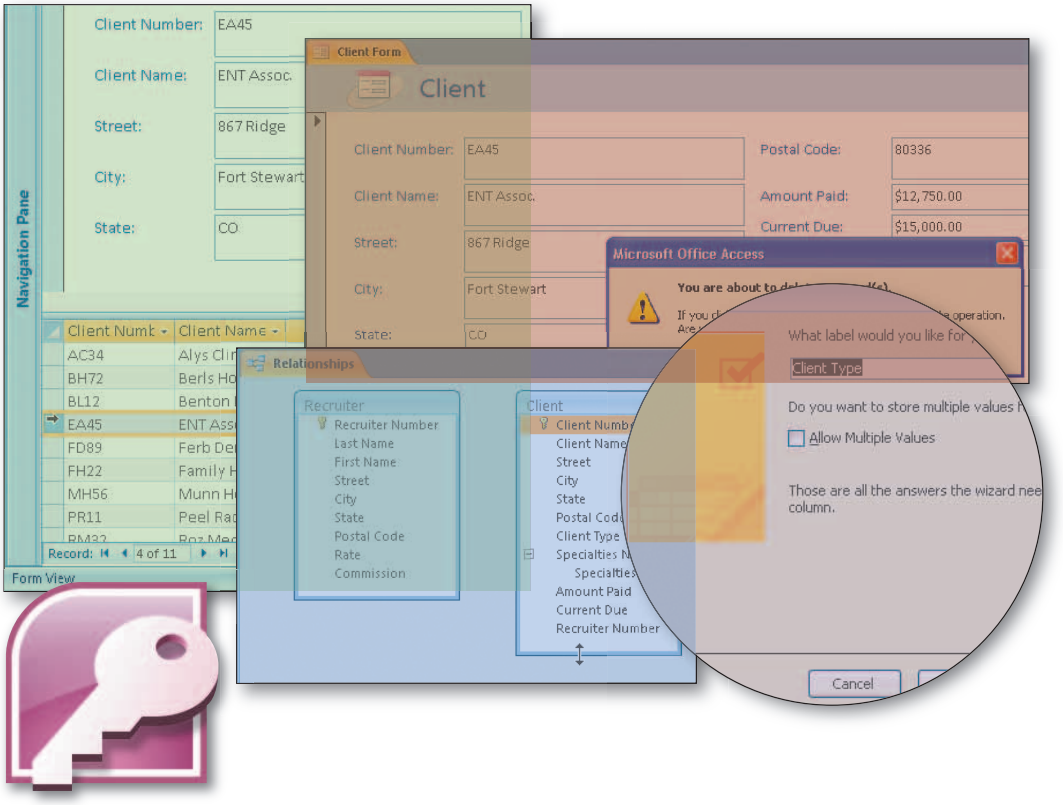
3 Maintaining a Database



Objectives

You will have mastered the material in this chapter when you can:

- Add, change, and delete records
- Search for records
- Filter records
- Update a table design
- Format a datasheet
- Use action queries to update records
- Specify validation rules, default values, and formats
- Create and use single-valued and multivalued Lookup fields
- Specify referential integrity
- Use a subdatasheet
- Sort records

3 Maintaining a Database

Introduction

Once a database has been created and loaded with data, it must be maintained. **Maintaining the database** means modifying the data to keep it up-to-date, such as adding new records, changing the data for existing records, and deleting records. Updating can include mass updates or mass deletions; that is, updates to, or deletions of, many records at the same time.

Maintenance of a database can also involve the need to **restructure the database** periodically; that is, to change the database structure. Restructuring can include adding new fields — including both Lookup and multivalued fields — to a table, changing the characteristics of existing fields, and removing existing fields. It also includes the creation of validation rules and referential integrity. Validation rules ensure validity of the data in the database, while referential integrity ensures the validity of the relationships.

Maintaining a database also can include filtering records, a process that ensures that only the records that satisfy some criterion appear when viewing and updating the data in a table. Changing the appearance of a datasheet is a maintenance activity. Finally, backing up the database as well as compacting and repairing a database are database maintenance tasks as well.

Project — Maintaining a Database

JSP Recruiters faces the task of keeping its database up-to-date. As the agency takes on new clients and recruiters, it will need to add new records, make changes to existing records, and delete records. JSP managers have found they must change the structure of the database to categorize the clients by type. They will do this by adding a Client Type field to the Client table. They also want to track the specialties that are of interest to clients. They will do so by adding a Specialties Needed field to the Client table. Because clients may need more than one specialty, this field will be a multivalued field. Along with these changes, JSP staff want to change the appearance of a datasheet when displaying data.

JSP would like the ability to make mass updates, that is, to update or delete many records in a single operation. They want rules that make sure users can enter only valid data into the database, and they want to ensure that it is not possible for the database to contain a client who is not associated with a specific recruiter. Finally, they want to improve the efficiency of certain types of processing, specifically sorting and retrieving data.

Figure 3–1 summarizes some of the various types of activities involved in maintaining the JSP Recruiters database.

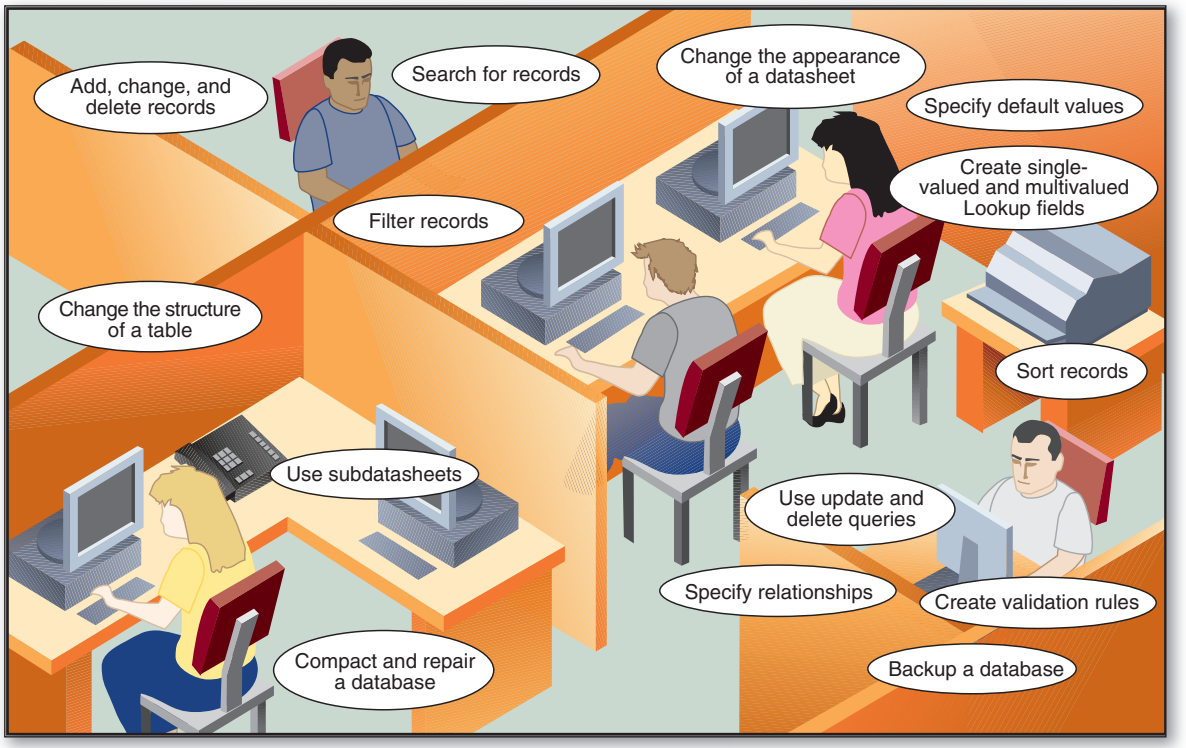


Figure 3–1

Overview

As you read through this chapter, you will learn how to maintain a database by performing these general tasks:

- Add, change, and delete records.
- Filter records so that only those records that satisfy some criterion appear in a datasheet or form.
- Change the structure of a table.
- Make mass changes to a table.
- Create validation rules to ensure that the database contains only valid data.
- Change the appearance of a datasheet.
- Enforce relationships by creating referential integrity.
- Order records.
- Perform special database operations such as backing up a database and compacting a database.

Plan Ahead

Database Maintenance Guidelines

1. **Determine when it is necessary to add, change, or delete records in a database.** Decide when updates are necessary. Also determine whether the updates are to be made to individual records or whether mass updates would be more efficient. For example, if a state changes an area code, a mass update would be more efficient.
2. **Determine whether you should filter records.** For each situation where a user will be working with a table in the database, examine whether it might be desirable to have the records filtered, that is, have only those records that satisfy some criterion appear. For example, if a user only wants to make changes to clients in a particular city, it would be easier to view only those records rather than all the records in the table.
3. **Determine whether additional fields are necessary or whether existing fields should be deleted.** Have there been any changes to the initial requirements that would require the addition of a field (or fields) to one of the tables? If so, you will need to add the field to the appropriate table. Also, now that the database has been in operation for a period of time, determine whether all the fields actually are being used. If some fields are not in use, verify that they are, in fact, no longer needed. If so, you can delete the field from the table.
4. **Determine whether validation rules, default values, and formats are necessary.** Can you improve the accuracy of the data entry process by enforcing data validation? What values are allowed for a particular field? Are there some fields in which one particular value is used more than another? You can control the values that are entered in a field by modifying the table design to include default values, formats, and validation rules.
5. **Determine whether changes to the format of a datasheet are desirable.** Can you improve the appearance of the Datasheet view of your tables? Once you have decided on a particular appearance, it is a good idea to be consistent throughout all your tables except in special circumstances.
6. **Identify related tables in order to implement relationships between the tables.** Examine the database design you created earlier to identify related tables. For each pair of related tables, you will need to make decisions about the implementation of the relationship between the tables.

When necessary, more specific details concerning the above decisions and/or actions are presented at appropriate points in the chapter. The chapter also will identify the use of these guidelines in database maintenance tasks such as those shown in Figure 3–1 on the previous page.

Starting Access

If you are using a computer to step through the project in this chapter and you want your screen to match the figures in this book, you should change your screen's resolution to 1024 × 768. For information about how to change a computer's resolution, read Appendix E.

To Start Access

The following steps, which assume Windows is running, start Access.

1. Click the Start button on the Windows taskbar to display the Start menu.
2. Point to All Programs on the Start menu to display the All Programs submenu and then point to Microsoft Office on the All Programs submenu to display the Microsoft Office submenu.
3. Click Microsoft Office Access 2007 on the Microsoft Office submenu to start Access and display the Getting Started with Microsoft Office Access window.
4. If the Access window is not maximized, click the Maximize button on its title bar to maximize the window.

To Open a Database

In Chapter 1, you created your database on a USB flash drive using the file name, JSP Recruiters. There are two ways to open the file containing your database. If the file you created appears in the Recent Documents list, you can click it to open the file. If not, you can use the More button to open the file. The following steps use the More button to open the JSP Recruiters database from the USB flash drive.

1. With your USB flash drive connected to one of the computer's USB ports, click the More button to display the Open dialog box.
2. If necessary, click the Look in box arrow and then click UDISK 2.0 (E:) to select the USB flash drive, in the Look in list as the new open location. (Your drive letter might be different.)
3. Click JSP Recruiters to select the file name.
4. Click the Open button to open the database.
5. If a Security Warning appears, click the Options button to display the Microsoft Office Security Options dialog box.
6. Click the Enable this content option button.
7. Click the OK button to enable the content.

Updating Records

Keeping the data in a database up-to-date requires updating records in three ways: adding new records, changing the data in existing records, and deleting existing records.

Adding Records

In Chapter 1, you added records to a database using Datasheet view; that is, as you added records, the records appeared on the screen in a datasheet. The data looked like a table. When you need to add additional records, you can use the same techniques.

In Chapter 1, you used a split form to view records. The split form contained both a form and a datasheet. You can use either portion to add records. You also can use a simple

form, that is, a form that does not contain a datasheet. Whether you use a simple form or the form portion of a split form, you can use the form to update the table. To add new records, change existing records, or delete records, you use the same techniques you used in Datasheet view. The following steps create a simple form and then add a record to the Client table using the form.

To Create a Simple Form

Rather than using a split form, you may wish just to view the data in a form without also having a datasheet on the screen. If you already have created such a form, you can open it. If not, you can create a simple form to use. The following steps create a simple form.

1

- Show the Navigation pane if it is currently hidden.
- If necessary, click the Client table in the Navigation pane to select it.
- Click Create on the Ribbon to display the Create tab (Figure 3–2).

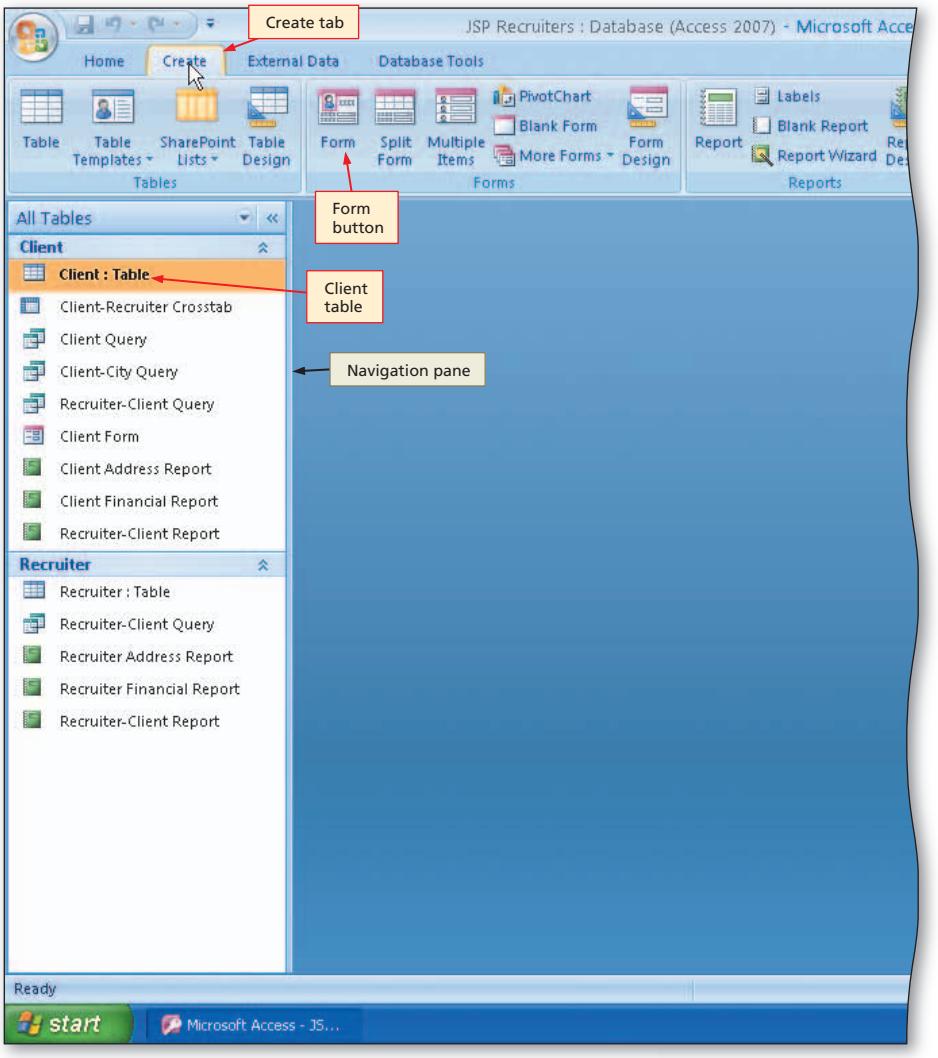


Figure 3–2

2

- Click the Form button on the Create tab to create a simple form (Figure 3–3).

Q&A How can I tell which view of the form is currently on the screen?

Point to the button that is highlighted in the lower-right corner of the screen. The ScreenTip indicates the current view. At the present time, the form appears in Layout view.

Q&A Which view should I use if I want to enter records?

Form view.

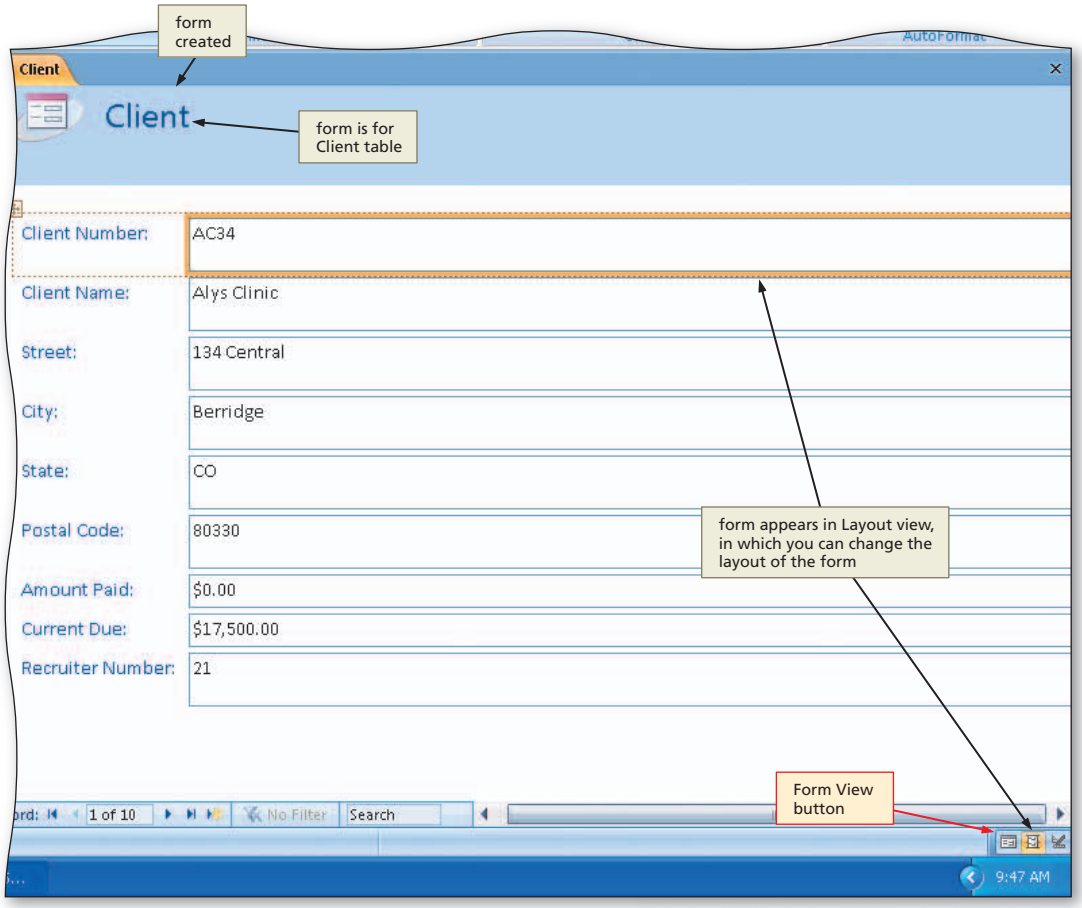


Figure 3–3

3

- Click the Form View button to display the form in Form view (Figure 3–4).

Q&A Could I use the View button to display the form in Form view?

Yes. Click the arrow at the bottom of the button and then click Form View.

Experiment

- Click the various navigation buttons (First record, Next record, Previous record, and Last record) to see each button's effect. Click the Current Record box, change the record number, and press the ENTER key to see how to move to a specific record.

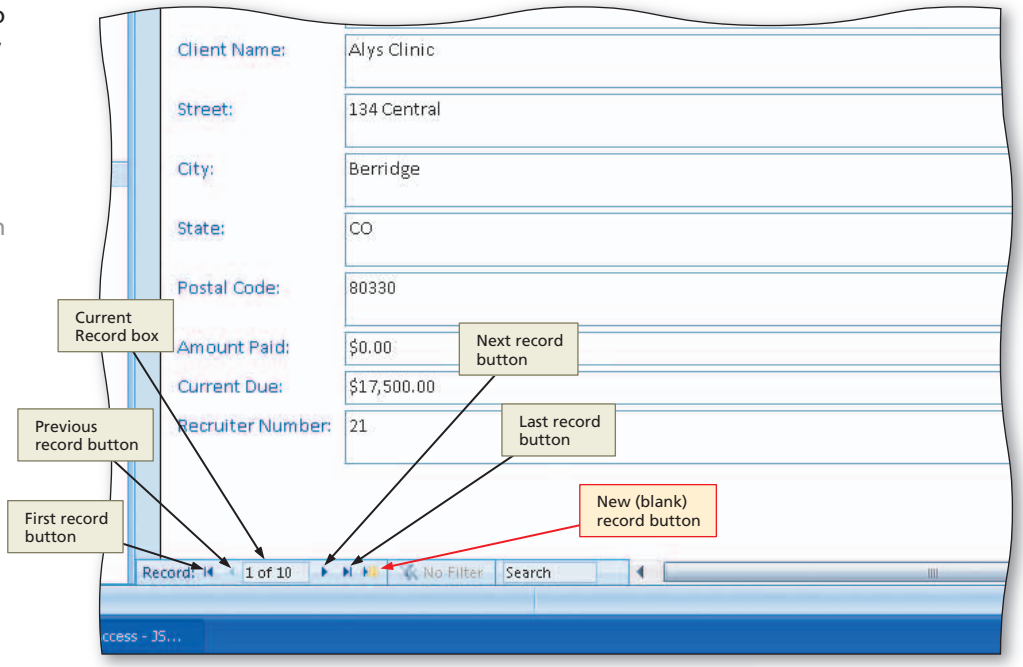


Figure 3–4

To Use a Form to Add Records

Once a form is open in Form view you can add records using the same techniques you used to add records in Datasheet view. The following steps use the form just created to add records.

1

- Click the New (blank) record button on the Navigation bar to enter a new record, and then type the data for the new record as shown in Figure 3–5. Press the TAB key after typing the data in each field, except after typing the data for the final field (Recruiter Number).

2

- Press the TAB key to complete the entry of the record.
- Click the Close 'Client' button to close the Client form.
- Click the No button when asked if you want to save your changes.

Q&A

Why not save the form?

If you wish to use this form frequently in the future, you would probably save it. It is very easy to re-create the form whenever you need it, however.

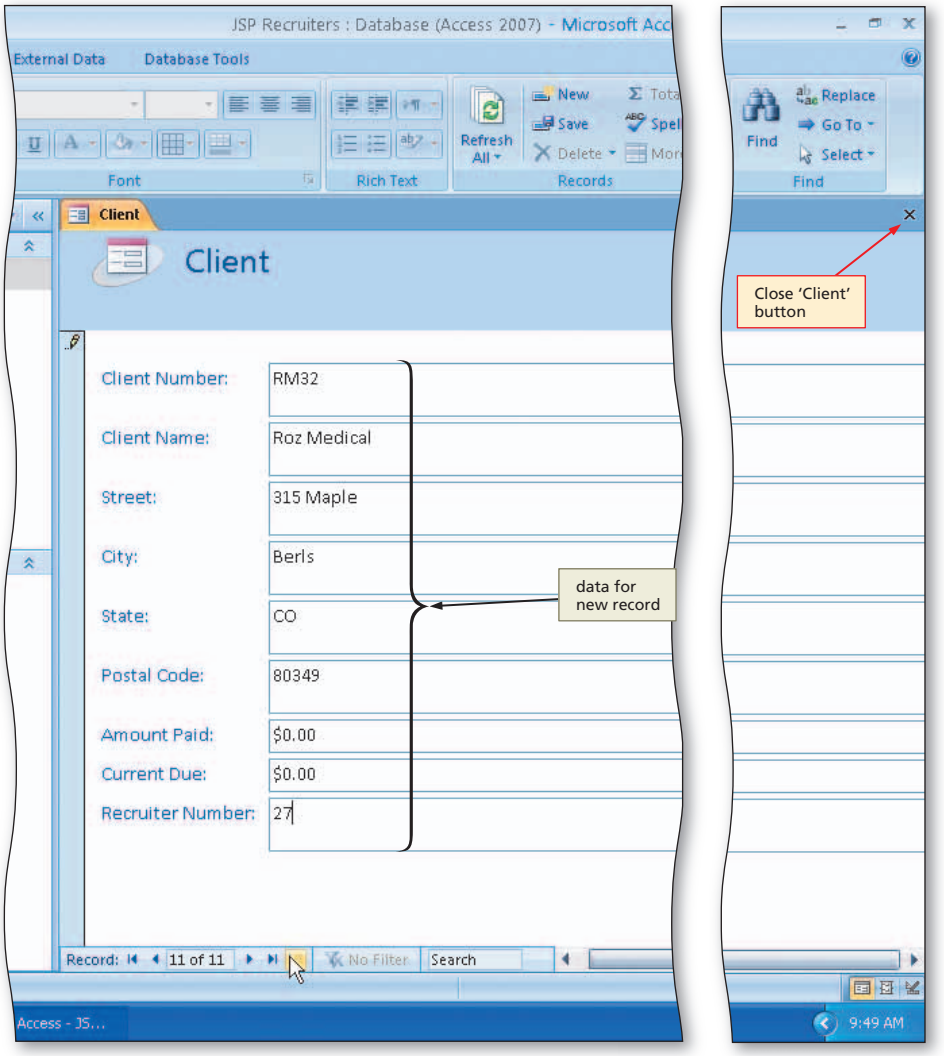


Figure 3–5

Other Ways

1. Click New button on Ribbon
2. Press CTRL+PLUS SIGN (+)

To Search for a Record

In the database environment, **searching** means looking for records that satisfy some criteria. Looking for the client whose number is MH56 is an example of searching. The queries in Chapter 2 also were examples of searching. Access had to locate those records that satisfied the criteria.

A need for searching also exists when using Form view or Datasheet view. To update client MH56, for example, first you need to find the client.

The following steps show how to search for the client whose number is MH56.

1

- Right-click Client Form in the Navigation pane and click Open on the shortcut menu to open the form in Form view.
- Hide the Navigation pane (Figure 3–6).

Q&A

Which command on the shortcut menu gives me Form view? I see both Layout view and Design view, but no option for Form view.

The Open command opens the form in Form view.

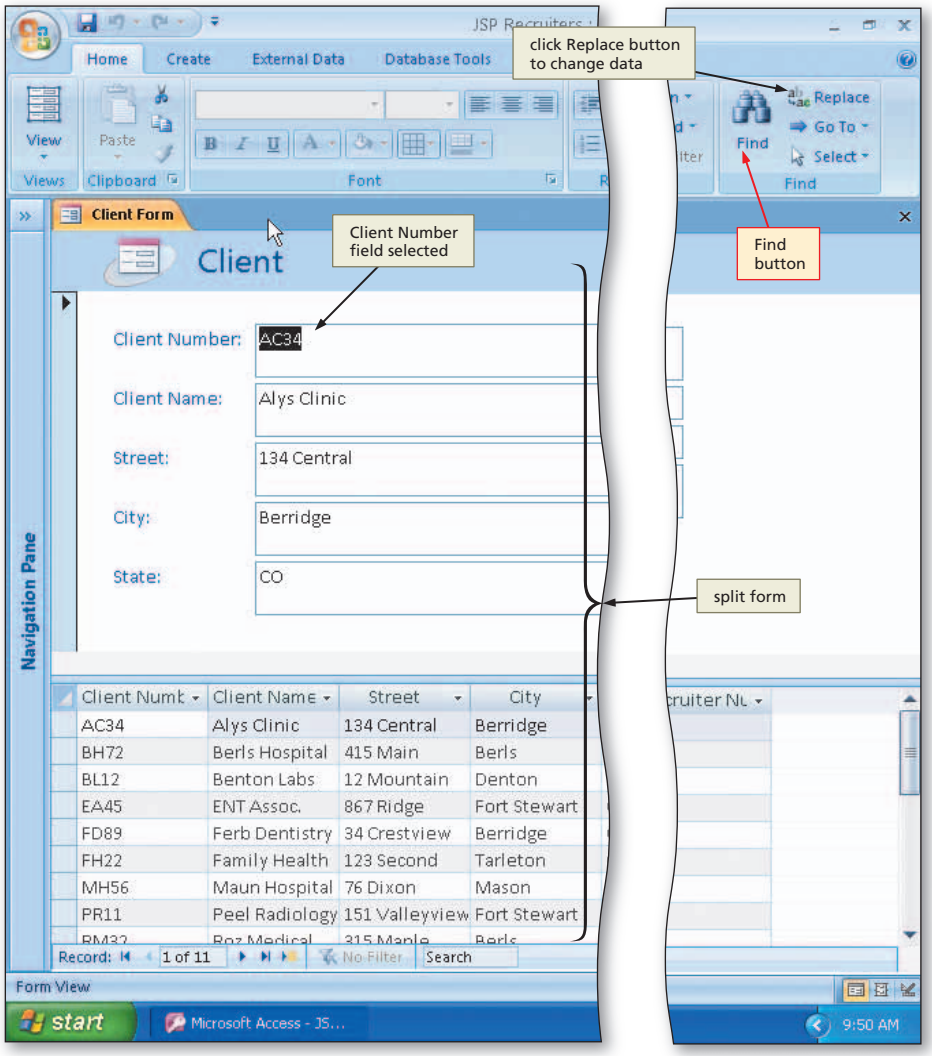


Figure 3–6

2

- Click the Find button on the Home tab to display the Find and Replace dialog box.
- Type MH56 in the Find What text box.
- Click the Find Next button in the Find and Replace dialog box to find client MH56 (Figure 3–7).

Q&A

Can I also find records in Datasheet view or in Form view?

Yes. You use the same process to find records whether you are viewing the data with split form, in Datasheet view, or in Form view.

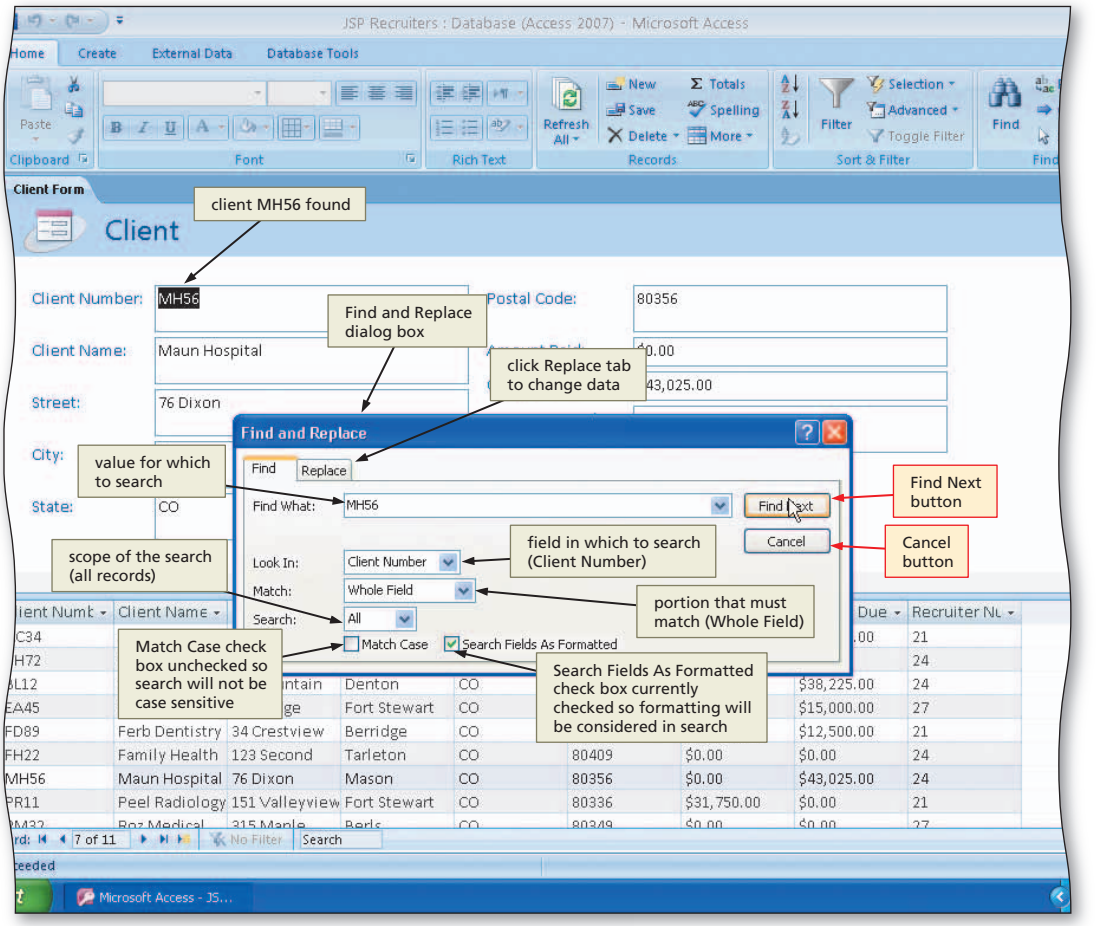


Figure 3–7

Experiment

- Find records using other client numbers. Try to find a record using a client number that does not exist. Click in a different field and try to find records based on the value in that field. Try to use wildcards just as you did in queries. When done, once again locate client MH56.

3

- Click the Cancel button in the Find and Replace dialog box to remove the dialog box from the screen.

Q&A

Why does the button in the dialog box read Find Next rather than simply Find?

In some cases, after locating a record that satisfies a criterion, you might need to find the next record that satisfies the same criterion. For example, if you just found the first client whose recruiter number is 24, you then may want to find the second such client, then the third, and so on. To do so, click the Find Next button. You will not need to retype the value each time.

Q&A

Can I replace one value with another using this dialog box?

Yes. Either click the Replace button on the Ribbon or the Replace tab in the Find and Replace dialog box. You then can enter both the value to find and the replacement value.

Other Ways

1. Press CTRL+F

To Update the Contents of a Record

After locating the record to be changed, select the field to be changed by clicking the field. You also can press the TAB key repeatedly. Then make the appropriate changes. (Clicking the field automatically produces an insertion point. If you use the TAB key, you will need to press F2 to produce an insertion point.)

The following step uses Form view to change the name of client MH56 from Maun Hospital to Munn Hospital by deleting the letters au and then inserting the letters un after the letter M.

1

- Click in the Client Name field in the datasheet for client MH56 after the letter M to select the field.
- Press the DELETE key twice to delete the letters au.
- Type the letters un after the letter M.
- Press the TAB key to complete the change and move to the next field (Figure 3–8).

Q&A Could I have changed the contents of the field in the form?

Yes. You first will need to ensure the record to be changed appears in the form. You can then change the value just as in the datasheet.

Q&A Do I need to save my change?

No. Once you move to another record or close this table, the change to the name will become permanent.

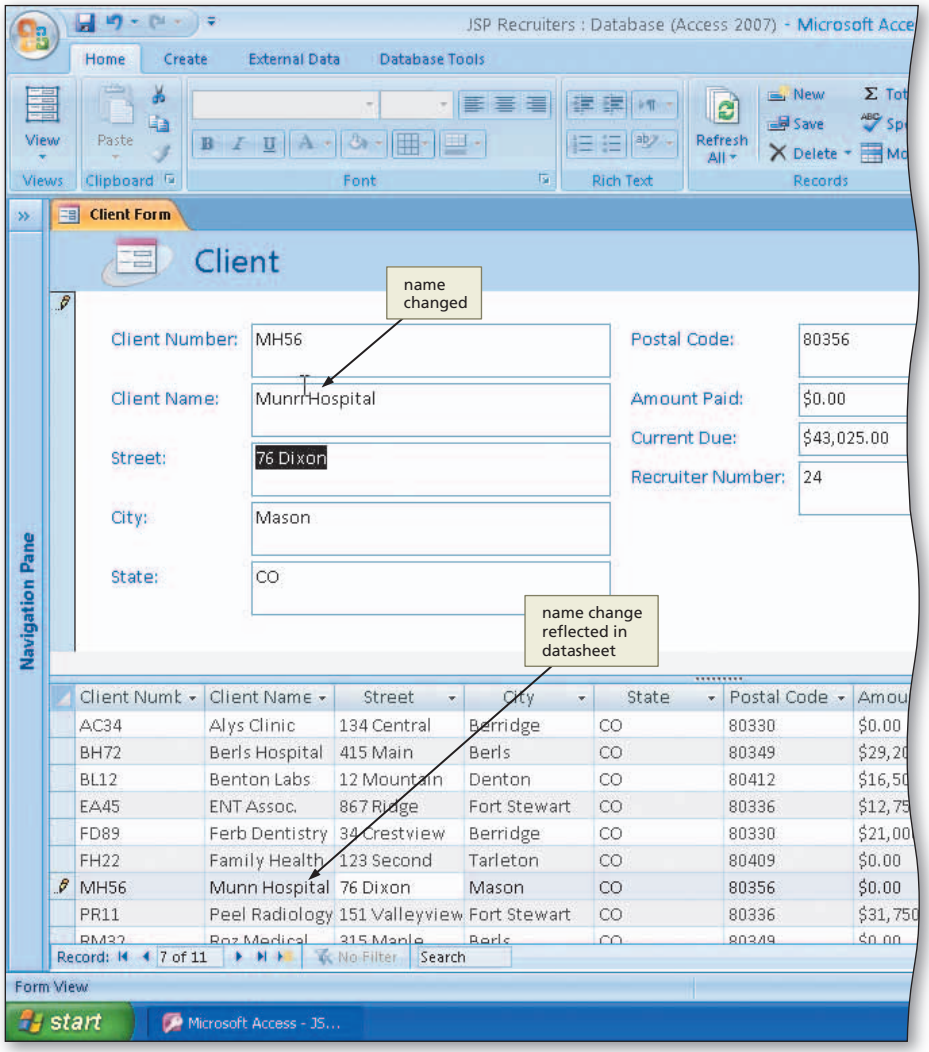


Figure 3–8

To Delete a Record

When records no longer are needed, **delete the records** (remove them) from the table. If client EA45 no longer is served by JSP Recruiters and its final payment is made, the record can be deleted. The following steps delete client EA45.

1

- With the Client Form open, click the record selector in the datasheet (the small box that appears to the left of the first field) of the record on which the client number is EA45 (Figure 3–9).

Q&A

That technique works in the datasheet portion. How do I select the record in the form portion?

With the desired record appearing in the form, click the record selector (the triangle in front of the record) to select the entire record.

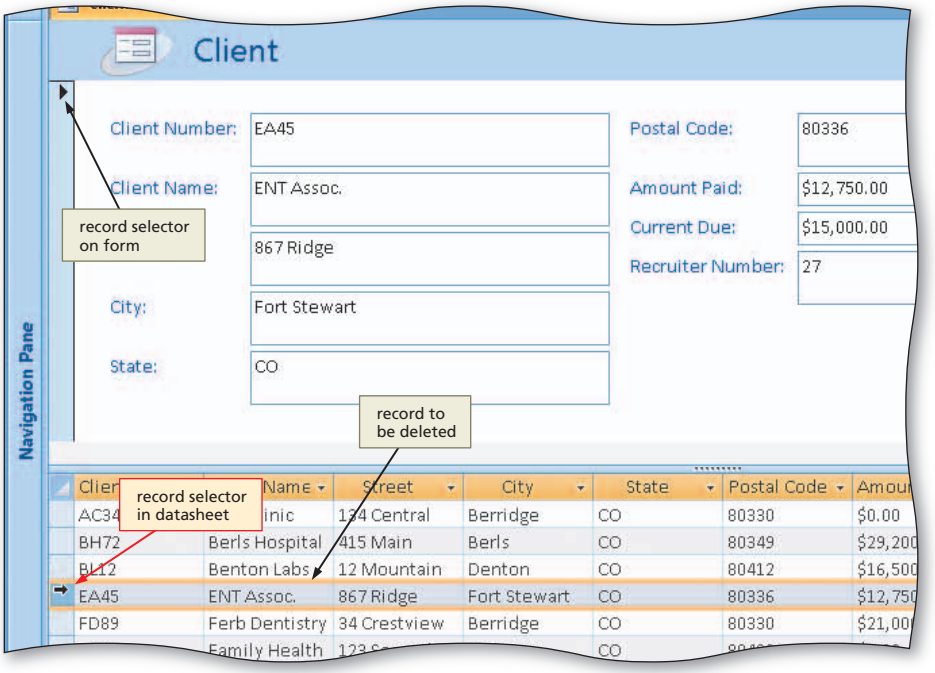


Figure 3–9

2

- Press the DELETE key to delete the record (Figure 3–10).

3

- Click the Yes button to complete the deletion.
- Close the Client Form by clicking the Close 'Client Form' button.

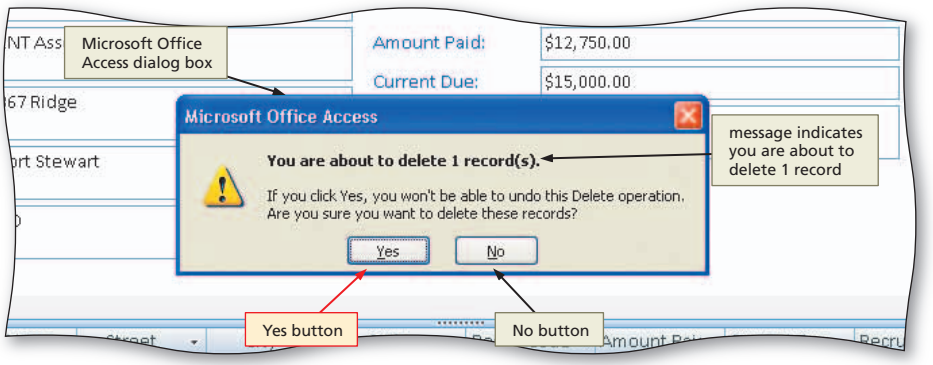


Figure 3–10

Other Ways

1. Click Delete button on Ribbon

Filtering Records

You can use the Find button in either Datasheet view or Form view to locate a record quickly that satisfies some criterion (for example, the client number is MH56). All records appear, however, not just the record or records that satisfy the criterion. To have only the record or records that satisfy the criterion appear, use a **filter**. Four types of filters are available: Filter By Selection, Common Filters, Filter By Form, and Advanced Filter/Sort. You can use a filter in either Datasheet view or Form view.

Plan Ahead

Determine whether you should filter records.
If you determine that it is desirable to have only those records that satisfy some criterion appear, you have two choices. You can create a query or create a filter. The following guidelines apply to this decision.

1. If you think that you frequently will want to display records that satisfy precisely this same criterion, you should consider creating a query whose results only contain the records that satisfy the criterion. To display those records in the future, simply open the query.
2. If you are viewing data in a datasheet or form and decide you want to restrict the records to be included, it is easier to create a filter than create a query. You can create and use the filter while you are viewing the data.
3. If you have created a filter that you would like to be able to use again in the future, you can save the filter as a query.

If you have decided that it is appropriate to use a filter, you need to decide which type of filter to use.

1. If your criterion for filtering is that the value in a particular field matches or does not match a certain specific value, you can use Filter By Selection.
2. If your criterion only involves a single field but is more complex, for example, that the value in the field begins with a certain collection of letters, you can use a Common Filter.
3. If your criterion involves more than one field, use Filter By Form.
4. If your criterion involves more than a single And or Or, or if it involves sorting, you will probably find it simpler to use Advanced Filter/Sort.

To Use Filter By Selection

The simplest type of filter is called **Filter By Selection**. To use Filter By Selection, you give Access an example of the data you want by selecting the data within the table. You then choose the option you want on the Selection menu. If you have determined that you only want to display those clients located in Berridge, Filter By Selection is appropriate. The following steps use Filter By Selection in Datasheet view to display only the records for clients in Berridge.

1

- Open the Client form and hide the Navigation pane.
- Click the City field on the first record in the datasheet portion of the form to select Berridge as the city (Figure 3–11).

Q&A

Could I have selected the City field on the fourth record, which is also Berridge?

Yes. It does not matter which record you select as long as the city is Berridge.

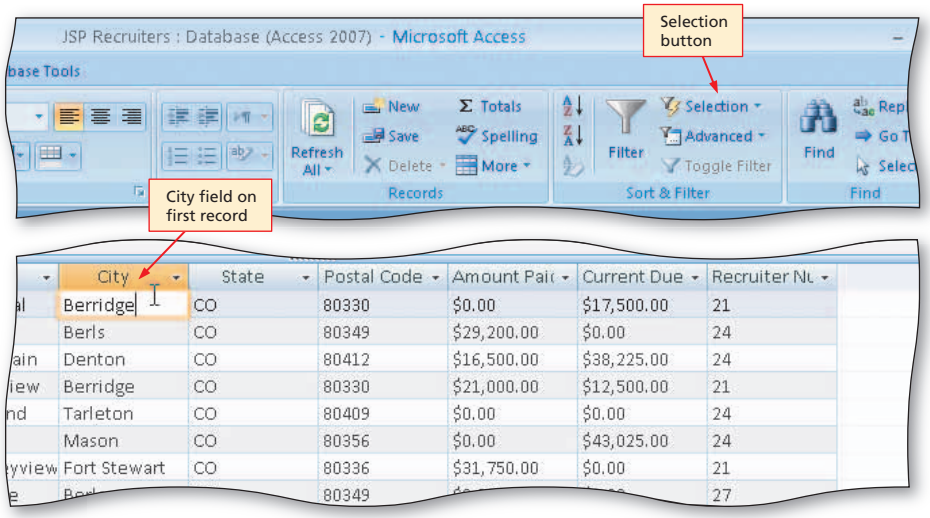


Figure 3–11

2

- Click the Selection button on the Home tab to display the Selection menu (Figure 3–12).

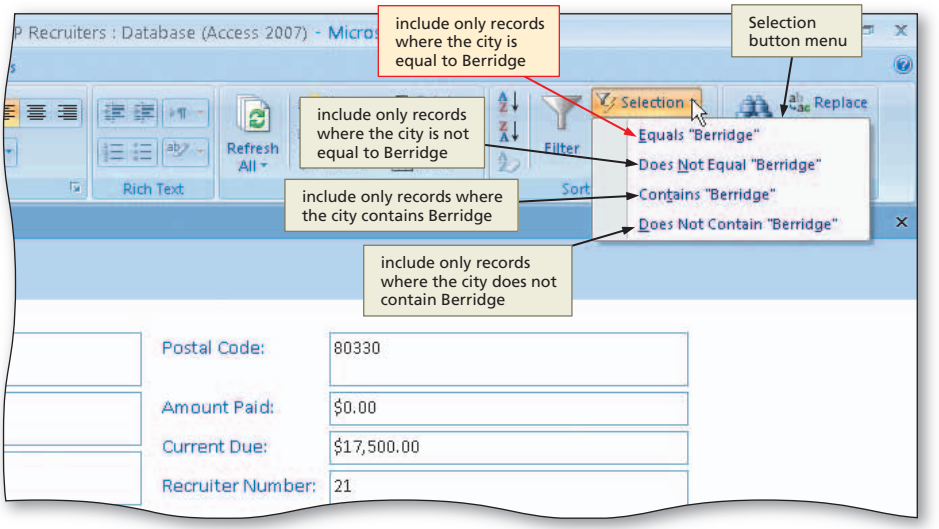


Figure 3–12

3

- Click Equals "Berridge" to select only those clients whose city is Berridge (Figure 3–13).

Q&A

Can I also filter in Datasheet view or in Form view?

Yes. Filtering works the same whether you are viewing the data with split form, in Datasheet view, or in Form view.

Experiment

- Try each of the other values in the Selection menu to see their effect. When done, once again select those clients whose city is Berridge.

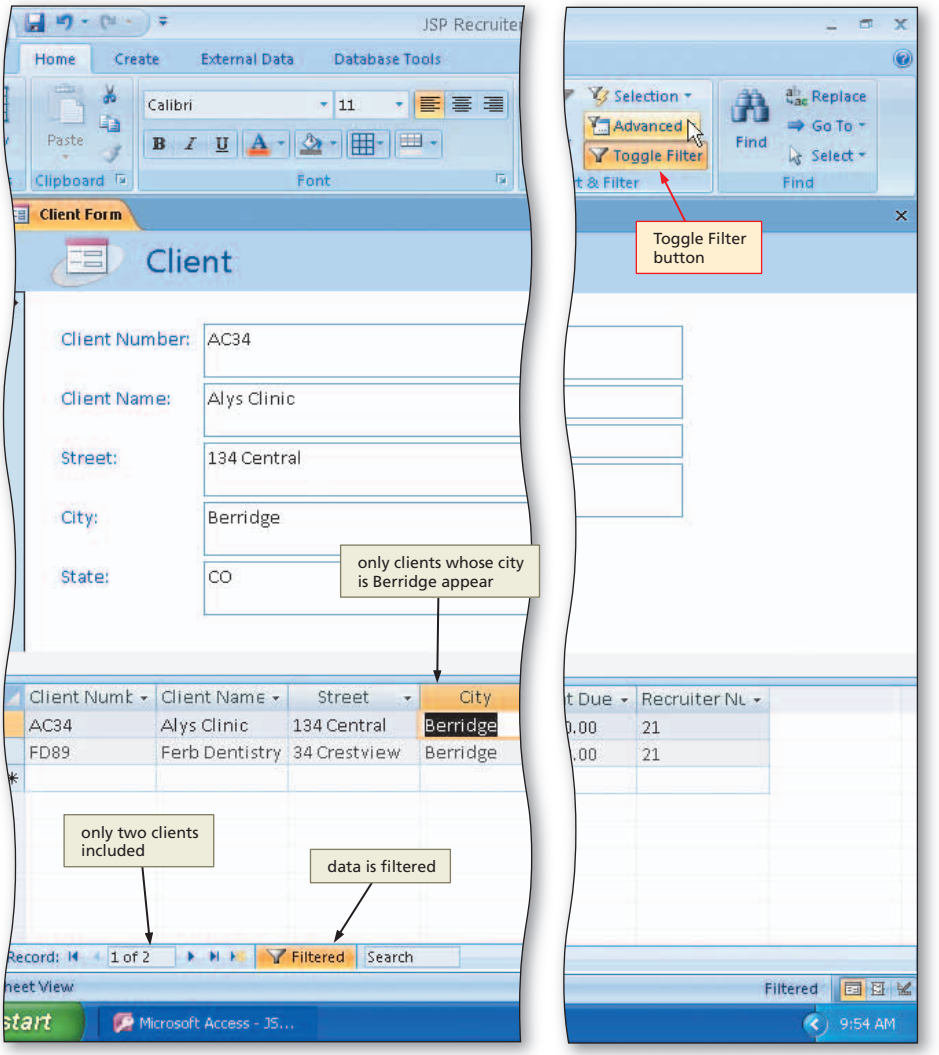


Figure 3–13

To Toggle a Filter

The following step toggles the filter to redisplay all records.

1

- Click the Toggle Filter button on the Home tab to toggle the filter and redisplay all records (Figure 3–14).

Q&A

Does that action clear the filter?

No. The filter is still in place. If you click the Toggle Filter button a second time, you again will see only the filtered records.

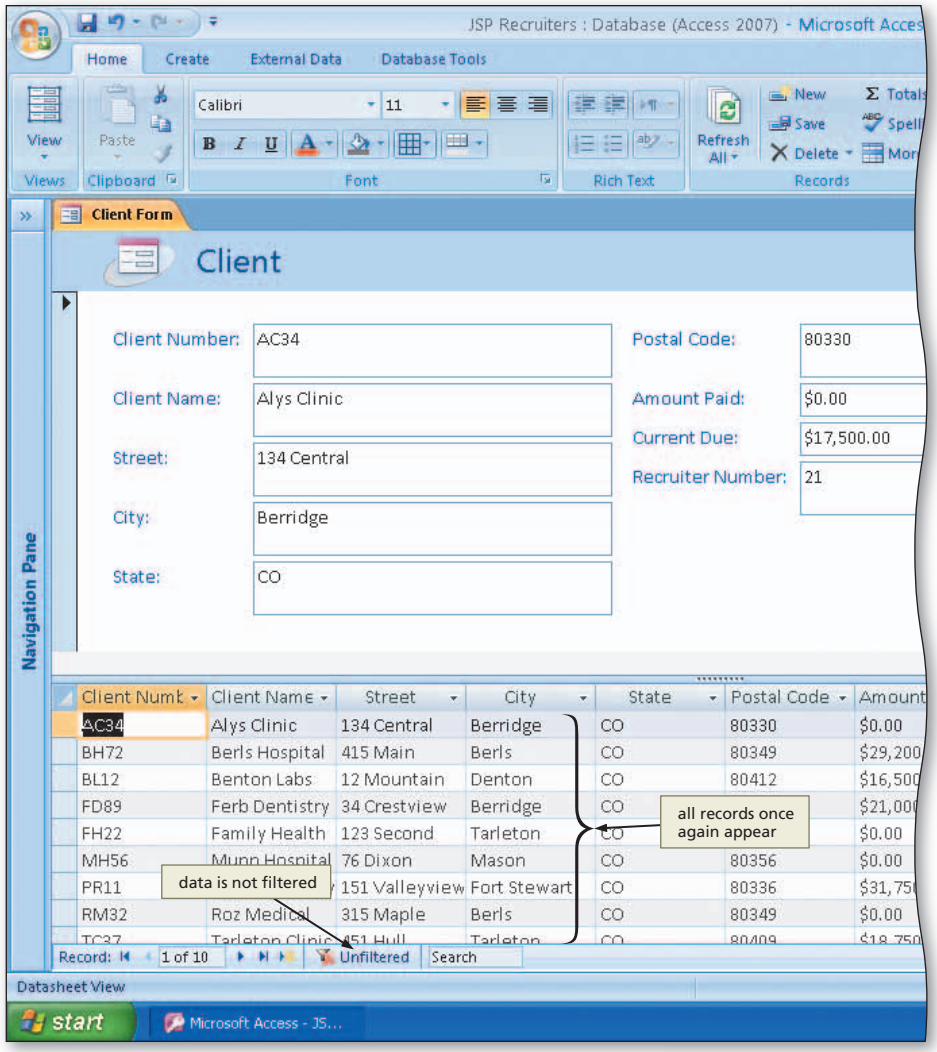


Figure 3–14

To Clear a Filter

Once you have finished using a filter, you can clear the filter. After doing so, you no longer will be able to use the filter by pressing the Toggle Filter button. To clear a filter, you use the following steps.

1. Click the Advanced button on the Home tab.
2. Click Clear All Filters on the Advanced menu.

BTW

Using Wildcards in Filters

Both the question mark (?) and the asterisk (*) wildcards can be used in filters created using Advanced Filter/Sort.

To Use a Common Filter

You can filter individual fields by clicking the arrow to the right of the field name and using a Common Filter. If you have determined you want to include those clients whose city begins with Ber, Filter By Selection would not be appropriate. You would need to use a Common Filter. The following steps use a common filter to include only those clients whose city begins with Ber.

1

- Be sure the Home tab is selected.
- Click the City arrow to display the common filter menu.
- Point to the Text Filters command to display the custom text filters (Figure 3–15).

Q&A

I selected the City field and then clicked the Filter button on the Home tab. My screen looks the same. Is this right?

Yes. That is another legitimate way to display the common filter menu.

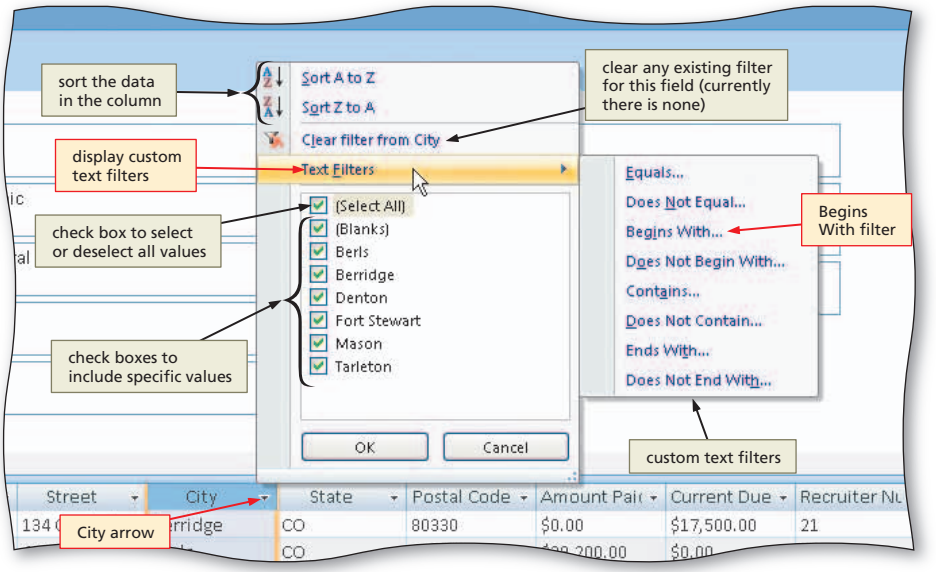


Figure 3–15

2

- Click Begins With to display the Custom Filter dialog box.
- Type `Ber` as the City begins with value (Figure 3–16).

Q&A

If I wanted certain cities included, could I use the check boxes?

Yes. Be sure the cities you want are the only ones checked. One way to do this is to click the Select All check box to remove all the check marks and then click the check boxes for the cities you want to include. Another way is to clear the check boxes for the cities you don't want. Use whichever technique you find more convenient.

Experiment

- Try other options in the Common Filter menu to see their effect. When done, once again select those clients whose city begins with Ber.

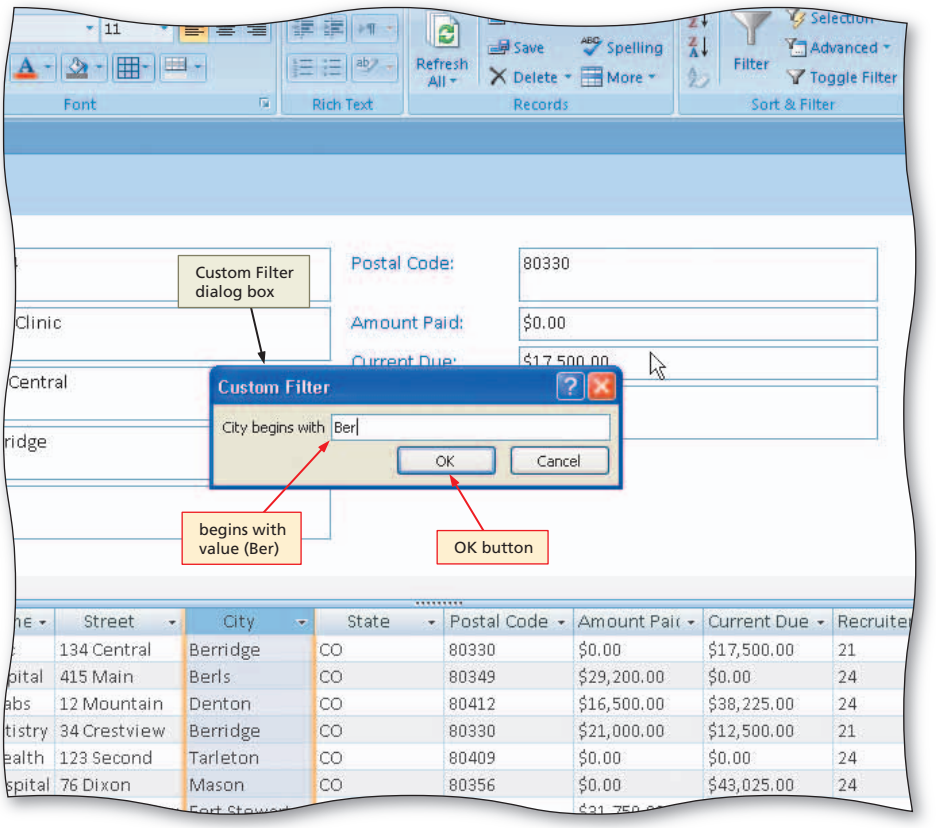


Figure 3–16

3

- Click the OK button to filter the records (Figure 3–17). (Your order may be different.)

Q&A

Can I use the same technique in Form view?

In Form view, you would need to click the field and then click the Filter button to display the Common Filter menu. The rest of the process would be the same.

4

- Click the Toggle Filter button on the Home tab to toggle the filter and redisplay all records.

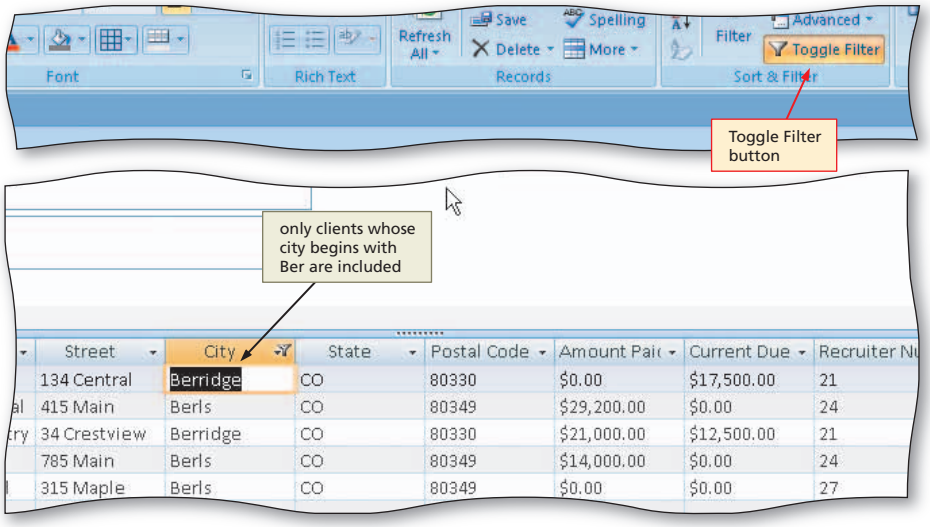


Figure 3–17

To Use Filter By Form

Filter By Selection is a quick and easy way to filter by the value in a single field. For more complex criteria, however, it is not appropriate. For example, if you determined you only wanted those clients whose postal code is 80330 and whose amount paid is 0, you could not use either the Filter by Selection or the Common Filter processes. Rather, you would use **Filter By Form**. The following steps use Filter By Form to restrict the records that appear.

1

- Click the Advanced button on the Home tab to display the Advanced menu (Figure 3–18).

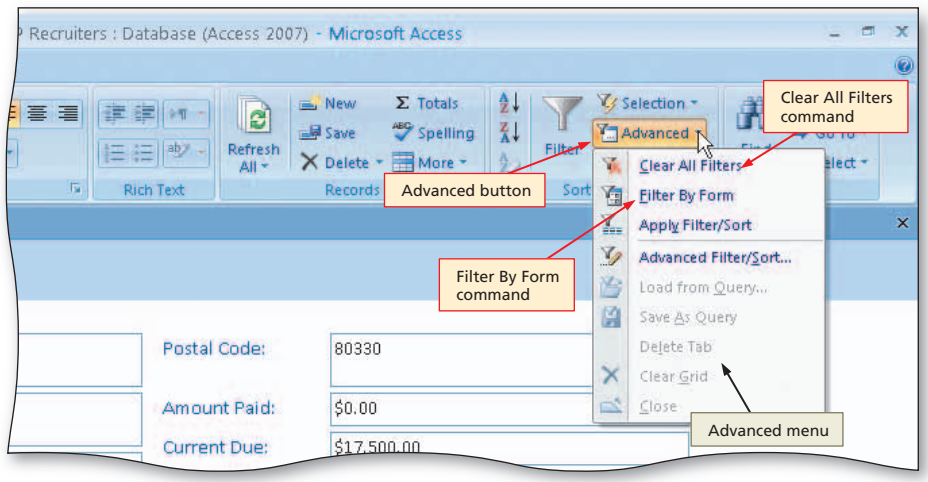


Figure 3–18

2

- Click Clear All Filters on the Advanced menu to clear the existing filter.
- Click the Advanced button on the Home tab to display the Advanced menu a second time.
- Click Filter By Form on the Advanced menu.
- Click the Postal Code field, click the arrow that appears, and then click 80330.
- Click the Amount Paid field, click the arrow that appears, and then click 0 (Figure 3–19).

Q&A

Is there any difference in the process if I am viewing a table in Datasheet view rather than in Form view or in a split form?

In Datasheet view, you will make your entries in a datasheet rather than a form. Otherwise, the process is the same.

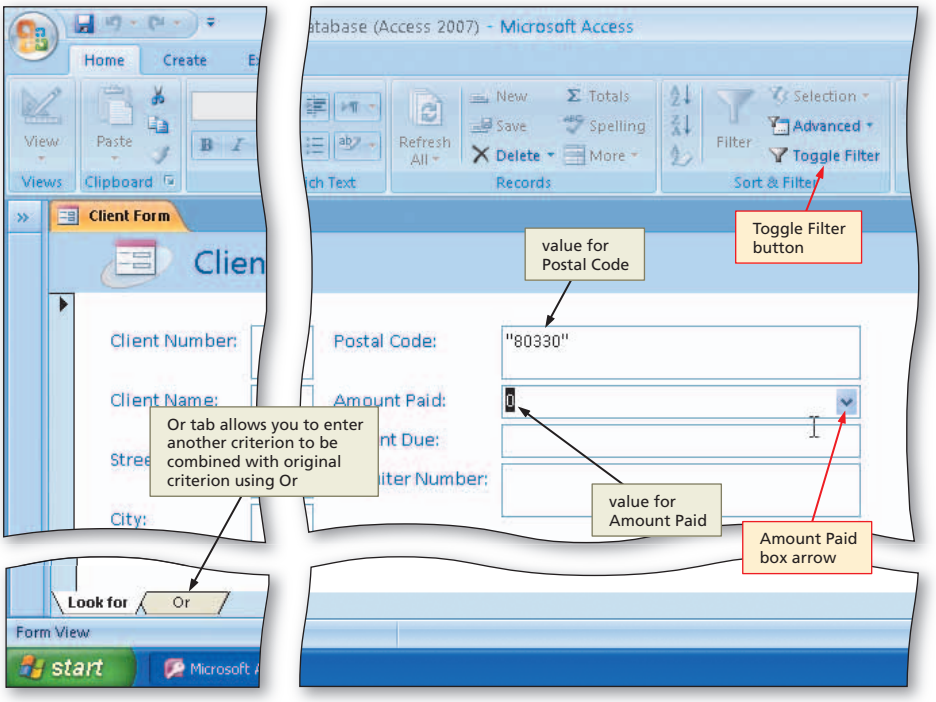


Figure 3–19

- Click the Toggle Filter button on the Home tab to apply the filter (Figure 3–20).

Experiment

- Select Filter By Form again and enter different criteria. In each case, toggle the filter to see the effect of your selection. When done, once again select those clients whose postal code is 80330 and whose amount paid is 0.

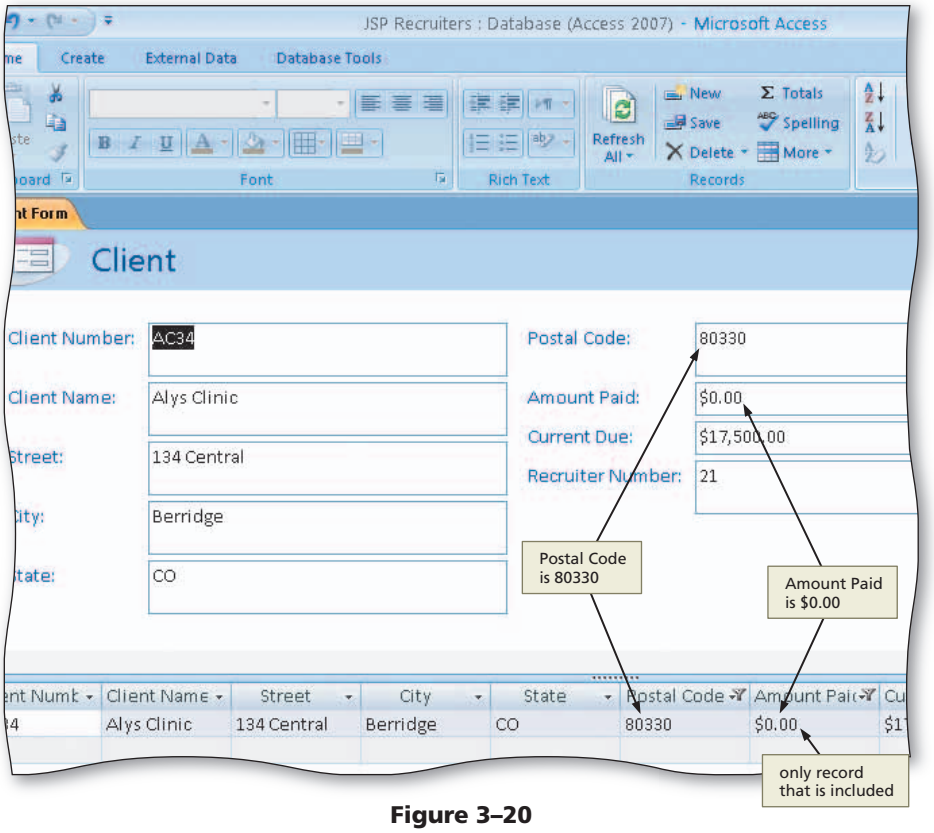


Figure 3–20

To Use Advanced Filter/Sort

In some cases, your criteria may be too complex even for Filter By Form. You might decide you want to include any client for which the postal code is 80330 and the amount paid is $0. You also may want to include any client whose amount paid is greater than $20,000, no matter where the client is located. Further, you might want to have the results sorted by name. To filter records using complex criteria, you need to use Advanced Filter/Sort as in the following steps.

1

- Click the Advanced button on the Home tab to display the Advanced menu, and then click Clear All Filters on the Advanced menu to clear the existing filter.
- Click the Advanced button on the Home tab to display the Advanced menu a second time.
- Click Advanced Filter/Sort on the Advanced menu.
- Expand the size of the field list so all the fields in the Client Table appear.
- Include the Client Number field and select Ascending as the sort order.
- Include the Postal Code field and enter 80330 as the criterion.
- Include the Amount Paid field and enter 0 as the criterion in the Criteria row and >20000 as the criterion in the Or row (Figure 3–21).

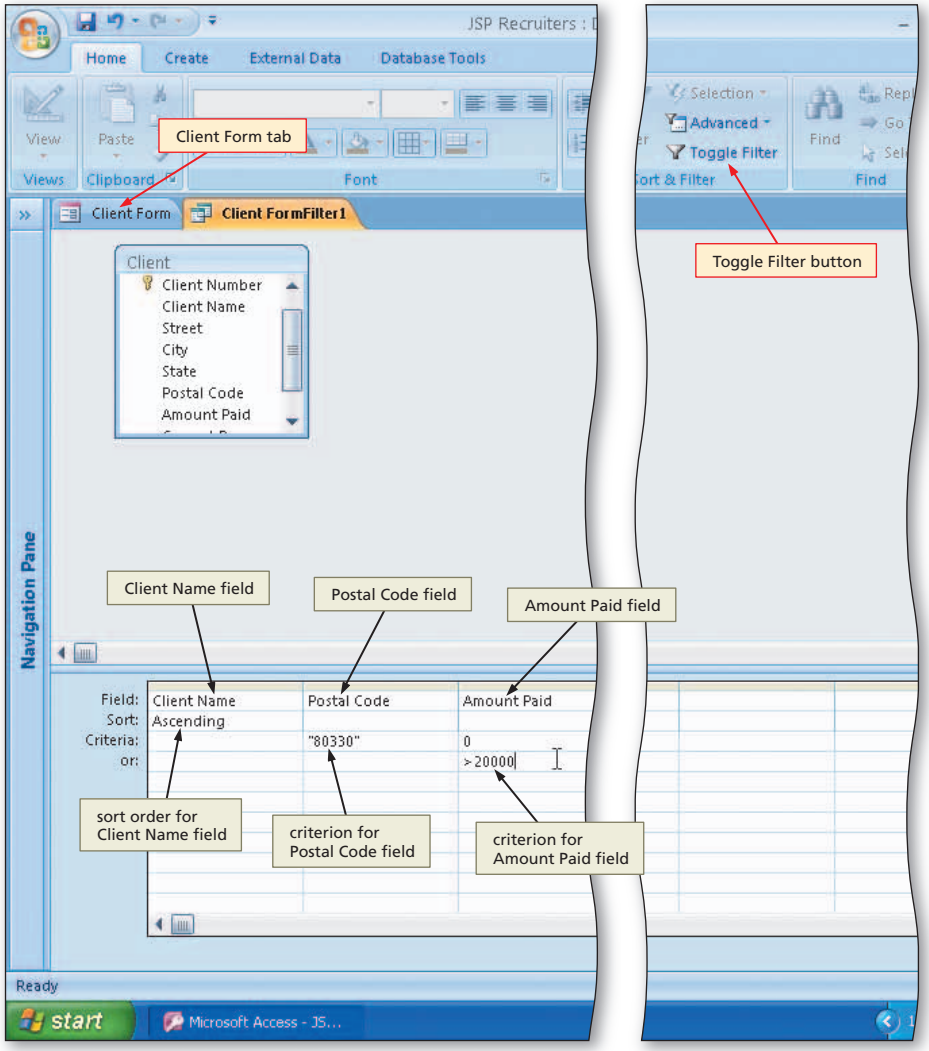


Figure 3–21

2

- Click the Toggle Filter button on the Home tab to toggle the filter and view the results. Click the Client Form tab to view the Client table (Figure 3–22).

Experiment

- Select Advanced Filter/Sort again and enter different sorting options and criteria. In each case, toggle the filter to see the effect of your selection. When done, change back to the sorting options and criteria you entered in Step 1.

3

- Click Clear All Filters on the Advanced menu.
- Close the Client Form.

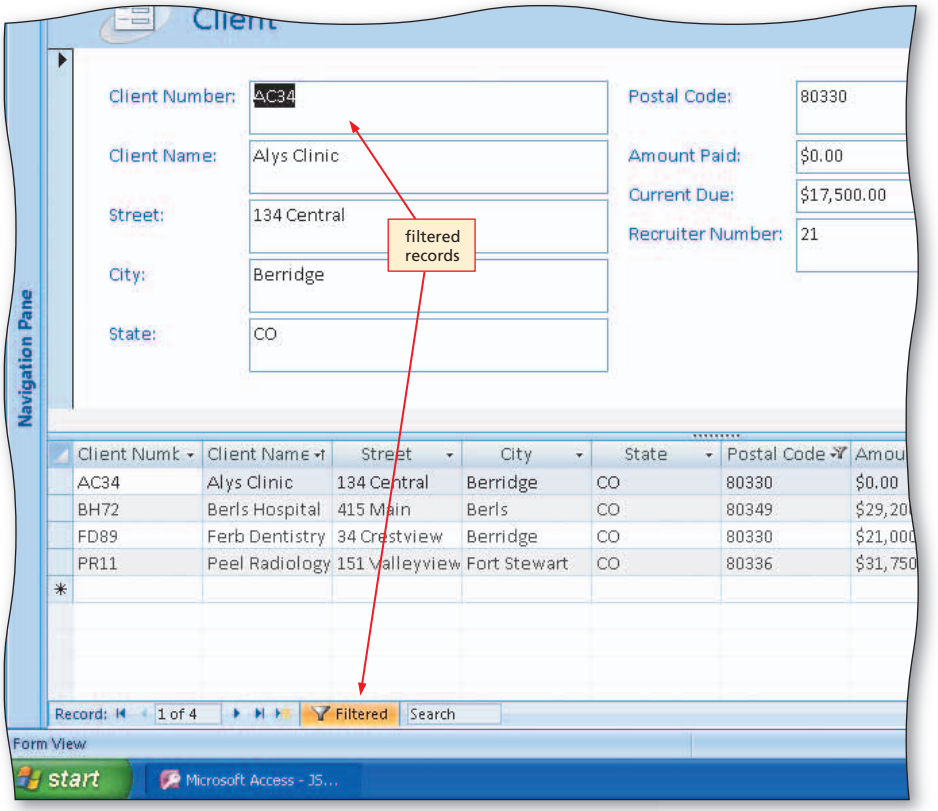


Figure 3–22

Filters and Queries

Filters and queries are related in three ways.

1. You can apply a filter to the results of a query just as you can apply a filter to a table.
2. When you have created a filter using either Filter By Form or Advanced Filter/Sort, you can save the filter settings as a query by using the Save As Query command on the Advanced menu.
3. You can restore filter settings that you previously saved in a query by using the Load From Query command on the Advanced menu.

BTW

Moving a Field in a Table Structure

If you add a field to a table and later realize the field is in the wrong location, you can move the field. To do so, click the row selector for the field and then drag the field to the new location.

Changing the Database Structure

When you initially create a database, you define its **structure**; that is, you assign names and types to all the fields. In many cases, the structure you first define will not continue to be appropriate as you use the database.

Perhaps a field currently in the table no longer is necessary. If no one ever uses a particular field, it is not needed in the table. Because it is occupying space and serving no useful purpose, you should remove it from the table. You also would need to delete the field from any forms, reports, or queries that include it.

More commonly, an organization will find that it needs to maintain additional information that was not anticipated at the time the database was first designed. The organization's own requirements may have changed. In addition, outside regulations that

the organization must satisfy may change as well. In either case, the organization must add additional fields to an existing table.

To make any of these changes, you first must open the table in Design view.

To Delete a Field

If a field in one of your tables no longer is needed; for example, it serves no useful purpose or it may have been included by mistake, you should delete the field. To delete a field you would use the following steps.

1. Open the table in Design view.
2. Click the row selector for the field to be deleted.
3. Press the DELETE key.
4. When Access displays the dialog box requesting confirmation that you want to delete the field, click the Yes button.

To Add a New Field

You can add fields to a table in a database. JSP Recruiters has decided that it needs to categorize its clients. To do so requires an additional field, Client Type. The possible values for Client Type are MED (which indicates the client is a medical institution), DNT (which indicates the client is a dental organization), or LAB (which indicates the client is a lab). The following steps add the Client Type to the Client table immediately after the Postal Code field.

1

- Show the Navigation pane, and then right-click the Client table to display a shortcut menu.
- Click Design View on the shortcut menu to open the Client table in Design view.
- Click the row selector for the Amount Paid field, and then press the INSERT key to insert a blank row above the Amount Paid row (Figure 3–23).

2

- Click the Field Name column for the new field. If necessary, erase any text that appears.
- Type `Client Type` as the field name and then press the TAB key.

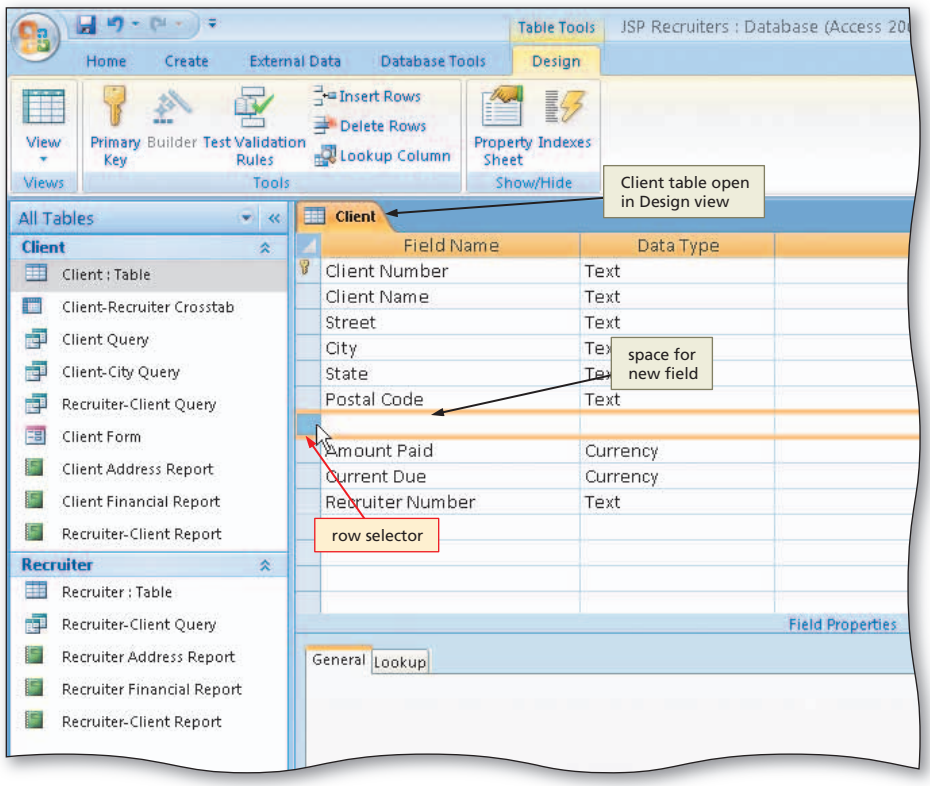


Figure 3–23

Other Ways

1. Click Insert Rows button on Ribbon

To Create a Lookup Field

Because there are only three possible values for the Client Type field, you should make it easy for users to enter the appropriate value. A **Lookup field** allows the user to select from a list of values.

The following steps make the Client Type field a Lookup field.

1

- If necessary, click the Data Type column for the Client Type field, and then click the arrow to display the menu of available data types (Figure 3–24).

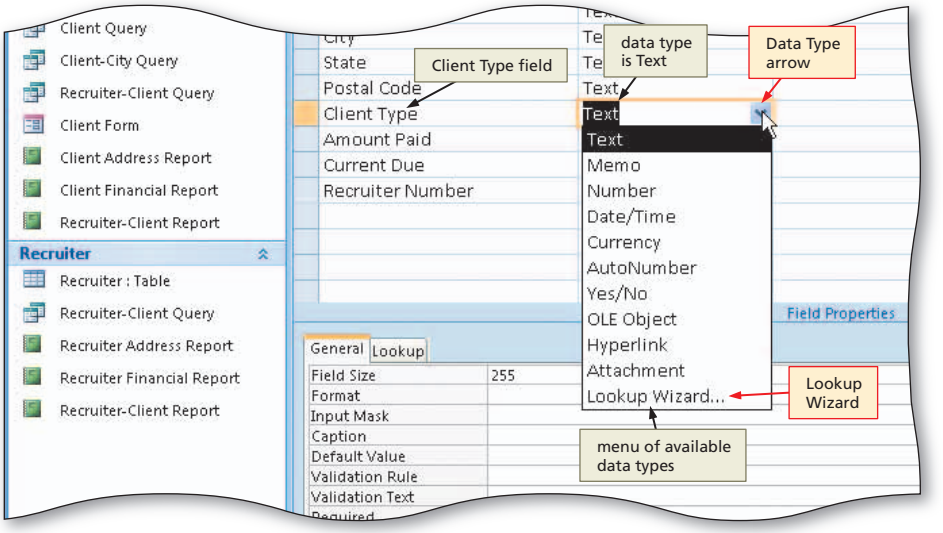


Figure 3–24

2

- Click Lookup Wizard, and then click the 'I will type in the values that I want.' option button to indicate that you will type in the values (Figure 3–25).

Q&A

When would I use the other option button?

You would use the other option button if the data to be entered in this field is found in another table or query.

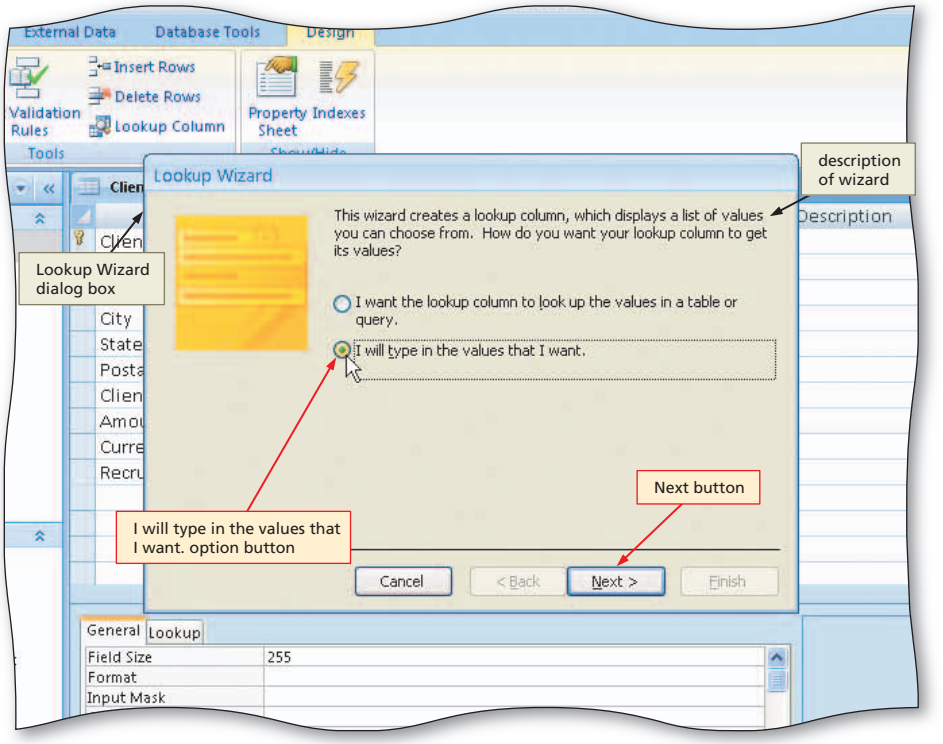


Figure 3–25

3

- Click the Next button to display the next Lookup Wizard screen (Figure 3–26).

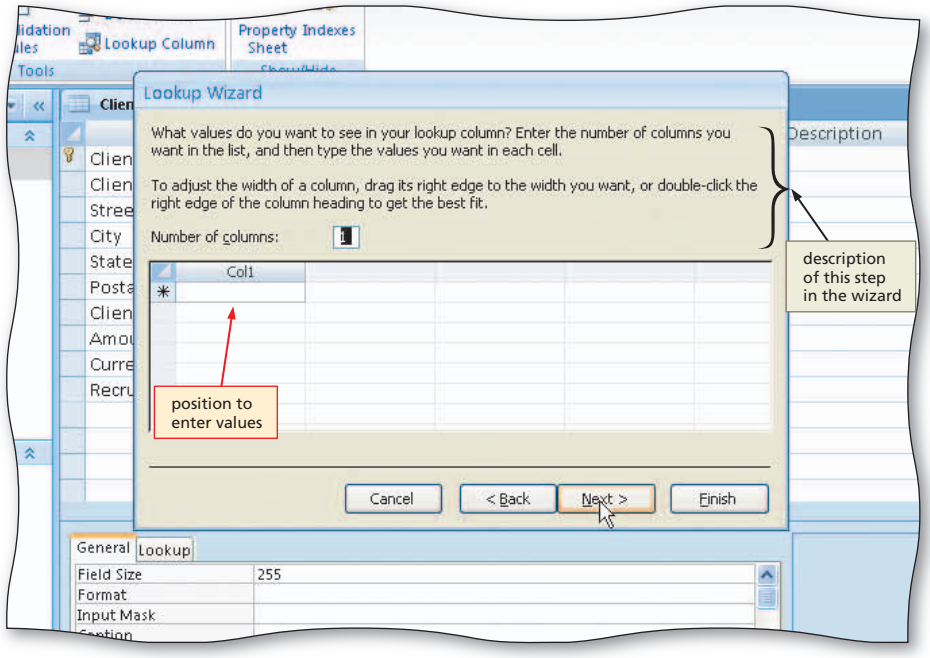


Figure 3–26

4

- Click the first row of the table (below Col1), and then type MED as the value in the first row.
- Press the DOWN ARROW key, and then type DNT as the value in the second row.
- Press the DOWN ARROW key, and then type LAB as the value in the third row (Figure 3–27).

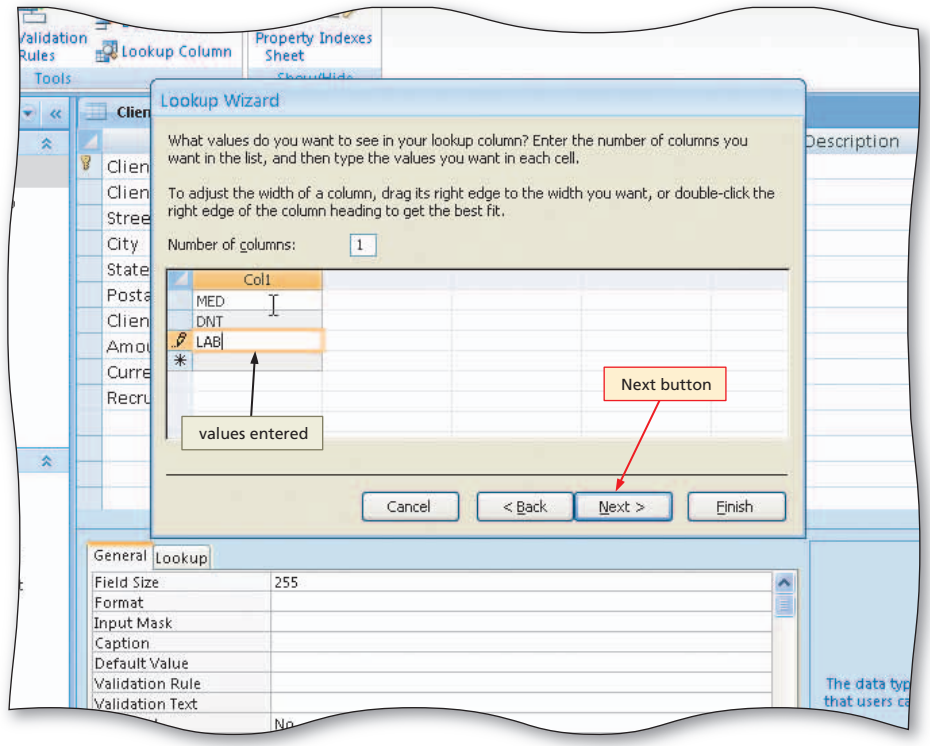


Figure 3–27

5

- Click the Next button to display the next Lookup Wizard screen.
- Ensure Client Type is entered as the label for the lookup column and that the Allow Multiple Values check box is NOT checked (Figure 3–28).

6

- Click the Finish button to complete the definition of the Lookup Wizard field.

Q&A

Why does the data type for the Client Type field still show Text?

The data type is still Text because the values entered in the wizard were entered as text.

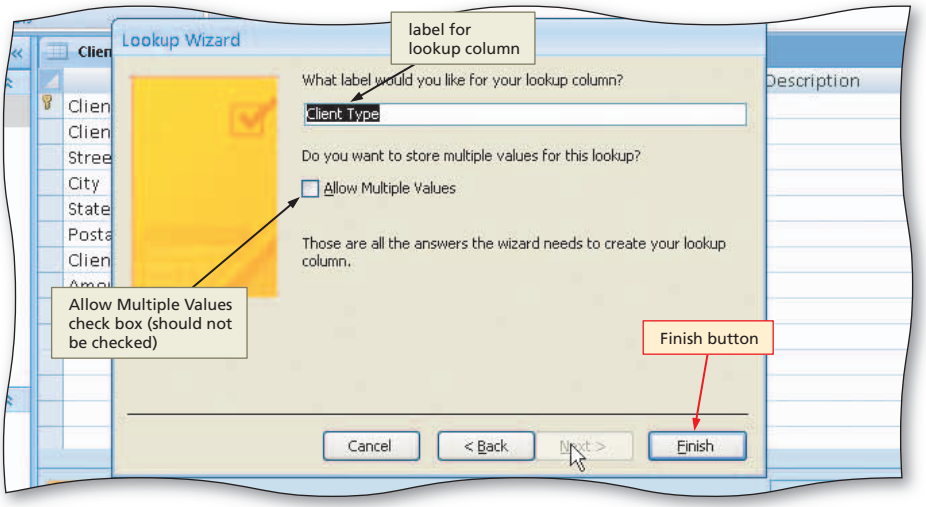


Figure 3–28

To Add a Multivalued Field

BTW

Multivalued Fields

If you plan to move your data to SQL Server at a later date, do not use multivalued fields. When you upsize a database containing multivalued fields to SQL Server, the field is converted to a memo field that contains the delimited set of values. This may mean that you need to do some redesign of your database.

Normally, fields contain only a single value. In Access 2007 it is possible to have **multivalued fields**, that is, fields that can contain more than one value. JSP Recruiters wants to use such a field to store the abbreviations of all the specialties their clients need (see Table 3–1 for the specialty abbreviations and descriptions). Unlike the Client Type, where each client only had one type, clients can require multiple specialty descriptions.

Table 3–1 Specialty Abbreviations and Descriptions

Specialty Abbreviation	Description
CLS	Clinical Laboratory Specialist
CNA	Certified Nursing Assistant
CRNA	Certified Registered Nurse Anesthetist
DH	Dental Hygienist
Dnt	Dentist
EMT	Emergency Medical Technician
NP	Nurse Practitioner
OT	Occupational Therapist
PA	Physician Assistant
Phy	Physician
PT	Physical Therapist
RN	Registered Nurse
RT	Respiratory Therapist

One client might need CNA, PA, Phy, and RN employees (Certified Nursing Assistants, Physician Assistants, Physicians, and Registered Nurses). Another client might only need RTs (Respiratory Therapists).

To create a multivalued field, create a Lookup field being sure to check the Allow Multiple Values check box. The following steps create a multivalued field.

1. Click the row selector for the Amount Paid field, and then press the INSERT key to insert a blank row.
2. Click the Field Name column for the new field, type `Specialties Needed` as the field name, and then press the DOWN ARROW key.
3. Click the Data Type column for the Specialties Needed field, and then click Lookup Wizard in the menu of available data types to start the Lookup Wizard.
4. Click the 'I will type in the values that I want.' option button to indicate that you will type in the values.
5. Click the Next button to display the next Lookup Wizard screen.
6. Click the first row of the table (below Col1), and then type `CLS` as the value in the first row.
7. Enter the remaining values from the first column in Table 3–1. Before typing each value, press the TAB key to move to a new row.
8. Click the Next button to display the next Lookup Wizard screen.
9. Ensure Specialties Needed is entered as the label for the lookup column.
10. Click the Allow Multiple Values check box to allow multiple values.
11. Click the Finish button to complete the definition of the Lookup Wizard field.

To Save the Changes and Close the Table

The following steps save the changes; that is, it saves the addition of the two new fields and closes the table.

1. Click the Save button on the Quick Access Toolbar to save the changes.
2. Click the Close 'Client' button.

To Modify Single or Multivalued Lookup Fields

You may find that you later want to change the list of choices in a Lookup field. If you find you need to modify a single or multivalued Lookup field you have created, you can use the following steps.

1. Open the table in Design view and select the field to be modified.
2. Click the Lookup Tab in the field properties.
3. Change the list in the Row Source property to change the desired list of values.

BTW

Modifying Table Properties

You can change the properties of a table by opening the table in Design view and then clicking the Property Sheet button on the Table Tools tab. Access will display the property sheet for the table. To display the records in a table in an order other than primary key order (the default sort order), use the Order By property. For example, to display the Client table automatically in Client Name order, click the Order By property box, type Client.Client Name in the property box, close the property sheet, and save the change to the table design. When you open the Client table in Datasheet view, the records will be sorted in Client Name order.

Mass Changes

In some cases, rather than making individual changes to records, you will want to make mass changes. That is, you will want to add, change, or delete many records in a single operation. You can do this with action queries. An **action query** adds, deletes, or changes data in a table. An **update query** allows you to make the same change to all records satisfying some criterion. If you omit the criterion, you will make the same changes to all records in the table. A **delete query** allows you to delete all the records satisfying some criterion. You can add the results of a query to an existing table by using an **append query**. You also can add the results to a new table by using a **make-table query**.

To Use an Update Query

The Client Type field is blank on every record. One approach to entering the information for the field would be to step through the entire table, assigning each record its appropriate value. If most of the clients have the same type, a simpler approach is available.

In the JSP Recruiters database, for example, most clients are type MED. Initially, you can set all the values to MED. To accomplish this quickly and easily, you can use an update query, which is a query that makes the same change to all the records satisfying a criterion. Later, you can change the type for dental organizations and labs.

The following steps use an update query to change the value in the Client Type field to MED for all the records. Because all records are to be updated, criteria are not required.

1

- Create a new query for the Client table.
- Click the Update button on the Design tab, double-click the Client Type field to select the field, click the Update To row in the first column of the design grid, and then type `MED` as the new value (Figure 3–29).

Q&A

Don't I have to enter a criterion?

If you only want the change to be made on some of the records, you would need to enter a criterion to identify those records. Without a criterion, the change will be made on all records, which is what you want in this update.

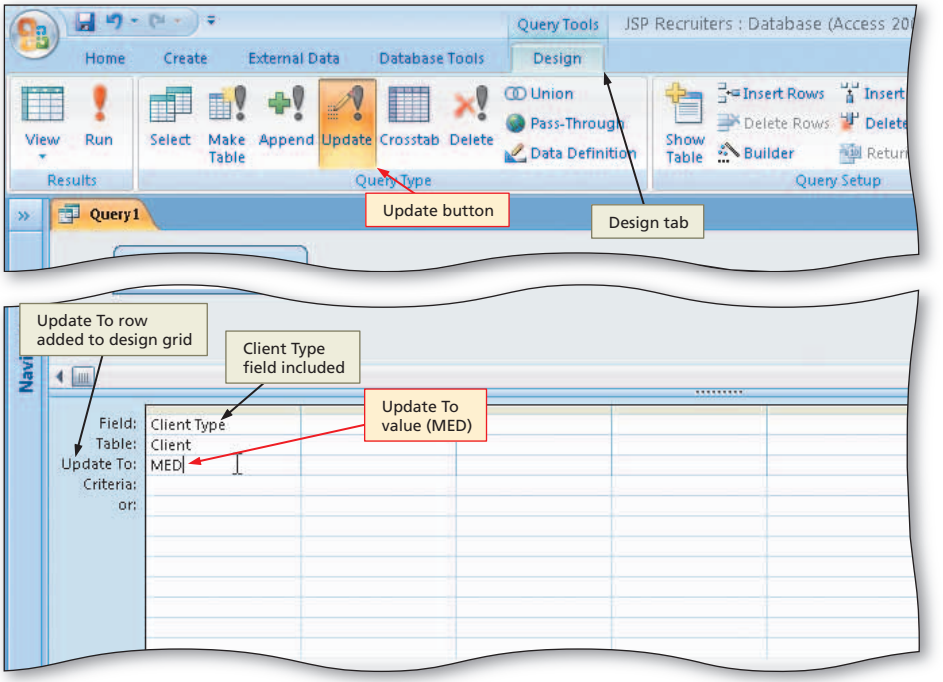


Figure 3–29

2

- Click the Run button on the Design tab to run the query and update the records (Figure 3–30).

Q&A Why don't I click the View button to update the records?

The purpose of the View button is to simply view results. The Run button causes the updates specified by the query to take place.

Q&A Why doesn't the dialog box appear on my screen when I click the Run button?

If the dialog box does not appear, it means that you did not choose the Enable this content option button when you first opened the database. Close the database, open it again, and enable the content in the Microsoft Office Security Options dialog box. Then, create and run the query again.

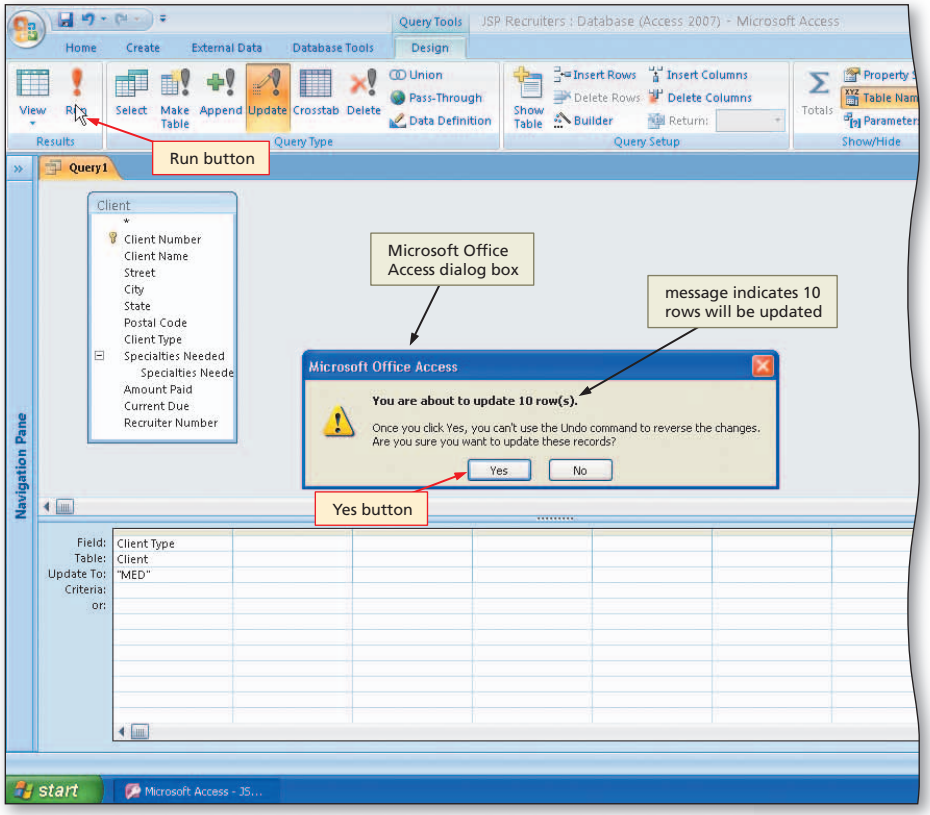


Figure 3–30

Experiment

- Create an Update query to change the client type to DNT. Enter a criterion to restrict the records to be updated, and then run the query. Open the table to view your changes. When finished, create and run an Update query to change the client type to MED on all records.

3

- Click the Yes button to make the changes.

Other Ways

1. Right-click any open area in upper pane, point to Query Type on shortcut menu, click Update Query on Query Type submenu

To Use a Delete Query

In some cases, you may need to delete several records at a time. If, for example, all clients in a particular postal code are to be serviced by another firm, the clients with this postal code can be deleted from the JSP Recruiters database. Instead of deleting these clients individually, which could be very time-consuming in a large database, you can delete them in one operation by using a **delete query**, which is a query that will delete all the records satisfying the criteria entered in the query.

You can preview the data to be deleted in a delete query before actually performing the deletion. To do so, click the View button after you create the query, but before you run it. The records to be deleted then would appear in Datasheet view. To delete the records, click the View button again to change to Design view. Click the Run button, and then click the Yes button in the Microsoft Office Access dialog box when asked if you want to delete the records.

The following steps use a delete query to delete any client whose postal code is 80412 without first previewing the data to be deleted. (Only one such client currently exists in the database.)

1

- Clear the grid.
- Click the Delete button on the Design tab to make the query a Delete query (Figure 3–31).
- Double-click the Postal Code field to select the field.
- Click the Criteria row for the Postal Code field and type `80412` as the criterion.

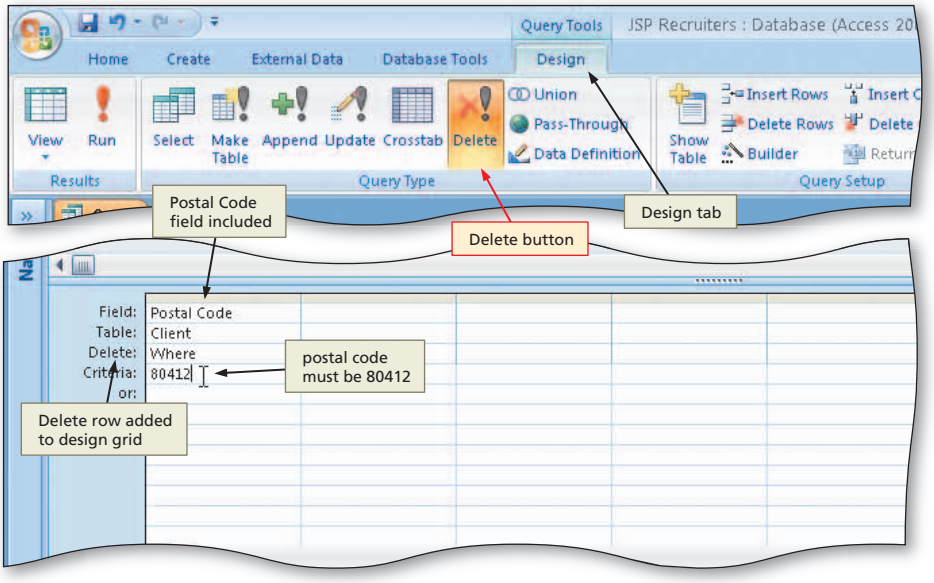


Figure 3–31

2

- Run the query by clicking the Run button (Figure 3–32).

3

- Click the Yes button to complete the deletion.
- Close the Query window. Do not save the query.

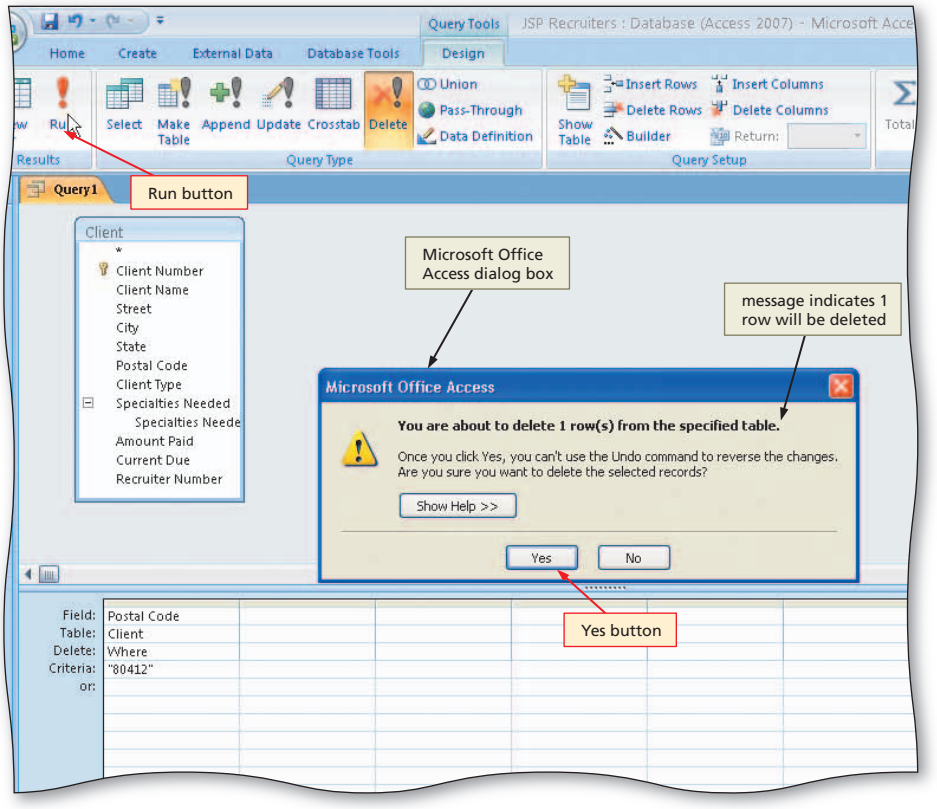


Figure 3–32

Other Ways

1. Right-click any open area in upper pane, point to Query Type on shortcut menu, click Delete Query on Query Type submenu

To Use an Append Query

An append query adds a group of records from one table to the end of another table. For example, suppose that JSP Recruiters acquires some new clients and a database containing a table with those clients. To avoid entering all this information manually, you can append it to the Client table in the JSP Recruiters database using the append query. To create an append query, you would use the following steps.

1. Create a query for the table containing the records to append.
2. In Design view, indicate the fields to include, and then enter any necessary criteria.
3. View the query results to be sure you have specified the correct data, and then return to Design view.
4. Click the Append button on the Design tab.
5. When Access displays the Append dialog box, specify the name of the table to receive the new records and its location. Run the query by clicking the Run button on the Design tab.
6. When Access indicates the number of records to be appended, click the Yes button.

To Use a Make-Table Query

In some cases, you might want to add the records from an existing table to a new table, that is, a table that has not yet been created. If so, use a make-table query to add the records to a new table. Access will create this table as part of the process and add the records to it. To create a make-table query, you would use the following steps.

1. Create a query for the table containing the records to add.
2. In Design view, indicate the fields to include, and then enter any necessary criteria.
3. View the query results to be sure you have specified the correct data, and then return to Design view.
4. Click the Make Table button on the Design tab.
5. When Access displays the Make Table dialog box, specify the name of the table to receive the new records and its location. Run the query by clicking the Run button on the Design tab.
6. When Access indicates the number of records to be inserted, click the Yes button.

Validation Rules

You now have created, loaded, queried, and updated a database. Nothing you have done so far, however, makes sure that users enter only valid data. To ensure the entry of valid data, you create **validation rules**; that is, rules that a user must follow when entering the data. As you will see, Access will prevent users from entering data that does not follow the rules. The steps also specify **validation text**, which is the message that will appear if a user violates the validation rule.

Validation rules can indicate a **required field**, a field in which the user actually must enter data. For example, by making the Client Name field a required field, a user actually must enter a name (that is, the field cannot be blank). Validation rules can make sure a user's entry lies within a certain **range of values**; for example, that the values in the Amount Paid field are between $0.00 and $100,000.00. They can specify a **default value**; that is, a value that Access will display on the screen in a particular field before the user begins adding a record. To make data entry of client numbers more convenient, you also can have lowercase letters appear automatically as uppercase letters. Finally, validation rules can specify a collection of acceptable values; for example, that the only legitimate entries for the Client Type field are MED, DNT, and LAB.

BTW

Using Wildcards in Validation Rules

You can include wildcards in validation rules. For example, if you enter the expression, like C?, in the Validation Rule box for the State field, the only valid entries for the field will be CA, CO, and CT.

To Specify a Required Field

To specify that a field is to be required, change the value for the Required property from No to Yes. The following steps specify that the Client Name field is to be a required field.

1

- Show the Navigation pane, and then open the Client table in Design view.
- Select the Client Name field by clicking its row selector.
- Click the Required property box in the Field Properties pane, and then click the down arrow that appears.
- Click Yes in the list (Figure 3–33).

Q&A What is the effect of this change?

Users cannot leave the Client Name field blank when entering or editing records.

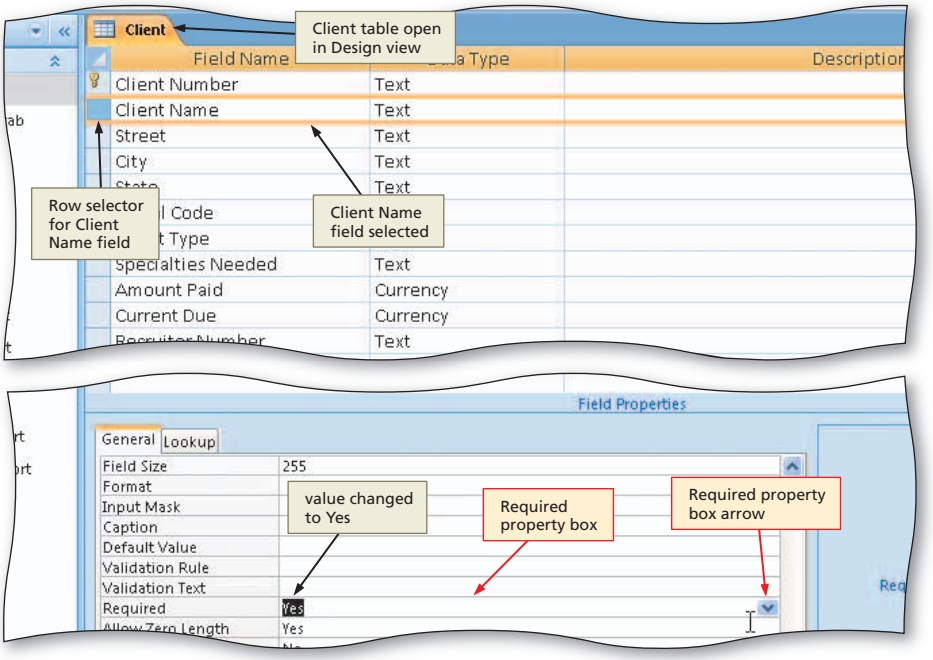


Figure 3–33

To Specify a Range

The following step specifies that entries in the Amount Paid field must be between $0.00 and $100,000.00. To indicate this range, the criterion specifies that the amount paid value must be both >= 0 (greater than or equal to 0) and <= 100000 (less than or equal to 100000).

1

- Select the Amount Paid field by clicking its row selector, click the Validation Rule property box to produce an insertion point, and then type `>=0 and <=100000` as the rule.
- Click the Validation Text property box to produce an insertion point, and then type `Must be at least $0.00 and at most $100,000` as the text (Figure 3–34).

Q&A What is the effect of this change?

Users now will be prohibited from entering an amount paid value that either is less than $0.00 or greater than $100,000.00 when they add records or change the value in the Amount Paid field.

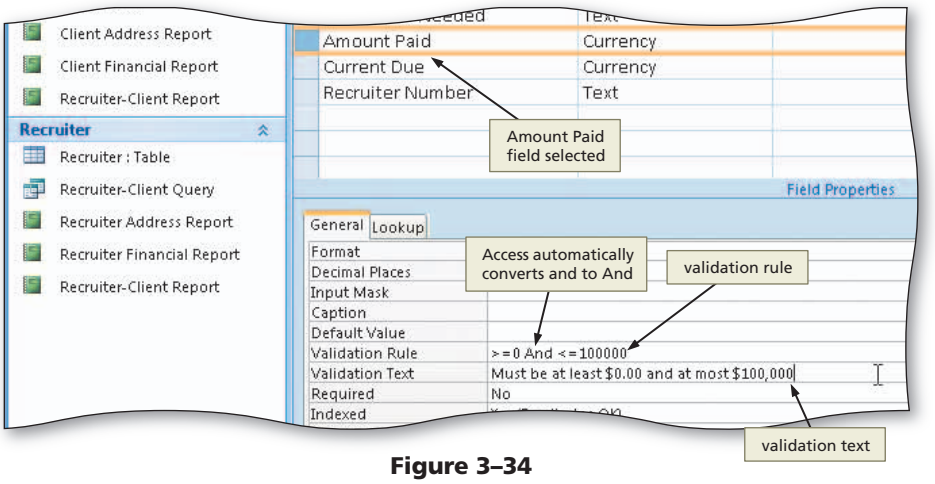


Figure 3–34

To Specify a Default Value

To specify a default value, enter the value in the Default Value property box. The following step specifies MED as the default value for the Client Type field. This simply means that if users do not enter a client type, the type will be MED.

1

- Select the Client Type field. Click the Default Value property box to produce an insertion point, and then type `=MED` as the value (Figure 3–35).

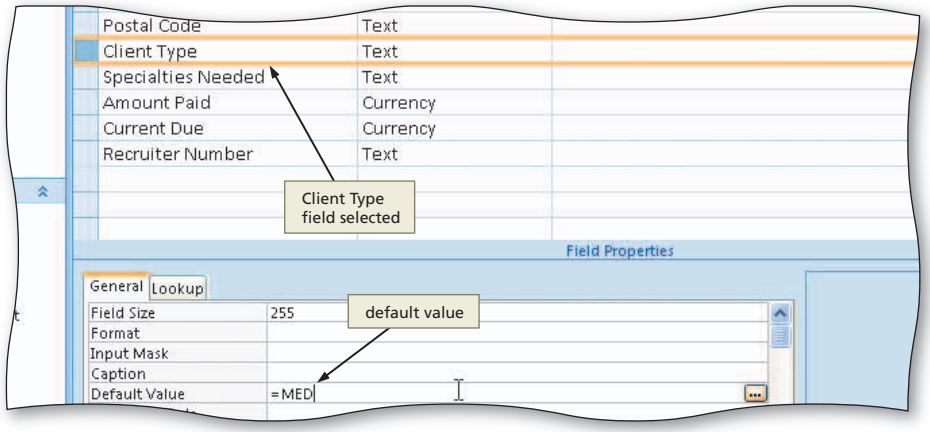


Figure 3–35

To Specify a Collection of Allowable Values

The only allowable values for the Client Type field are MED, DNT, and LAB. An appropriate validation rule for this field prevents Access from accepting any entry other than these three possibilities. The following step specifies the legal values for the Client Type field.

1

- Make sure the Client Type field is selected.
- Click the Validation Rule property box to produce an insertion point and then type `=MED or =DNT or =LAB` as the validation rule.
- Click the Validation Text property box and then type `Must be MED, DNT, or LAB` as the validation text (Figure 3–36).

Q&A

What is the effect of this change?

Users now will be allowed to enter only MED, DNT, or LAB in the Client Type field when they add records or make changes to this field.

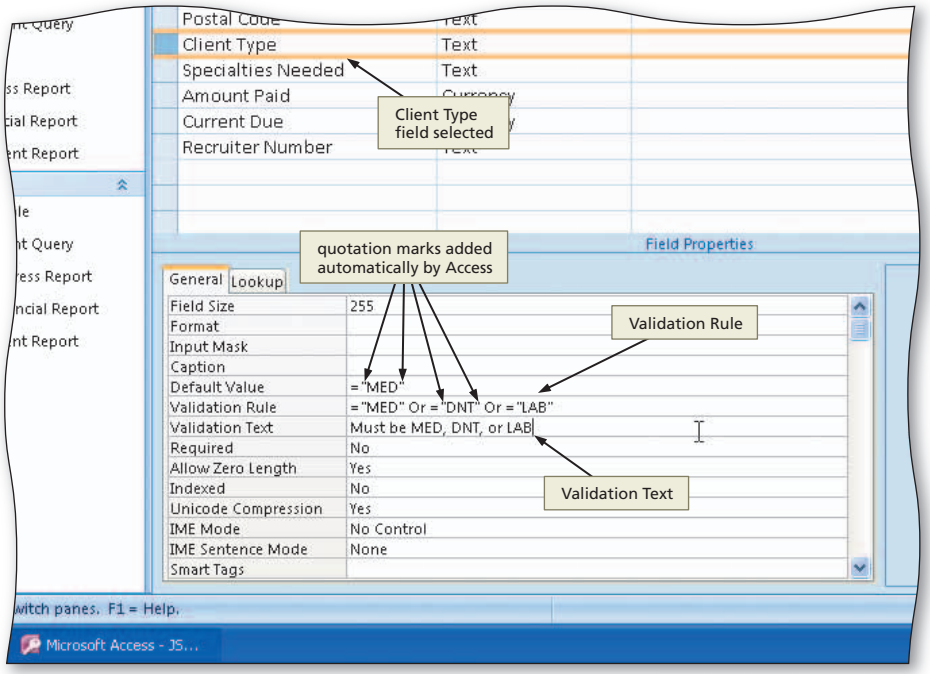


Figure 3–36

To Specify a Format

To affect the way data appears in a field, you can use a **format**. To use a format with a Text field, you enter a special symbol, called a **format symbol**, in the field's Format property box. The Format property uses different settings for different data types. The following step specifies a format for the Client Number field in the Client table and illustrates the way you enter a format. The format symbol used in the example is >, which causes Access to display lowercase letters automatically as uppercase letters. The format symbol < causes Access to display uppercase letters automatically as lowercase letters.

1

- Select the Client Number field.
- Click the Format property box and then type > (Figure 3–37).

Q&A What is the effect of this change?

From this point on, any lowercase letters will appear automatically as uppercase when users add records or change the value in the Client Number field.

Q&A Client numbers are supposed to be four characters long. Is there a way to ensure users don't type more than four characters?

Yes. The Field Size property dictates how many characters the users can type, so if you wanted to ensure that a maximum of four characters be allowed, you could change the field size from 255 to 4.

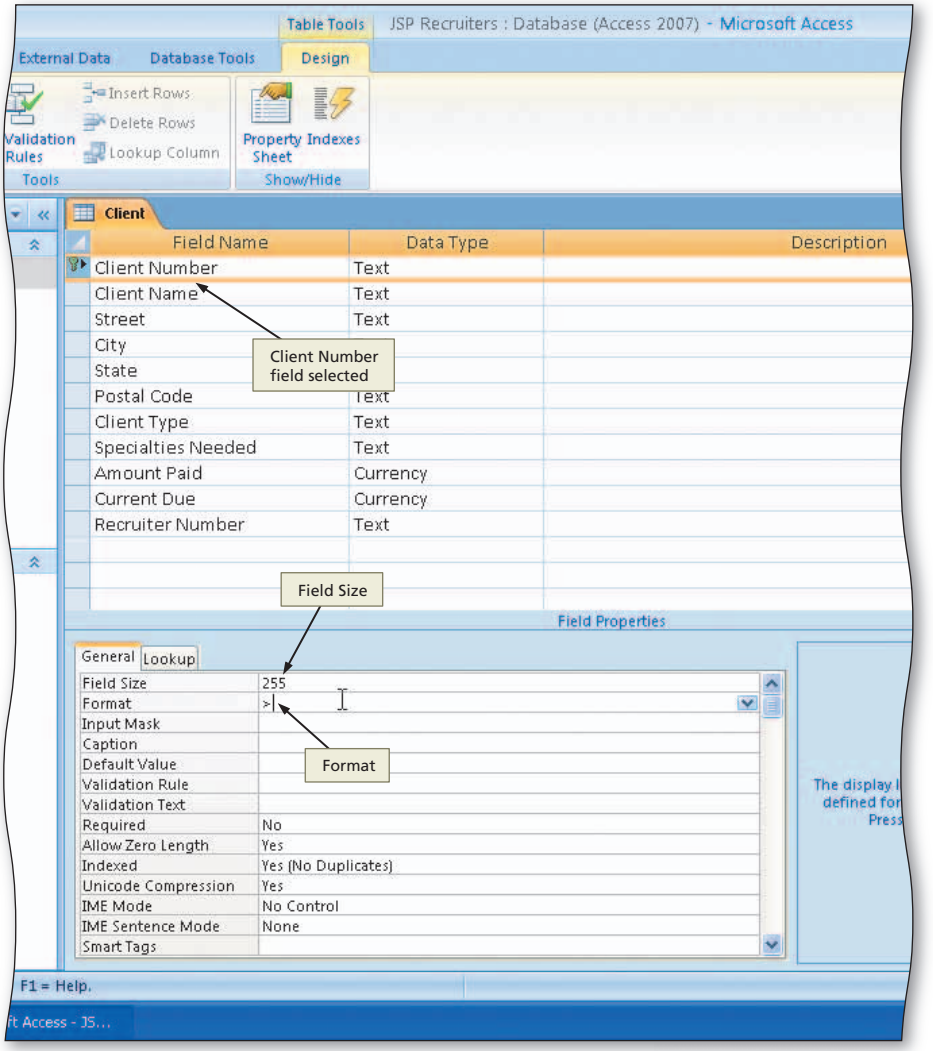


Figure 3–37

To Save the Validation Rules, Default Values, and Formats

The following steps save the validation rules, default values, and formats.

1. Click the Save button on the Quick Access Toolbar to save the changes (Figure 3–38).

2. Click the No button to save the changes without testing current data.

- Close the Client table.

Q&A Should I always click the No button when saving validation rules?

If this were a database used to run a business or to solve some other critical need, you would click Yes. You would want to be sure that the data already in the database does not violate the rules.

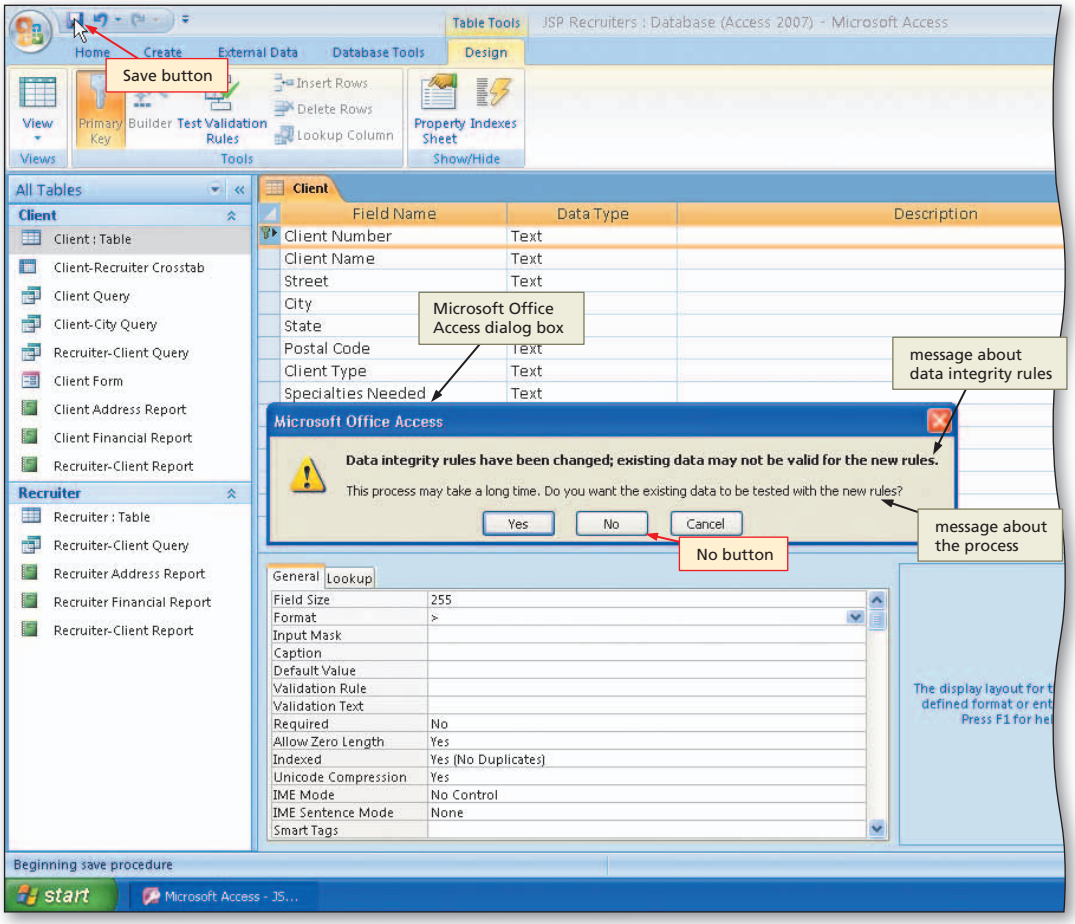


Figure 3–38

BTW **Changing Data Types**
It is possible to change the data type for a field that already contains data. Before you change a data type, however, you should consider what effect the change will have on other database objects, such as forms, queries, and reports. For example, you could convert a Text field to a Memo field if you find that you do not have enough space to store the data that you need. You also could convert a Number field to a Currency field or vice versa.

Updating a Table that Contains Validation Rules

When updating a table that contains validation rules, Access provides assistance in making sure the data entered is valid. It helps in making sure that data is formatted correctly. Access also will not accept invalid data. Entering a number that is out of the required range, for example, or entering a value that is not one of the possible choices, will produce an error message in the form of a dialog box. The database will not be updated until the error is corrected.

If the client number entered contains lowercase letters, such am49 (Figure 3–39), Access will display the data automatically as AM49 (Figure 3–40).

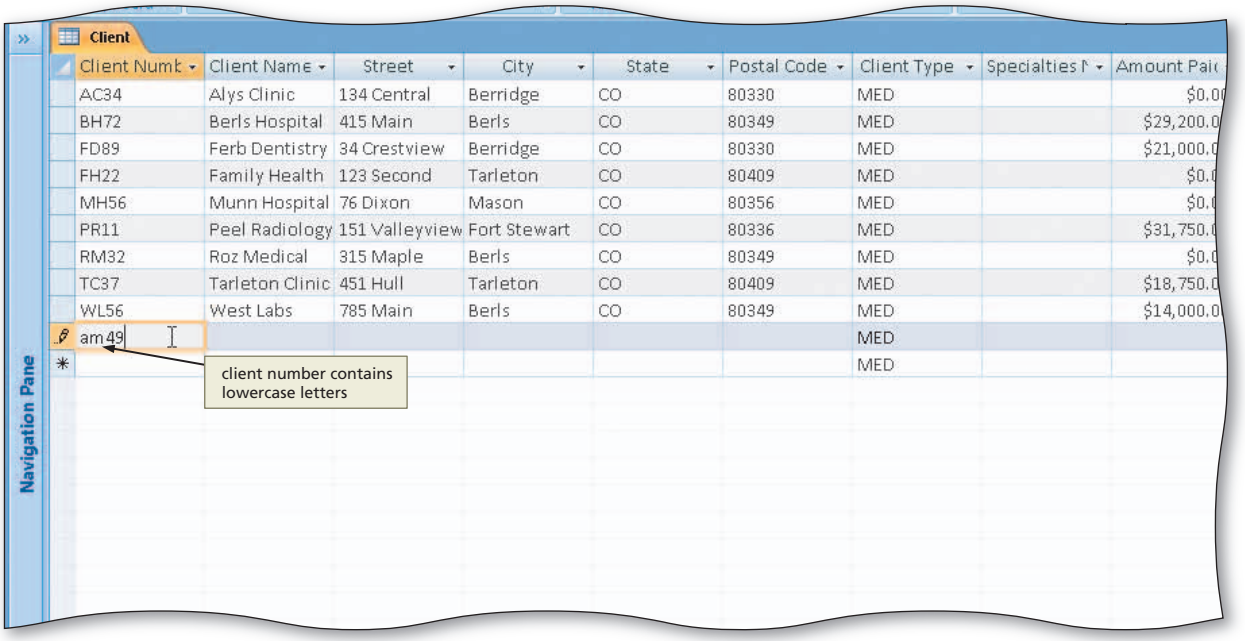


Figure 3–39

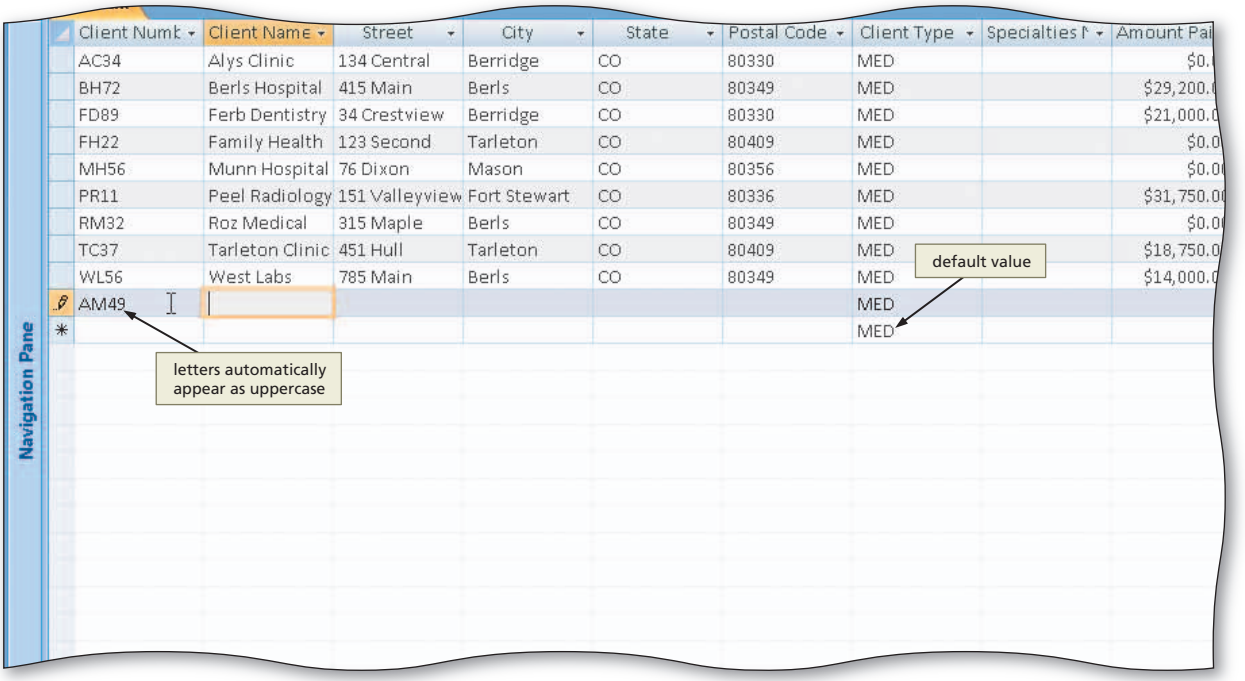


Figure 3–40

If the client type is not valid, such as xxx, Access will display the text message you specified (Figure 3–41) and not allow the data to enter the database.

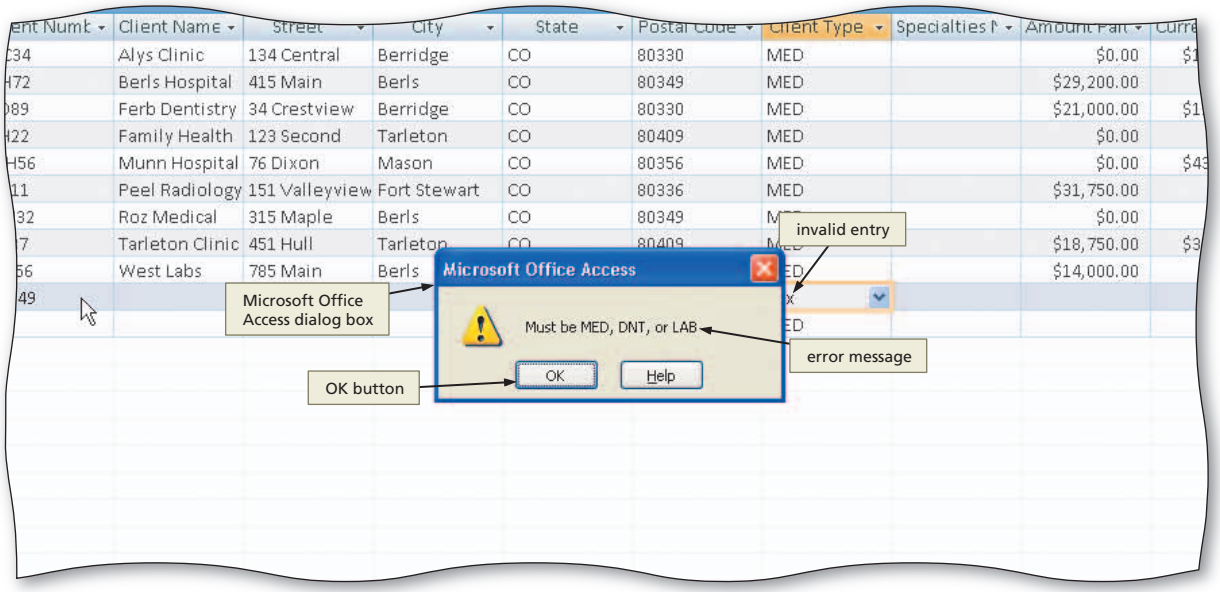


Figure 3–41

If the amount paid value is not valid, such as 125000, which is too large, Access also displays the appropriate message (Figure 3–42) and refuses to accept the data.

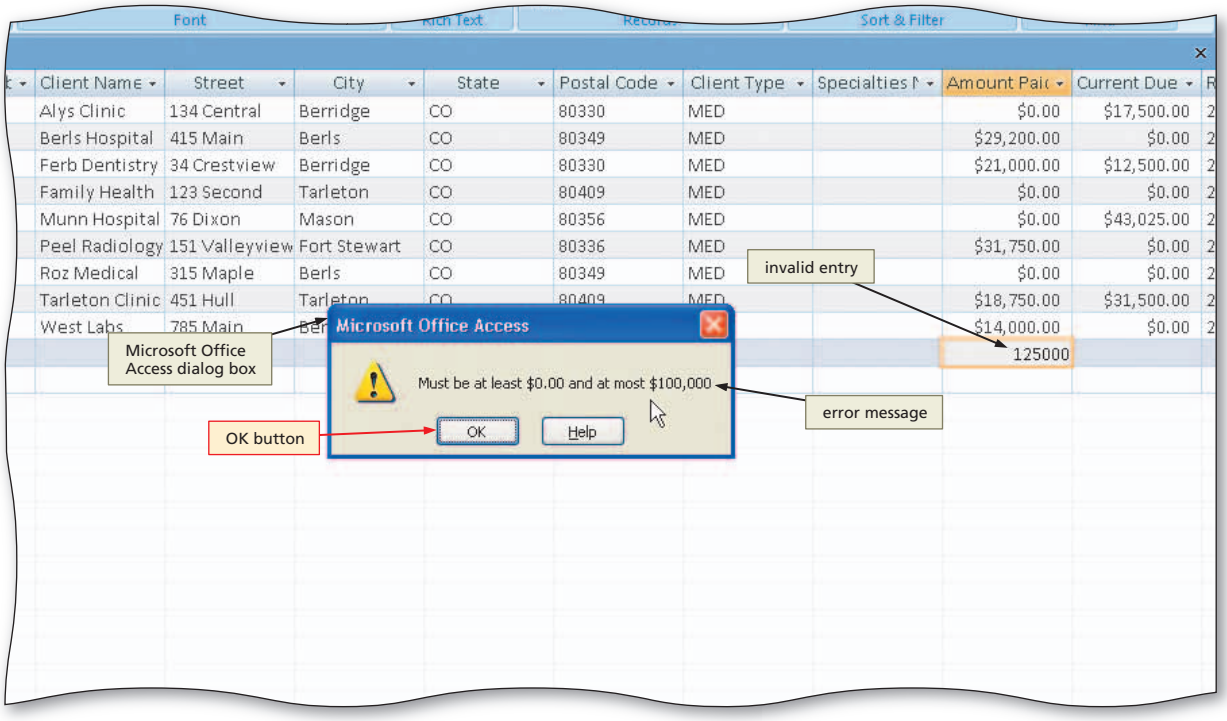


Figure 3–42

If a required field contains no data, Access indicates this by displaying an error message as soon as you attempt to leave the record (Figure 3–43). The field must contain a valid entry before Access will move to a different record.

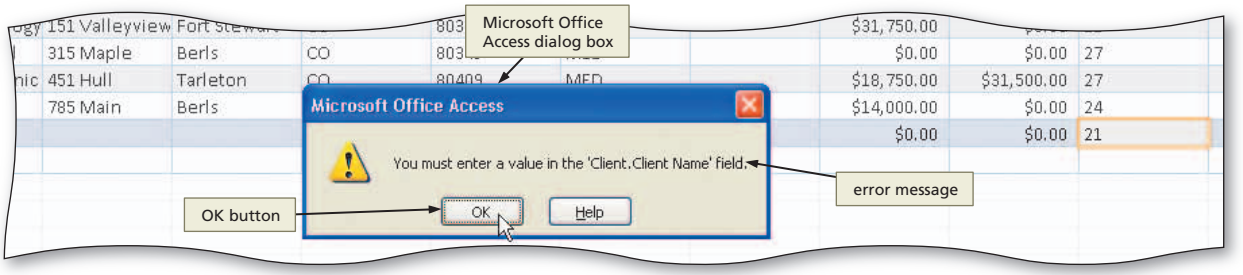


Figure 3–43

When entering data into a field with a validation rule, you may find that Access displays the error message and you are unable to make the necessary correction. It may be that you cannot remember the validation rule you created or it was created incorrectly. In such a case, you neither can leave the field nor close the table because you have entered data into a field that violates the validation rule.

If this happens, first try again to type an acceptable entry. If this does not work, repeatedly press the BACKSPACE key to erase the contents of the field and then try to leave the field. If you are unsuccessful using this procedure, press the ESC key until the record is removed from the screen. The record will not be added to the database.

Should the need arise to take this drastic action, you probably have a faulty validation rule. Use the techniques of the previous sections to correct the existing validation rules for the field.

To Use a Lookup Field

Earlier, you changed all the entries in the Client Type field to MED. Thus, you have created a rule that will ensure that only legitimate values (MED, DNT, or LAB) can be entered in the field. You also made Client Type a Lookup field using a mass change. You can make changes to a Lookup field by clicking the field to be changed, clicking the arrow that appears in the field, and then selecting the desired value from the list.

The following steps change the Client Type value on the third record to DNT and on the ninth record to LAB.

1

- Open the Client table in Datasheet view and ensure the Navigation pane is hidden.
- Click in the Client Type field on the third record to display the arrow (Figure 3–44).

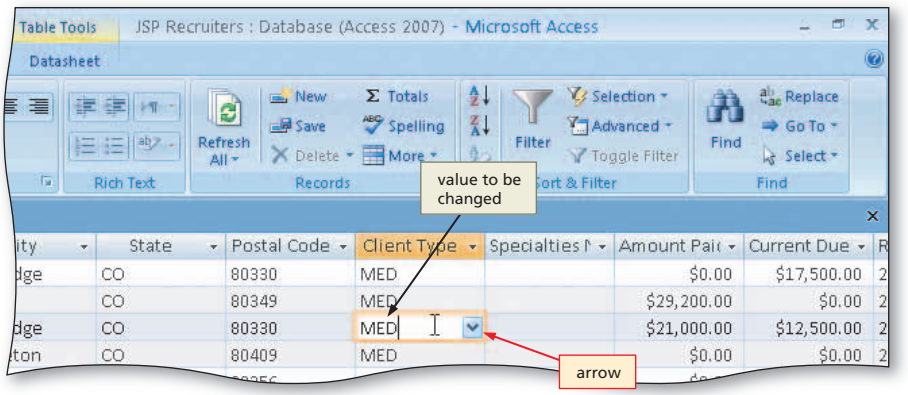


Figure 3–44

2

- Click the down arrow to display the drop-down list of available choices for the Client Type field (Figure 3–45).

Q&A

Could I type the value instead of selecting it from the list?

Yes. Once you have either deleted the previous value or selected the entire previous value, you can begin typing. You do not have to type the full entry. When you begin with the letter, D, for example, Access will automatically add the NT.

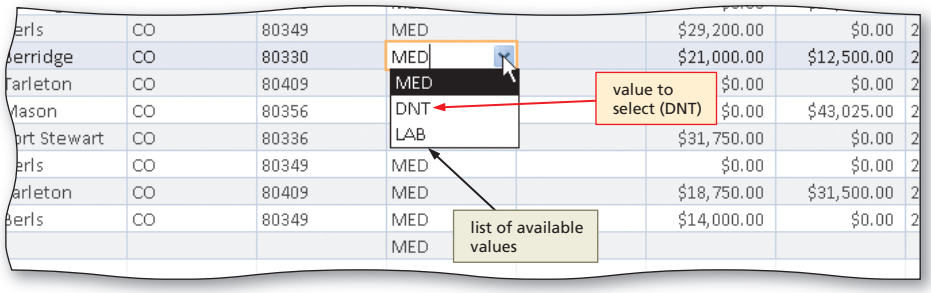


Figure 3–45

Experiment

- Select the Client Type field on the first record. Try to change the client type by typing various values. Try to type an invalid Client Type (like SPT). When finished, change the value on the record to MED.

3

- Click DNT to change the value.
- In a similar fashion, change MED on the ninth record to LAB (Figure 3–46).

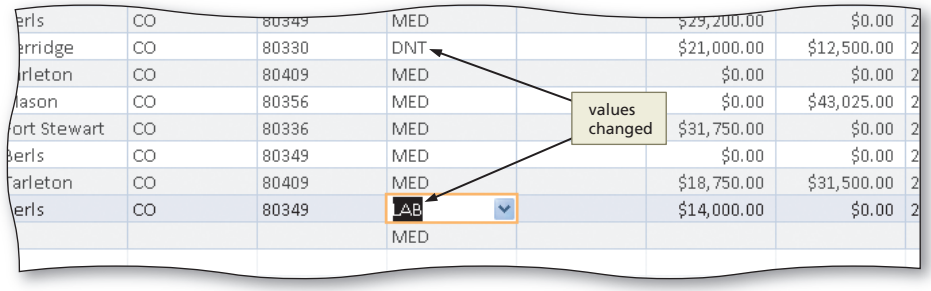


Figure 3–46

To Use a Multivalued Lookup Field

Using a multivalued Lookup field is similar to using a regular Lookup field. The difference is that when you drop down the list, the entries all will be preceded by check boxes. You then can check all the entries that you want. The appropriate entries are shown in Figure 3–47. As indicated in the figure, the specialties needed for client AC34 are CNA, PA, Phy, and RN.

Client Number	Client Name	Specialties Needed
AC34	Alys Clinic	CNA, PA, Phy, RN
BH72	Berls Hospital	CLS, OT, PA, Phy, PT, RN
FD89	Ferb Dentistry	DH, Dnt
FH22	Family Health	NP, Phy, RN
MH56	Munn Hospital	CRNA, OT, Phy, PT, RN
PR11	Peel Radiology	RT
RM32	Roz Medical	CNA, NP, PA, Phy, RN
TC37	Tarleton Clinic	NP, PA, Phy, RN
WL56	West Labs	CLS

Figure 3–47

The following steps make the appropriate entries for the Specialties Needed field.

1

- Click the Specialties Needed field on the first record to display the arrow.
- Click the arrow to display the list of available specialties (Figure 3–48).

Q&A

All the specialties currently appear in the box. What if there were too many specialties to fit?

Access would automatically include a scroll bar that you could use to scroll through all the choices.

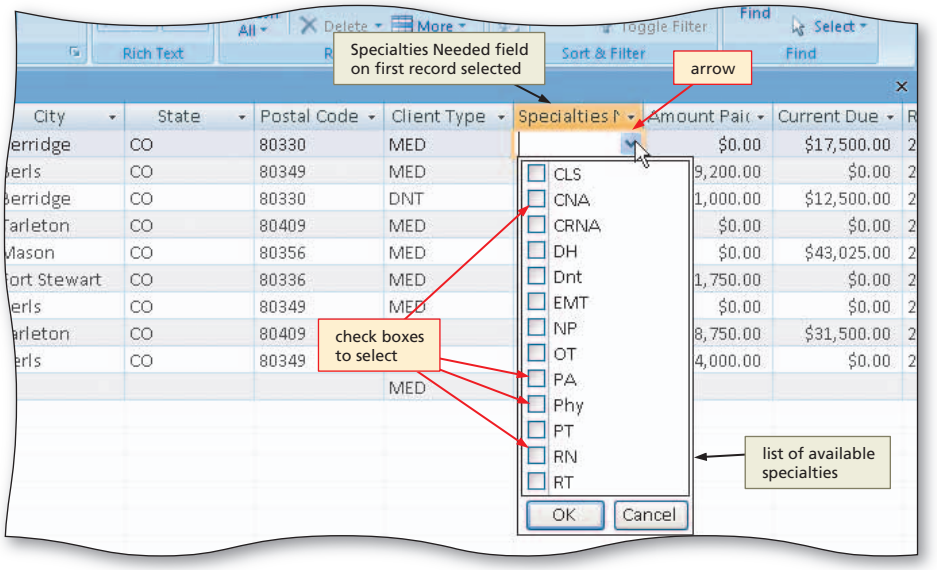


Figure 3–48

2

- Click the CNA, PA, Phy, and RN check boxes to select the specialties for the first client (Figure 3–49).

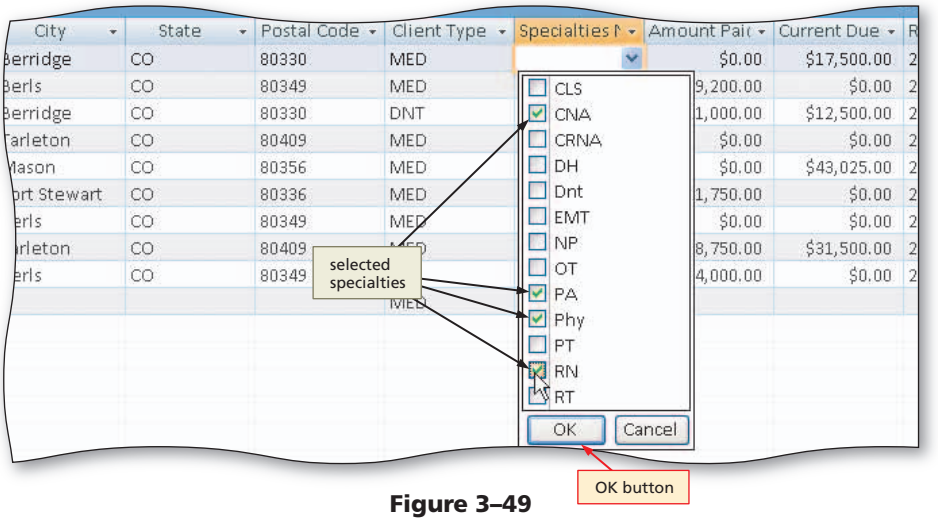


Figure 3–49

3

- Click the OK button to complete the selection.
- Using the same technique, enter the specialties given in Figure 3–47 on the previous page for the remaining clients (Figure 3–50).

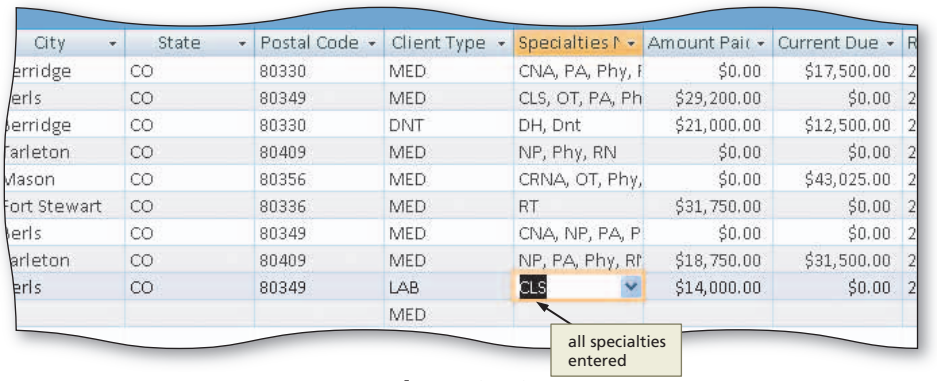


Figure 3–50

To Resize a Column in a Datasheet

The Access default column sizes do not always allow all the data in the field to appear. In some cases, the data may appear, but not the entire field name. You can correct this problem by **resizing** the column (changing its size) in the datasheet. In some instances, you may want to reduce the size of a column. The State field, for example, is short enough that it does not require all the space on the screen that is allotted to it. Changing a column width changes the **layout**, or design, of a table.

The following steps resize the columns in the Client table and save the changes to the layout.

1

- Point to the right boundary of the field selector for the Specialties Needed field (Figure 3–51) so that the mouse pointer becomes a doubled-ended arrow.

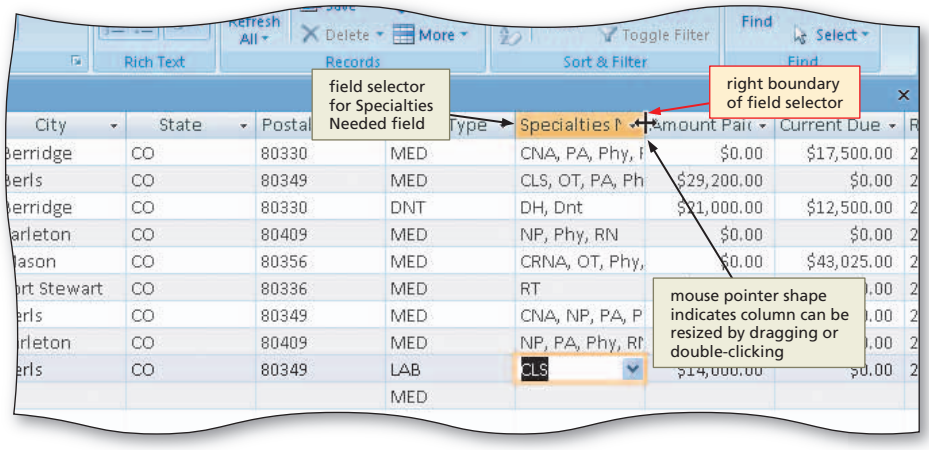


Figure 3–51

2

- Double-click the right boundary of the field selector for the Specialties Needed field to resize the field so that it best fits the data (Figure 3–52).

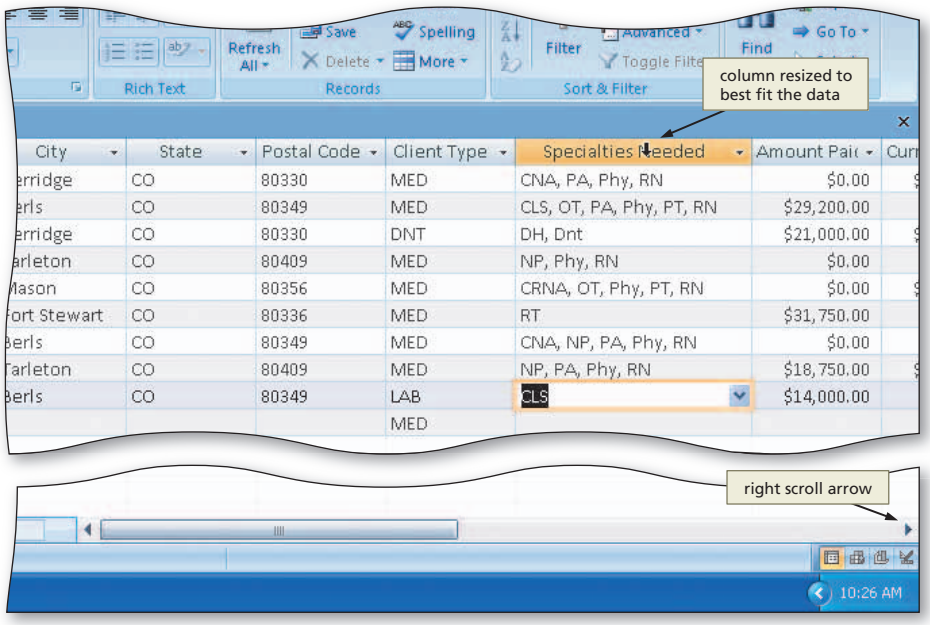


Figure 3–52

3

- Use the same technique to resize all the other fields to best fit the data. To resize the Amount Paid, Current Due, and Recruiter Number fields, you will need to scroll the fields by clicking the right scroll arrow shown in Figure 3–52 on the previous page (Figure 3-53).

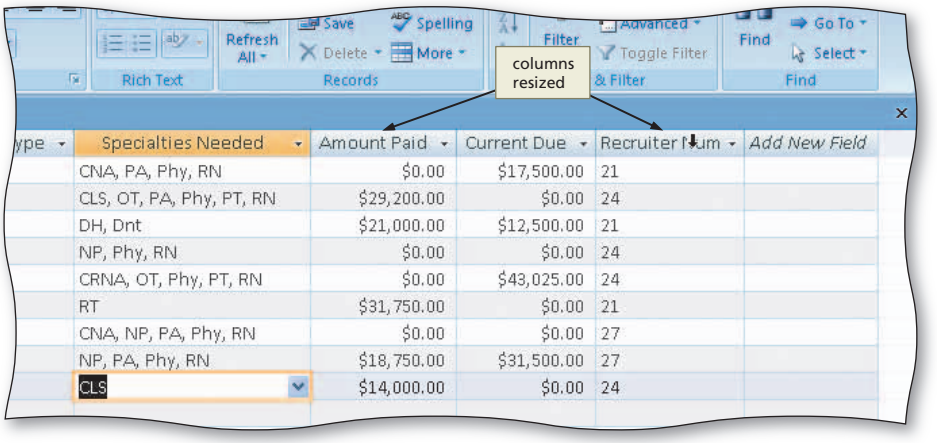


Figure 3–53

4

- Save the changes to the layout by clicking the Save button on the Quick Access Toolbar.
- Close the Client table.

Q&A

What if I closed the table without saving the layout changes?

You would be asked if you want to save the changes.

Other Ways

1. Right-click field name, click Column Width

To Include Totals in a Datasheet

It is possible to include totals and other statistics at the bottom of a datasheet in a special row called the Total row. The following steps display the total of the commissions and the average of the rates for recruiters in the Total row.

1

- Open the Recruiter table in Datasheet view and hide the Navigation pane.
- Click the Totals button on the Home tab to include the Total row in the datasheet (Figure 3–54).

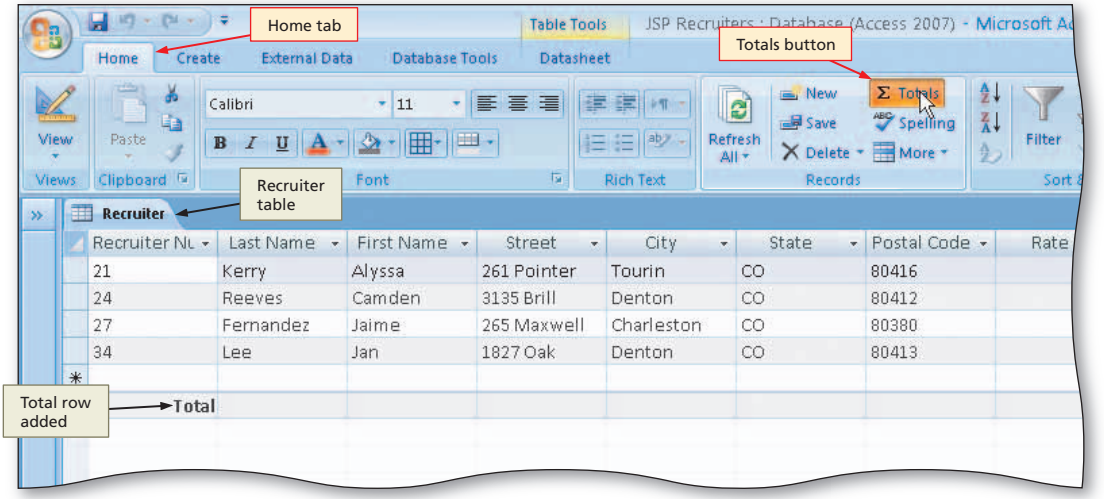


Figure 3–54

2

- Click the Total row in the Commission column to display an arrow.
- Click the arrow to display a menu of available computations (Figure 3–55).

Q&A

Will I always get the same list?

No. You only will get the items that make sense for the type of data in the column. You cannot calculate the sum of text data, for example.

3

- Click Sum to calculate the sum of the commissions.

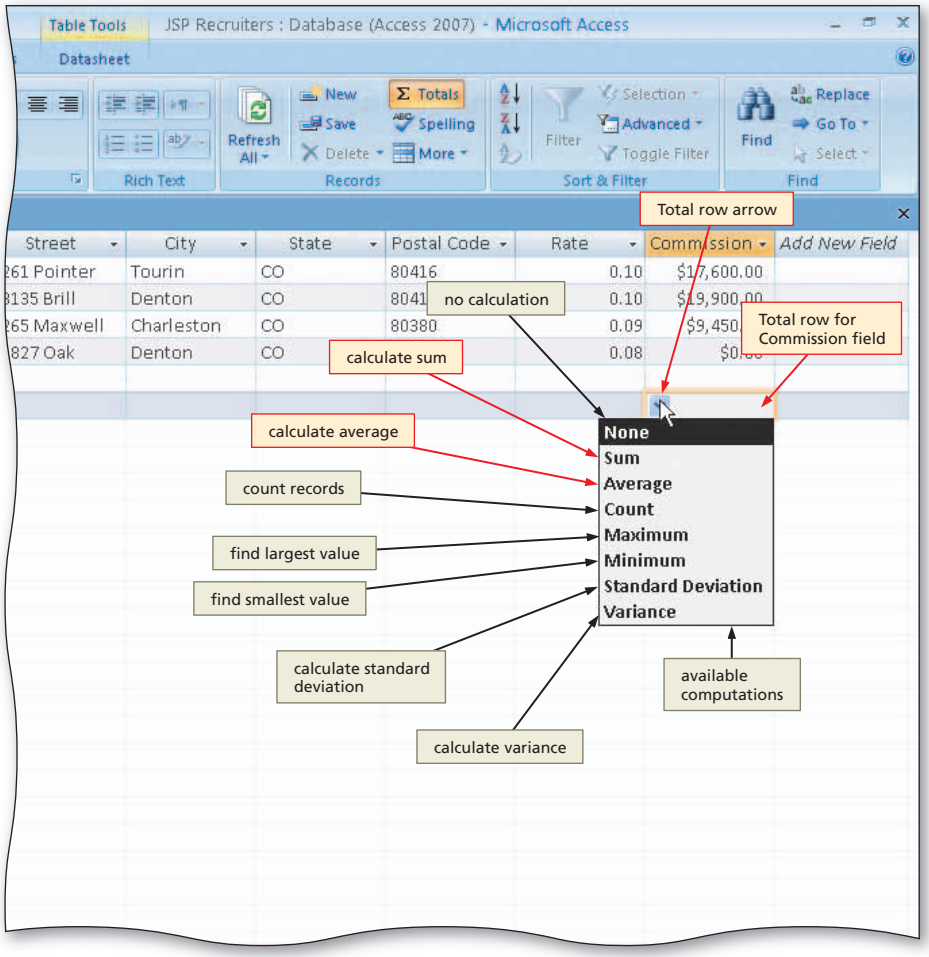


Figure 3–55

4

- Click the Total row in the Rate column to display an arrow.
- Click the arrow to display a menu of available computations.
- Click Average to calculate the average of the rates (Figure 3–56).

Experiment

- Experiment with other statistics. When finished, once again select the sum of the commissions and the average of the rates.

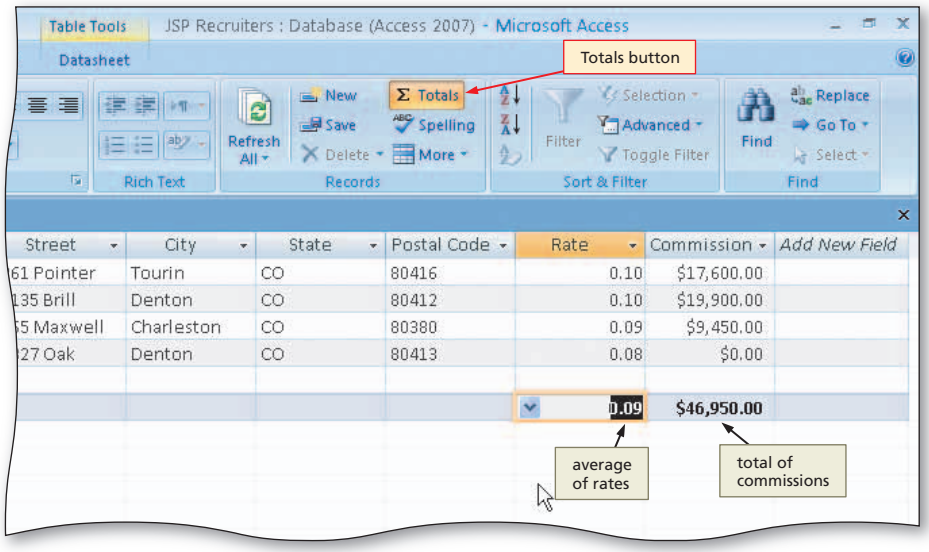


Figure 3–56

To Remove Totals from a Datasheet

If you no longer want the totals to appear as part of the datasheet, you can remove the Total row. The following step removes the Total row.

1

- Click the Totals button on the Home tab to remove the Total row from the datasheet.

Changing the Appearance of a Datasheet

In addition to resizing columns and displaying totals, you can change the appearance of a datasheet in a variety of other ways. For example, you can change the appearance of gridlines or change the text colors and font. Figure 3–57 shows the various buttons, found on the Home tab, that are available to change the Datasheet appearance.

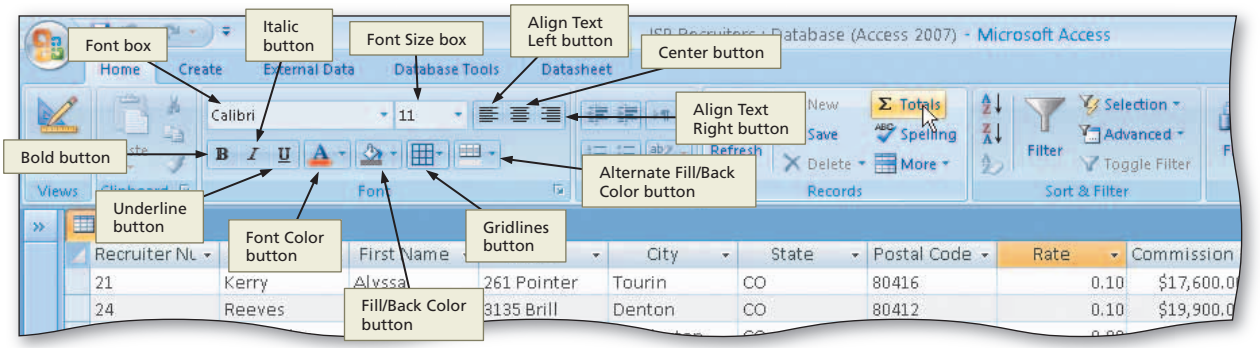


Figure 3–57

The changes to the datasheet will be reflected not only on the screen, but also when you print or preview the datasheet.

Plan Ahead

Determine whether changes to the format of a datasheet are desirable.
You need to decide if changes to the format of a datasheet would improve its appearance and/or its usefulness. The following are the decisions you would make.

1. Would totals or other calculations be useful in the datasheet? If so, include the Total row and select the appropriate computations.
2. Would different gridlines make the datasheet more useful? If so, change to the desired gridlines.
3. Would alternating colors in the rows make them easier to read? If so, change the alternate fill color.
4. Would a different font and/or font color make the text stand out better? If so, change the font color and/or the font.
5. Is the font size appropriate? Can you see enough data at one time on the screen and yet have the data be readable? If not, change the font size to an appropriate value.
6. Is the column spacing appropriate? Are some columns wider than they need to be? Are there some columns where not all the data is visible? If so, change the column size.

As a general guideline, once you have decided on a particular look for a datasheet, all your datasheets should have the same look, unless there is a compelling reason for one of your datasheets to differ.

To Change Gridlines in a Datasheet

One of the changes you can make to a datasheet is which gridlines appear. You may feel that the appearance would be improved by having only horizontal gridlines. The following steps change the datasheet so that only horizontal gridlines are included.

1

- Open the Recruiter table in Datasheet view, if it is not already open.
- Click the box in the upper-left corner of the Datasheet selector to select the entire datasheet (Figure 3–58).

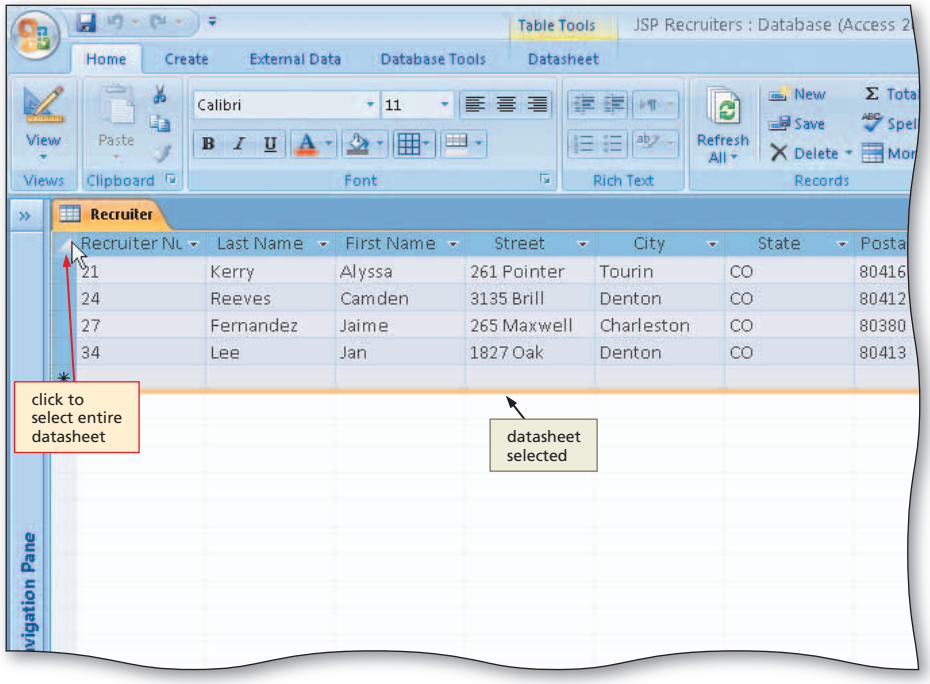


Figure 3–58

2

- Click the Gridlines button on the Home tab to display the Gridlines gallery (Figure 3–59).

Q&A

Does it matter whether I click the button or the arrow?

In this case, it does not matter. Either one will produce the same result.

3

- Click the Gridlines: Horizontal command in the Gridlines gallery to include only horizontal gridlines.

Experiment

- Experiment with other gridline options. When finished, once again select horizontal gridlines.

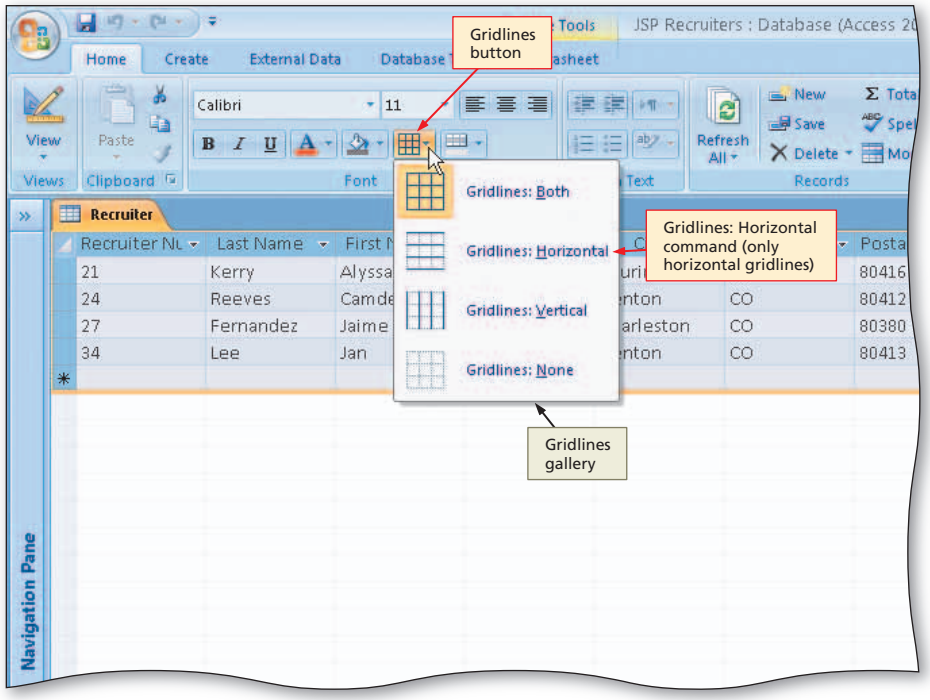


Figure 3–59

To Change the Colors and Font in a Datasheet

You also may decide that you can improve the datasheet by changing the colors and the font. The following steps change the Alternate Fill color, a color that appears on every other row in the datasheet. They also change the font color, the font, and the font size.

1

- With the datasheet for the Recruiter table selected, click the Alternate Fill/Back Color button arrow to display the color palette (Figure 3–60).

Q&A Does it matter whether I click the button or the arrow?

Yes. Clicking the arrow produces a color palette. Clicking the button applies the currently selected color. When in doubt, you should click the arrow.

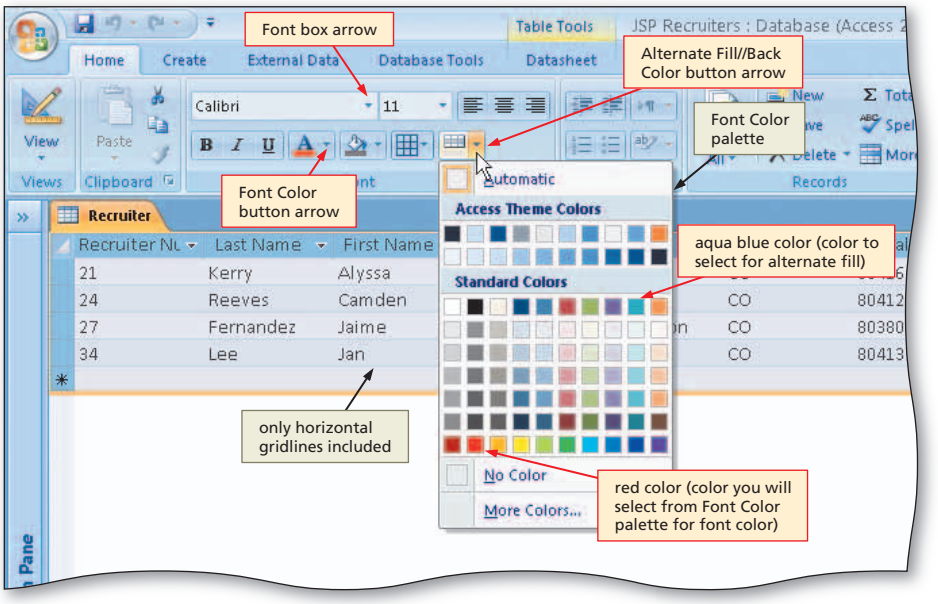


Figure 3–60

2

- Click Aqua Blue (the second from the right color in the standard colors) to select aqua blue as the alternate color.
- Click the Font Color arrow, and then click Red (the second color in the bottom row) in the lower-left corner of standard colors to select Red as the font color.
- Click the Font box arrow, and then select Bodoni MT as the font. (If it is not available, select any font of your choice.)
- Click the Font Size box arrow, and select 10 as the font size (Figure 3–61).

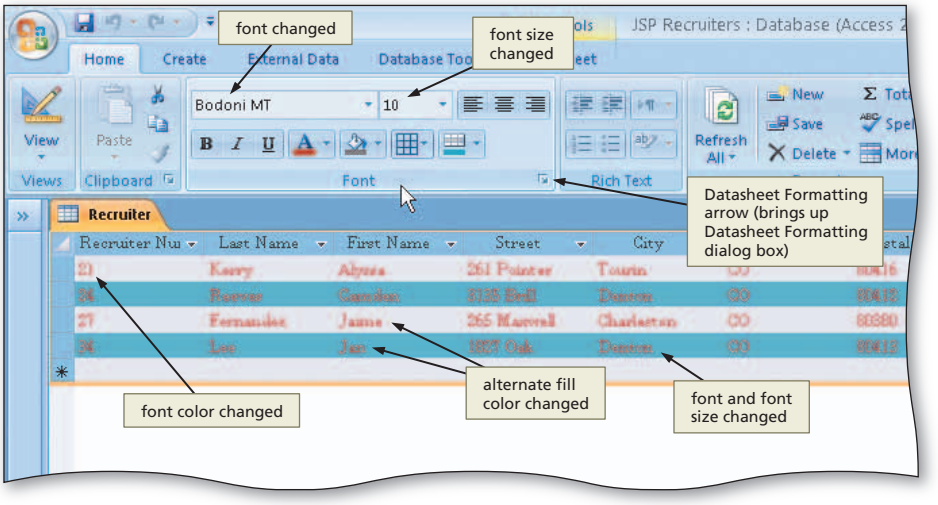


Figure 3–61

Q&A Does the order in which I make these selections make a difference?

No. You could have made these selections in any order.

Experiment

- Experiment with other colors, fonts, and font sizes. When finished, return to the options selected in this step.

Using the Datasheet Formatting Dialog Box

As an alternative to using the individual buttons, you can click the Datasheet Formatting arrow, shown in Figure 3–61, to display the Datasheet Formatting dialog box (Figure 3–62). You can use the various options within the dialog box to make changes to the datasheet format. Once you are finished, click the OK button to apply your changes.

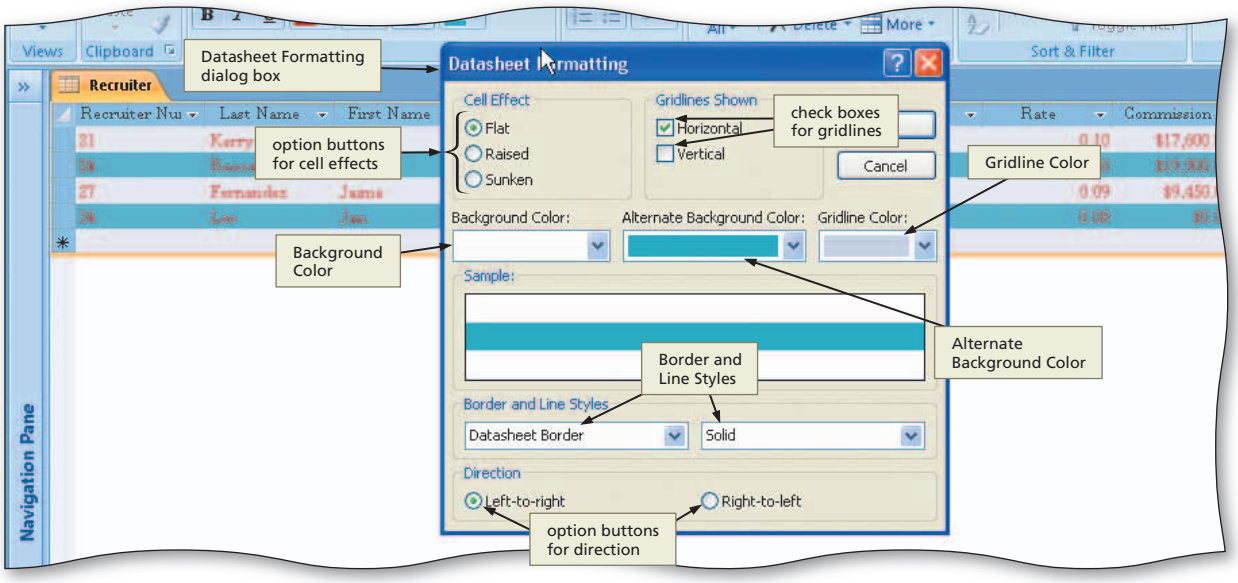


Figure 3–62

To Close the Datasheet Without Saving the Format Changes

The following steps show how to close the datasheet without saving the changes to the format. Because the changes are not saved, the next time you open the Recruiter table it will appear in the original format. If you had saved the changes, the changes would be reflected in its appearance.

1. Click the Close 'Recruiter' button to close the Recruiter table.
2. Click the No button in the Microsoft Office Access dialog box when asked if you want to save your changes.

Multivalued Field in Queries

You can use multivalued fields in queries just as you can use other fields. You have a choice concerning how the multiple values appear. You can choose to have them on a single row or on multiple rows.

To Query a Multivalued Field Showing Multiple Values on a Single Row

To include a multivalued field in the results of a query, place the field in the design grid just like any other field. The results will list all of the values for the multivalued field on a single row, just as in a datasheet. The following steps create a query to display the client number, client name, client type, and specialties needed for all clients.

1

- Create a query for the Client table and hide the Navigation pane.
- Include the Client Number, Client Name, Client Type, and Specialties Needed fields (Figure 3–63).

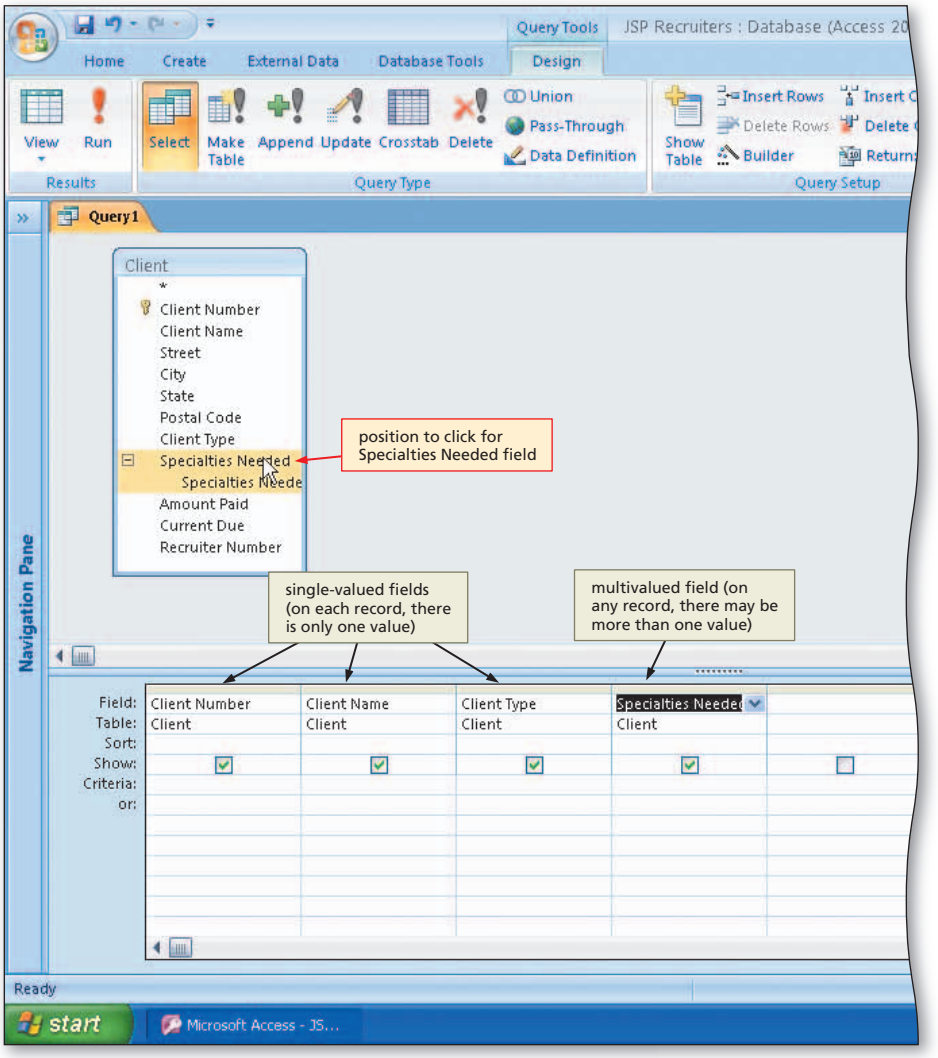


Figure 3–63

2

- View the results (Figure 3–64).

Q&A

Can I include criteria for the multivalued field?

You can include criteria for the multivalued field when all the entries are displayed on a single row.

Experiment

- Return to Design view and enter various criteria in the Specialties Needed field. Run the queries. When finished, return to the options selected in this step.

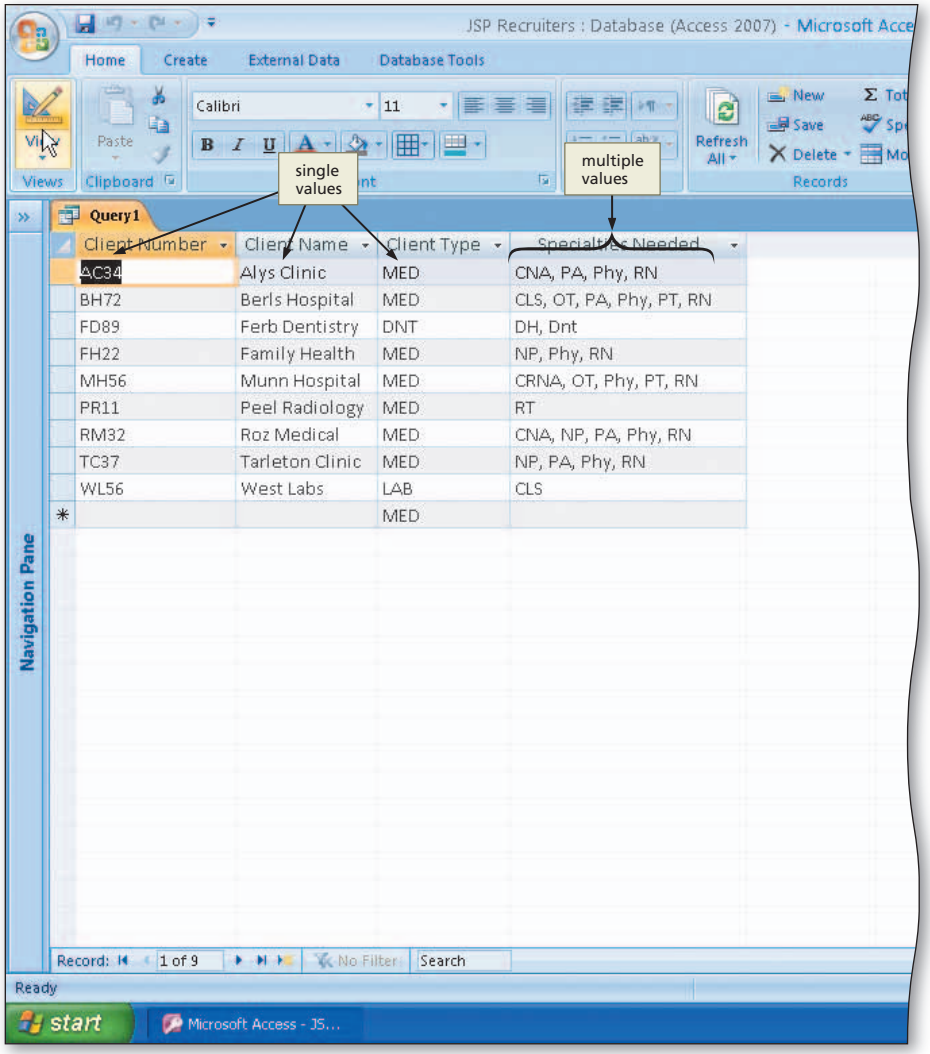


Figure 3–64

To Query a Multivalued Field Showing Multiple Values on Multiple Rows

You may be interested in those clients requiring a particular specialty, for example, those clients needing an RN. Unfortunately, you cannot simply put the desired specialty in the Criteria row just as you would with other fields. Instead you need to change the query so that each specialty occurs on a different row by using the Value property. Once you have done so, you can enter criteria just as you would in any other query.

The following steps use the Value property to display each specialty on a separate row.

1

- Return to Design view and ensure the Client Number, Client Name, Client Type, and Specialties Needed fields are selected.
- Click the Specialties Needed field to produce an insertion point, and then type a period and the word `Value` after the word, Needed, to use the Value property (Figure 3–65).

Q&A I don't see the word, Specialties. Did I do something wrong?

No. There is not enough room to display the entire name. If you wanted to see it, you could point to the right boundary of the column selector and then either drag or double-click.

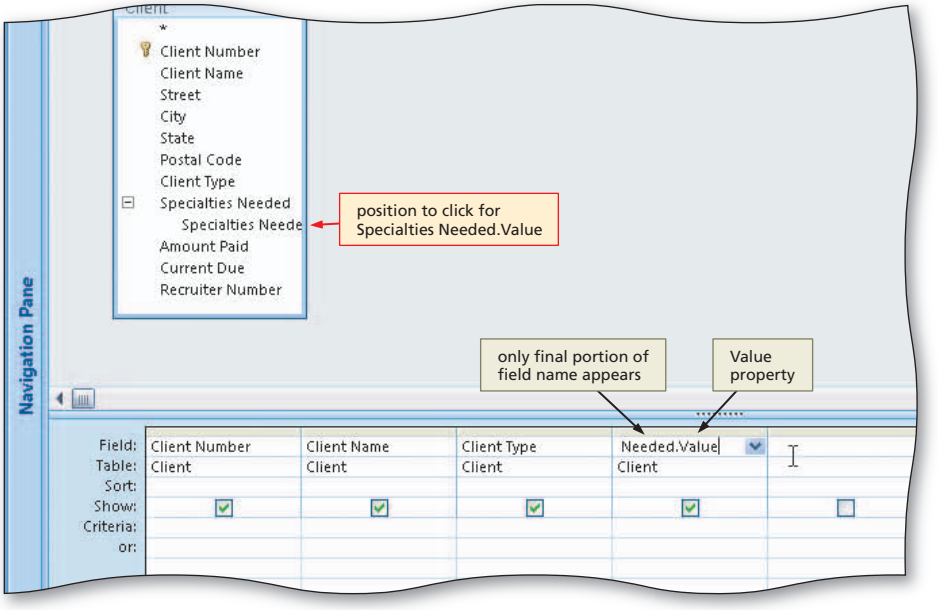


Figure 3–65

Q&A Do I need to type the word Value?

No. You also can double-click the second Specialties Needed entry in the field list.

2

- View the results (Figure 3–66).

Q&A Can I now include criteria for the multivalued field?

Yes. This is now just like any other query. There are no multiple values on any row.

3

- Close the query by clicking the Close 'Query1' button.
- When asked if you want to save the query, click the No button.

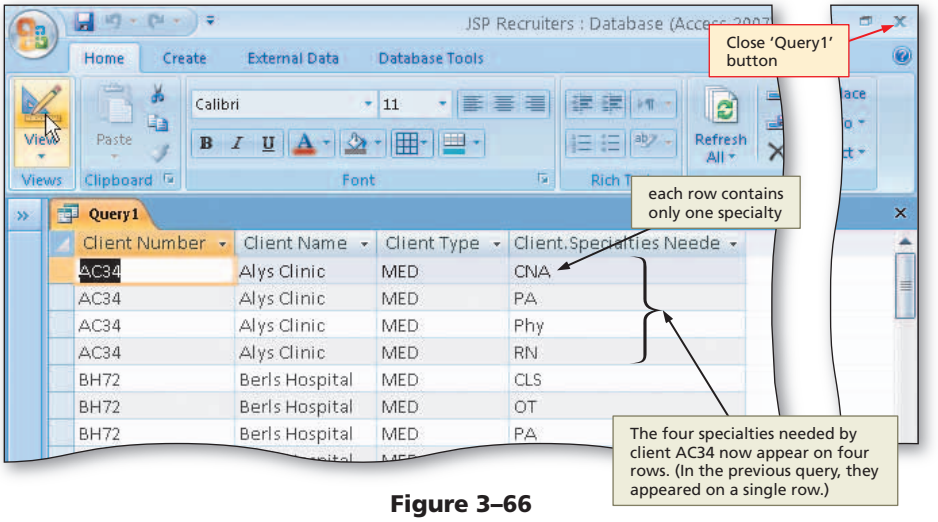


Figure 3–66

Referential Integrity

The property that ensures that the value in a foreign key must match that of another table's primary key is called **referential integrity**. A **foreign key** is a field in one table whose values are required to match the *primary key* of another table. In the Client table, the Recruiter Number field is a foreign key that must match the primary key of the Recruiter table; that is, the Recruiter number for any client must be a recruiter currently in the Recruiter table. A client whose Recruiter number is 92, for example, should not be stored because no such recruiter exists.

In Access, to specify referential integrity, you must define a relationship between the tables by using the Relationships command. Access then prohibits any updates to the database that would violate the referential integrity.

The type of relationship between two tables specified by the Relationships command is referred to as a **one-to-many relationship**. This means that *one* record in the first table is related to (matches) *many* records in the second table, but each record in the second table is related to only *one* record in the first. In the JSP Recruiters database, for example, a one-to-many relationship exists between the Recruiter table and the Client table. *One* recruiter is associated with *many* clients, but each client is associated with only a single recruiter. In general, the table containing the foreign key will be the *many* part of the relationship.

Plan Ahead

Identify related tables in order to implement relationships between the tables. When specifying referential integrity, you need to decide how to handle deletions. In the relationship between clients and recruiters, for example, deletion of a recruiter for whom clients exist, such as recruiter number 21, would violate referential integrity. Any clients for recruiter 21 no longer would relate to any recruiter in the database. You can handle this in two ways. For each relationship, you need to decide which of the approaches is appropriate.

1. The normal way to avoid this problem is to prohibit such a deletion.
2. The other option is to **cascade the delete.** This means that Access would allow the deletion but then delete all related records. For example, it would allow the deletion of the recruiter but then automatically delete any clients related to the deleted recruiter.

You also need to decide how to handle the update of the primary key. In the relationship between recruiters and clients, for example, changing the recruiter number for recruiter 21 to 12 in the Recruiter table would cause a problem. Clients are in the Client table on which the recruiter number is 21. These clients no longer would relate to any recruiter. You can handle this in two ways. For each relationship, you need to decide which of the approaches is appropriate.

1. The normal way of avoiding the problem is to prohibit this type of update.
2. The other option is to **cascade the update**. This means to allow the change, but make the corresponding change in the foreign key on all related records. In the relationship between clients and recruiters, for example, Access would allow the update but then automatically make the corresponding change for any client whose recruiter number was 21. It now will be 12.

To Specify Referential Integrity

The following steps use the Relationships command to specify referential integrity by specifying a relationship between the Recruiter and Client tables. The steps also ensure that update will cascade, but that delete will not.

1

- Click Database Tools on the Ribbon to display the Database Tools tab (Figure 3–67).

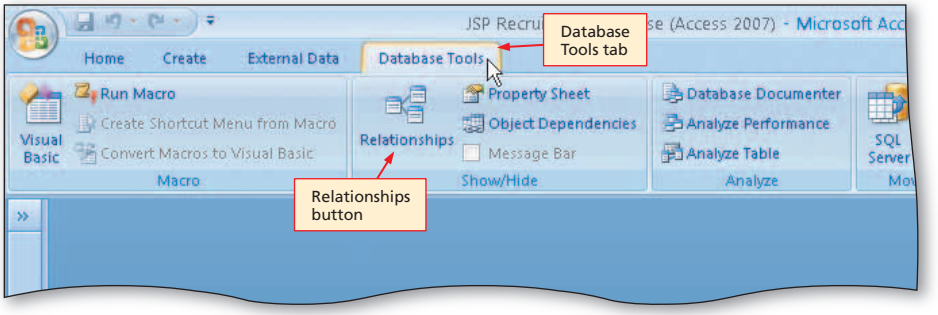


Figure 3–67

2

- Click the Relationships button on the Database Tools tab to open the Relationships window and display the Show Table dialog box (Figure 3–68).

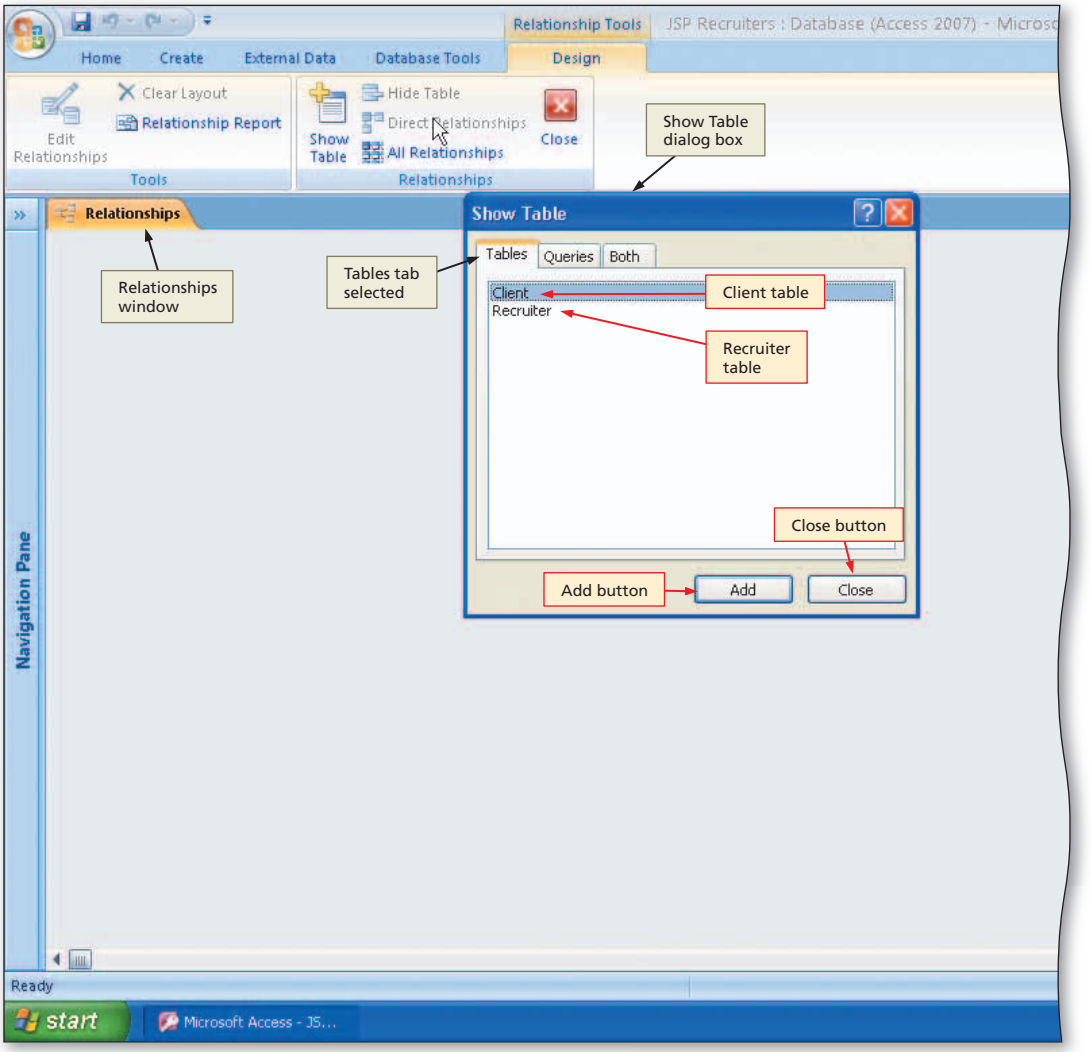


Figure 3–68

3

- Click the Recruiter table and then click the Add button to add the Recruiter table.
- Click the Client table and then click the Add button to add the Client table.
- Click the Close button in the Show Table dialog box to close the dialog box.
- Resize the field lists that appear so all fields are visible (Figure 3–69).

Q&A

Do I need to resize the field lists?

No. You can use the scroll bars. Before completing the next step, however, you would need to make sure the Recruiter Number fields in both tables appear on the screen.

4

- Drag the Recruiter Number field in the Recruiter table field list to the Recruiter Number field in the Client table field list to open the Edit Relationships dialog box to create a relationship.

Q&A

Do I actually move the field from the Recruiter table to the Client table?

No. The mouse pointer will change shape to indicate you are in the process of dragging, but the field does not move.

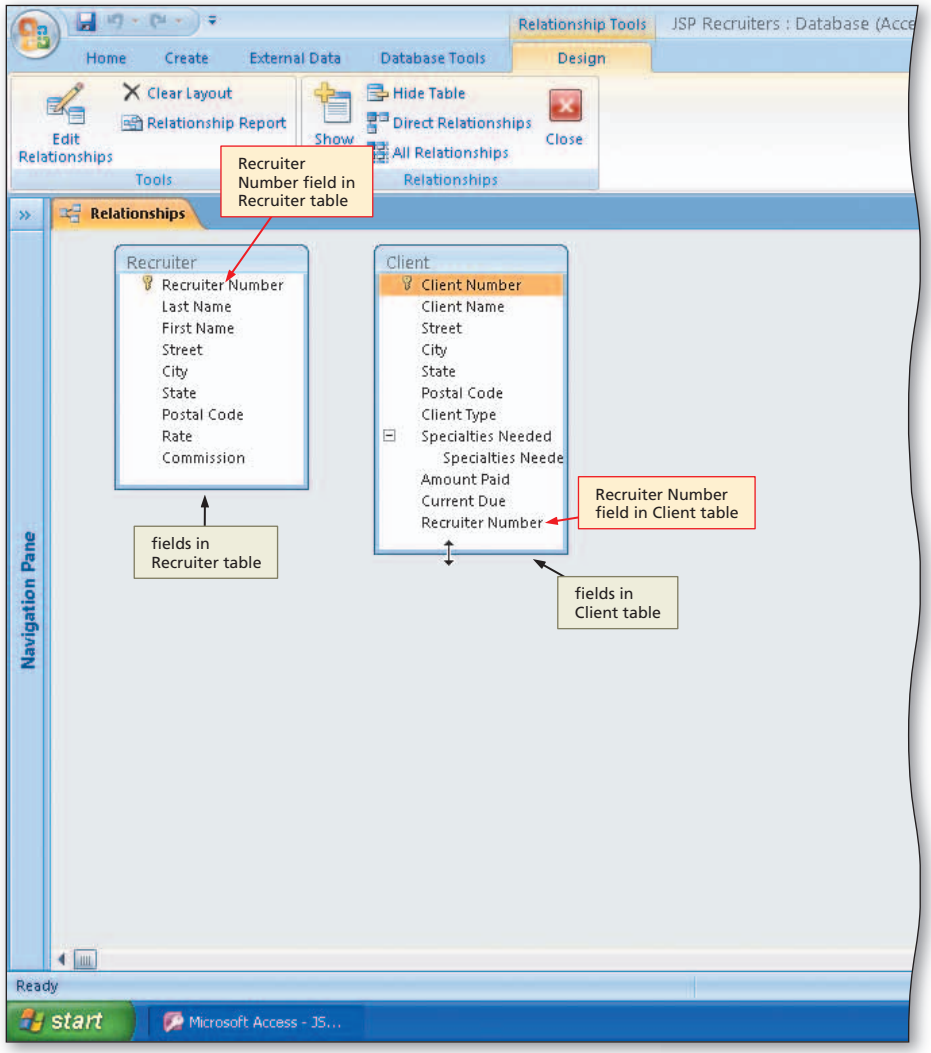


Figure 3–69

- Click the Enforce Referential Integrity check box.

- Click the Cascade Update Related Fields check box (Figure 3–70).

Q&A The Cascade check boxes were dim until I clicked the Enforce Referential Integrity check box. Is that correct?

Yes. Until you have chosen to enforce referential integrity, the cascade options have no meaning.

Q&A Can I change the **join type** like I can in queries?

Yes. Click the Join Type button in the Edit Relationships dialog box. Just as with queries, option button 1 creates an INNER join, option button 2 creates a LEFT join, and option button 3 creates a RIGHT join.

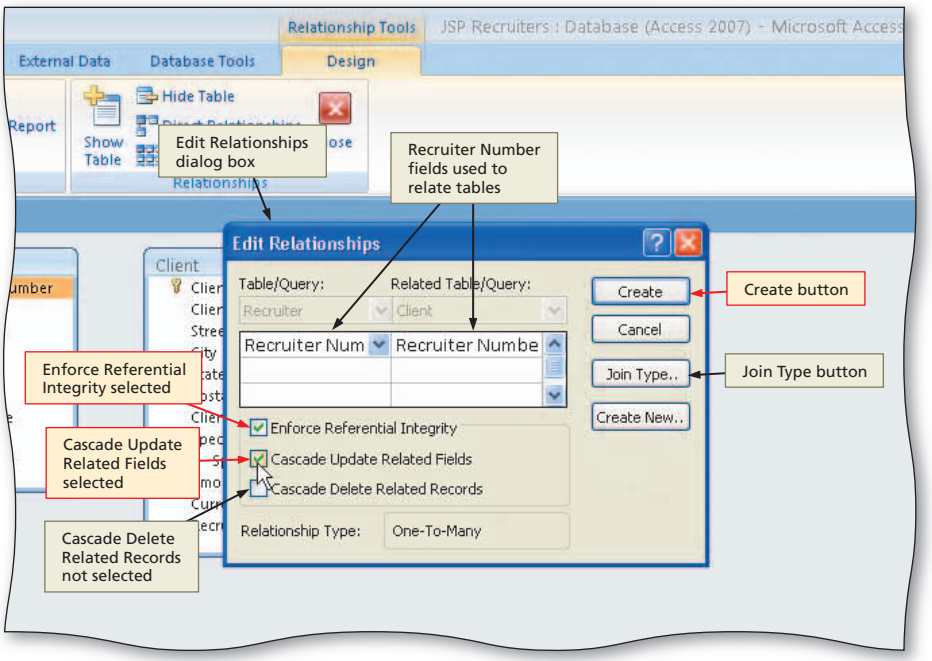


Figure 3–70

5

- Click the Create button to complete the creation of the relationship (Figure 3–71).

Q&A What is the symbol at the lower end of the join line?

It is the mathematical symbol for infinity. It is used here to denote the "many" end of the relationship.

Q&A Can I print a copy of the relationship?

Yes. Click the Relationship Report button on the Design tab to produce a report of the relationship. You can print the report. You also can save it as a report in the database for future use. If you do not want to save it, close the report after you have printed it and do not save the changes.

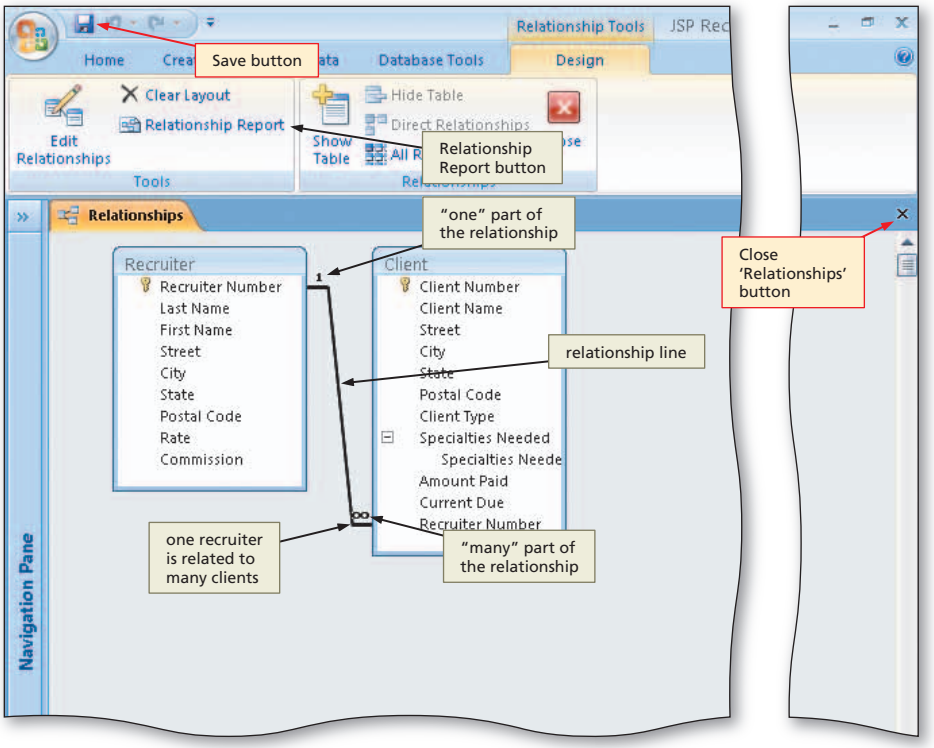


Figure 3–71

6

- Click the Save button on the Quick Access Toolbar to save the relationship you created.
- Close the Relationships window by clicking the Close 'Relationships' button.

Q&A

Can I later modify the relationship if I want to change it in some way?

Yes. Click the Relationships button on the Database Tools tab. To add another table, click the Show Table button on the Design tab. To remove a table, click the Hide table button. To edit a relationship, select the relationship and click the Edit Relationships button.

Effect of Referential Integrity

Referential integrity now exists between the Recruiter and Client tables. Access now will reject any number in the Recruiter Number field in the Client table that does not match a Recruiter number in the Recruiter table. Attempting to change the recruiter number for a client to one that does not match any recruiter in the Recruiter table would result in the error message shown in Figure 3–72. Similarly, attempting to add a client whose recruiter number does not match would lead to the same error message.

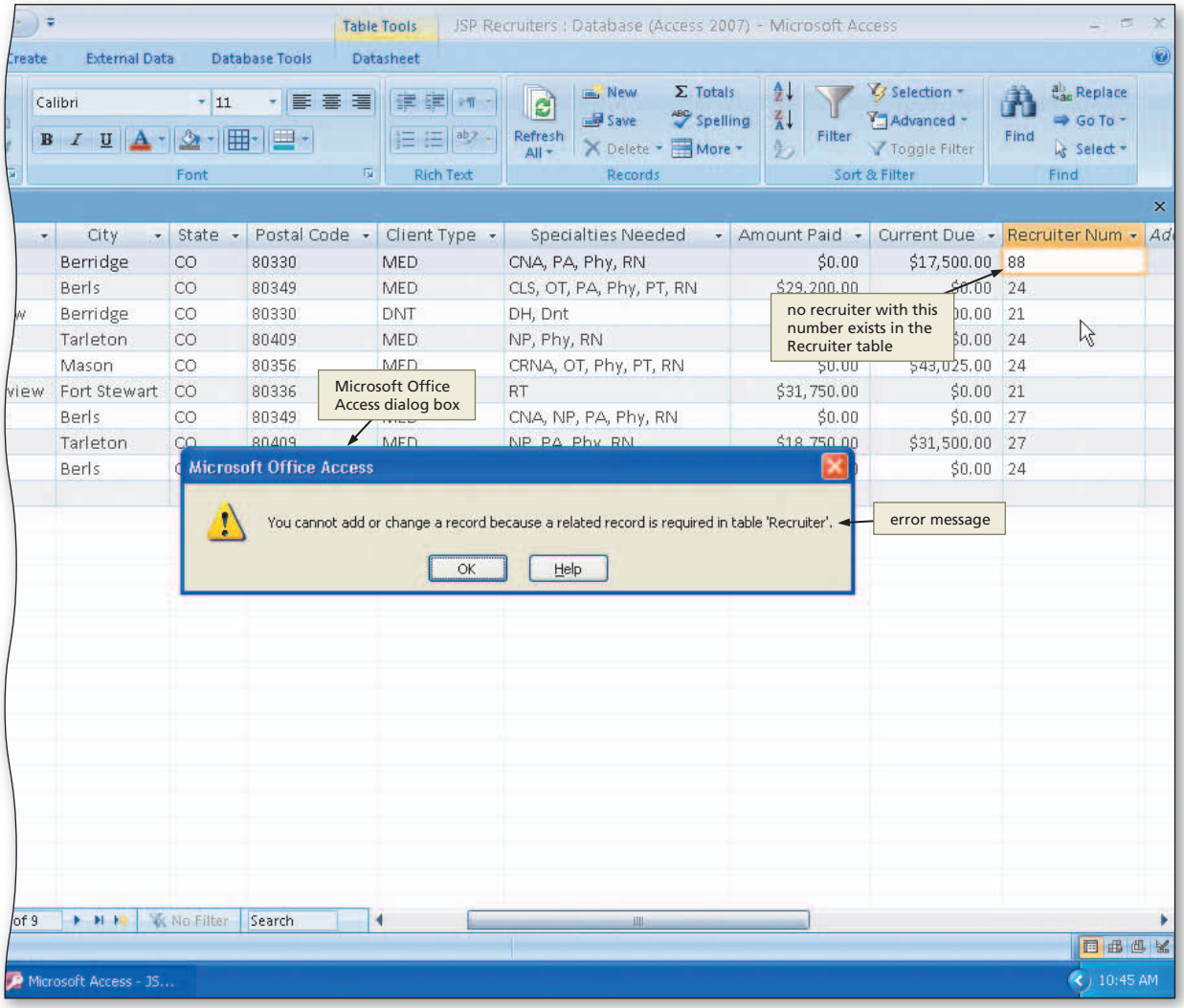


Figure 3–72

Access also will reject the deletion of a recruiter for whom related clients exist. Attempting to delete recruiter 21 from the Recruiter table, for example, would result in the message shown in Figure 3–73.

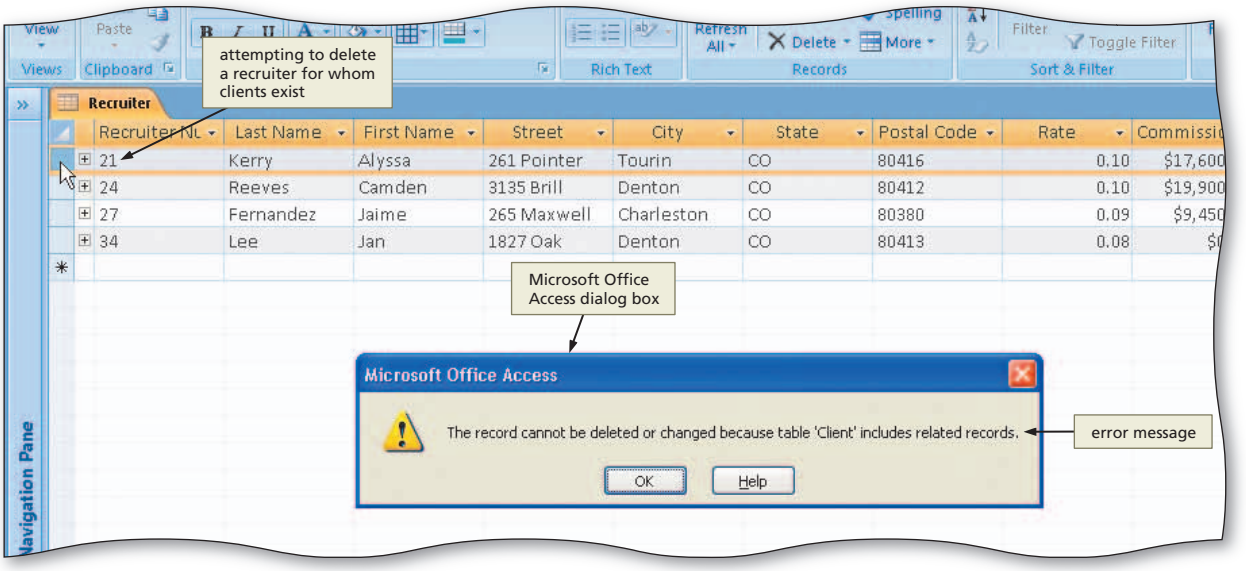


Figure 3–73

Access would, however, allow the change of a recruiter number in the Recruiter table. Then it automatically makes the corresponding change to the recruiter number for all the recruiter's clients. For example, if you changed the recruiter number of recruiter 21 to 12, the same 12 would appear in the recruiter number field for clients.

To Use a Subdatasheet

Now that the Recruiter table is related to the Client table, it is possible to view the clients of a given recruiter when you are viewing the datasheet for the Recruiter table. The clients for the recruiter will appear below the recruiter in a **subdatasheet**. The availability of such a subdatasheet is indicated by a plus sign that appears in front of the rows in the Recruiter table. The following steps display the subdatasheet for recruiter 24.

1. Open the Recruiter table and hide the Navigation pane (Figure 3–74).

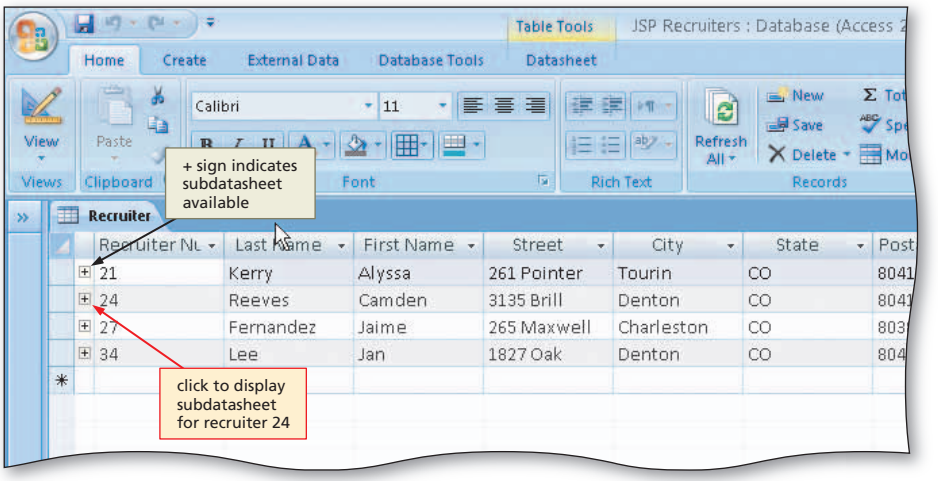


Figure 3–74

2

- Click the plus sign in front of the row for Recruiter 24 to display the subdatasheet (Figure 3–75).

Q&A

How do I hide the subdatasheet when I no longer want it to appear?

When you clicked the plus sign, it changed to a minus sign. Click the minus sign.

Experiment

- Display subdatasheets for other recruiters. Display more than one subdatasheet at a time. Remove the subdatasheets from the screen.

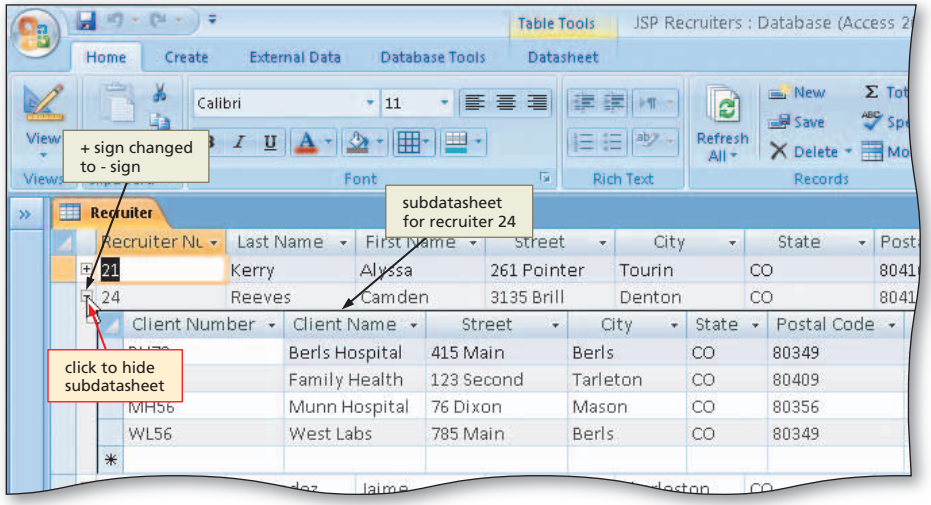


Figure 3–75

3

- Close the datasheet for the Recruiter table.

To Find Duplicate Records

One reason to include a primary key for a table is to eliminate duplicate records. A possibility still exists, however, that duplicate records can get into your database. Perhaps the same client was inadvertently added to the database with a new client number. You can detect this type of redundancy by searching to see if any client's names are duplicated. The **Find Duplicates Query Wizard** allows you to find duplicate records. The following steps illustrate how to use the Find Duplicates Query Wizard to find duplicate records.

1. Click Create on the Ribbon, and then click the Query Wizard button on the Create tab.
2. When Access displays the New Query dialog box, click the Find Duplicates Query Wizard and then click the OK button.
3. Identify the table and field or fields that might contain duplicate information.
4. Indicate any other fields you want displayed.
5. Finish the wizard to see any duplicate records.

To Find Unmatched Records

Occasionally, you may want to find records in one table that have no matching records in another table. For example, you may want to determine which recruiters currently have no clients. The **Find Unmatched Query Wizard** allows you to find unmatched records. The following steps illustrate how to find unmatched records using the Find Unmatched Query Wizard.

1. Click Create on the Ribbon, and then click the Query Wizard button on the Create tab.
2. When Access displays the New Query dialog box, click the Find Unmatched Query Wizard and then click the OK button.
3. Identify the table that may contain unmatched records and then identify the related table.
4. Indicate the fields you want displayed.
5. Finish the wizard to see any duplicate records.

Ordering Records

Normally, Access sequences the records in the Client table by client number whenever listing them because the Client Number field is the primary key. You can change this order, if desired.

To Use the Ascending Button to Order Records

To change the order in which records appear, use the Ascending or Descending buttons. Either button reorders the records based on the field in which the insertion point is located.

The following steps order the records by city using the Ascending button.

1

- Open the Client table in Datasheet view and hide the Navigation pane.
- Click the City field on the first record to select the field (Figure 3–76).

Q&A

Did I have to click the field on the first record?

No. Any other record would have worked as well.

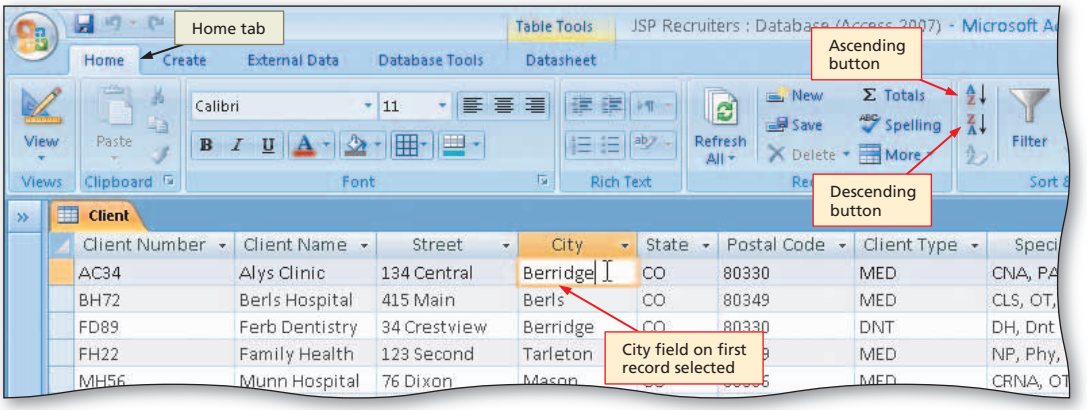


Figure 3–76

2

- Click the Ascending button on the Home tab to sort the records by City (Figure 3–77).

Q&A

What if I wanted the cities to appear in reverse alphabetical order?

Click the Descending button.

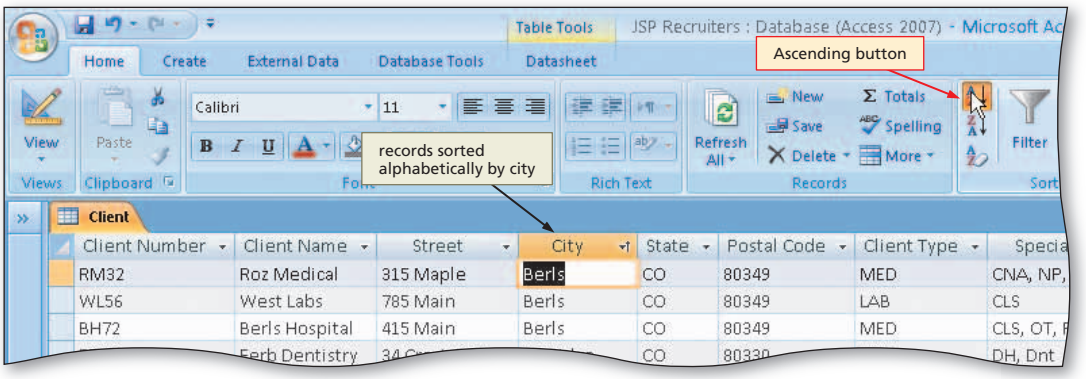


Figure 3–77

Experiment

Sort the records by city in reverse order. When done, sort the records by city in the original order.

3

- Close the table. When asked if you want to save your changes, click the No button.

Other Ways

1. Right-click field name, click Sort A to Z (for ascending) or Sort Z to A (for descending)

Special Database Operations

The special operations involved in maintaining a database are backup, recovery, compacting a database, and repairing a database.

Backup and Recovery

It is possible to damage or destroy a database. Users can enter data that is incorrect; programs that are updating the database can end abnormally during an update; a hardware problem can occur; and so on. After any such event has occurred, the database may contain invalid data. It even may be totally destroyed.

Obviously, you cannot allow a situation in which data has been damaged or destroyed to go uncorrected. You must somehow return the database to a correct state. This process is called recovery; that is, you **recover** the database.

The simplest approach to recovery involves periodically making a copy of the database (called a **backup copy** or a **save copy**). This is referred to as **backing up** the database. If a problem occurs, you correct the problem by copying this backup copy over the actual database, often referred to as the **live database**.

To backup the database that is currently open, you use the Back Up Database command on the Manage submenu on the Office Button menu. In the process, Access suggests a name that is a combination of the database name and the current date. For example, if you back up the JSP Recruiters database on April 20, 2008, Access will suggest the name JSP Recruiters_2008-04-20. You can change this name if you desire, although it is a good idea to use this name. By doing so, it will be easy to distinguish between all the backup copies you have made to determine which is the most recent. In addition, if you discover that a critical problem occurred on April 18, 2008, you may want to go back to the most recent backup before April 18. If, for example, the database was not backed up on April 17 but was backed up on April 16, you would use JSP Recruiters_2008-04-16.

The following steps back up a database to a file on a hard disk or high-capacity removable disk. You should check with your instructor before completing these steps.

To Back Up a Database

1. Open the database to be backed up.
2. Click the Office Button, and then point to Manage on the Office Button menu.
3. Click Back Up Database on the Manage submenu.
4. Select the desired location in the Save in box. If you do not want the name Access has suggested, enter the desired name in the File name text box.
5. Click the Save button.

Access creates a backup copy with the desired name in the desired location. Should you ever need to recover the database using this backup copy, you can simply copy it over the live version.

Compacting and Repairing a Database

As you add more data to a database, it naturally grows larger. When you delete an object (records, tables, forms, or queries), the space previously occupied by the object does not become available for additional objects. Instead, the additional objects are given new space, that is, space that was not already allocated. To remove this wasted space from the database, you must **compact** the database. The same option that compacts the database also repairs problems that may have occurred in the database.

To Compact and Repair a Database

1. Open the database to be compacted.
2. Click the Office Button, and then point to Manage on the Office Button menu.
3. Click Compact and Repair Database on the Manage submenu.

The database now is the compacted form of the original.

BTW

Certification
The Microsoft Certified Application Specialist (MCAS) program provides an opportunity for you to obtain a valuable industry credential—proof that you have the Access 2007 skills required by employers. For more information, see Appendix F or visit the Access 2007 Certification Web page (scsite.com/ac2007/cert).

BTW

Quick Reference
For a table that lists how to complete the tasks covered in this book using the mouse, Ribbon, shortcut menu, and keyboard, see the Quick Reference Summary at the back of this book, or visit the Access 2007 Quick Reference Web page (scsite.com/ac2007/qr).

BTW

Compacting Error Message on Opening Database
If you open your database and receive a compact error message, you may not be able to view all the objects in your database. You also may not see your tables in tabbed windows. To redisplay all the objects in your database, click the Navigation pane arrow to display the Navigation pane menu. Make sure that Tables and Related Views is selected. To make sure that objects appear in tabbed windows, click the Microsoft Office button, click the Access Options button, click Current Database, and make sure the Tabbed Documents option button is selected in the Application Options category.

Additional Operations

Additional special operations include opening another database, closing a database without exiting Access, and saving a database with another name. They also include deleting a table (or other object) as well as renaming an object. Finally, you can change properties of a table or other object, such as the object's description.

When you open another database, Access automatically will close the database that had been open. Before deleting or renaming an object, you should ensure that the object has no dependent objects, that is, other objects that depend on the object you wish to delete.

The following steps describe how you could perform these operations.

To Open Another Database

1. Click the Office Button.
2. Click Open on the Office Button menu.
3. Select the database to be opened.
4. Click the Open button.

To Close a Database without Exiting Access

1. Click the Office Button.
2. Click Close Database on the Office Button menu.

To Save a Database with Another Name

1. Click the Office Button.
2. Point to Save As on the Office Button menu.
3. Select the Desired format.
4. Enter a name and select a location for the new version.
5. Click the Save button.

To Check for Dependent Objects

1. Ensure that the object you wish to check is selected.
2. Click Database Tools on the Ribbon to display the Database Tools tab.
3. Click the Object Dependencies button on the Database Tools tab.
4. Click the 'Objects that depend on me' option button to display any objects that depend on the selected object.

To Delete a Table or Other Object

1. Right-click the object.
2. Click Delete on the shortcut menu.
3. Click the Yes button in the Microsoft Office Access dialog box.

To Rename an Object

1. Right-click the object.
2. Click Rename on the shortcut menu.
3. Type the new name and press the ENTER key.

To Change Object Properties

1. Right-click the object.

2. Click Table Properties (if the object is a table) or Object Properties on the shortcut menu.
3. Change the desired property and click the OK button.

To Quit Access

You saved all your changes and are ready to quit Access. The following step quits Access.

1 Click the Close button on the right side of the Access title bar to quit Access.

Chapter Summary

In this chapter you have learned how to use a form to add records to a table; search for records; delete records; filter records; create and use Lookup fields; create and use multivalued fields; make mass changes; create validation rules; change the appearance of a datasheet; specify referential integrity; and use subdatasheets. The following list includes all the new Access skills you have learned in this chapter.

1. Create a Simple Form (AC 142)
2. Use a Form to Add Records (AC 144)
3. Search for a Record (AC 145)
4. Update the Contents of a Record (AC 147)
5. Delete a Record (AC 148)
6. Use Filter By Selection (AC 149)
7. Toggle a Filter (AC 151)
8. Clear a Filter (AC 151)
9. Use a Common Filter (AC 152)
10. Use Filter By Form (AC 153)
11. Use Advanced Filter/Sort (AC 155)
12. Delete a Field (AC 157)
13. Add a New Field (AC 157)
14. Create a Lookup Field (AC 158)
15. Add a Multivalued Field (AC 160)
16. Save the Changes and Close the Table (AC 161)
17. Modify Single or Multivalued Lookup Fields (AC 161)
18. Use an Update Query (AC 162)
19. Use a Delete Query (AC 163)
20. Use an Append Query (AC 165)
21. Use a Make-Table Query (AC 165)
22. Specify a Required Field (AC 166)
23. Specify a Range (AC 166)
24. Specify a Default Value (AC 167)
25. Specify a Collection of Allowable Values (AC 167)
26. Specify a Format (AC 168)
27. Save the Validation Rules, Default Values, and Formats (AC 169)
28. Use a Lookup Field (AC 172)
29. Use a Multivalued Lookup Field (AC 173)
30. Resize a Column in a Datasheet (AC 175)
31. Include Totals in a Datasheet (AC 176)
32. Remove Totals from a Datasheet (AC 178)
33. Change Gridlines in a Datasheet (AC 179)
34. Change the Colors and Font in a Datasheet (AC 180)
35. Close the Datasheet Without Saving the Format Changes (AC 181)
36. Query a Multivalued Field Showing Multiple Values on a Single Row (AC 182)
37. Query a Multivalued Field Showing Multiple Values on Multiple Rows (AC 183)
38. Specify Referential Integrity (AC 186)
39. Use a Subdatasheet (AC 190)
40. Find Duplicate Records (AC 191)
41. Find Unmatched Records (AC 191)
42. Use the Ascending Button to Order Records (AC 192)
43. Backup a Database (AC 193)
44. Compact and Repair a Database (AC 193)
45. Open Another Database (AC 194)
46. Close a Database Without Exiting Access (AC 194)
47. Save a Database with Another Name (AC 194)
48. Check for Dependent Objects (AC 194)
49. Delete a Table or Other Object (AC 194)
50. Rename an Object (AC 194)
51. Change Object Properties (AC 194)

If you have a SAM user profile, you may have access to hands-on instruction, practice, and assessment. Log in to your SAM account (http://sam2007.course.com) to launch any assigned training activities or exams that relate to the skills covered in this chapter.

Learn It Online

Test your knowledge of chapter content and key terms.

Instructions: To complete the Learn It Online exercises, start your browser, click the Address bar, and then enter the Web address `scsite.com/ac2007/learn`. When the Access 2007 Learn It Online page is displayed, click the link for the exercise you want to complete and then read the instructions.

Chapter Reinforcement TF, MC, and SA
A series of true/false, multiple choice, and short answer questions that test your knowledge of the chapter content.

Flash Cards
An interactive learning environment where you identify chapter key terms associated with displayed definitions.

Practice Test
A series of multiple choice questions that test your knowledge of chapter content and key terms.

Who Wants To Be a Computer Genius?
An interactive game that challenges your knowledge of chapter content in the style of a television quiz show.

Wheel of Terms
An interactive game that challenges your knowledge of chapter key terms in the style of the television show *Wheel of Fortune*.

Crossword Puzzle Challenge
A crossword puzzle that challenges your knowledge of key terms presented in the chapter.

Apply Your Knowledge

Reinforce the skills and apply the concepts you learned in this chapter.

Specifying Validation Rules, Updating Records, Formatting a Datasheet, and Creating Relationships

Instructions: Start Access. Open The Bike Delivers database that you modified in Apply Your Knowledge in Chapter 2 on page AC 128. (If you did not complete this exercise, see your instructor for a copy of the modified database.)

Perform the following tasks:

1. Open the Customer table in Design view as shown in Figure 3–78.

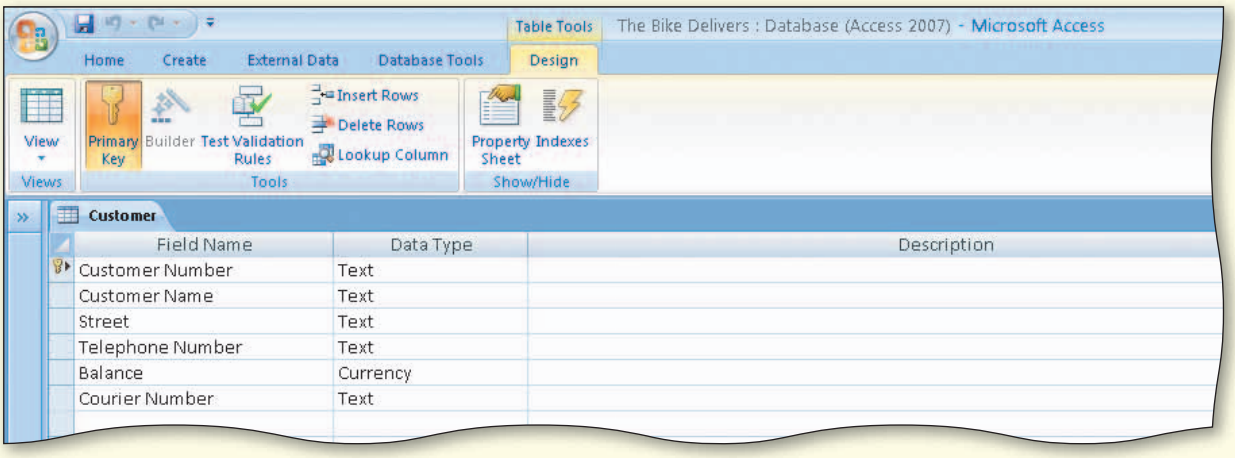


Figure 3–78

2. Format the Customer Number field so any lowercase letters appear in uppercase and make the Customer Name field a required field.
3. Specify that balance amounts must be between $0.0 and $1,000. Include validation text.
4. Save the changes to the Customer table.
5. Create a simple form for the Customer table and find the record for ME71 and change the customer name to Mentor Group Limited. Save the form as Customer Simple Form and close the form.
6. Open the Customer table in Datasheet view and use Filter By Selection to find the record for CI76. Delete the record. Remove the filter.
7. Resize all columns to best fit and remove the gridlines from the datasheet. Save the changes to the layout of the table. Close the Customer table.
8. Establish referential integrity between the Courier table (the one table) and the Customer table (the many table). Cascade the update but do not cascade the delete.
9. Submit the revised database in the format specified by your instructor.

Extend Your Knowledge

Extend the skills you learned in this chapter and experiment with new skills. You may need to use Help to complete the assignment.

Creating Action Queries, Changing Table Properties

Instructions: See the inside back cover of this book for instructions for downloading the Data Files for Students, or see your instructor for information on accessing the files required in this book.

Backyard is a retail business that specializes in products for the outdoors. The owner has created an Access database in which to store information about the products he sells. He recently acquired the inventory of a store that is going out of business. The inventory currently is stored in the Inventory database.

Perform the following tasks:

1. The owner needs to add the items stored in the Product table of the Inventory database to the Item table of the Backyard database. Create and run an append query to create the Item table for the Backyard database shown in Figure 3–79.

Figure 3–79

Continued >

Extend Your Knowledge *continued*

2. Open the Item table in the Backyard database and change the description for WF10 to Window Bird Feeder. Resize all columns to best fit the data.
3. Sort the datasheet in ascending order by Description.
4. Add a totals row to the datasheet and display the sum of the on hand items, and the average cost and average selling price.
5. Save the changes to the layout of the table. Close the table and rename it Product.
6. Update the table properties for the Product table to include the description, Updated to include items from Inventory database.
7. Using a query, delete all records in the Product table where the description starts with the letter S. Save the query as Delete Query.
8. Change the database properties, as specified by your instructor. Submit the revised database in the format specified by your instructor.

Make It Right

Analyze a database and correct all errors and/or improve the design.

Correcting Table Design Errors

Instructions: Start Access. Open the Care4Pets database. See the inside back cover of this book for instructions for downloading the Data Files for Students, or see your instructor for information on accessing the files required in this book.

Care4Pets provides a variety of services to pet owners. The owner of Care4Pets has decided that she could better manage her business if she added a multivalued field that lists the various types of pets her customers have. She created the field shown in Figure 3–80 but forgot to add Rabbit as one of the pet types. Modify the multivalued Lookup field to include Rabbit as a pet type.

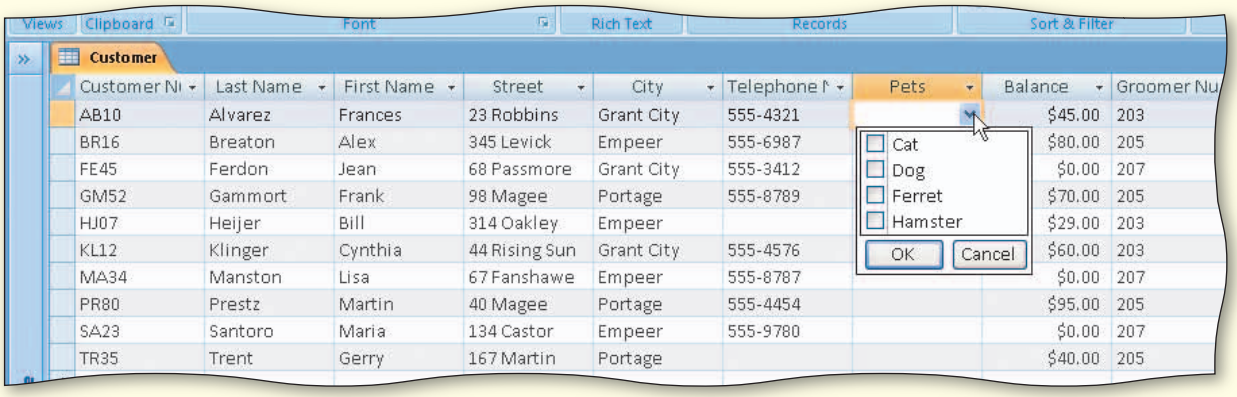


Figure 3–80

Finally, she wanted to add referential integrity between the Groomer table and the Customer table. The relationship shown in Figure 3–81 is not correct and must be fixed. She does not want to cascade the update or the delete.

Figure 3–81

Submit the revised database in the format specified by your instructor.

In the Lab

Design, create, modify, and/or use a database following the guidelines, concepts, and skills presented in this chapter. Labs are listed in order of increasing difficulty.

Lab 1: Maintaining the JMS TechWizards Database

Problem: JMS TechWizards is expanding rapidly and needs to make some database changes to handle the expansion. The company needs to know more about its clients, such as the type of business, and it needs to ensure that data that is entered is valid. It also needs to update the records in the database.

Instructions: Use the database created in the In the Lab 1 of Chapter 1 on page AC 67 for this assignment or see your instructor for information on accessing the files required for this book.

Perform the following tasks:

1. Open the JMS TechWizards database and then open the Client table in Design view.
2. Add a Lookup field, Client Type, to the Client table. The field should appear after the Telephone Number field. The field will contain data on the type of client. The client types are MAN (Manufacturing), RET (Retail), and SER (Service). Save these changes to the structure.
3. Using a query, change all the entries in the Client Type column to RET. Save the query as Client Type Update Query.
4. Open the Client table and make the following changes. You can use either the Find button or Filter By Selection to locate the records to change:
   a. Change the client type for clients AM53 and SA56 to MAN.
   b. Change the client type for clients GR56, JE77, and ME17 to SER.
   c. Change the name of client SA56 to Sawyer Industries.
   d. Change the name of client ST21 to Steed's Department Store.
5. Resize all columns to best fit the data and remove the vertical gridlines. Save the changes to the layout of the table.

Continued >

In the Lab *continued*

6. Create the following validation rules for the Client table and save the changes.
   a. Specify the legal values MAN, RET, and SER for the Client Type field. Include validation text.
   b. Assign a default value of RET to the Client Type field.
   c. Ensure that any letters entered in the Client Number field appear as uppercase.
   d. Specify that the billed amount must be less than or equal to $1,500.00. Include validation text.
7. Open the Client table and use Filter By Form to find all records where the client is located in Anderson and has a client type of SER. Delete these records.
8. JMS has signed up a new retail store, Cray Meat Market (Client Number CR21) and needs to add the record to the Client table. The Meat Market is at 72 Main in Anderson, TX 78077. The phone number is 512-555-7766. Lee Torres is the technician assigned to the account. To date, they have not been billed for any services. Create a split form for the Client table and use this split form to add the record.
9. Specify referential integrity between the Technician table (the one table) and the Client table (the many table). Cascade the update but not the delete.
10. Compact the database and then back up the database.
11. Submit the revised database in the format specified by your instructor.

In the Lab

Lab 2: Maintaining the Hockey Fan Zone Database

Problem: The management of the Hockey Fan Zone store needs to change the database structure, add validation rules, and update records.

Instructions: Use the database created in the In the Lab 2 of Chapter 1 on page AC 68 for this assignment, or see your instructor for information on accessing the files required for this book.

Perform the following tasks:

1. Open the Hockey Fan Zone database and then open the Item table in Design view.
2. Add a Lookup field, Item Type to the Item table. The field should appear after the Description field. The field will contain data on the type of item for sale. The item types are CAP (caps and hats), CLO (clothing), and NOV (Novelties).
3. Make the following changes to the Item table:
   a. Change the field size for the On Hand field to Integer. The Format should be fixed and the decimal places should be 0.
   b. Make Description a required field.
   c. Specify the legal values CAP, CLO, and NOV for the Item Type field. Include validation text.
   d. Specify that number on hand must be between 0 and 75. Include validation text.
4. Save the changes to the table design. If a dialog box appears indicating that some data may be lost, click the Yes button.
5. Using a query, assign the value NOV to the Item Type field for all records. Save the query as Update Query.
6. Delete the split form for the Item table that you created in Chapter 1. The form does not include the Item Type field. Recreate the split form for the Item table.

7. Use the split form to change the item type for item numbers 3663 and 7930 to CAP. Change the item type for item numbers 5923 and 7810 to CLO.
8. Add the following items to the Item table.

3673	Blanket	NOV	5	$29.90	$34.00	AC
6078	Key Chain	NOV	20	$3.00	$5.00	MN
7550	Sweatshirt	CLO	8	$19.90	$22.95	LG

9. Create an advanced filter for the Item table. The filter should display the item number, item type, description, and number on hand for all items with less than 10 items on hand. Sort the filter by item type and description. Save the filter settings as a query and name the filter Reorder Filter.
10. Resize all columns in the Item table and the Supplier table to best fit.
11. Using a query, delete all records in the Item table where the description starts with the letter F. Save the query as Delete Query.
12. Specify referential integrity between the Supplier table (the one table) and the Item table (the many table). Cascade the update but not the delete.
13. Compact the database.
14. Submit the revised database in the format specified by your instructor.

In the Lab

Lab 3: Maintaining the Ada Beauty Supply Database

Problem: The management of Ada Beauty Supply has determined that some changes must be made to the database structure. A multivalued field must be added. Validation rules need to be added. Finally, some additions and deletions are required to the database.

Instructions: Use the Ada Beauty Supply database created in the In the Lab 3 of Chapter 1 on page AC 69 for this assignment, or see your instructor for information on accessing the files required for this book. Submit the revised database in the format specified by your instructor.

Instructions Part 1: Several changes must be made to the database structure. For example, management would like a multivalued field that lists the type of services each beauty salon offers. This knowledge can help the sales representatives better meet the needs of their customers. Table 3-2 lists the service abbreviations and descriptions that management would like in a Services Offered multivalued field.

Table 3–2 Service Abbreviations and Descriptions

Service Abbreviation	Description
FAC	Facial
HRS	Hair Styling
MNC	Manicure
PED	Pedicure
MST	Massage Therapy
TAN	Tanning

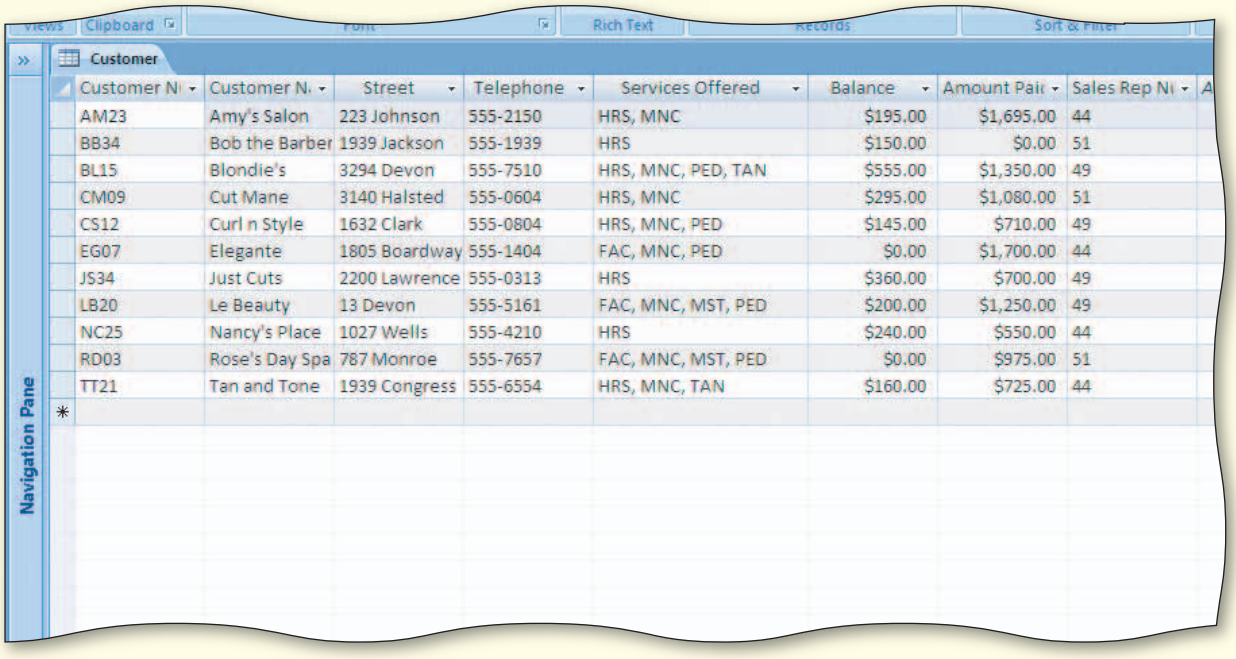
Management wants to ensure that an entry always appears in the Customer Name field and that any letters entered in the Customer Number field appear in uppercase. It also requires that the amount in the Balance field is never less than 0 or greater than $1,000. Make the changes to the database structure. Place the Services Offered field after the Telephone field.

Continued >

In the Lab *continued*

Instructions Part 2: The data for the Services Offered field shown in Figure 3–82 must be added to the database. The address for Elegante is incorrect. It should be 180 Broadway. Le Beauty has changed its name to Le Beauty Day Spa. Nancy's Place has gone out of business. A new salon, PamperMe Day Spa, just opened. The address for the salon is 2125 Lawrence and the phone number is 555-2401. The spa provides all services except hair styling and tanning.

Management wants to use PA10 as the customer number and Terry Sinson is the sales rep. The new spa has purchased $750 worth of supplies but has not paid for them. Format the datasheet to best fit the data.



Customer Ni	Customer N.	Street	Telephone	Services Offered	Balance	Amount Paic	Sales Rep Ni	A
AM23	Amy's Salon	223 Johnson	555-2150	HRS, MNC	$195.00	$1,695.00	44	
BB34	Bob the Barber	1939 Jackson	555-1939	HRS	$150.00	$0.00	51	
BL15	Blondie's	3294 Devon	555-7510	HRS, MNC, PED, TAN	$555.00	$1,350.00	49	
CM09	Cut Mane	3140 Halsted	555-0604	HRS, MNC	$295.00	$1,080.00	51	
CS12	Curl n Style	1632 Clark	555-0804	HRS, MNC, PED	$145.00	$710.00	49	
EG07	Elegante	1805 Boardway	555-1404	FAC, MNC, PED	$0.00	$1,700.00	44	
JS34	Just Cuts	2200 Lawrence	555-0313	HRS	$360.00	$700.00	49	
LB20	Le Beauty	13 Devon	555-5161	FAC, MNC, MST, PED	$200.00	$1,250.00	49	
NC25	Nancy's Place	1027 Wells	555-4210	HRS	$240.00	$550.00	44	
RD03	Rose's Day Spa	787 Monroe	555-7657	FAC, MNC, MST, PED	$0.00	$975.00	51	
TT21	Tan and Tone	1939 Congress	555-6554	HRS, MNC, TAN	$160.00	$725.00	44	

Figure 3–82

Instructions Part 3: Because the sales reps work on commission, management wants to make sure that customers are not assigned to a sales rep who is not in the database. It also wants the ability to change a sales rep number in the Sales Rep table and have the change applied to the Customer table. Create the appropriate relationship that would satisfy management's needs.

Cases and Places

Apply your creative thinking and problem solving skills to design and implement a solution.

• Easier •• More Difficult

• 1: Maintaining the Second-Hand Goods Database

Use the Second-Hand Goods database you created in Cases and Places 1 in Chapter 1 on page AC 71 for this assignment, or see your instructor for information on accessing the files required for this book. Perform each of the following tasks:

a. The Condition field should be a Lookup field. Only the current values in the database should be legal values.
b. A better description for the bookcases is 3-Shelf Bookcase.
c. The duvet has been sold.
d. The minimum price of any item is $2.00.
e. It would be easier to find items for sale if the default sort order for the item table were by description rather than by item number. Also, some of the descriptions are not displayed completely in Datasheet view.
f. Specify referential integrity. Cascade the update and the delete.

Submit the revised database in the format specified by your instructor.

• 2: Maintaining the BeachCondo Rentals database

Use the BeachCondo Rentals database you created in Cases and Places 2 in Chapter 1 on page AC 71 for this assignment, or see your instructor for information on accessing the files required for this book. Perform each of the following tasks:

a. Add the field, For Sale to the Condo Unit, to indicate whether a condo unit is for sale. The field is a Yes/No field and should appear after the weekly rate.
b. All units owned by Alonso Bonita are for sale.
c. The Bedrooms, Bathrooms, and Sleeps fields always should contain data.
d. Most common condo units have one bedroom, one bathroom, and sleep two people. All condo units should have a minimum of one bedroom, one bathroom, and sleep two people.
e. No unit rents for less than $700 or more than $1,500.
f. Management has just received a new listing from Mark Graty. It is unit 300. The unit sleeps 10, has three bedrooms, has 2.5 bathrooms, and includes linens. The weekly rate is $1,400 and the owner is interested in selling the unit.

Submit the revised database in the format specified by your instructor.

•• 3: Maintaining the Restaurant Database

Use the restaurant database you created in Cases and Places 3 in Chapter 1 on page AC 71 for this assignment, or see your instructor for information on accessing the files required for this book. Using the Plan Ahead guidelines presented in this chapter, determine what changes need to be made to your database. For example, a multivalued field could be useful to record opening days and times of a restaurant. Another multivalued field could record restaurant specialties. Use a word processing program, such as Microsoft Word, to explain the changes you need to make to the database. Then, make the changes to the database. Submit the Word document and the revised database in the format specified by your instructor.

Continued >

Cases and Places *continued*

•• 4: Updating Your Contacts Database

Make It Personal

Use the contacts database you created in Cases and Places 4 in Chapter 1 on page AC 71 for this assignment, or see your instructor for information on accessing the files required for this book. Consider your own personal job situation. Has the focus of your job search changed? Are there specific jobs within the companies of interest that appeal to you? Have you contacted an individual within a company to express your interest? Create a multivalued field to store those specific positions that would interest you. Review the fields in the contacts database. Are there any fields you need to add? Are there any fields you need to delete? Are there any tables that need to be deleted? Are there companies that need to be added to your database? Make any necessary changes to your database structure and update the database. Using a word processing program, such as Microsoft Word, explain what changes you made to your database and why you made the changes. Submit the Word document and the revised database in the format specified by your instructor.

•• 5: Understanding Action Queries, Query Wizards, and Table Design Changes

Working Together

With a make-table query, a user can create a new table from one or more tables in the database. The table can be stored in the same database or a new database. As a team, use the Access Help system to learn more about make-table queries. Then, choose either the Cases and Places 1 database or the Cases and Places 2 database and create a make-table query. For example, for the Hockey Fan Zone, the management could create a table named Supplier Call List that would include the item code, description, and cost of each item as well as the supplier name and telephone number. Write a one-page paper that (1) explains the purpose for which the new table is intended and (2) suggests at least two additional uses for make-table queries. Submit the paper and the database in the format specified by your instructor.

Open the Students database that you created in Chapter 1. As a team, review the data types for each of the fields that are in the database. Do any of these data types need to be changed? For example, is there a field that should store multiple values? Are there any fields that should contain validation rules? Change the data types and add validation rules as necessary. Examine the tables in your database. Delete any tables that you do not need. Write a one-page paper that explains your reasons for changing (or not changing) the structure of the database. Submit the paper and the database in the format specified by your instructor.

Save the Ada Beauty Supply database as AdaTeam Beauty Supply. Research the purpose of the Find Unmatched Query Wizard and the Find Duplicates query Wizard. Use the AdaTeam database and create queries using each of these wizards. Did the queries perform as expected? Open each query in Design view and modify it, for example, add another field to the query. What happened to the query results? Write a one-page paper that explains the purpose of each query wizard and describes the team's experiences with creating and modifying the queries. Submit the paper and database in the format specified by your instructor.