CHAPTER 8: ACCESS

Introducing Databases

In this chapter, you will be introduced to database concepts and work with Access tables, the starting point of all databases. Have you ever wondered how sportscasters come up with fun and interesting facts about teams and players in a flash? Have you been taken by surprise when a customer service agent suddenly begins to recite your name, address, and a detailed purchase history? In most cases, these people have access to a powerful database from which they obtain the information.

LEARNING OBJECTIVES

- Identify database objects and the functions they perform
- Identify table features
- Create database tables
- Identify and choose data types
- Print a datasheet

Project: Creating a Database

Winchester Web Design is a small website development company. The company specializes in building websites for small businesses. You have been asked to build a database to help the company manage its employee, customer, and sales data. You'll get started by exploring objects in an existing database. Then you'll create a database and work with tables.

What Is Access?

It is likely that you routinely interact with databases. If you make an online purchase, your order information goes into a database. The database might be used to track your order status, product likes and reviews, past orders, or future promotions. If you post or like something on your Facebook account, that information is maintained in a database. If you search for or store a telephone number, that information is likely kept in a database. It is quite possible you have been using databases without even knowing it! Here, you will be introduced to what a database is and gain a better understanding of related terms, explore a sample database, and finally, create your own!

While there are many definitions of a database, you can think of a database as an organized collection of related data files or tables. For example, a company might organize its information by both customers (external to the business) and employees (internal to the business). While the data relate to the same business, the types of data provided for customers and employees will likely differ.

Databases are the epicenter of our digital world.

Types of Databases

Large organizations typically use large custom-designed databases specifically for that company or industry. When you make travel plans, you are using a database that is specific to the airline industry. It contains real-time data, meaning that if there is only one seat left on a plane, whoever selects and pays for the seat first gets the reservation. If you are a small business owner, you may use a database like Microsoft Access to track information about your customers, products, and employees. Access provides the tools needed to let small organizations create, use, and maintain databases.

Open and Save an Access Database

Each time you start Access, the Backstage view displays options for opening an existing file, creating a new blank database, or selecting from a number of pre-built templates. If you're creating a new database, Access will immediately prompt you to save the file in your desired storage location. You must save your file first because the database needs to constantly make updates to data as it is entered or edited.

HANDS-ON 8.1 Start Access and Open a Database

In this exercise, you will start the Access program and open an existing database.

1. If necessary, start your computer.
2. Click the **Start** button in the bottom-left corner of the screen.
3. Scroll down the alphabetical list and click **Access 2016**.
   The Access program loads and Backstage view is displayed. Recently used databases appear on the left, and you can create new databases from the list of templates.
4. **Maximize** the Access window if it isn't already maximized.
5. Choose **Open Other Files** near the lower-left side of the window.
6. Click the **Browse** button, navigate to your **Chapter 08** folder, and open the **Win Web Design** database file.
7. Click **Enable Content** if the Security Warning bar displays.
   The Security Warning appears whenever a database file is opened for the first time. You should never open files unless you know and trust the file sender. The database objects are shown in the Navigation pane on the left.
8. Keep Access open, as you will continue to use the database to explore the Access environment.

Database Objects and the Access Window

The Access window includes the Ribbon, Navigation pane, and work area. A database object is a structure used to store, retrieve, or display data. The four Access objects are tables, queries, forms, and reports. The database objects are displayed in the Navigation pane on the left side of the window. The work area is where you create, modify, or work with database objects.

DATABASE OBJECT TYPES

Access Object	What It Does
Table	Tables contain the database's data, and they let you enter, edit, delete, or view records in a row and column layout that is similar to that used in an Excel worksheet. A record contains information about an individual person, place, or item.
Form	Forms are used to view, edit, and add data one table record at a time.
Query	Queries are used to search for specific table records using criteria and to sort and perform calculations on the results.
Report	Reports are printable database objects that can display, group, and summarize data from tables and/or queries.

HANDS-ON 8.2 Use Database Objects and Enter and Edit Data

In this exercise, you will open and view the four Access object types.

1. Take a moment to explore the Access window noticing the various tables, queries, forms, and reports in the Navigation pane.

Explore a Table

2. Double-click the **Customers** table in the Objects list of the Navigation pane to open it in the work area within Datasheet View.

   Notice that the table, which is in Datasheet View, looks like a worksheet with columns and rows. Datasheet View lets you view, add, and edit table records. One benefit of Datasheet View is it lets you see more than one record at a time.

3. Click in the **first empty Cust ID** cell at the bottom of the CustID column.

4. Type **AdamsA** and tap Tab to complete the entry and move the insertion point to the next field.

   Notice the pencil icon highlighted in yellow. This indicates the current record is active and being created or edited.

	⊞	ThibeauxP	Thibeaux	Pierre
	⊞	WinklerS	Winkler	Samuel
✎	⊞	AdamsA		
*				

   Cust ID is known as a primary key field in this table, so each Cust ID must be unique.

5. Type **Adams** in the Last Name field and tap Tab.

6. Enter **Anthony** as the First Name, **23 Pine St** as the street address, and **Bradenton** as the city.

7. Click the **drop-down menu** button ▾ in the ST field and choose **FL** from the list of states.

   ST is an example of a field with properties that make data entry easy and accurate.

8. Complete the record as follows, making sure you tap Tab after entering the information in each cell.

   Tapping Tab after entering a full row of data completes the record, saving it in the database. As you enter the telephone number, just type the digits; Access will automatically format the entry for you.

   - ZIP: **34210**
   - Telephone: **(941) 555-3648**
   - Email: **AAdams@email.com**
   - Notes: **Call for delivery.**

9. Choose **Home**→**Views**→**View menu button** ▾ and then choose **Design View**.

   Fields contain pieces of data in records such as zip codes, telephone numbers, email addresses, or notes. Each object type can be created or edited using Design View. Tables Design View is where fields can be added, removed, or edited and field properties can be set.

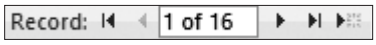
10. Click the **View menu** button ▾ and choose **Datasheet View**.

    Notice the Anthony Adams record is now the second record in the table. It moved up because the records are sorted in ascending order using the Cust ID field.

Explore a Form

Now you will explore a form that is based on the Customers table. Forms help facilitate effective data entry by displaying one record at a time.

11. Double-click **Customers Form** in the Forms section of the Navigation pane.
    Notice the form displays all fields from the Customers table but only one record is visible.

12. Locate the Record bar at the bottom of the form.
    

13. Click the **Next Record** button to view the Anthony Adams record you just entered.

14. Click in the **Notes** box and type **`after 10:00`** at the end of the note (that is, "Call for Delivery after 10:00").

15. Click the **Next Record** button again to complete the edit.
    This edit has now been saved in the Customers table.

Explore a Query

Now you will explore a query that is based on the Customers table. Queries choose specific database records using criteria that you specify.

16. Double-click **Customers Query** in the Queries section of the Navigation pane.
    The query results look like a table displayed in Datasheet View, but the query only displays some of the fields from the underlying Customers table and records where the City is equal to Bradenton.

17. Click the **View menu** button on the Ribbon and choose **Design View**.
    The query has fields from the Customers table and the criterion (a single criteria) bradenton*. This is an example of a simple query based on a single table. Queries can draw data from multiple tables and can include more sophisticated criteria.*

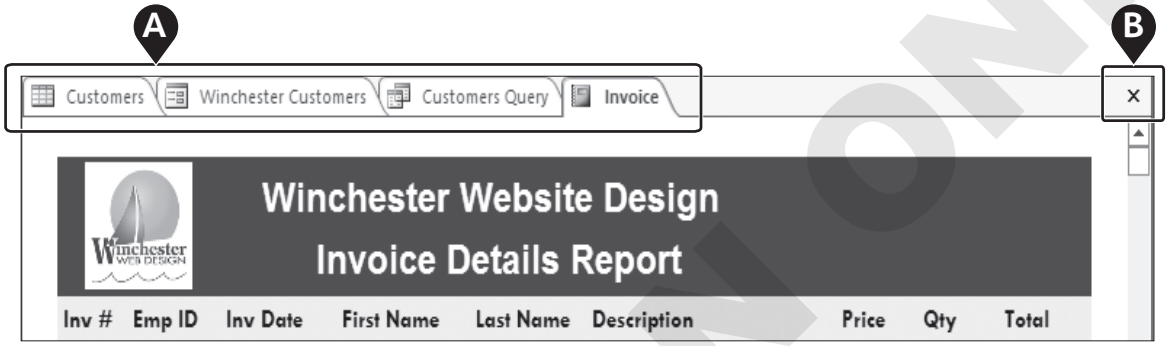
18. Choose **Design**→**Results**→**Run** to run the query and display only the Bradenton results.

Explore a Report

Now you will explore a report that uses multiple tables, including the Customers table.

19. Double-click **Invoice Details Report** in the Reports section.
    Take a moment to scroll through and observe the report.

20. Click the **View menu** button ▾ on the Ribbon and choose **Design View**.
    The Report design grid may look complicated, but it's easy to create a robust report using the Access Report Wizard. The design grid can then be used to make modifications once the foundation has been set with the Wizard.
21. Click the **View menu** button ▾ on the Ribbon and choose **Report View**, which is great for viewing reports.
22. Follow these steps to explore the object tabs and to close an object:



Ⓐ Switch between open objects using the tabs.
Ⓑ Click the **Close Object** button to close the objects one at a time.

23. Choose **File→Close** to close the database.
    The data you entered and edited is automatically saved by the database.

Introducing Tables

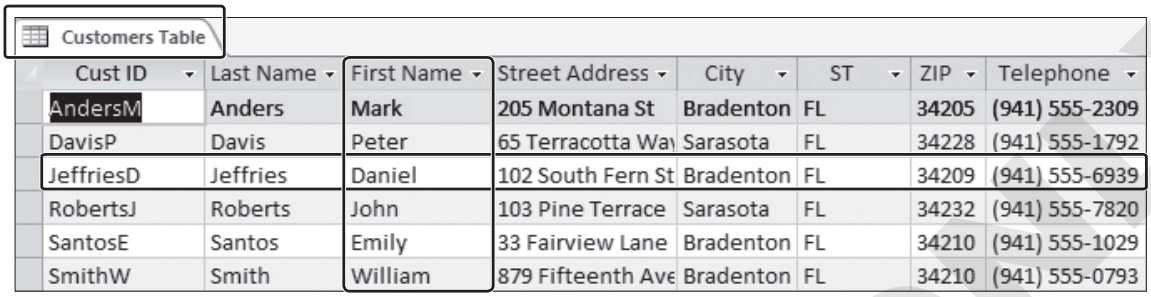
A table is the starting point for entering, finding, and reporting useful information located in your database. A database can have separate tables, each tracking different types of data. A business might use a table to keep track of customer billing or employee contact information.

Table Features

Data are meaningful units of information such as names, numbers, dates, and descriptions organized for reference or analysis. The data stored in the Winchester Web Design Group database might include customer first and last names, business names, telephone numbers, and other important information.

A field is the smallest meaningful unit of information about a person, place, or item. Individually, each field represents a piece of data. Together the fields provide information. In most databases, fields are displayed in columns.

A record is a collection of related fields about a person, place, or item, such as a single customer or employee. A collection of related records makes up a table. In most databases, records are displayed in rows.



Customers Table

Cust ID	Last Name	First Name	Street Address	City	ST	ZIP	Telephone
AndersM	Anders	Mark	205 Montana St	Bradenton	FL	34205	(941) 555-2309
DavisP	Davis	Peter	65 Terracotta Way	Sarasota	FL	34228	(941) 555-1792
JeffriesD	Jeffries	Daniel	102 South Fern St	Bradenton	FL	34209	(941) 555-6939
RobertsJ	Roberts	John	103 Pine Terrace	Sarasota	FL	34232	(941) 555-7820
SantosE	Santos	Emily	33 Fairview Lane	Bradenton	FL	34210	(941) 555-1029
SmithW	Smith	William	879 Fifteenth Ave	Bradenton	FL	34210	(941) 555-0793

First Name field and JeffriesD record in Customers table

Field Data Types

If you have ever filled out an online form, you might have seen instant formatting of some fields. When typing in currency values, the dollar sign and decimal point may appear automatically, and when entering a date, the slashes between month, day, and year spontaneously appear. This can be accomplished by assigning a data type to the field. A data type sets the characteristics of a particular field, identifying the type of values it may hold, such as alphanumeric text, or numbers, or dates, yes/no values, or even a hyperlink.

Primary Key Fields

Almost every database table should have a primary key field. A primary key is a unique identifier for each record in the table. Examples of fields that would make good primary keys are Social Security numbers, student IDs, or email addresses. Using a student ID as a primary key ensures that each student is uniquely identified in a student database table. Two students may have identical names, but they will never have identical student ID numbers.

Creating a Table in a New Database

Instead of using a database that someone else has prepared, you can design your own using a blank database template in Access. Tables are the starting point for databases

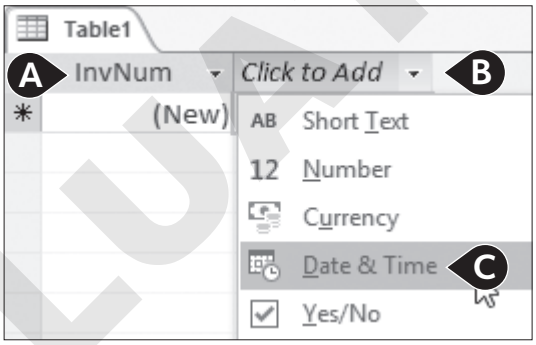
and this shows up when a new blank database is first created. The new table has a single primary key field as a starting point for the database.

The starting point in a blank database

HANDS-ON 8.3 Create a Blank Database and Add a Table

In this exercise, you will create a new blank database and add an Invoices table in Datasheet View.

1. If necessary, start Access and choose **Blank Desktop Database**.
2. Click **Browse Folders** and save the database in your **Chapter 08** folder as: **`Datasheet`**
   Access is the only Office application that requires you to save a new file (the database) before you can begin working.
3. Click the **Create** button, and a new table will appear.
4. Follow these steps to change the name of the ID field and set the data type for a second field:



   A. Double-click the **ID** field name and type **`InvNum`** as the new name. This will be the primary key field.
   B. Tap Tab to go to the second column and, if necessary, choose **Click to Add** to display the data type list.
   C. Choose **Date & Time**.
   Once the data type is selected, the heading for the new field becomes Field1*.*
5. Replace *Field1* with the name **`InvDate`** and tap Tab to move to a new field.
   Your table currently has a primary key field and one Date/Time field.

6. Choose **Short Text** as the data type for the third field and change the field name to: **`EmpID`**

7. Tap Tab, choose **Short Text** for the fourth field data type, and change the field name to: **`CustID`**

   Your simple table with four fields is now set up and ready for data to be entered.

8. Click in the **empty InvDate** field (you might have to click twice) and type **`12/15/2016`**.

9. Tap Tab and type **`JFW`** as the EmpID.

10. Tap Tab, type **`SmithW`** as the CustID and then tap Tab again to begin a new record.

11. Enter the data for these three additional records:

    The InvNum primary key field is automatically numbered because it has an AutoNumber property set.

InvNum	InvDate	EmpID	CustID
1	12/15/2016	JFW	SmithW
2	12/2/2016	MJW	SantosE
3	1/1/2016	JMM	SantosE
4	11/30/2016	JMM	SmithW

12. Choose **File**→**Save** or click the **Save** button on the Quick Access toolbar and save the table as: **`Invoices`**

    You will print the table in the next exercise.

Printing Data and Closing a Database

Previewing and printing table datasheets and other Access objects, such as reports, is easily done using the File→Print command. Sometimes paper printouts are necessary, and you may also find they are an effective way to check a database for accuracy. When you close a database using the File→Close command, Access will prompt you to save changes to any unsaved open objects, such as tables, forms, reports, and queries.

HANDS-ON 8.4 Print a Datasheet and Close the Database

In this exercise, you will preview and print a database table and then close it.

1. Make sure the **Datasheet** database is open and the Invoices table is displayed in Datasheet View.
   Tables are displayed in Datasheet View by double-clicking them in the Navigation pane on the left side of the Access window.
2. Choose **File**→**Print** and then choose **Print Preview**.
3. Notice the preview of how the datasheet will look when printed and then take a moment to explore the Print Preview toolbar options.
4. Choose **Print Preview**→**Print** and then click **OK** if you want to actually print the datasheet; otherwise, choose **Print Preview**→**Close Print Preview**.
5. Choose **File**→**Close** to close the database, choosing **Yes** if you are prompted to save changes to your table.

Self-Assessment

Check your knowledge of this chapter's key concepts and skills by completing the Self-Assessment.

Page number

1. Zara should use a form if she wants to display one record at a time on her screen. **true** **false** _____

2. A primary key uniquely identifies each record in a table. **true** **false** _____

3. Which database object is used for storing data?

   A. Form
   B. Query
   C. Report
   D. Table

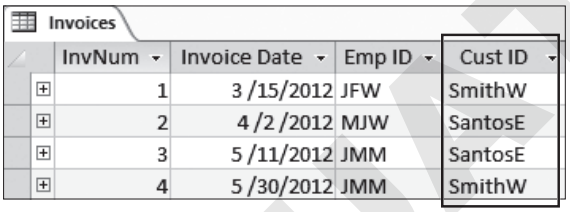
   Page number: _____

4. Short text, hyperlink, and numeric are examples of?

   A. Primary keys
   B. Records
   C. Queries
   D. Data types

   Page number: _____

5. Which table feature is shown within the rectangle?



   A. Field
   B. Record
   C. Relationship
   D. Primary key

   Page number: _____

6. Which database object should be used to locate all customers who live in Springfield, Illinois, and to then sort the results in order by zip code?

   A. Form
   B. Query
   C. Report
   D. Table

   Page number: _____

7. Which database object is best for viewing and editing one record at a time?

   A. Table
   B. Form
   C. Query
   D. Report

   Page number: _____

8. The names, addresses, and phone numbers for 5,000 customers are stored in a database as which of the following?

   A. 5,000 fields
   B. 5,000 records
   C. 5,000 tables
   D. A single object

   Page number: _____

Skill Builders

SKILL BUILDER 8.1 Enter and Edit Database Records

First Perk is a coffee shop that tracks sales using an Access database. In this exercise, you will update pricing and add several new items.

1. Start Access and choose **Open Other Files**. (Or, if Access is already open, choose **File→Open**.)
2. Click the **Browse** button, navigate to your **Chapter 08** folder, and double-click the **First Perk** database file.
3. Open the **Items** table in Datasheet View by double-clicking it in the Navigation pane.
4. Click in the **Price** field for the Coffee item and change the price from 1.50 to `2.00`.
   Note that dollar signs $ are automatically displayed in the Price field because the field is formatted with a Currency number format.
5. Change the price of Coffee-Decaf to `2.00` and change the price of Espresso Shot to `2.50`.
6. Now add the following items to the database:

ItemName	Price
Latte	3.25
Cappuccino	3.25
Mocha	3.50
Green Tea	2.50
Earl Grey	2.50

   Note that Access automatically numbers the ItemNumber field for you because it is set up as an AutoNumber field type.
7. Feel free to print a copy of the datasheet.
8. Close the table and then choose **File→Close** to close the database.

SKILL BUILDER 8.2 Create a Table in Datasheet View

In this exercise, you will create a new database and a table using Datasheet View.

1. Start Access. Or, if Access is already open, choose **File**.
2. Choose **Blank Desktop Database** and then click the **Browse Folders** button and save the database in your **Chapter 08** folder as **K4C**.
3. Click the **Create** button to start a new database.
4. Double-click the **ID** heading and change the text to **StID**.
   This will be the primary key field with autonumbering, so your records will automatically get numbered.
5. Tap Tab, choose **Short Text** as the data type, and change the heading from *Field1* to **StLName**.
6. Add **StFName**, **StAdd**, **StCity**, **StST**, **StZIP**, **StPhone**, and **StAvail** as fields with the Short Text data type.
7. Choose **File→Save** or click the **Save** button on the Quick Access toolbar and save your table as **Staff**.
8. Click the first empty cell in the **StLName** field and enter the following records using these guidelines:
   - Tap the Tab key to complete your entries.
   - Enter hyphens in the phone field, as the field is not set up to automatically enter them for you.
   - Widen the columns as necessary by double-clicking the right borders of the column headings you want to widen.
   - Strive for 100% accuracy when entering data, which requires including spaces between characters when called for and verifying the capitalization of upper- and lowercase letters.

Staff

StID	StLName	StFName	StAdd	StCity	StST	StZIP	StPhone	StAvail
1	Bryant	Matthew	12 Macintosh St	Sarasota	FL	34022	941-555-7523	Thursday
2	Earle	Kevin	77 Kingfisher Ct	Sarasota	FL	34024	941-555-1368	Monday

9. Close the Staff table, saving the changes, and then choose **File→Close** to close the database.
10. Exit Access.