



MICROSOFT ACCESS

Tutorial and Manual

Table of Contents

Chapter 1 – Overview of Microsoft Access Databases.....	1
Chapter 2 – Design and Create Tables to Store Data	13

Chapter 1 Overview of Microsoft Access Databases

Have You Ever Used a Database?

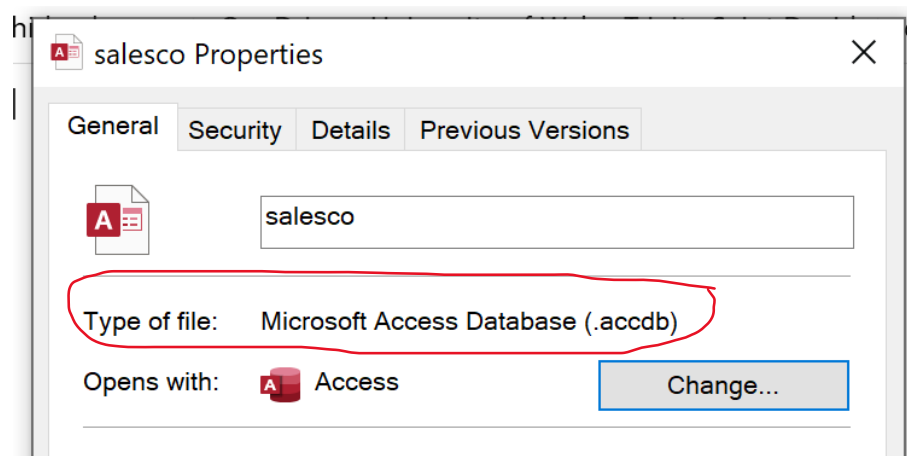
If you are learning Microsoft Access for the first time, you may instinctively answer “no” to the question of whether you have ever used a database. I’m absolutely positive, however, that you have interacted with many databases, whether you realize it or not. To understand this, let’s examine what the term **database** truly means by listing some basic characteristics of databases.

- Databases store all kinds of data.
- Databases are either low-tech (manual) or high-tech (electronic).
- Databases are highly structured and organized.
- Databases are somewhat analogous to multiple spreadsheets that are linked together.
- Databases are designed to allow easy extraction and use of the stored data.

So, if you have ever used a phone book or a library card catalog, you have indeed used a database. Also, many online search engines and e-commerce websites rely on databases for their proper functioning, so you likely have interacted with them.

See, you may already be more familiar with databases than you realize!

Although the concept of a database may still seem foreign and new to you, it is helpful to relate the material in this book to examples of databases you are familiar with. Doing so will often help you to demystify and better understand these strange things called databases.



What Will I Find in a Microsoft Access Database?

There are five main things (objects) you will find in an Access database: tables, queries, forms, reports, and macros. These objects allow you to enter, store, analyze, and compile your data. Take a minute to familiarize yourself with these terms. The Guided Exercise later in this chapter will show you examples of each of these.

MS Access — Objects

1. **Tables** store the data in the database and are analogous to the foundation of the database. It is critically important that the tables be designed properly; they provide the foundation for building the remainder of the database.
 - Each field must have a unique name, and data type.
 - You can define a primary key, one or more fields that have a unique value for each record, and one or more indexes on each table to help retrieve your data more quickly.
2. **Queries** enable you to extract data from your database tables and allow us to answer questions we have about the data. Queries may combine data from multiple tables and manipulate data output through the use of expressions, formulas, and functions.
 - Running a query is like asking a detailed question of your database.
 - In Access, you can use the graphical query by example facility or you can write Structured Query Language (SQL) statements to create your queries.
 - You can define queries to Select, Update, Insert, or Delete data.
 - You can also define queries that create new tables from data in one or more existing tables.
3. **Forms** are based on tables or queries, and they are used for entering data into the database in a user-friendly manner. They are also used for displaying data to the end user and can be used to create a menu system for the database.
 - Forms are used for entering, modifying, and viewing records.

- The reason forms are used so often is that they are an easy way to guide people toward entering data correctly.
 - When you enter information into a form in Access, the data goes exactly where the database designer wants it to go in one or more related tables.
4. **Reports** use data from a table or query and format the output in a professional-looking manner. Reports provide you with the ability to summarize, sort, group, and display the data in many different ways suited to the needs of the end user. Often, the purpose of a report is to provide a printed output of some data in your database.
- Anything you plan to print deserves a report, whether it is a list of names and addresses, a financial summary for a period, or a set of mailing labels.
- Reports are useful because they allow you to present components of your database in an easy-to-read format. ? ? You can even customize a report's appearance to make it visually appealing. ? ? Access offers you the ability to create a report from any table or query.
5. **Macros** are small programs that you build into Microsoft Access; they perform some advanced operations, making the database more user-friendly and/or functional.

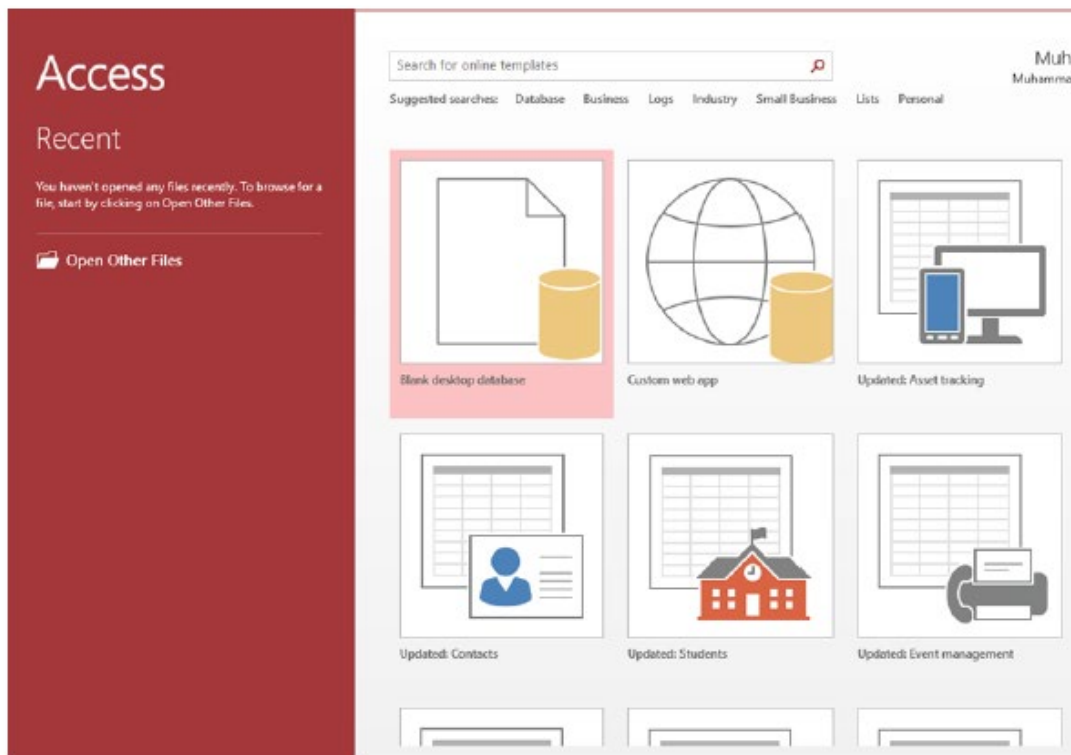
Where Can I Get Help?

F1. Simply, press the F1 key in Microsoft Access to use the built-in help anytime you need it. You should also use the numerous online resources that are available.

Aside from the Applied Exercises at the conclusion of some chapters, nothing in this book is intended to be extraordinarily difficult or challenging to complete. If you find yourself stuck on a step of a Guided Exercise, try re-reading a few steps back to see if you either missed something or misunderstood the instructions. **It is important to read each step carefully and follow the directions closely.**

MS Access — Create Database

In this chapter, we will be covering the basic process of starting Access and creating a database. This chapter will also explain how to create a desktop database by using a template and how to build a database from scratch. To create a database from a template, we first need to open MS Access and you will see the following screen in which different Access database templates are displayed.

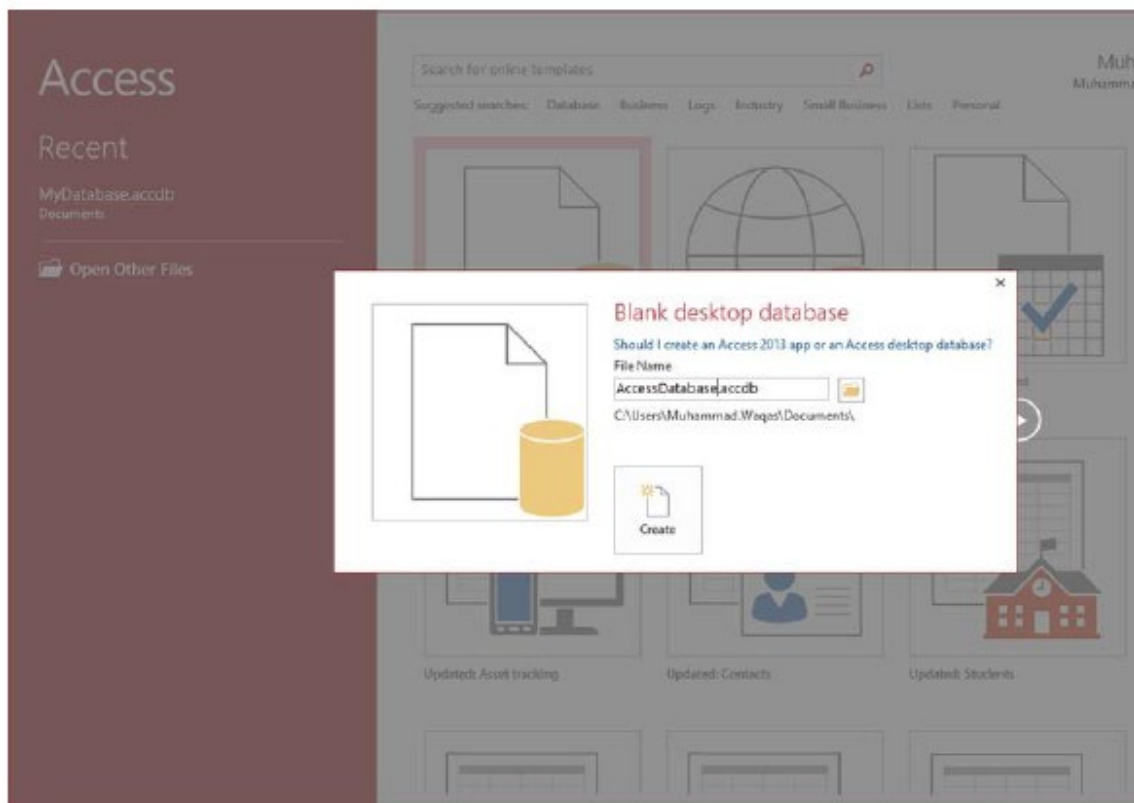


Create Blank Database

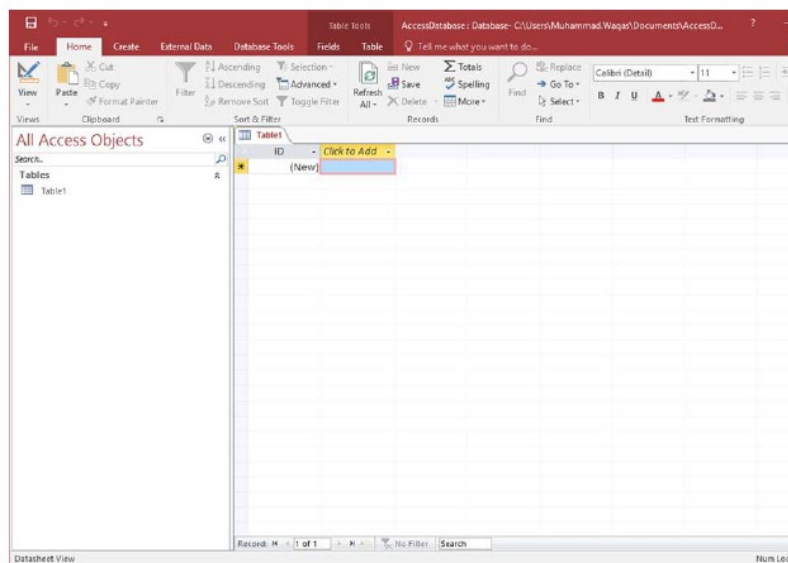
Sometimes database requirements can be so specific that using and modifying the existing templates requires more work than just creating a database from scratch. In such case, we make use of blank database.

Step 1: Let us now start by opening MS Access.

Step 2: Select Blank desktop database. Enter the name and click the Create button.



Step 3: Access will create a new blank database and will open up the table which is also completely blank.



MS Access — Data Types

Every field in a table has properties and these properties define the field's characteristics and behavior. The most important property for a field is its data type. A field's data type determines what kind of data it can store. MS Access supports different types of data, each with a specific purpose.

- The data type determines the kind of the values that users can store in any given field.
- Each field can store data consisting of only a single data type.

Here are some of the most common data types you will find used in a typical Microsoft Access database.

Type of Data	Description	Size
Short Text	Text or combinations of text and numbers, including numbers that do not require calculating (e.g. phone numbers).	Up to 255 characters.
Long Text	Lengthy text or combinations of text and numbers.	Up to 63, 999 characters.
Number	Numeric data used in mathematical calculations.	1, 2, 4, or 8 bytes (16 bytes if set to Replication ID).
Date/Time	Date and time values for the years 100 through 9999.	8 bytes.
Currency	Currency values and numeric data used in mathematical calculations involving data with one to four decimal places.	8 bytes.
AutoNumber	A unique sequential (incremented by 1) number or random number assigned by Microsoft Access whenever a new record is added to a table.	4 bytes (16 bytes if set to Replication ID).
Yes/No	Yes and No values and fields that contain only one of two values (Yes/No, True/False, or On/Off).	1 bit.

Here are some of the other more specialized data types, you can choose from in Access.

- **OLE Object** stores or links to an object such as a Microsoft Word document, an image file, or a Microsoft Excel spreadsheet. It is recommended that you use the new Attachment data type instead of the OLE Object data type.
- **Hyperlink** stores website addresses, email addresses, and hyperlink data.
- **Attachment** stores various file formats in the database with the option of editing files within the database.
- **Calculated** is a special data type in Microsoft Access. It is used to display results of calculations or expressions based on other fields in the table. The results of a calculated field are read-only.
- **Lookup Wizard** is technically not a data type, but it does appear in the data type list because it easily enables you to create a drop-down list (combo box) of values that the user can select from in the table. This list of values can be typed in manually or dynamically based on another table in the database. This feature makes data entry easier for the end user and can help eliminate bad data from being entered into the database.

Depending on the data type, each field also has specific properties that can be set. Although the following list of properties is not exhaustive, remember that you can always click F1 to get help about a specific property you encounter using Microsoft Access. Included here are some of the common properties used for a Short Text field.

- **Field Size** sets the maximum number of characters that can be entered for this field. For Short Text data types, the maximum value is 255 characters. Generally, this should be set as small as possible but large enough to accommodate potentially large entries of data.
- **Format** adjusts how the data are displayed as output. For Date/Time data types, this will adjust the date and time format used. For Number data types, this provides the option to select from Fixed, Standard, Percent, Scientific, or General Number formats. Different settings are also available for Short Text, Currency, and Yes/No data types.

- **Input Mask** creates a predefined structure into which the data for this field must be entered. Phone number and Social Security number fields commonly use Input Masks because the data follow a set structure every time.
- **Caption** provides an alternative field name to be displayed on all database objects that reference this field. For example, in a field named SSN, you may enter Social Security number as the Caption. Captions are used to display more descriptive field names to the end user.
- **Default Value** Automatically adds this set value for property to each new record in the table. This can be useful for reducing data entry when a large percentage of records use the same field data.
- **Validation Rule** is a property that works in conjunction with the Validation Text described next. The Validation Rule property enables you to set specific data entry rules that must be strictly followed. For example, you can force the users to enter data in a prespecified list or range of data.
- **Validation Text** is the text displayed in the error or warning message that appears when data entered into the database violate the corresponding Validation Rule.
- **Required**, when selected, forces the end user to enter data into this field before continuing to another record. Make sure this is enforced only when you need this field data 100% of the time. If there are situations when the data may not be available or do not exist, it is advised not to enforce this property.

These are all the different data types that you can choose from when creating fields in a Microsoft Access table.

One final, but very important, option to set in the Design View of a table is the primary key. A primary key is a field or combination of fields that uniquely identifies a record in a table. Every table in a database must have a primary key established.

To understand primary keys, consider an example of a database table containing a list of vehicles registered for on-campus parking at a university. The fields in the table are VIN, Make, Model, Color, LicensePlate, LicenseState, RegistrationDate, and VehicleType, and each record in the table is a separate vehicle. Given this example, the following are three ways you can set a primary key in the table.

1. **Use an existing field that uniquely identifies each record in the table.**

Example: Use Vehicle Identification Number (VIN).

2. **Create a new field to act as the primary key and assign it the AutoNumber data type.**

Example: Add a field named VehicleID and set the data type to AutoNumber.

3. **Combine multiple fields to create a concatenated primary key.**

Example: Use both LicensePlate and LicenseState as a concatenated key.

At least one of these three approaches can always be used for establishing a primary key in any table you encounter. The easiest method is to add a new field to the table and set it to the AutoNumber data type. This guarantees a primary key field every time.

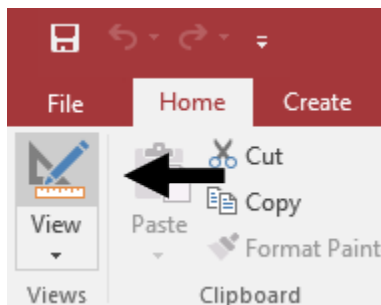
Chapter 2 Design and Create Tables to Store Data

When you create a database, you store your data in tables. Because other database objects depend so heavily on tables, you should always start your design of a database by creating all of its tables and then creating any other object. Before you create tables, carefully consider your requirements and determine all the tables that you need.

Let us try and create the first table that will store the basic contact information concerning

Field Name	Data Type
EmployeeID	AutoNumber
FirstName	Short Text
LastName	Short Text
Address1	Short Text
Address2	Short Text
City	Short Text
Country	Short Text
Postcode	Short Text
Phone	Short Text
PhoneType	Short Text

1. Select the **Home** ribbon and click on the **View** button in the upper left-hand corner to switch to the Design View of the table. The **View** button icon is a picture of a pencil, ruler, and triangle.



2. Click on the various fields in the Design View. As you do this, briefly examine the different

properties for each field.

3. Click on the **View** button in the upper left-hand corner (it looks different now) to switch back to the Datasheet View of the table. The **View** button is an easy way to toggle back and forth between the Datasheet and Design View of a table. Click once more on the **View** button to switch back to the Design View of the Employees table.
4. Click on the **EmployeeID** field to select it. Select the **Design** ribbon and click on the **Primary Key** button. A small picture of a key appears next to EmployeeID; this indicates that the field has been set as the primary key.
5. Beneath the **PhoneType** field, add a field named **Email**. Set the data type to **Hyperlink**. Set the **Caption** property for this field to **Email Address**.(table fields ribbon-**Name&caption**)
6. Add another field named **Salary** and set the data type as **Currency**. Set the **Validation Rule** property for this field to **>=2000**. Set the **Validation Text** property for this field to **Enter a salary above £2000**.
7. Add another field named **HireDate** and set the data type as **Date/Time**. Set the **Format** property for this field to **Short Date**.
8. Click the **PhoneNum** field to select it. Click the **Input Mask** property. A build button (small button with three dots) should appear to the right of the **Input Mask** row. Click the build button to open the **Input Mask Wizard**. Click **Yes** if prompted to Save the table.

Click **Yes** if prompted with the message, “**Data integrity rules have been changed; existing data may not be valid for the new rules.**” Click **Yes** if prompted with the message, “**Existing data violates the new setting for the ‘Validation Rule’ property for field ‘Salary’**”.

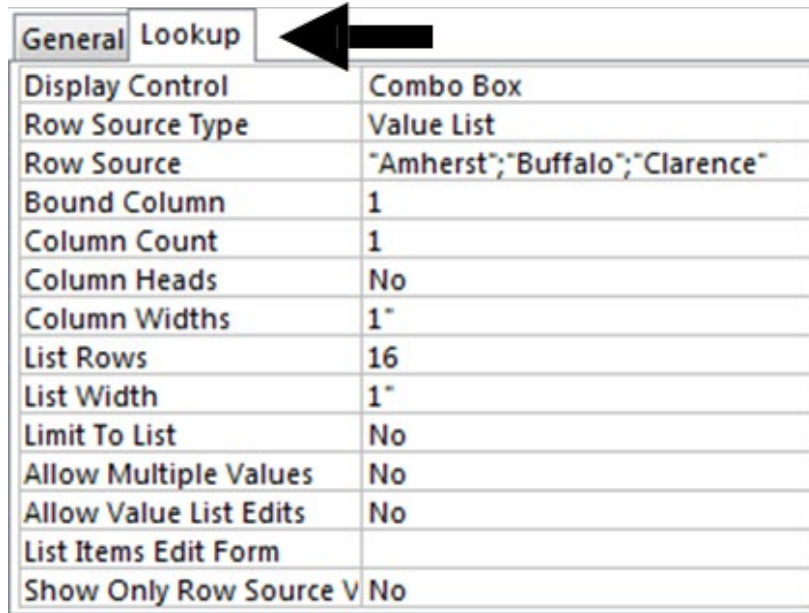
9. Select the Input Mask for phone number and click **Next**. Click **Next** twice more and then click **Finish** to close the wizard. Notice the symbols and numbers used to create the input mask are now in the PhoneNum Input Mask property.
10. With the Input Mask property selected, Press **F1** to open the help system and look at the different characters and symbols that can be used to create a custom input mask. Close the help system and return to the Design View of the Employees tables.
11. Click the Country field to select it. Click the **Default Value** property and set it to **UK**. Set the **Field Size** property to **2**.

12. Click the **City** field to select it. Change the data type from Short Text to **Lookup Wizard**.

13. Select the radio button labeled “**I will type in the values that I want.**” Click **Next**.

14. Enter any 5 cities in UK of your choice in the row under Col1.. Click **Next**. Save as City. Click **Finish**.

15. Click the **City** field to select it. Click the **Lookup** tab in the **Field Properties** section.



General	Lookup
Display Control	Combo Box
Row Source Type	Value List
Row Source	"Amherst";"Buffalo";"Clarence"
Bound Column	1
Column Count	1
Column Heads	No
Column Widths	1"
List Rows	16
List Width	1"
Limit To List	No
Allow Multiple Values	No
Allow Value List Edits	No
List Items Edit Form	
Show Only Row Source Values	No

16. Set the **Limit to List** property to **Yes** as indicated in the preceding screenshot. This setting will only allow the data in the combo box to be added to the City field. Click on the **General** tab.

17. Click the **City** field to select it. Click the **Required** property and set it to **Yes**. Click the **Allow Zero Length** property and set it to **No**. Click the **View** button to switch back to the Datasheet View of the table. Click **Yes** if prompted to Save the table. Click **Yes** if prompted with the message, “**Some data may be lost.**” Click **Yes** if prompted with the message, “**Data integrity rules have been changed; existing data may not be valid for the new rules.**”

18. Add a new record for yourself in the table. You can do this by entering your data below the last record in the table. Make sure you add your correct first name, last name, phone number, and email address. The rest of the data record should be made up. Because of the design of the database, you may only choose a City value that is in the drop-down list.

19. You should notice and/or test the following items covered throughout this exercise:

a. What is the Caption of the Email field?

b. Can you enter 15000 in the salary field? What happens when you do?

c. Is the City drop-down list working properly? What values appear in the list?

d. What happens when you type **Rochester** into the City field for your record?

e. Can you leave the City field blank?

f. How does your phone number appear in the database table?

g. What happens when you attempt to edit the data in the Full Name field?

h. What is the default value appearing in the country field for new records?

i. What is your EmployeeID in the database table?

j. How does your Hire Date appear in the database table?
