Lab 2: MS ACCESS Tables

Summary
- Introduction to Tables and How to Build a New Database
- Creating Tables in Datasheet View and Design View
- Working with Data on Sorting and Filtering

1. Introduction

Creating a New Database
First, open MS Access. To build a new database, choose File → New. By selecting New, a panel will pop out on the right, which allows us to create a blank database, or to choose from other database template wizards. For this session, we will focus on creating a database from a blank one, so choose New → Blank Database.

![Fig. 1: Creating a New Database](image-url)
Once you created a blank database and type the database name, you will see a dialog box with seven objects on the left as shown in Fig. 2, they are briefly described as follows,

- **Tables** - a collection of data about a specific topic, such as products or suppliers.
- **Queries** - a command for viewing or analyzing data in different ways or a result of the command.
- **Forms** - a friendly interface to add a new record
- **Reports** - an object that present data in a organized way according to your specification. Examples are telephone bills, sales summary etc.
- **Pages** - a web page that has connection to a database. It makes data available on the Internet or an intranet for interactive reporting, data entry, or data analysis.
- **Macros** - a set of one or more actions that each performs a particular operation, such as opening a form or printing a report. Macros can help you to automate common tasks. For example, you can run a macro that prints a report when a user clicks a command button.
- **Module** - a collection of Visual Basic for Applications declarations and procedures that are stored together as a unit.

![Fig. 2 New Database db1.mdb](image)

### 2. Creating a Table:

There are three ways to create a table:

- Use Datasheet View, i.e. enter data directly
- Use Design View
- Use Table wizard

#### 2.1 Create a Table in Datasheet View

To create a blank (empty) table in datasheet view, you can:

- Click **Tables**→**Create table by entering data** in Fig. 2, or
- Click **New** in the database window, you will see a new dialog box as shown in Fig. 3. Then click **Datasheet View** followed by clicking **OK**.

You are then given a Datasheet View with column headings Field1, Field2 and so on all across the top of the datasheet as shown in Fig. 4. You can enter data directly into it. When you save the new datasheet, Microsoft Access will analyze your data and automatically assign the appropriate
data type and format for each field. Because the names of each field are not descriptive, you may want to rename the fields.

![Fig. 3 Dialog Box for Creating New Table](image)

**Renaming Fields:**
1. Place the cursor over the column heading you want to rename and double click. The column heading will appear highlighted and the cursor will be blinking (you are now in edit mode)
2. Type the name you want to use and then press the Enter key.
3. Repeat the first two steps for the second column, and so on.

![Fig. 4: Creating a Table in Datasheet View (Renaming Fields)](image)

As the column corresponds to the field, the row corresponds to the record. Now we are ready to add the information. Say that, if we are doing a database of a company, the first table we may have is **Employee**. And the fields of Employee may contain SSN, LastName, FirstName, and so on. Please refer to Fig. 5 for the example Employee table.

![Fig. 5: Datasheet View (Employee Table)](image)
Summarizing Datasheet View

In table Datasheet view, you can add, edit, or view the data in a table. You can also check the spelling and print your table’s data, filter or sort records, change the datasheet’s appearance, or change the table’s structure by adding or deleting columns.

2.2 Create a Table in Design View

In Design View you can add fields, define how each field appears or handles data, and create a primary key. To create a blank (empty) table in design view, you can:

- Click **Tables**→**Create table in Design view** in Fig. 2, or
- Click **Design View** in the dialog box as shown in Fig. 3. Then click **OK**.

You are then given a Design View as shown in Fig. 6.
In this view, we can specify detailed properties for each field. This includes the length and type of information used in the field. But if we were to enter data into the table, we must use Datasheet View or Forms. The design view for the example Employee table mentioned before will look like Fig. 7.

There are three columns on the top portion of the window. The Field Name is the name of the fields. For example, SSN, FirstName, LastName are proper field names for the Employee table. The name for a field must follow MS Access object-naming rules. The Data Type is like the domain of an attribute. It provides a list of data types that we can choose from, including Text, Memo, Number, Date, and so on. The Description column allows us to describe the field and it is optional. It is always a good practice to be descriptive in your comments. This allows new users to easily understand the specifications and meaning of your fields. Table 2 summarizes all data types available in MS Access.

You can set up properties of fields in the Field Properties window at the bottom half pane. Table 1 describes all properties available for setup.

Before we save the table and quit, we need to specify the primary key. In our Employee table, SSN will be good for primary key. To define SSN as the primary key, click the Field Selector as

---

1 Object-naming rules are a set of specific rules for naming Microsoft Access objects. In Microsoft Access, names can be up to 64 characters long and can include any combination of letters, numbers, spaces, and special characters except a period (.), an exclamation point (!), an accent grave (`), and brackets ([ ]). Note that you also can't use leading spaces or control characters (ASCII values 0 to 31). For information on Visual Basic naming conventions, search the Help index for "naming conventions."

Tips
· Avoid including spaces in object names if you'll frequently refer to the objects in expressions or Visual Basic code.
· Avoid using extremely long names because they are difficult to remember and refer to.
shown in Fig. 7 for the SSN field. Field Selector is the gray bar on the left side of the Table Design grid by each field. When we click here, the whole row appears highlighted. Then click menu **Edit→Primary Key** or click the Primary Key button (i.e. the key symbol, shown in Fig. 7) on the toolbar in design view, a key symbol will appear on the Field Selector. Save the table as Employee. Now we have created one table.

<table>
<thead>
<tr>
<th>Field Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Field Size</strong></td>
<td>The maximum number of characters you can enter in the field. The largest maximum you can set is 255.</td>
</tr>
<tr>
<td><strong>Format</strong></td>
<td>The display layout for the field. Select a pre-defined format or enter a custom format.</td>
</tr>
<tr>
<td><strong>Input Mask</strong></td>
<td>A pattern for all data to be entered in the field.</td>
</tr>
<tr>
<td><strong>Caption</strong></td>
<td>The label for the field when used on a form. If you don't enter a caption, the field name is used as the label.</td>
</tr>
<tr>
<td><strong>Default Value</strong></td>
<td>A value that is automatically entered in the field for new records.</td>
</tr>
<tr>
<td><strong>Validation Rule</strong></td>
<td>An expression that limits the values that can be entered in the field.</td>
</tr>
<tr>
<td><strong>Validation Text</strong></td>
<td>The error message that appears when you enter a value prohibited by the validation rule.</td>
</tr>
<tr>
<td><strong>Required</strong></td>
<td>Specify whether the field is required data entry.</td>
</tr>
<tr>
<td><strong>Allow Zero Length</strong></td>
<td>Specify whether allow zero-length strings in the field.</td>
</tr>
<tr>
<td><strong>Indexed</strong></td>
<td>An index speeds up searches and sorting on the field, but may slow updates. Selecting &quot;Yes - No Duplicates&quot; prohibits duplicate values in the field.</td>
</tr>
</tbody>
</table>

**Table 1 Field Properties in Design View**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Type of data</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Text</strong></td>
<td>(Default) Text or combinations of text and numbers, as well as numbers that don't require calculations, such as phone numbers</td>
<td>Up to 255 characters or the length set by the FieldSize property, whichever is less. Microsoft Access does not reserve space for unused portions of a text field</td>
</tr>
<tr>
<td><strong>Memo</strong></td>
<td>Lengthy text or combinations of text and numbers</td>
<td>Up to 65,535 characters.</td>
</tr>
<tr>
<td><strong>Number</strong></td>
<td>Numeric data used in mathematical calculations.</td>
<td>1, 2, 4, or 8 bytes (16 bytes if the FieldSize property is set to Replication ID).</td>
</tr>
<tr>
<td><strong>Date/Time</strong></td>
<td>Date and time values for the years 100 through 9999.</td>
<td>8 bytes.</td>
</tr>
<tr>
<td><strong>Currency</strong></td>
<td>Currency values and numeric data used in mathematical calculations involving data with one to four decimal places. Accurate to 15 digits on the left side of the decimal separator and to 4 digits on the right side.</td>
<td>8 bytes.</td>
</tr>
<tr>
<td><strong>AutoNumber</strong></td>
<td>A unique sequential (incremented by 1) number or random number assigned by Microsoft Access whenever a new record is added to a table. AutoNumber fields can't be updated.</td>
<td>4 bytes (16 bytes if the FieldSize property is set to Replication ID).</td>
</tr>
<tr>
<td><strong>Yes/No</strong></td>
<td>Yes and No values and fields that contain only one of two values (Yes/No, True/False, or On/Off).</td>
<td>1 bit.</td>
</tr>
<tr>
<td><strong>OLE Object</strong></td>
<td>An object (such as a Microsoft Excel spreadsheet, a Microsoft Word document, graphics, sounds, or other binary data) linked to or embedded in</td>
<td>Up to 1 gigabyte (limited by available disk space)</td>
</tr>
</tbody>
</table>

**Table 2 Data Types in MS Access**
2.3 Create a Table by Wizard

Wizard is always a useful tool for starters. You can choose the fields for your table from a variety of predefined tables such as business contacts, household inventory, or medical records. To create a blank (empty) table by wizard, you can:

- Click TablesÆCreate table by using wizard in Fig. 2, or
- Click Table Wizard in the dialog box as shown in Fig. 3. Then click OK.

Then follow the guide in the wizard step by step.

---

2. You can set combination of more than two attributes as a primary key. To do so, first highlight attributes you wish to set as primary key, and click Primary Key button in design view.
3. Working with Data

In this section, we will learn how to work with existing data. The sample database file used here is "Northwind.mdb". It is a sample database comes with Microsoft Access. You can find it in by clicking HelpÆSample DatabasesÆNorthwind Sample Database. Then double-click Table "Orders" to open it.

3.1 Sorting

In the Datasheet View, we can sort the records in ascending or descending orders. To sort a single column, place the cursor anywhere in the column desired. Simply click either the Sort Ascending or Sort Descending toolbar buttons. We can also right-click and choose Sort Ascending or Sort Descending from the shortcut menu.

If we want to sort *multiple columns*, we need to do a little more work. The two columns we want to sort by must be adjacent to each other; the one that we want to sort by first must be to the left of the other. Let’s work with "Orders" table in Northwind Database. Now we will try sorting by ‘Order Date’ then by ‘Shipped Date’, we must first move ‘Shipped Date’ column to the left of ‘Order Date’ column. Here are the steps,

1. Highlight the ‘Shipped Date’ column by clicking the ‘Shipped Date’ column heading.
2. Let go of the mouse button and then press it again, holding it this time.
3. Now drag the ‘Shipped Date’ column over the ‘Required Date’ column. When we get just to the right of the ‘Order Date’, let go of the mouse button. Then ‘Order Date’ and ‘Shipped Date’ should sit side by side now.
4. Click the mouse button on the ‘Order Date’ header, highlighting the column. Holding the mouse button down, drag it over the ‘Shipped Date’ column so that both the ‘Order Date’ and ‘Shipped Date’ columns appear highlighted.
5. Click on RecordsÆSortÆSort Ascending. The sorted table is shown in Fig. 8.
3.2 Filters
By using Filter by Selection, you tell Access that you want to see only certain records, based on the value in the field in which the cursor currently resides. For example, say that we want to see those orders shipped in Germany. To do this,
1. In the 'Ship Country' column, click a field that has "Germany" in this field.
2. Click the right button of mouse and select "Filter by Selection" button. Or, you may click Records button in the menu bar and select Filter button and select Filter by Selection. Only those records that have Germany for their Ship Country appear.
3. Click the right button again and select "Remove Filter" button to remove the filter.

With Filter by Selection, you were filtering records based on a field you selected in the datasheet, and then selected another field in the subset to narrow it further. When using Filter by Form, Access takes you to a different screen to specify the criteria you want to filter with. Using Filter by Form, although more complicated, allows you to be more specific and filter your data based on a combination of selected values from multiple fields. To do this,
1. Click on Records \rightarrow Filter \rightarrow Filter by Form
2. The datasheet will suddenly look as if you deleted all the records. Refer to Fig. 9 for example. Now you can pick the fields you want to filter and display your information.
3. Click Ship Via field to see the drop-down list. You can use =, >, <, >=, and <= to specify your criteria.
4. Finally, click on Filter \rightarrow Apply Filter to see the result.

Fig. 9 Filter by Form

In the end, we will see how to use AND and OR criterion in a filter. The AND operator allows you to filter records based on two or more criteria. When you apply a filter using the AND operator, only those records that meet both (or all) criteria appear. To show how to use the AND operator, we will choose all orders shipped in USA AND freight is above $100. To do this,
1. Click the Filter by Form button to return to the Filter by Form screen. The screen should be blank.
2. Click Ship Country and select USA.
3. Click Freight and type ”>100" (without quotation mark).
4. Click the Apply Filter button. Now those orders shipped in USA and freight is above $100 will appear. The resulting table contains 40 records. Please check your answer.

To show all the orders which is either shipped in USA OR whose freight is over $100, you can
1. Click the Record menu.
2. Select Filter in the roll down menu and choose Filter by Form.
3. Press the right mouse button on any field and choose Clear Grid button.(this clears all previous filters' parameters)
4. Click Ship Country and select "USA". As soon as you enter the first criteria, Access enables an OR tab at the bottom of the Filter by Form.
5. Click the Or tab at the bottom of the Filter by Form screen.
6. Click freight and type ”>100" (without quotation mark).
7. Press the right mouse button in any field and a menu will pop up. Click the Apply Filter button. Now those orders that are either shipped in USA or whose freight is over $100 will appear. The resulting table contains 269 records.
CONGRATULATIONS! You have learned the basics of creating and manipulating tables of data.

--- Quiz 2 ---

(Due at start of next class)

Open the Northwind sample database and answer the following questions:

1. In the 'Categories' table, what is the data type for the field Photo? Using MS Access help, list concise steps to insert photographs into your database.

2. In some of the tables, the 1st column on the left shows a + sign. Click on it and describe shortly what happens.

3. In the Design View of a table, right click under the field name column. Click on the Build option and describe what it does.

4. By using FILTER option in the TABLE: Orders, how many orders were shipped on/after 6-May-1998? And where were they shipped to (List country only)?

5. In the same table, how many orders were shipped with freight charges between $50 and $100?

6. In the same table, using FILTER/SORT, among the orders that were shipped on the 14-Nov-1997, which one is the most expensive (in terms of merchandise costs, NOT freight)? Which one is the cheapest? (Please give OrderID and cost only)