discussion

You can restrict cell entry to specific values in a list. The list value can be text or numbers. For example, you can specify the four departments that can be entered into a **Department** field.

When you restrict data entry in a cell to a specified list, a drop-down arrow appears when the user selects the cell. The user can either select a valid entry from the list or type a valid entry. Entries that do not appear on the list are considered invalid.

✔ Procedures

1. Select the cells with the data entry you want to restrict to a list.

2. Select the **Data** menu.

3. Select the **Validation** command.

4. Select the **Settings** tab.

5. Select the **Allow** list.

6. Select **List**.

7. Click the **Collapse Dialog** button in the **Source** box.

8. Drag to select the list range in the worksheet.

9. Click the **Expand Dialog** button in the **Source** box.

10. Select **OK**.

CREATING A CUSTOM ERROR MESSAGE

🔎 Discussion

When a user enters an invalid entry into a cell with restricted data entry, Excel opens a message box, informing the user that the entry is invalid. You can create a custom message that appears in the message box instead of the default message.

Excel includes three styles of alert message boxes: **Stop**, **Warning**, and **Information**. Each style provides different buttons in the message box and, more importantly, different restrictions. The default error alert style is **Stop**, which does not allow invalid data to be entered into cells. Both the **Warning** and **Information** styles allow invalid data to be entered.

> 📖 You can enable the **Apply these changes to all other cells with the same settings** option on the **Settings** page in the Data Validation dialog box. This option applies any changes you have made to all cells that contain the same data validation as the changed cells.

> You can use the **Input Message** page in the Data Validation dialog box to create a message that appears in a ScreenTip when the user selects a cell. This message can provide information for the user about the type of data to be entered.

✅ Procedures

1. Select the cells with the error message you want to customize.
2. Select the **Data** menu.
3. Select the **Validation** command.
4. Select the **Error Alert** tab.
5. Select the **Style** list.
6. Select the desired style.
7. Select the **Title** box.
8. Type the desired title.
9. Select the **Error message** box.
10. Type the desired error message.
11. Select **OK**.

REMOVING DATA VALIDATION

Discussion

You can remove all the restrictions on data entry in a cell by clearing the data validation from the cell. Removing data validation allows any entry to be entered in a cell.

> Selecting the **Clear All** button on any page in the Data Validation dialog box clears the restrictions on all the pages for the selected range.

✅ **Procedures**

1.   Select the cells with the data validation you want to remove.

2.   Select the **Data** menu.

3.   Select the **Validation** command.

4.   Select **Clear All**.

5.   Select **OK**.

CREATING SUBTOTALS IN A LIST

Discussion

You can create subtotals for lists that are grouped. When a database is sorted by the values in a field, records containing identical values are grouped together. Therefore, when you sort a list by department, all records from the same department, such as the sales department, are grouped together and appear consecutively in the list.

Once a list is grouped, you can calculate the subtotals of fields. For example, summing the salaries by departments would provide the salary subtotals for each department: administrative, development, production, and sales. Besides the SUM function, other functions can be used for subtotal calculations, including COUNT, AVERAGE, MIN, and MAX. Multiple fields can be subtotaled within a group.

When a list is subtotaled, Excel inserts a summary row under each group with the group name and resulting subtotals, and a final grand total at the bottom of the list. In addition, outlining is automatically applied to the list. Subtotaled groups appear with outline symbols. Using the symbols, you can display or hide the group details.
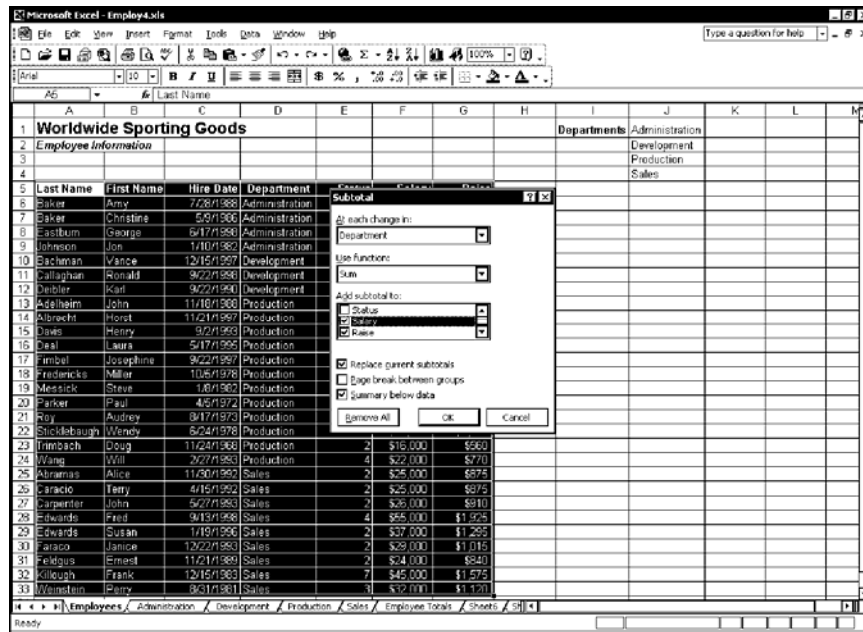
Creating subtotals in a list

📖 You can calculate different functions for the same group. First, create the subtotals for the first function. Then, reopen the Subtotals dialog box, select the second function and the fields you want to calculate, and deselect the **Replace current subtotals** option.

⚠ A list must be sorted first by the same field in which you want to report grouped subtotals.

✔ Procedures

1. Select a cell in the column containing the field you want to group.

2. Click the **Sort Ascending** button 🔼 on the **Standard** toolbar.

3. Select the **Data** menu.

4. Select the **Subtotals** command.

5. Select the **At each change in** list.

6. Select the same field in which the list is sorted.

7. Select the **Use function** list.

8. Select the desired function.

9. Select the field you want to calculate in the **Add subtotal to** list box.

10. Select additional fields as desired.

11. Select **OK**.

REMOVING SUBTOTALS FROM A LIST

Discussion

You can remove the subtotals from a list when you no longer need the results. Removing the subtotals also removes the outlining and grand total information.

✔ Procedures

1. Select a cell in the list containing the subtotals you want to remove.

2. Select the **Data** menu.

3. Select the **Subtotals** command.

4. Select **Remove All**.

LESSON 2 -
WORKING WITH THE DATA FORM

In this lesson, you will learn how to:
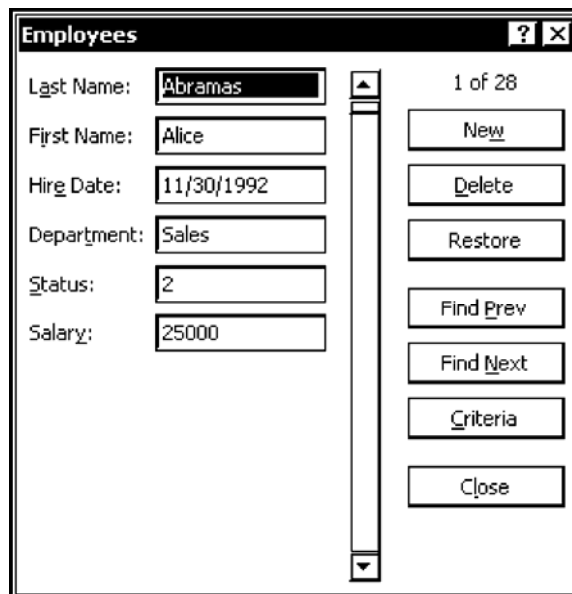
- View the data form

- View data form records

- Edit data form records

- Add data form records

- Define criteria

- Clear data form criteria

- Delete data form records

VIEWING THE DATA FORM

🔖 Discussion

The data form provides an easy way to view, change, add, or delete records in a list. You can also use the data form to find specific records based on criteria.

The data form allows you to view a complete record in a dialog box format. The field names are listed in a column on the left side of the data form. The information in each field appears to the right of the field name. (The list must contain column labels in order for the data form to correctly display the data.)

Viewing the data form

📖	The Data Form dialog box expands to display a number of fields in a list.

📖	Criteria set up in the data form does not affect criteria set up in a criteria range in the worksheet.

✔ **Procedures**

1. Select any cell in the list.

2. Select the **Data** menu.

3. Select the **Form** command.

VIEWING DATA FORM RECORDS

🔮 **Discussion**

The Data Form dialog box allows you to move to records easily. For example, if a list has hundreds of records, the data form allows you to quickly scroll to the one you want. When you drag the scroll box in the scroll bar, the counter in the upper right corner of the Data Form dialog box indicates which record will appear when you release the mouse button.

> 📖 You can press the **[Enter]** key and the **[Shift**+**Enter]** key combination to move to the next and previous records, respectively. The **[Page Up]** and **[Page Down]** keys move you rapidly through the database.

✔ **Procedures**

1. Open the Data Form dialog box.

2. Click the down arrow to move to the next record in the list.

3. Click the up arrow to move to the previous record in the list.

4. Drag the scroll box as desired to move quickly through the list.

5. Drag the scroll box to the top of the scroll bar to display the first record.

EDITING DATA FORM RECORDS

Discussion

You can use the data form to edit records. In the data form, each field appears in its own box. You can edit data in the boxes in the same way as you edit data in a worksheet.

> You can cancel your changes and restore the original data if you click the **Restore** button in the Data Form dialog box before you press the **[Enter]** key to move to another record.

Procedures

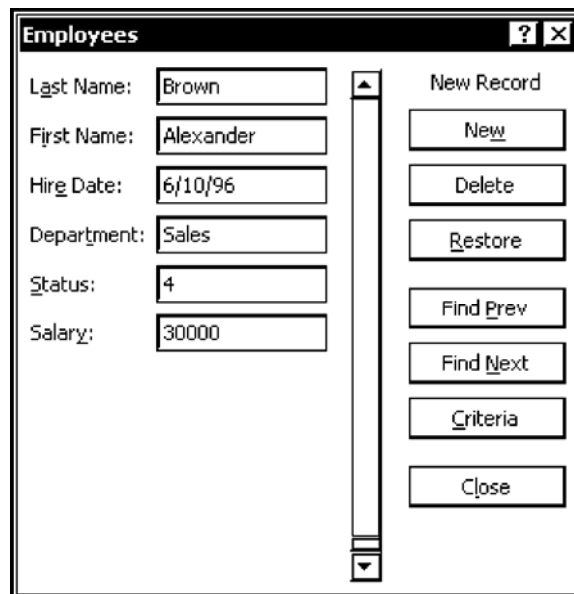1. Open the Data Form dialog box.

2. Display the record you want to edit.

3. Select the text in the field you want to edit.

4. Edit the text as desired.

5. Press **[Enter]**.

ADDING DATA FORM RECORDS

Discussion

You can add records to the data form. New records appear at the end of the data form. However, any existing named ranges in the list do not expand to include the new records.

Adding a record to the data form

📖   You can press the **[Tab]** key and the **[Shift+Tab]** key
combination to move to the next and previous fields,
respectively. If you are in the last field in a record, the
insertion point moves to the **New** button when you press the
[Tab] key.

✔ **Procedures**

1. Open the Data Form dialog box.

2. Select **New**.

3. Type the information for the first field.

4. Select the next field in which you want to enter information.

5. Type information in the remaining fields as desired to complete the
    record.

6. Press **[Enter]**.

DEFINING CRITERIA

Discussion

You can define criteria to locate records in the data form. Criteria filter the records so that you view only those records meeting the criteria. When you are searching a long list of records, criteria can help to decrease the number of records you must search.
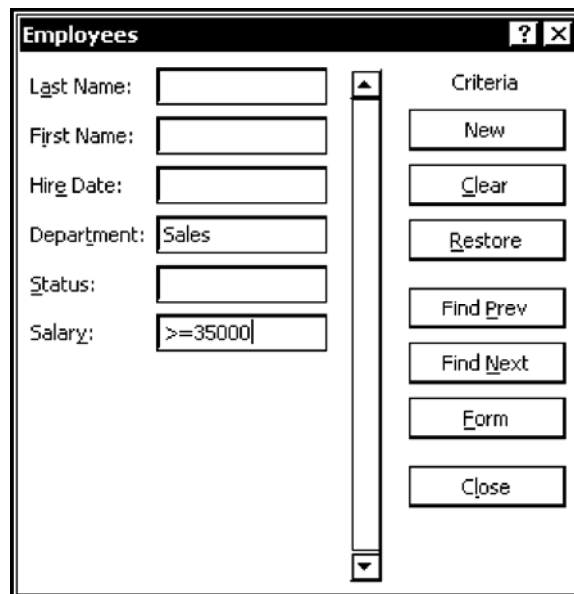
You can search for records that meet a single criterion or multiple criteria. When you specify multiple criteria, found records must match all the specified criteria.

In the data form, you can use comparison criteria to locate records. Comparison criteria can be text you want to match, or you can use comparison operators to locate numeric data, including dates. The following comparison operators are available:

Operator	Definition
=	equal to
>	greater than
<	less than
>=	greater than or equal to
<=	less than or equal to
<>	not equal to

By default, the data form uses matching criteria, which means that a record must contain data in the selected field that exactly matches the criteria. Criteria are not case-sensitive. Therefore, you can enter text in uppercase or lowercase characters.

When you have added criteria to the data form, you can use the **Find Next** and **Find Prev** buttons to view those records meeting the criteria. If you use the scroll arrows or drag the scroll box, the criteria are ignored and all records appear.

Defining criteria

> 📖 Excel beeps when you have viewed the last record that meets the criteria.

✔ Procedures

1. Open the Data Form dialog box.

2. Select **Criteria**.

3. Select the field in which you want to enter a criterion.

4. Type the desired criterion.

5. Select any additional fields in which you want to enter criteria.

6. Type the desired criteria.

7. Select **Find Next** or **Find Prev** as desired to view the records that meet the criteria.

CLEARING DATA FORM CRITERIA

Discussion

After you have defined criteria in the data form, you can use the **Find Prev** and **Find Next** buttons to view those records meeting the criteria. However, you can still use the scroll arrows and the scroll box to view the other records in the database.

Criteria remain in effect until you clear them or enter new criteria. After you no longer need to filter the data form, you should clear the criteria.

✔ Procedures

1. Open the Data Form dialog box.

2. Select **Criteria**.

3. Select **Clear**.

4. Select **Form** to return to the data form.

DELETING DATA FORM RECORDS

Discussion

When you no longer need a record or a record becomes irrelevant, you can delete the record from the data form. The record is then deleted from the worksheet as well.

> ⚠ You should use the **Delete** button in the Data Form dialog box with caution. If you delete a record from the data form, you cannot restore it.

✔ Procedures

1. Open the Data Form dialog box.

2. Display the record you want to delete.

3. Select **Delete**.

4. Select **OK**.

LESSON 3 -
USING AUTOFILTER

In this lesson, you will learn how to:

- Enable AutoFilter

- Use AutoFilter to filter a list

- Clear AutoFilter criteria

- Create a custom AutoFilter

- Disable AutoFilter
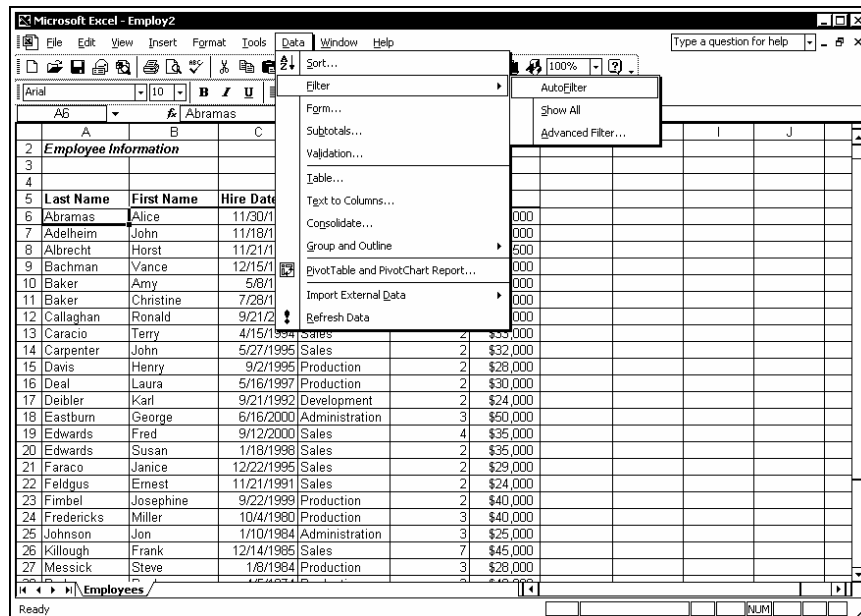
ENABLING AUTOFILTER

Discussion

A list is a range of cells organized with similar sets of data in each column. Column labels describe the data in the corresponding column, also known as a field. For instance, if you are creating an employee list, you might use the column label **Department** for the column containing each employee's department. The information displayed across each row is called a record.

When data is in an organized list, you can filter the data to display only selected information. A filter is a set of conditions (criteria) that must be met. When you enable a filter, only the rows (records) matching the filter conditions appear. For example, you can filter a list to view only the employees in the **Production** department.

The **AutoFilter** feature allows you to easily create and change filters in a list. When AutoFilter is enabled, AutoFilter arrows appear in the column label cells. You can then select criteria from one or more fields. For example, you can select criteria from two different fields to display only those employees making more than $25,000 or who were hired before a specified date.

Since AutoFilter adds drop-down lists to column label cells, the list must contain column labels in order to use this feature.

Enabling AutoFilter

✔ **Procedures**

1. Select any cell in the list.

2. Select the **Data** menu.

3. Point to the **Filter** command.

4. Select the **AutoFilter** command.

USING AUTOFILTER TO FILTER A LIST

📖 **Discussion**

After you have enabled AutoFilter, you can click any AutoFilter arrow to display the values contained in that field. You can then select a value from the list to create a filter. Thereafter, only records containing the matching value in that field appear on the worksheet. The records that do not contain the matching value are hidden, not deleted. You can select criteria from multiple fields to create more complex conditions.

A filtered list

> 📖   Once a filter has been applied to a field, the AutoFilter arrow turns blue, and the number of records found appears in the status bar.
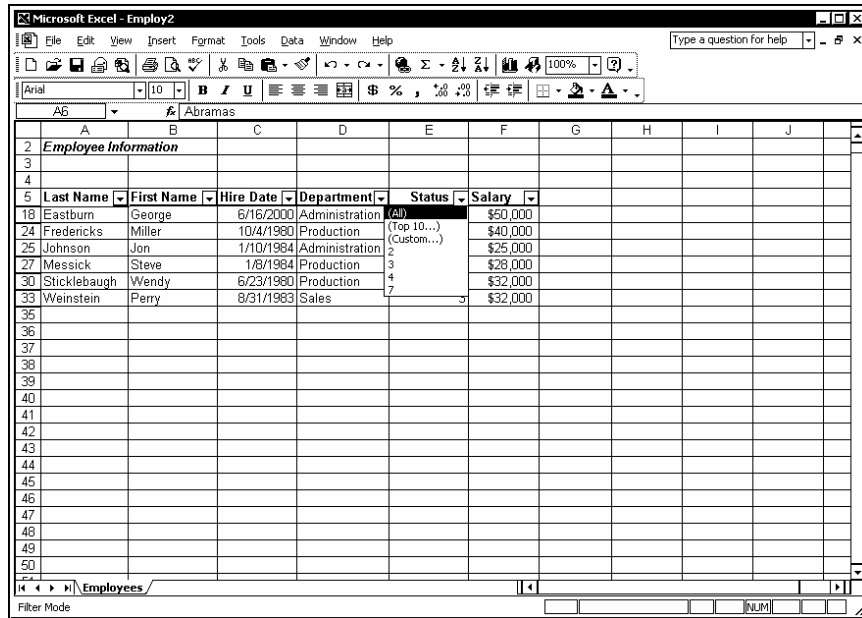
✔️ **Procedures**

1.   Enable AutoFilter for the list.

2.   Click the desired AutoFilter arrow.

3.   Select the value you want to use as a filter.

CLEARING AUTOFILTER CRITERIA

📖 **Discussion**

You can clear AutoFilter criteria to remove a filter and display all rows in a list. AutoFilter is flexible enough to allow you to display and hide records without the fear of deleting data.

Clearing AutoFilter criteria

> 📖 If you have filtered on multiple fields, you must select **(All)** from each AutoFilter list to display all records. You can clear all filters at the same time by selecting the **Data** menu, pointing to the **Filter** command, and selecting the **Show All** command.

✅ Procedures

1. Enable AutoFilter for the list.

2. Select the AutoFilter arrow of the field you want to clear.

3. Select **(All)**.

CREATING A CUSTOM AUTOFILTER

🔲 Discussion

An AutoFilter list displays all field values in that column. In addition to filtering by one value on the list, you can use comparison criteria to create a custom filter. Excel provides a number of conditions you can use to create a filter. For example, you can use the **is greater than** condition to view only those salaries greater than $35,000.

You can use AutoFilter to filter by two criteria using the **And** or **Or** condition. You use the **And** condition when the record must match both conditions. For example, you can create a custom filter that displays only records in which the sales are greater than $50,000 and less than $65,000.

You use the **Or** condition when the record can match either criteria. For example, you can create a filter that displays the records of employees either in the sales or the production department.

Creating a custom AutoFilter

> You can use the question mark (**?**) and asterisk (*****) wildcard characters to enter criteria. The question mark (**?**) represents a single character, and the asterisk (*****) represents an unspecified number of characters. For example, the **S*** condition displays all items beginning with the letter **S**.

✔ **Procedures**

1. Enable AutoFilter for the list.

2. Select the AutoFilter arrow in the column you want to filter.

3. Select the **(Custom...)** option.

4. Select the top, left list.

5. Select the desired condition.

6. Select the top, right list.

7. Enter the desired value.

8. To add a second condition, select the **And** or **Or** option.

9. Select the lower, left list.

10. Select the desired condition.

11. Select the lower, right list.

12. Enter the desired value.

13. Select **OK**.

DISABLING AUTOFILTER

Discussion

When you have finished using AutoFilter, you can disable it. Disabling AutoFilter removes the AutoFilter arrows from the worksheet.

✓ **Procedures**

1. Select the **Data** menu.

2. Point to the **Filter** command.

3. Select the **AutoFilter** command.

LESSON 4 -
WORKING WITH ADVANCED FILTERS

In this lesson, you will learn how to:

- Create a criteria range

- Use a criteria range

- Show all records

- Use comparison criteria

- Use an advanced And condition

- Use an advanced Or condition

- Copy filtered records

- Use database functions

CREATING A CRITERIA RANGE

🛈 Discussion

You can use advanced filters to create more complicated conditions to filter a data list. To use advanced filters, you must specify the list range and the criteria range.

The list range is the cells containing the data arranged in a series of rows and columns, where the column headings are the field names for the list.

The criteria range is a separate range of cells in the worksheet, apart from the data list. The criteria range can be located anywhere in the worksheet outside of the list range, or in another worksheet. The criteria range consists of one row of criteria labels and at least one row of search conditions. The criteria range must contain at least two rows and one column.

Although the criteria labels are not case-sensitive, they must be spelled exactly the same as the field names in the data list. The most accurate method of ensuring this consistency is to copy the field names in the data list and paste them into the top row of the criteria range.

You can change criteria as often as desired. You can also create more than one criteria range in a worksheet; however, only one criteria range can be used at a time.

Creating a criteria range

> 📖   There must be at least one blank row between the criteria
> range and the list range.

✅ Procedures

1. Select the column labels.

2. Click the **Copy** button on the **Standard** toolbar.

3. Position the active cell where you want to create the criteria range.

4. Click the **Paste** button on the **Standard** toolbar.

USING A CRITERIA RANGE

🔅 Discussion

To find records that match a specific number, date, or text, you can enter matching
criteria in the row below the criteria labels.

For example, to create a list of all employees in the sales department, you can type
Sales in the **Department** cell in the criteria range. Text in the criteria range is not
case-sensitive. If you type **sales**, Excel will search the field in the list range named
sales, **Sales**, or **SALES**.

You define the list and criteria ranges in the Advanced Filter dialog box. The list
range contains the fields and records and the criteria range contains the criteria labels
and the conditions for which you want to search.

If the active cell is positioned in the data list before you open the Advanced Filter
dialog box, Excel automatically defines the list range. Otherwise, you can manually
enter the list range by typing the range address or by selecting the range in the
worksheet.

Using a criteria range

> You can use comparison criteria to enter criteria. Comparison
> criteria include wildcards for text and operators for numbers.

✔ Procedures

1. Copy the column labels to the range where you want to create the criteria.

2. Select the cell below the criteria label of the field you want to search.

3. Type the desired criteria.

4. Press **[Enter]**.

5. Select any cell in the data list.

6. Select the **Data** menu.

7. Point to the **Filter** command.

8. Select the **Advanced Filter** command.

9. Click the **Collapse Dialog** button in the **Criteria range** box.

10. Select the criteria range.

11. Click the **Expand Dialog** button in the **Criteria range** box.

12. Select **OK**.

SHOWING ALL RECORDS

Discussion

At any time when a data list is filtered, the **Show All** command from the **Filter** submenu on the **Data** menu is available. This command allows you to display all the records in the data list. It does not, however, delete the criteria in the criteria range.

Procedures

1. Select the **Data** menu.

2. Point to the **Filter** command.

3. Select the **Show All** command.

USING COMPARISON CRITERIA

Discussion

You can also use comparison criteria in a criteria range when you want to find text or numeric values.

When specifying criteria to find text values, you can enter the first few characters of text to search for all records beginning with those characters. Entering **ba** in a field of last names finds records with last names of Baker, Backman, and Ball.

You can also use special characters called wildcards when creating criteria. Wildcards represent one or more characters in a search. You can use one of two wildcard characters in search criteria. A question mark (**?**) represents a single character, whereas an asterisk (*****) can represent an unspecified number of characters. Typing **?erry** in a field of first names will find records with first names beginning with any single character followed by **erry**, such as Terry or Perry. Typing **T*man** in a field of last names will find any records with last names starting with **T** and ending in **man**, such as Thurman, Truman, Tierman. Wildcard characters only work for finding text values.

You can use operators as comparison criteria for finding numeric values. You can use any of the following comparison operators:

Operator	Definition
=	equal to
<	less than
<=	less than or equal to
>	greater than
>=	greater than or equal to
<>	not equal to

For example, to search for all employees with salaries that are less than or equal to $25,000, you type **<=25000** in the cell below the **Salary** criteria label.
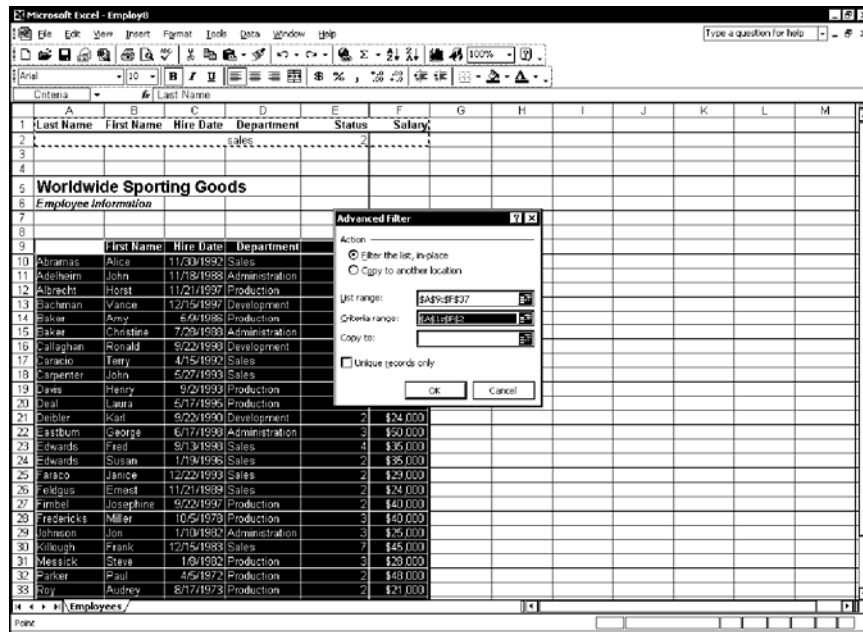
USING AN ADVANCED AND CONDITION

Discussion

You can create **And** conditions in a criteria range. In an **And** condition, a record must meet all the criteria to be selected. For example, you can find the records of all employees who work in the sales department and whose salaries are less than **$25,000**. This example is a typical **And** condition, where both conditions must be met for a record to be selected.

All the criteria for **And** conditions must be located in the same row in the criteria range.

Using an advanced And condition

✅ Procedures

1. Copy the column labels to the range where you want to create the criteria.

2. Select the cell below the criteria label of the field you want to search.

3. Type the desired criteria.

4. Press **[Enter]**.

5. Select a cell below the criteria label of the second field you want to search.

6. Type the desired criteria.

7. Press **[Enter]**.

8. Select any cell in the database list.

9. Select the **Data** menu.

10. Point to the **Filter** command.

11. Select the **Advanced Filter** command.

12. Click the **Collapse Dialog** button [icon] in the **Criteria range** box.

13. Select the criteria range.

14. Click the **Expand Dialog** button [icon] in the **Criteria range** box.

15. Select **OK**.

USING AN ADVANCED OR CONDITION

[icon] **Discussion**

You can create **Or** conditions in a criteria range. In an **Or** condition, a record must meet either one of two or more criteria in order to be included. For example, you can view the records of all employees who work in the administration department or whose salaries are less that **$22,000**. This example is a typical **Or** condition, in which a record meeting either condition is selected.

The criteria for **Or** conditions must be located in different rows in the criteria range. Each **Or** condition occupies its own row.
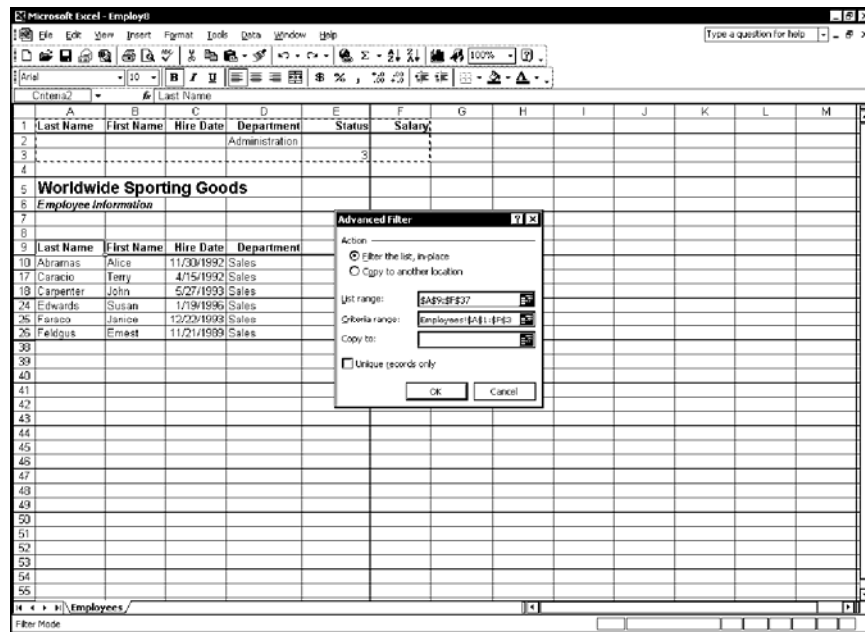
Using an advanced Or condition

> [icon] It is important to note that when selecting the criteria range for an **Or** condition, you must expand the criteria range to include all rows containing criteria.

✓ Procedures

1. Copy the column labels to the range where you want to create the criteria.

2. Select the cell below the criteria label of the first field you want to search.

3. Type the desired criteria.

4. Press **[Enter]**.

5. Select the cell below the criteria label of the second field you want to search.

6. Type the desired criteria.

7. Press **[Enter]**.

8. Select any cell in the database list.

9. Select the **Data** menu.

10. Point to the **Filter** command.

11. Select the **Advanced Filter** command.

12. Click the **Collapse Dialog** button in the **Criteria range** box.

13. Select the criteria range.

14. Click the **Expand Dialog** button in the **Criteria range** box.

15. Select **OK**.

COPYING FILTERED RECORDS

🗣 Discussion

You can filter records in a data list and copy the results to another area of the worksheet. In this instance, the original data list remains intact.

Copying filtered records allows you to create different lists of similar records in various areas of the worksheet or on other worksheets. For example, if a master employee data list contains all employees in all departments, you can create similar data lists of the employees in each department.

✔ **Procedures**

1. Copy the column labels to the range where you want to create the criteria.

2. Select the cell below the criteria label of the field you want to search.

3. Type the desired criteria.

4. Press **[Enter]**.

5. Select any cell in the database list.

6. Select the **Data** menu.

7. Point to the **Filter** command.

8. Select the **Advanced Filter** command.

9. Click the **Collapse Dialog** button in the **Criteria range** box.

10. Select the criteria range.

11. Click the **Expand Dialog** button in the **Criteria range** box.

12. Under **Action**, select the **Copy to another location** option.

13. Click the **Collapse Dialog** button in the **Copy to** box.

14. Select the cell in the upper left corner of the paste range.

15. Click the **Expand Dialog** button in the **Copy to** box.

16. Select **OK**.

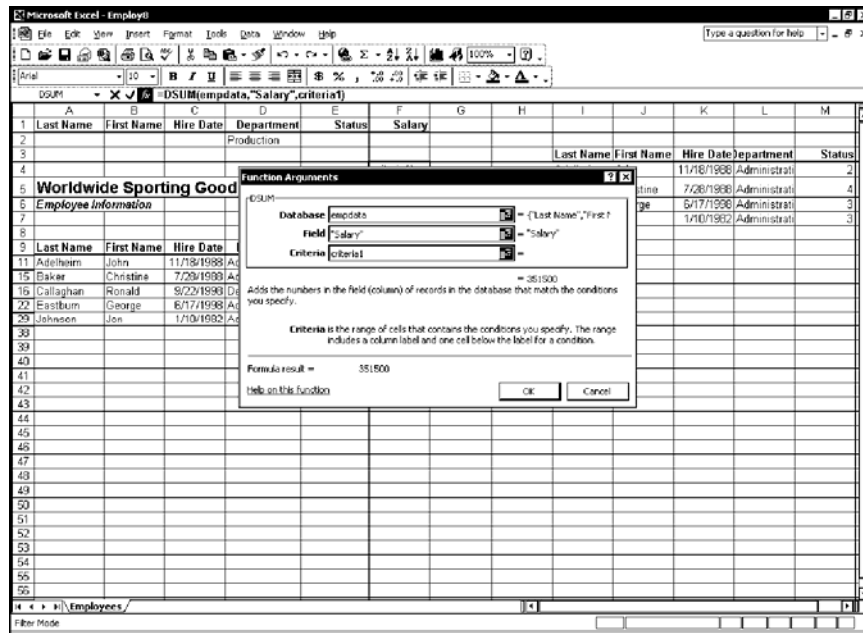# USING DATABASE FUNCTIONS

🖉 **Discussion**

Database functions, or Dfunctions, are used to provide calculations based on criteria. For example, from an employee database of all departments, you may want to calculate the salaries of employees just in the sales department. Although you can physically filter the data to display the records from the sales department and total the found records, you can also use a database function to find the answer without filtering the data.

A database function includes three arguments: database, field, and criteria. The database argument is usually the data list. The field argument is the column you want to use in the computation. The criteria argument refers to the cells that define the

conditions for the function. For example, in the Dfunction
=DSUM(A9:F37,F9,D1:D2), **A9:F37** is the database argument (and includes the
column labels), **F9** is the field argument (the column label of the field you want to
calculate), and **D1:D2** is the criteria argument.

Naming cells makes it easier to enter, copy, or edit database functions. If you name
each range, the Dfunction could be entered as:
=DSUM(Empdata,"Salary",Criteria1).

Using a database function

> 📖 The field argument (the column to be calculated) can be
> entered as the cell address of the field label, the column
> number of the field in the database, or the text of the field
> label enclosed in double quotation marks. Therefore, **F9**, **6**, or
> **"Salary"** could all be used to identify the same field.

> ❗ If you change or delete the criteria referenced in the
> Dfunction, the function automatically recalculates. To create
> database functions for several values in a field, you must
> create a separate criteria range for each value. Therefore, to
> display the salaries of two different departments, you will
> need to create two separate **Department** criteria ranges.

✔ Procedures

1. Copy the column labels to the range where you want to create the criteria.

2. Type the criteria in the cell below the criteria label of the field you want to search.

3. Select the cell where you want the result of the formula to appear.

4. Click the **Insert Function** button f_x on the formula bar.

5. Select the **Or select a category** list.

6. Select **Database**.

7. Select the name of the database function you want to use in the **Select a function** list box.

8. Select **OK**.

9. Enter the address or name of the database in the **Database** box.

10. Select the **Field** box.

11. Enter the address or name of the column label of the field you want to use in the formula.

12. Select the **Criteria** box.

13. Enter the address or name of the criteria range.

14. Select **OK**.

INDEX

Advanced filters
   copying filtered records, 38, 39
   creating a criteria range, 31, 32
   showing all records, 34
   using a criteria range, 32, 33
   using an advanced And condition, 35, 36
   using an advanced Or condition, 37, 38
   using comparison criteria, 34
   using database functions, 39, 41
And conditions
   using advanced, 35, 36
AutoFilter
   clearing criteria, 26, 27
   creating a custom AutoFilter, 27, 28
   creating an And condition, 27, 28
   creating an Or condition, 27, 28
   disabling, 28, 29
   enabling, 24, 25
   filtering a list, 25, 26
Criteria
   clearing, 21
   comparison, 19, 20
   creating a criteria range, 31, 32
   defining, 19, 20
   using a criteria range, 32, 33
   using comparison, 34
Criteria range
   creating, 31, 32
   using, 32, 33
Data form
   adding records, 17, 18
   clearing criteria, 21
   defining criteria, 19, 20
   deleting records, 21
   editing records, 17
   using comparison criteria, 19, 20
   viewing, 15, 16
   viewing records, 16
Data validation
   removing, 10, 11
   using, 7, 8
Database functions
   using, 39, 41
Databases
   creating, 2, 3
   creating a custom error message, 9, 10
   creating subtotals in a list, 11, 12