Access Introduction

Academic Computing Services

A Division of Information Services

Abstract: This document introduces users to the Access relational database management system, which allows for the creation, organization and manipulation of large quantities of data. This class will concentrate on creating a blank database, creating and importing tables into the database, establishing primary and foreign key fields, entering records into tables, sorting fields in tables, and filtering for specific records in tables. It is used in conjunction with the Access: Introduction workshop.

Contents

Introduction

The Access database program allows for the creation, organization and manipulation of large quantities of data. The basic building block of any database is the table, built of distinct and unique rows of information (called *records*), each of which are broken down into one or more columns (or *fields*) of predetermined and consistent size and type of data. As a *relational* database, an *Access* database can contain many tables, where the records in one table may be related to records in other tables.

Objectives

The goal of this workshop is to introduce participants to the basic parts of a Microsoft Access database, and to teach how to build a simple table. After today's workshop, participants will be able to:

- Understand normalization and the relational database concept

- Create a database

- Create new tables in design view and import tables

- Enter and delete records

- Edit the table design

- Display and organize data in a table

Prerequisites

It is assumed that the participants in this workshop have basic computing skills and know how to use the *Macintosh* or *Windows* operating system to maintain files and directories/subdirectories, open, close, and save files.

Related Training Available from ACS

All workshops offered by Academic Computing Services (ACS), a division of Information Services, are free to KU students, staff, faculty, and approved affiliates. The general public is also welcome to most workshops, but some ACS workshops require a registration fee for them.

To learn more about or register for workshops, receive automatic announcements of upcoming workshops, and track workshops you've registered for and have attended, visit the ACS Web site at www.ku.edu/acs/train. You can also check our online schedule at

www.ku.edu/acs/schedule for a list of class offerings and their availability. For further workshop related questions, please email training@ku.edu.

ACCESS: INTERMEDIATE

This three-hour, hands-on workshop introduces relationships, sub datasheets, and queries. Participants learn about creating and establishing rules on relationships, inserting sub datasheets into tables, and creating select queries between multiple tables and adding criteria.

Definitions

Term	Definition
Database	An organized collection of information.
Relational Database	A management system that allows the definition of data structures, storage and retrieval operations and rules to preserve data quality (integrity constraints).
Table	An object comprised of fields (columns) that collect records (rows of data) about a specific topic.
Field	A table column that stores specific information and when combined with other fields (columns), makes up a record.
Record	A row in a table that is a collection of related data treated as a unit.
Primary Key	One or more fields whose value or values uniquely identify each record in a table.
Foreign Key	One or more table fields that refer to the primary key field or fields in another table.
Query	An object that can allow for the retrieval, display, and updating of data from one or more related tables.
Form	An object designed primarily for the display and/or entry of data into a table, query, or other Access object but that can also be used for other execution purposes.
Report	An effective way to present data in a printed format from a table, query, or SQL statement.
Data Access Pages	A special type of web page especially designed for viewing and working with data (stored in an Access database, Microsoft SQL Server database, or some other type of database) from an Internet or intranet

| Macro	An action or set of actions used to automate tasks.
Module	An object that contains a collection of Visual Basic for Applications (VBA) declarations and procedures that are stored together as a unit.

Planning for a Relational Database

Because *Microsoft Access* is a relational database management system, the database table and relationship structure should be planned out **before** creating the actual physical model.

Creating a New Blank Database

You can create a new database two different ways: the Access database wizard and Blank Access database. To create a new database and design your own objects use the blank database method.

1.   Open Access

2.   In the Microsoft Access dialog box, choose **Blank Access database** and click **OK**.
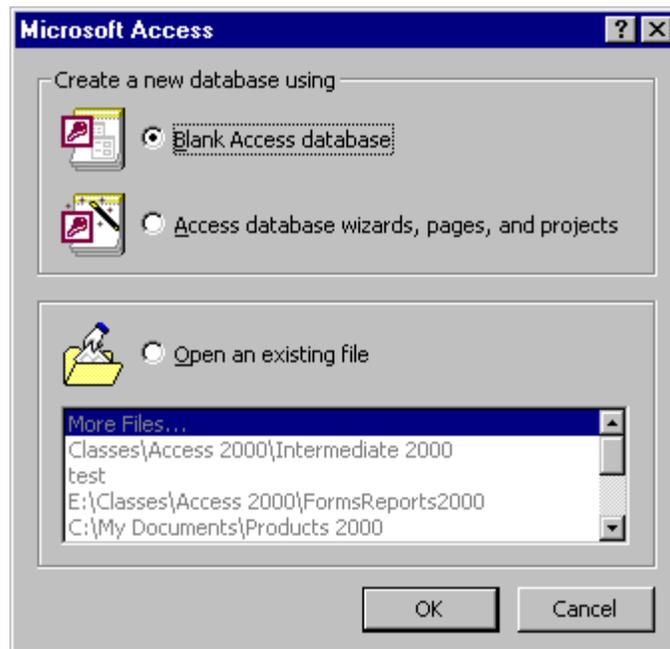
3. Choose a location to save your database and name your database by typing over **db1.mdb**. The .mdb file extension will be added automatically to whatever file name you choose.
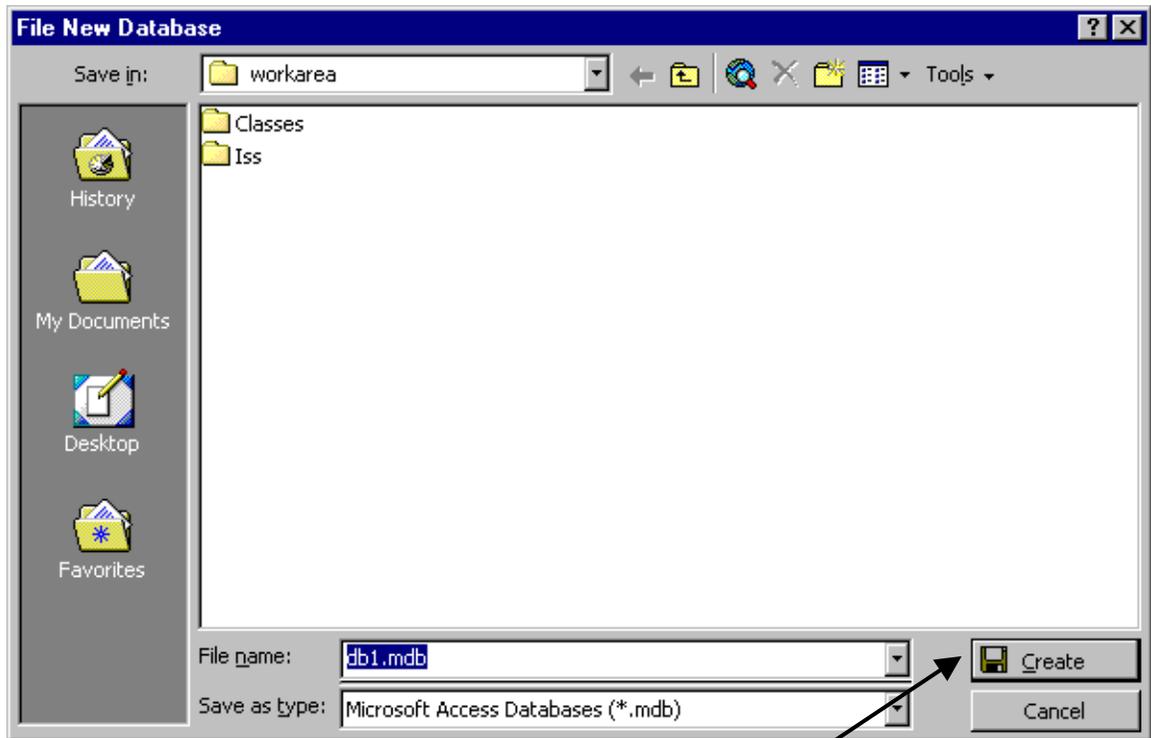

4. After naming your database, click the **Create** Button.

5. Access will create your database and open up the database window.

6. Now you are ready to create tables in your database.

Note: Once you name your database and click on **Create**, the database is saved. As you design objects, such as tables and queries, in your database, you must click on the save button to save design changes. Once the objects are created and saved, any records you add to your database will be **automatically** saved. Because of this, you might *not* have many "undo" opportunities.

The Database Window

Your database window is now displayed to you in Access. Its purpose is to provide you access to the objects in your database and allow you to create new ones. To close that Access database and open a different database, you click on the corner x of the window or choose **File➔Close** like you would in any other Office program. To open a database file, click the yellow folder on the Database toolbar, or **File➔Open**, just as in any other Office program.
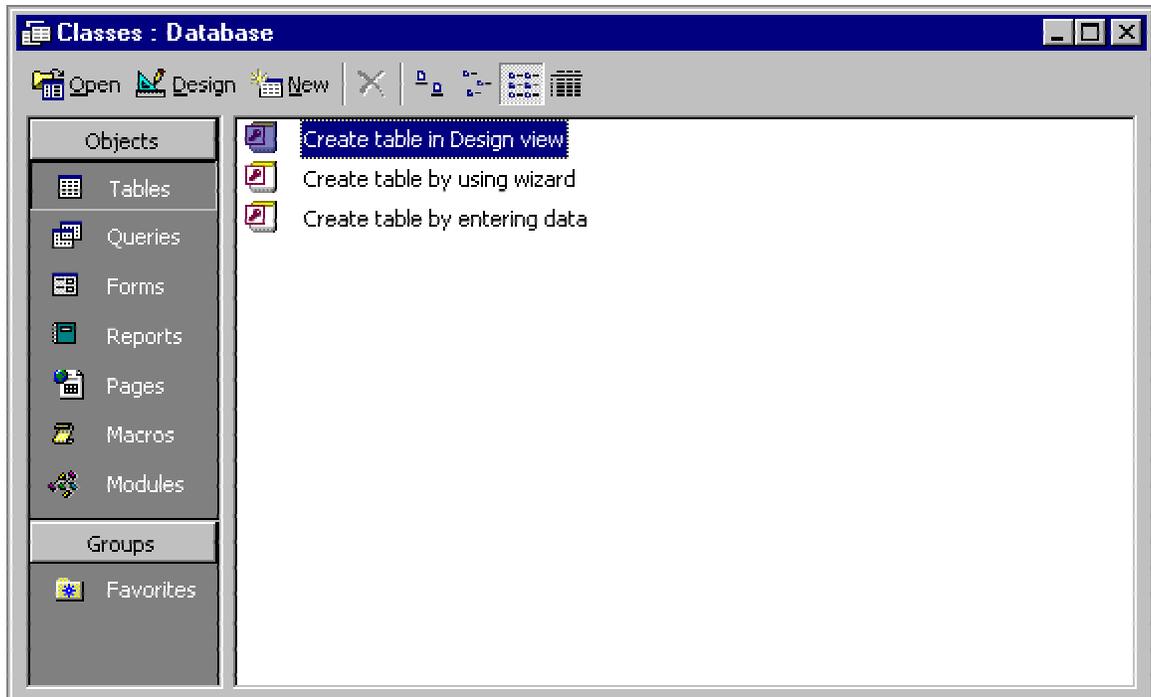
Note: In the Access program, you **cannot** have more than one database open at a time. If you open a database and already have a different one open, Access will close the first one before opening the second. However, you **can** have more than one database object open at a time. For example, you could have three different tables within the same database open at the same time.


Creating a Table

In Access, tables are what store our information or raw data. Before you can input the information, you must first create tables. There are quite a few ways to create Access tables. You can create a table in design view, create a table using the table wizard, create a table by entering data (this was called creating a table in datasheet view in Access '97) import tables from other types of files, and link tables of other file types as well.

Creating a Table in Design View

Creating a table in Design view is very common because it offers several benefits others do not. In the Design View, you create field names, data types and any field descriptions in the upper windowpane. At the same time, properties and field attributes for each field display in the bottom pane of the Design View window, under Field Properties. To create a table in Design view, start in the database window.

1. Click on the **Tables** button in the database window on the **Object** bar.

2. Double click **Create table in Design View**.

3. The design view of a new table will open for you to start typing in field names, data types, and descriptions.
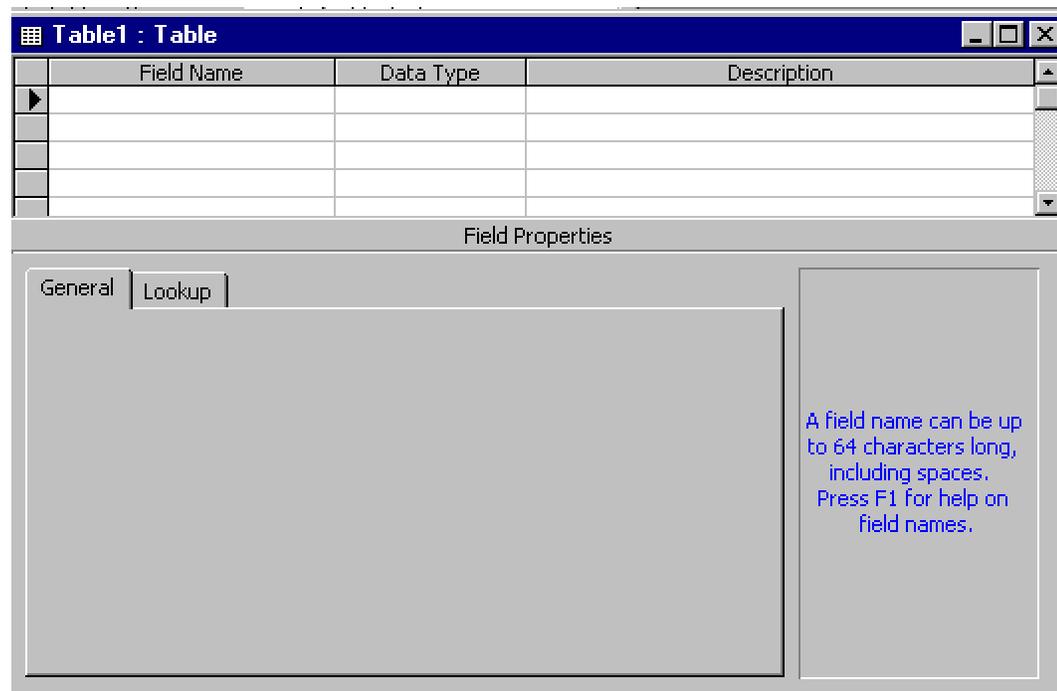
4. Type in the first field name and press **Tab** or **Enter** to move to the data type.

Note: Field names can contain letters, numbers, and/or spaces, although spaces are **not** highly recommended.

5. Choose the data type you want from a dropdown arrow and press **Tab** or **Enter** again to move to the description field.

6. The descriptions field, while optional, is good to use for your own documentation purposes as well as directions to the person inputting the data.

7. Continue steps 4-6 until you have created all of the fields in your table.

Choosing Access Data Types

In Access, you must assign a **data type** for each field. The data type determines what values you can enter for a field and what other properties the field will have. You want to choose a data type that most closely matches the kind of data you plan on storing in that field, especially in larger databases. This will help keep your file sizes manageable and will optimize *Access*' performance. The data types are as follows:

- Text: Use for field values that contain letters, digits, spaces, and special characters. Text fields can contain up to 255 characters. The default field size for a text data type is 50.

- Memo: Use for long text comments. Memo fields can contain up to 64,000 characters. Unlike text fields, however, you cannot search or sort records based on the contents of a memo field.

- Number: Use for numeric values. Because number fields are more restrictive than text fields, only chose this data type for numerical entries that will be used in calculations (e.g., percentages, quantities). Do not use this field type for currency values (see *Currency*, below). The default field size for a number data type is **Long Integer**. For more information about field sizes for number data types, press the **F1** key on your keyboard when you are clicked in the **Field Size** property box.

- Date/Time: Use for dates and times. Date/time fields have a number of standard display options, but can also be customized to display in other formats. *Access* is year-2000 (i.e., Y2K) compliant and recognizes years as 4-digit numbers, even if it only displays the final two digits.

- Currency: Use for currency values. Currency fields are similar to the number data type, except that the decimal places and field size are predetermined, and calculations performed using the currency data type are not subject to round-off error.

- AutoNumber: Use this when you want integers or a value automatically inserted in the field as each new record is created. You can specify sequential numbering or random numbering. Using

AutoNumber guarantees a unique field value to serve as a table's primary key. AutoNumber fields cannot be edited.

- Yes/No: Use this data type for fields that indicate the presence or absence of a condition (e.g., such as whether a person has enrolled, if their application has been submitted, etc.) Yes/No fields store a numeric value and can display a numeric value, text, or a graphic "check box." The value –1 means "yes", "true", or "on" and 0 means "no", "false", or "off."

- OLE Object: Use for data or files that are created in other software applications, such as photographs, video images, graphics, drawings, sound recordings, spreadsheets, word processing documents, etc.

- Lookup Wizard: This is not a data type, but this option will create a field that lets you select a value from another table or from a predefined list of values. Once the list is created, Access will then set the data type for you.

Setting the Primary Key Field

While not required, every table **should** have a primary key field. It's good practice to place the field or fields that will act as your primary key field first when listing your field names, since it is the only field that is required by default. Creating a primary key automatically creates a unique index for the field. Remember that the primary key should be a field whose value uniquely identifies the each of the records of the table. For example, each student's ID number uniquely identifies each student record. To create a primary key field:

1. To create a primary key, place your cursor in the field row and click the **Primary key** button (🔑) on the database toolbar. Notice that a key displays before the field row and the index information in the lower window has changed **to Indexed: Yes (No Duplicates)**.

Note: You can use multiple fields in a table as the primary key field. If the fields are adjacent, you can do this by clicking on the small gray square before the name of the field (this will select the entire row), holding the **Shift** key on your keyboard, and clicking on the gray square to the left of the next field name. When both rows are selected, click on the **Primary key** button, and a small key will appear in the gray squares beside both field names. If the two fields are **not** adjacent, hold the **Ctrl** key on your keyboard instead, following the same steps.

Removing the Primary Key Field

Each table should have a primary key field. However, primary keys will not allow duplicate records or key values. There may be cases (such as when you are importing records into a table) when you want to allow duplication of records. To remove a primary key:

1. In the table's Design View, select the primary key field, so the black indicator arrow appears to the left of the field name, along with the key symbol (⚷). The **primary key** button on the button bar (🔑) appears pressed in.

2. Click on the **primary key** button (🔑) on the button bar. This removes the primary key setting from the field and removes the indexing from the field.

Changing the Primary Key Field

If you want to change the primary field, select the field you want to be the primary field, and click the **Primary Key** button (🔑) on the toolbar.

Note: If you are creating a primary key from a field that already has data in it, be sure that there are no duplicate values in the field. If there are duplicate values, Access will not allow you to save your changes to a table's design.

Setting Field Properties

Each field in the table has its own properties, or named attributes, and behaviors that can be set to a desired value. Some of these properties are things such as the field size (number of characters that can be in a field), default information, whether a field is required (the default for all fields except the primary key field is no), and many others.

The Field Properties of each field display in the lower pane of the Design View of a table. Access lets you know which field's properties are being displayed by placing a black triangle next to the active field in top half of the window:
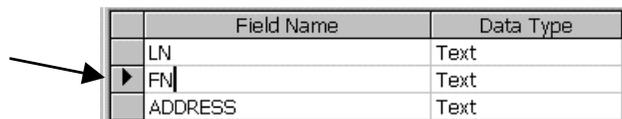
Field Name	Data Type
LN	Text
▶ FN	Text
ADDRESS	Text

To know more about specific field properties, when you click in the field beside the name of the property you're setting, you can press the **F1** key on your keyboard and **Microsoft Access Help** will open up and display the information for that property.

Saving the Table

Once you have finished designing your table and setting your primary key field, you're ready to save. Simply click on the **Save** button () on your toolbar or click on **File➜Save** and the **Save As** dialog box will open with **Table1** inside of it. Select it, and type the table name you want. Including **Tbl** before the table name can help you to distinguish between objects in a list and keep the objects in alphabetical order. Also, it's a good idea not to include spaces in the names of your objects. This helps when exporting or importing between programs, creating calculated fields, and/or writing VBA.

> **Note:** Make sure you save on a consistent basis when working in design view. Access does **not** save automatically in this view. You must click on **Save** to save any changes you make in this view.

Importing a Table

You can import a table from either another Access database or from a file created in a different software package such as FoxPro or dBase. You can also import text files. To import your data into your database as a new table:

1. Click **File➜Get External Data➜Import**.

2. Find the file that you want to import. Be sure the correct file type is selected in the **Files of Type** field at the bottom of the window (e.g. If you're importing a text file, then the **Files of Type** field must say **Text**.

3. Click the **Import** button.

> **Note:** You might have to go through an import wizard, depending upon what type of file you import.

4. If you receive a message that the import was successful click **OK**.

Entering and Deleting Information

Adding Records

Not only do we create objects in Access, but we also enter information into the objects that we create.   Customary places to enter data are tables and forms. Here, we will concentrate on entering data into our tables. While Design View is for designing the table, **Datasheet View** is where we create and edit records.

Student_ID	Last Name	First Name	Street Address	Home City	State	
524562	Jameson	Perry	782 Missouri	Lawrence	KS	6
534545	Walker	Reggie	1509 Rhode Island	Lawrence	KS	6
542045	Pederson	Gary	894 259th St	McLouth	KS	6
542123	Pilshaur	John	253 7th Ave	Topeka	KS	6
542645	Calahan	Brad	981 N Cedar St	Ottawa	KS	6
544534	Thompson	John	1323 W 7th	Lawrence	KS	6
545745	Raby	Daniel	1245 Webber	Lawrence	KS	6
554586	Thompson	Kenneth	6508 Sycamore St	Valley Falls	KS	6
555555	Lawrence	Jack	108 West 4th	Wichita	KS	6
555588	Wiley	William	8051 West 23rd	Wichita	KS	6
555777	Hollis	William	654 East 2nd	Wichita	KS	6

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1.   If you table is already open, switch to datasheet view of your table by clicking on the **Datasheet View** button (🖿) on your database toolbar.

2.   If you are in the Database Window, click on the **Tables** button on the **Object** bar and double click the table you want to open.

3.   To insert a new record, click the **New Record** button (▶*) on the Record Navigation Bar at the bottom of your table. This will take your cursor to the last row of the table for you to start entering record information.

Note: The **New Record** button can also be found on the database toolbar at the top of your screen as well as under **Insert➔New Record**.

4.   Use the **Tab** or **Enter** key to move from field to field.

5.   At the end of the row, you can press your **Tab** or **Enter** key to continue creating more records or you can close your table.

6.   Access will automatically save your changes whenever you move from one record to another and/or whenever you close the table. You do not have to click on Save to save records.

Deleting Records

You can also delete an unneeded record or records in datasheet view of a table. To delete a record:

1. Select the record to delete by clicking the gray record selector to the left of the row.

2. Press the **Delete** key on your keyboard or choose **Edit➔Delete Record**. A dialog box will appear asking you to confirm the deletion.

3. Click **Yes** to delete the record or **No** to cancel the action.

> **Note:** You **cannot** "undo" a deleted record.

Editing the Table Design

Once your table is created, you may find you need to make changes to the design or structure. You can switch between Datasheet View (▦) and Design View (▨) by clicking the appropriate button on the database toolbar. You can also use the **View** menu to switch between views.

Displaying and Organizing Data

There are many different ways for you to find and display your data in a table. You can temporarily or permanently rearrange your columns, sort by a field or adjacent fields in an Access table, filter for records that meet specific criteria in a table, and use the find and replace dialog box to quickly locate and change existing data. These options can be very beneficial when trying to locate data quickly in order to edit the information.

Rearranging Columns

You can rearrange the columns to place them in an order that can be temporary or permanent. This can allow for a multiple column sort. If you want the move to be temporary, you can do this in datasheet view of your table and not save the changes when closing.

5. Select the column you want to move by clicking once on the column heading.

6. Click and drag to place the column in its new position.

Sorting

In Access, there are a couple of ways to sort. You can sort information in an Ascending or a Descending sort order. What we sort in Access are fields. You can sort by one field or by many fields, but the fields must be adjacent. If they are not, then you can temporarily rearrange them. Also, Access always sorts data from left to right. This means that if you sort by more than one field, it will sort by whichever field is furthest left and move right.

Sorting by One Field (Quick Sort)

To sort one by one column or field, do the following:

1. Place your cursor anywhere in the column on which you want the sort performed.

2. Select **Records➔Sort**, and then choose **Sort Ascending** or **Sort Descending**. You can also click the Quick Sort buttons on the database toolbar (⬛⬛). Access sorts the table based upon the data in the selected column.

3. To undo a Quick Sort, select **Records➔Remove Filter/Sort**.

> **Note:** When you close a table, sorted records return to their previous order unless you save the layout changes.

Sorting by Multiple Fields

To sort across multiple fields, do the following:

1. Select multiple columns by clicking and dragging across the column headings of the columns you want to sort.

2. Select **Records➔Sort**, and then choose **Sort Ascending** or **Sort Descending**. You can also click the Quick Sort buttons on the database toolbar (⬛⬛). Access sorts the table based upon the data in the selected column.

Access sorts by the leftmost column first; *Access* then performs *secondary* sorts (where there were duplicate values in the column to the left) on the remaining selected columns to the right.

Filtering Records

One of the basic features of any database is that it should allow you to look at a subset of your data, based upon some criteria. For example, in an address list, you might want to only look at address from a particular city or state.

One of the ways of doing this in *Access* is with filters. When you filter a table in the Datasheet View, you hide all records that don't conform to your set of criteria. To "unhide" the hidden records, you remove the filter.

There are two basic types of filters: the Filter by Selection and the Filter by Form. They differ in the way you run the filter, and the complexity of the filter you can create.

Filter By Selection

This type of filter is the easiest to perform. It allows you to view all the records in the table that have the same value in a particular field.

To do a Filter by Selection:

1. Find the value in the field (column) that you want to filter by (e.g., find "Lawrence" in the City field).

2. Click in that cell so the cell is selected or your cursor is blinking in the cell.

3. Choose **Records➔Filter➔Filter by Selection**. You can also choose the **Filter by Selection** button (🦄) from the database toolbar.

Filter By Form

Filter by Form gives you the flexibility to find records based on the values in multiple fields using the **And** operator or **Or** operator, or to use selection criteria to find ranges of values. Selection criteria are operators and values you enter into the Filter by Form. Examples of several selection criteria operators include:

>   >   Greater than

>   >=   Greater than or equal to

>   <   Less than

>   <=   Less than or equal to

>   <>   Not equal to

This is an example of selection criteria:

<>66044   This criteria would find all values **not** equal to 66044.

To use Filter by Form:

1. Click **Records➔Filter➔Filter by Form**. You can also select the **Filter by Form** button (▣) on the database toolbar.

2. In the Filter by Form mode, you can select unique values from the pull-down menus for each field, or you can enter custom selection criteria.

3. If you are looking for more than one value in a field, click the **Or** tab at the bottom of the Form.

4. If a record must meet multiple values from different fields, continue to select or type in the appropriate value for each field. This uses the implied **And** operator.

5. Click on **Filter➔Apply Filter/Sort** or click the **Apply Filter** button (▼) on the toolbar.

Finding and Replacing Data

The **Find and Replace** dialog box is another way to locate large amounts of data when you need to change it. When used in conjunction with filtering, it can save quite a bit of time.

Finding Data

To find your data, do the following:

1. Place your cursor within the field to search.

2. Click the **Find** button on the database toolbar (🔍) or choose **Edit➔Find**.
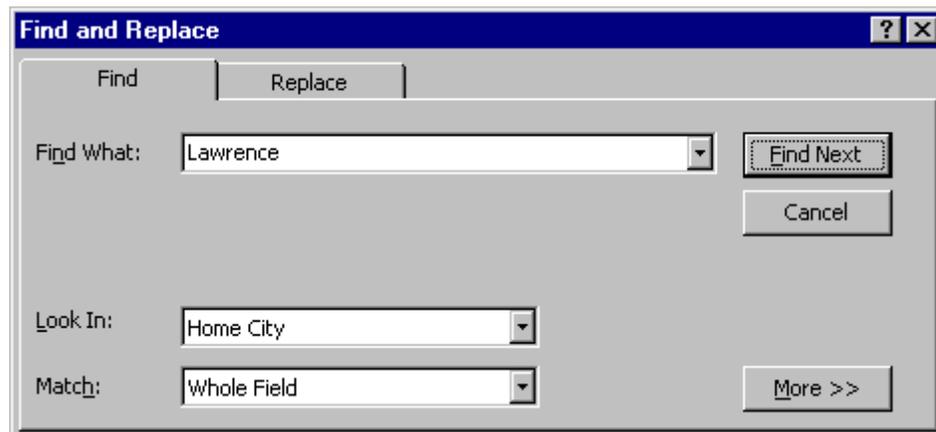

3. In the **Find and Replace** dialog box on the **Find** tab, type the field value you want to find. You can use wildcard characters (see definition below) to make the search more general.

4. You can refine your search with the following options:

a) **Look In**: The default is for Access to only search the field you were in before entering the **Find and Replace** dialog box, but you can change it to search the entire table.

b) **Match**: This gives you the option to only find a match when the text string exactly matches the complete contents of the field (e.g., searching for "Smith" finds Smith, but not Smithson). Choosing one of the other options will broaden your search and is the equivalent of using the asterisk (*) wildcard character.

5. The **More>>** button also contains the following options:

a) **Search**: Choose the direction of your search based on your current cursor location.

b) **Match Case**: If you want the search string to look for the text string exactly as typed (e.g., if you entered "Smith", Access does not locate SMITH).

c) **Search Fields as Formatted**: If you want to find data based on its display format. This option needs to be checked if you have a date field and you want to search for a particular month or year. Normally dates are stored as numbers within the database and table. If you have a date formatted as "dd-mm-yy", you can search for fields that contain June 1997 by selecting this option and entering "*June 97" in the Find What input box, where the * is a wildcard.

6. Click **Find Next** to move through the records of the datasheet.

Replacing Data

To change the data once you've found it, do the following:

1. In the **Find and Replace** dialog box, click on the **Replace** tab and click in the **Replace With:** dialog box. Type the information you want to replace the existing data with.

2. If you want to only replace one item at a time, click on the **Replace** button and continue to do so until everything is replaced. Access will make the replacement each time and then find the next piece of data for you.

3. If you want to replace everything at the same time, click on **Replace All**. You'll receive the following warning:
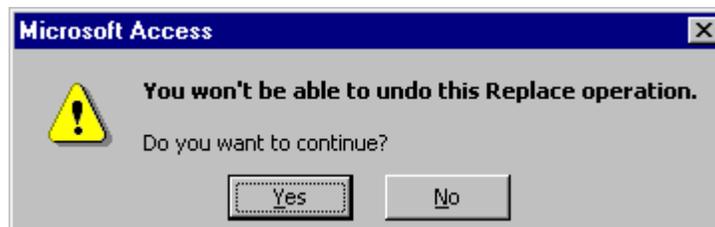
4. Click **Yes** to continue or **No** to abandon the replace all option.

5. Once you have finished, click on the **Close** button to close the dialog box.

Getting Additional Help

ACS provides consulting and Q&A help in a variety of ways:

785/864-0200
question@ku.edu
www.ku.edu/acs/help

To evaluate this course online, please visit www.ku.edu/acs/training/evaluation

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