Access Tutorial 11: Action Queries

11.1 Introduction: Queries that change data

11.1.1 What is an action query?

All of the queries that you have created to this point have been variations of “select” queries. Select queries are used to display data but do not actually change the data in any way.

Action queries, in contrast, are used to change the data in existing tables or make new tables based on the query's results set. The primary advantage of action queries is that they allow you to modify a large number of records without having to write Visual Basic programs.

Access provides four different types of action queries:

1. **Make table** — creates a new table based on the results set of the query;
2. **Append** — similar to a make-table query, except that the results set of the query is appended to an existing table;
3. **Update** — allows the values of one or more fields in the result set to be modified; and,
4. **Delete** — deletes all the records in the results set from the underlying table.

Since the operation of all four types of action queries is similar, we will focus on update queries in this tutorial.

11.1.2 Why use action queries?

To motivate the examples in the first part of this tutorial, we are going to assume that the number of credits allocated to courses in certain departments need to be changed. For example, assume that you need to increase the number of credits for courses in the Commerce department by 1.5 times their current values. There are at least four different ways of accomplishing this task:

1. Create a calculated field called `NewCredits` that multiplies the value of `Credits` by 1.5 — The query containing the calculated field can be used in place of the `Courses` table whenever credit information is required. Of course, the values stored in the `Courses` table are still the old values. Although there might be some advantages to keeping the old values, it may cause confusion about which values to use. In addition, the use of a calculated field creates a computational load that becomes larger as the number of courses increases.
2. Go through the `Courses` table record by record and manually change all the values — This approach is tedious and error prone. Furthermore, it is simply impractical if the number of courses is large.
3. Write a Visual Basic program to automate Step 2. This is a good approach; however, it clearly requires the ability to write Visual Basic programs.
4. Create an **update query** that (a) selects only those courses that require modification and (b) replaces the value of `Credits` with `Credits * 1.5`. — This approach is computationally efficient and allows you to work with the QBE editor rather than a programming language.

11.2 Learning objectives

- ❒ What is an action query? Why would I want to use one?
- ❒ How do I make a backup copy of one of my tables?
- ❒ How to I undo (rollback) an action query once I have executed it?

❒ How do I update only certain records in a table?

❒ How do I create a button on a form? How do I make an action query execute when the button is pressed?

11.3 Tutorial exercises

11.3.1 Using a make-table query to create a backup

Since action queries permanently modify the data in tables, it is a good idea to create a backup of the table in question before running the query. An easy way to do this is to use a make-table query.

- Create a select query based on the `Courses` table and save it as `qryCoursesBackup`.
- Project the asterisk (*) into the query definition so that all the fields are included in the results set.
- While still in query design mode, select *Query > Make Table* from the main menu and provide a name for the target table (e.g., `CoursesBackup`) as shown in Figure 11.1.
- Select *Query > Run* from the main menu to execute the action query, as shown in Figure 11.2.

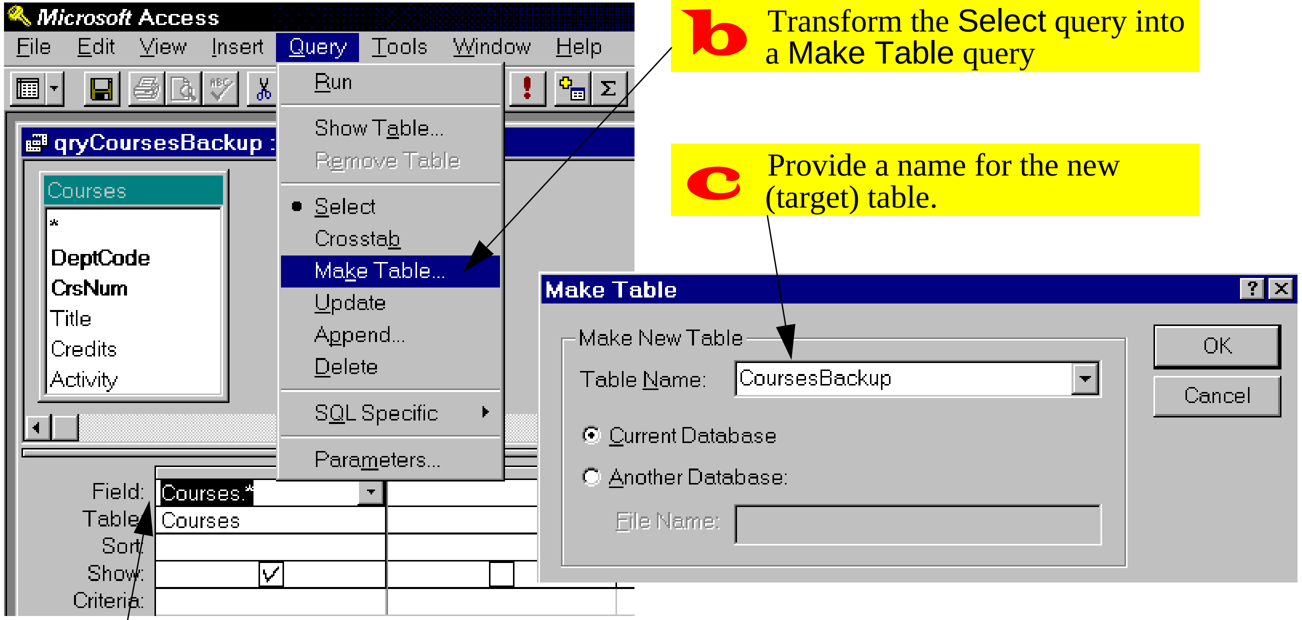
Action queries do not execute until you explicitly run them. Switching to datasheet mode only provides a preview of the results set.

- Save the query. If you switch to the database window, you will notice that the new make-table query has a different icon than the select queries.

11.3.2 Using an update query to rollback changes

Having a backup table is not much use without a means of using it to restore the data in your original table. In this section, you will use an update query to

FIGURE 11.1: Use a make-table query to back up and existing table



Field: Courses.*
Table: Courses
Sort:
Show: ✓
Criteria:

Table Name: CoursesBackup

[✓ Current Database] Another Database:

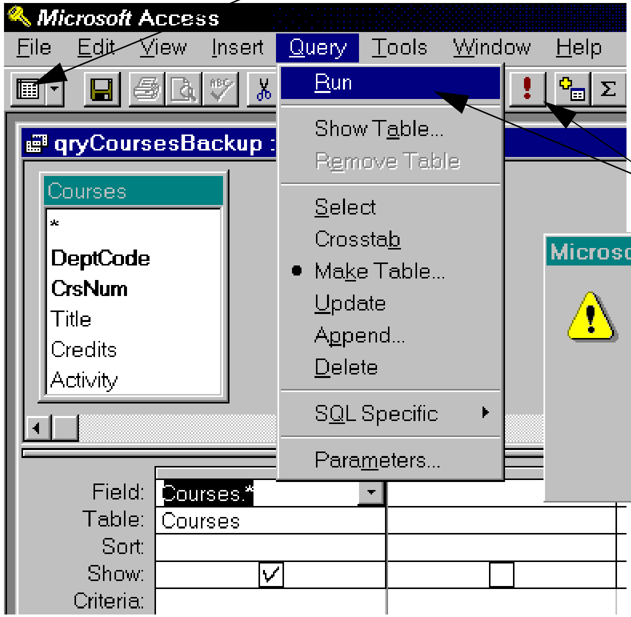
b Transform the Select query into a Make Table query

c Provide a name for the new (target) table.

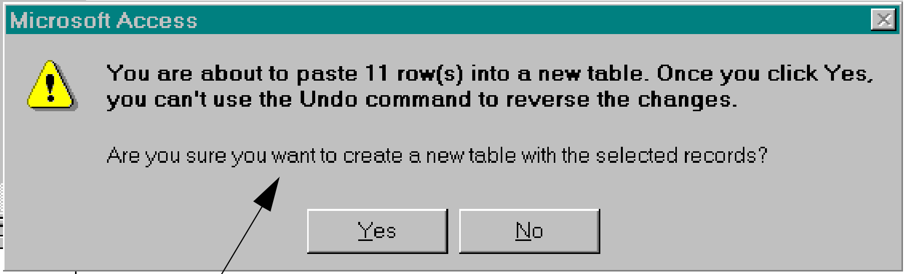
a Project all fields (*) into the query definition.

FIGURE 11.2: Run the make-table query.

? You can switch to datasheet mode to view the results set. Note that this does not actually execute the query.



a To execute the query, you must select Query > Run. Alternatively, you can press the "run" (!) icon on the toolbar.


Microsoft Access

You are about to paste 11 row(s) into a new table. Once you click Yes, you can't use the Undo command to reverse the changes.

Are you sure you want to create a new table with the selected records?

? The warning box reminds you that you are about to make permanent changes to the data in the database.

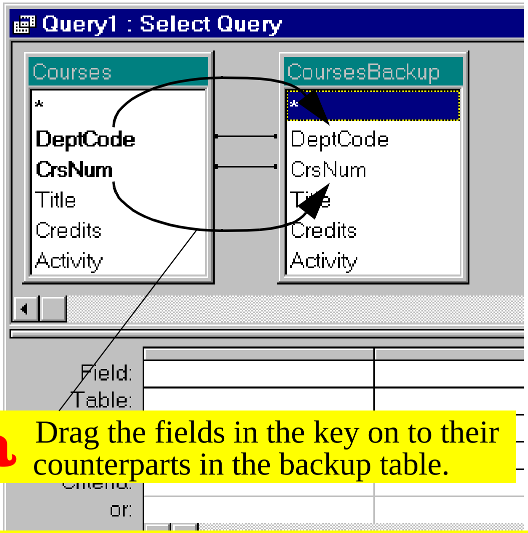
replace some of the values in your `Courses` table with values from your `CoursesBackup` table.

- Create a new query based on the `Courses` and `CoursesBackup` tables.
- Since no relationship exists between these tables, create an *ad hoc* relationship within the query as shown in Figure 11.3.
- Select *Query > Update* from the main menu. Note that this results in the addition of an *Update To* row in the query definition grid.
- Project `Credits` into the query definition and fill in the *Update To* row as shown in Figure 11.4.
- Save the query as `qryRollbackCredits`.

Now is a good point to stop and interpret what you have done so far:

1. By creating a relationship between the `Courses` table and its backup, you are joining together the records from both tables that satisfy the condi-

FIGURE 11.3: Create an *ad hoc* relationship between the table and its backup.

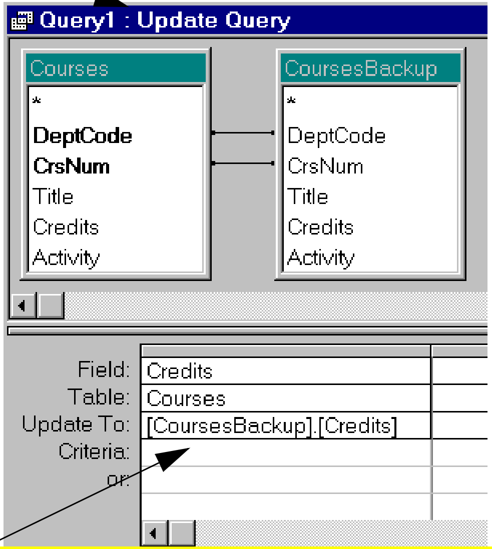


a Drag the fields in the key on to their counterparts in the backup table.

? You cannot drag two fields at once or enforce referential integrity in a QBE relationship like you can in the main relationship editor.

FIGURE 11.4: Fill in the *Update To* field.

a Select Query > Update to make the query an update query.



Field:	Credits
Table:	Courses
Update To:	[CoursesBackup].[Credits]
Criteria:	
or:	

b Use the `<table name>.<field name>` syntax to disambiguate the field name.

tion:

```
Courses.DeptCode =
 CoursesBackup.DeptCode AND
 Courses.CrsNum =
 CoursesBackup.CrsNum.
```

2. By projecting `Courses.Credits` into the query, you are making it the target for the update. In other words, the values in `Courses.Credits` are going to be modified by the update action.
3. By setting the *Update To* field to `Courses-Backup.Credits`, you are telling Access to replace the contents of `Courses.Credits` with the contents of `CoursesBackup.Credits`.

Whenever this query is run, it will replace whatever is in the `Credits` field of all the records in the `Courses` table with values from the backup. You will use this query to “rollback” updates made later on.

11.3.3 Using an update query to make selective changes

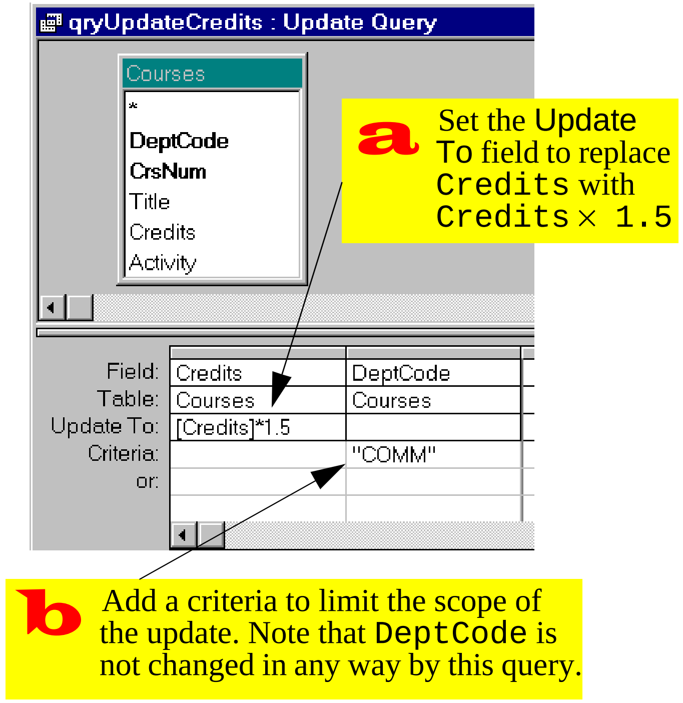
Now that you have an infrastructure for undoing any errors, you can continue with the task of updating credits for the Commerce department.

- Create an update query based on the `Courses` table and save it as `qryUpdateCredits`.
- Set the *Update To* field to `[Courses]*1.5`. Note that if you do not include the square brackets, Access will interpret `Courses` as a literal string rather than a field name.

Since this particular query only contains one table, the `<table name>.<field name>` syntax is not required for specifying the *Update To* expression.

- Since you only want to apply the change to Commerce courses, enter a criterion for the `DeptCode` field, as shown in Figure 11.5.

FIGURE 11.5: Create an update query that updates a subset of the records.


qryUpdateCredits : Update Query

Courses: *, DeptCode, CrsNum, Title, Credits, Activity

Field:	Credits	DeptCode
Table:	Courses	Courses
Update To:	[Credits]*1.5	
Criteria:		"COMM"
or:		

a Set the Update To field to replace `Credits` with `Credits` × `1.5`

b Add a criteria to limit the scope of the update. Note that `DeptCode` is not changed in any way by this query.

- Run the query and verify that update has been performed successfully.

11.3.4 Rolling back the changes

While testing the `qryUpdateCredits` query, your exuberance may have led you to execute it more than once. To return the `Courses` table to its state before any updates, all you need to do it run your rollback query.

- Run `qryRollback` credits by double-clicking its icon in the database window.

? Once an action query is created, it has more in common with subroutines written in Visual Basic than standard select queries. As such, it is best to think of action queries in terms of procedures to be executed rather than virtual tables or views. Double-clicking an action query executes it.

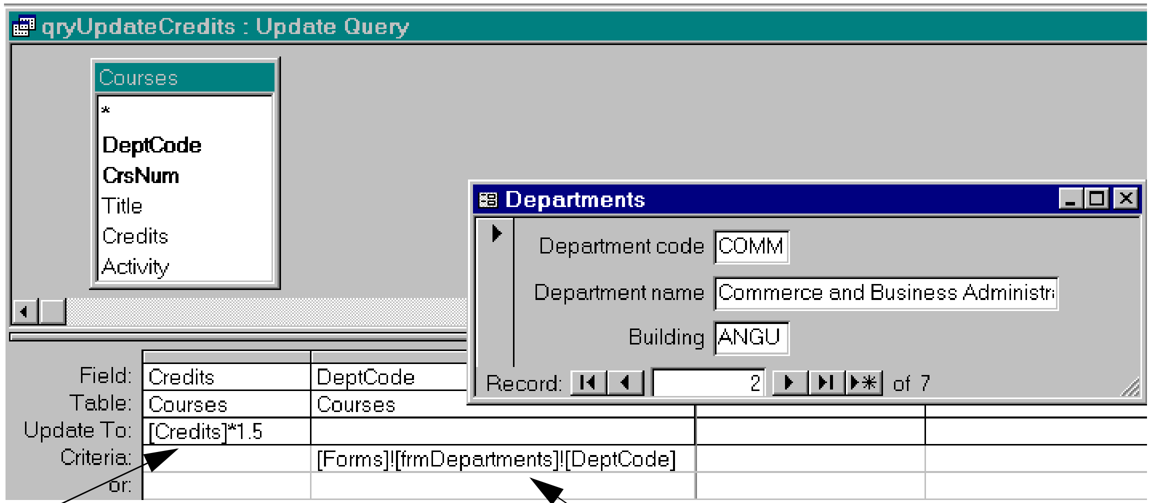
11.3.5 Attaching action queries to buttons

As a designer, you should not expect your users to understand your query naming convention, rummage through the queries listed in the database window, and execute the queries that need to be executed. As such, it is often useful to create buttons on forms and “attach” the action queries to the buttons. When the button is pressed, the query is executed.

Although we have not yet discussed buttons (or **events** in general), the button wizard makes the creation of this type of form object straightforward.

- Modify `qryUpdateCredits` so that it updates only those departments matching the `DeptCode` value in the `frmDepartments` table (see Figure 11.6).
- Save the resulting action parameter query as `pqryUpdateCredits` and close it.

FIGURE 11.6: Create an action parameter query to update `Credits` for a particular department.



Department code COMM
Department name Commerce and Business Administr
Building ANGU
Record: 2 of 7

Field:	Credits	DeptCode
Table:	Courses	Courses
Update To:	[Credits]*1.5	
Criteria:		[Forms]![frmDepartments]![DeptCode]
or:		

a The update operation specifies the action to perform on the records.

b The criterion limits the scope of the update to those records matching the current parameter value

- Switch to the design view of `frmDepartments` and add a button as shown in Figure 11.7.
- Attach the `pqryUpdateCredits` query to the button as shown in Figure 11.8.
- Provide a caption and a name for the button as shown in Figure 11.9.
- Switch to form view. Press the button to run the query (alternatively, use the shortcut key by pressing *Alt-U*) as shown in Figure 11.10.

11.4 Application to the assignment

11.4.1 Rolling back your master tables

As you begin to implement the transaction processing component of your system, it is worthwhile to have a means of returning your master tables to their original state (i.e., their state when you started developing the system).

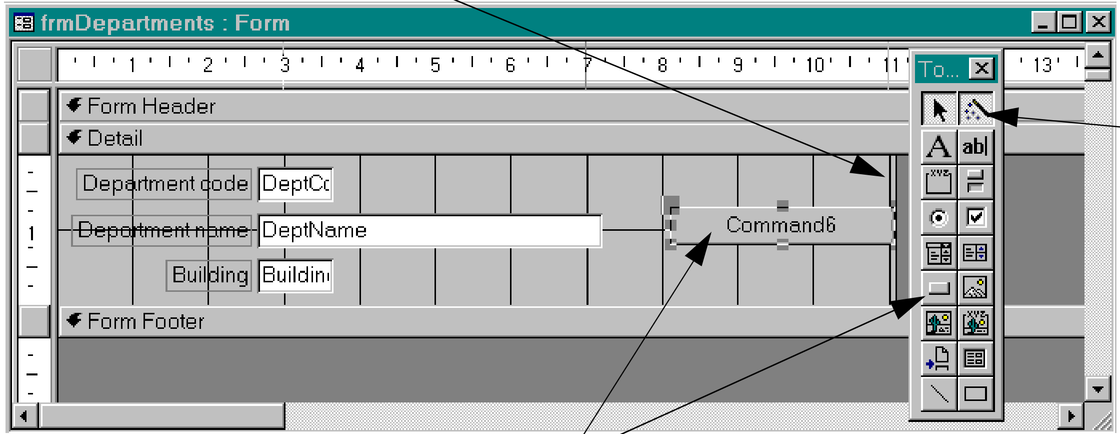
- Create backup copies of your `Products` and `BackOrders` tables using make-tables queries. Save these queries but note that they only need to be run once.
- Create a rollback query that allows you to return your `Products` table to its original state.

Rolling back the `BackOrders` table is more complex than rolling back the `Products` table. This is because we are making the assumption that no products are ever added or deleted to the system. As such, all the information needed for the rollback is in the backup copy of `Products`.

In contrast, records are added to the `BackOrders` table on a regular basis. As a result, the `BackOrders` table and its backup may contain a different number of records. If so, the match-and-replace process used for rolling back `Products` is inappropriate.

FIGURE 11.7: Add a button to the form using the button wizard.

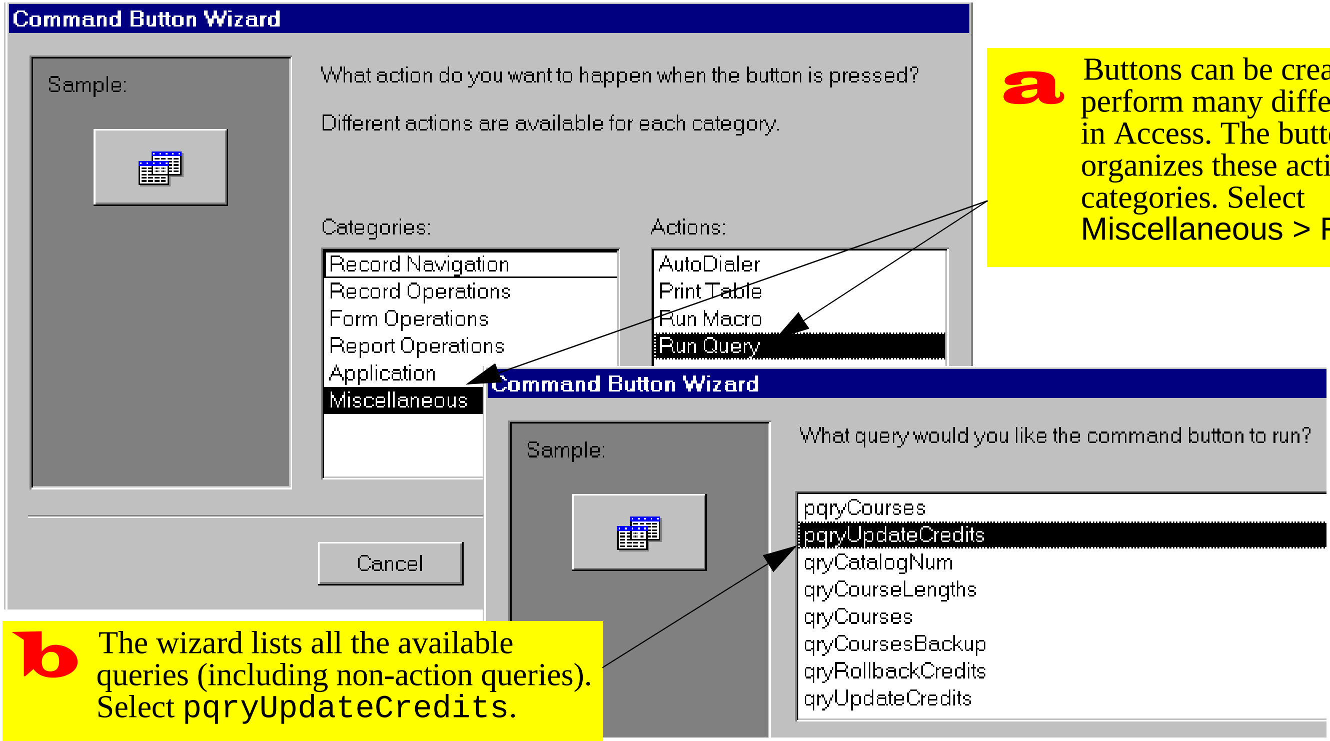
a If there is insufficient space for a button, drag the border of the detail section to the right



b Ensure that the wizard button in the toolbox is depressed (wizards are activated).

c Select the “command button” tool and click on an appropriate location on the form detail section. The button wizard should appear

FIGURE 11.8: Use the wizard to attach an action query to the button.



What action do you want to happen when the button is pressed?

Different actions are available for each category.

Categories:	Actions:
Record Navigation	AutoDialer
Record Operations	Print Table
Form Operations	Run Macro
Report Operations	Run Query
Application	
Miscellaneous	

What query would you like the command button to run?

pqryCourses
pqryUpdateCredits
qryCatalogNum
qryCourseLengths
qryCourses
qryCoursesBackup
qryRollbackCredits
qryUpdateCredits

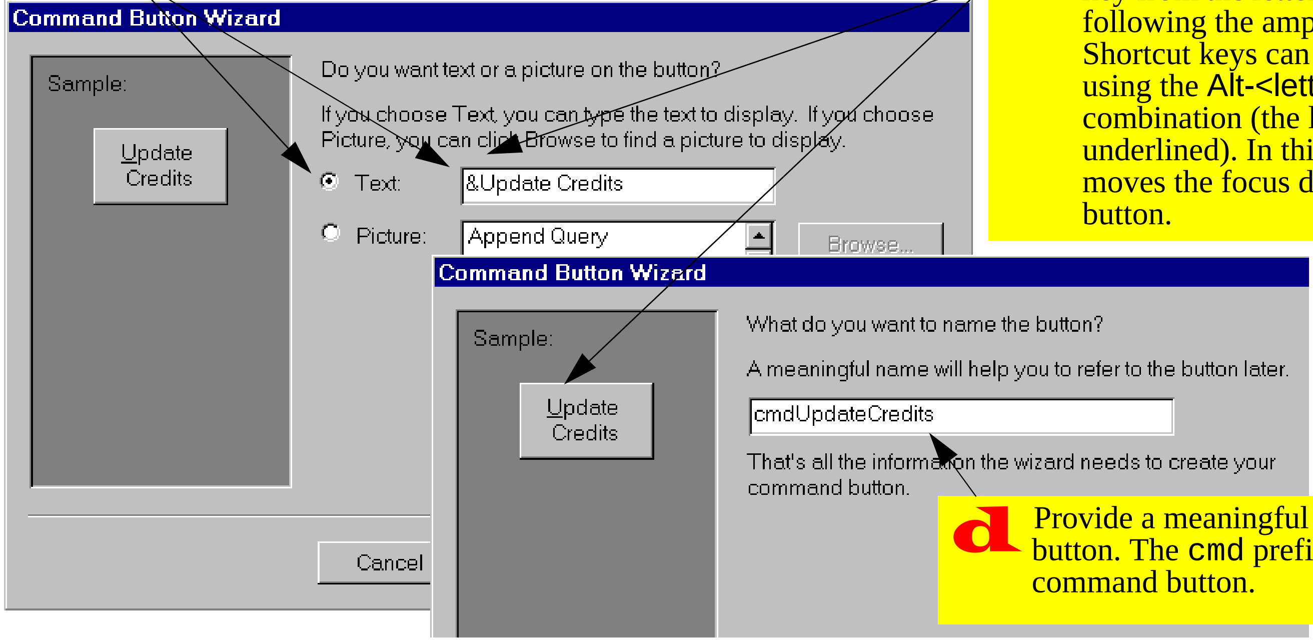
a Buttons can be created to perform many different actions in Access. The button wizard organizes these actions into categories. Select Miscellaneous > Run Query.

b The wizard lists all the available queries (including non-action queries). Select `pqryUpdateCredits`.

FIGURE 11.9: Use the wizard to attach a query to a button (continued)

c You can show either a picture (icon) or a caption on the button. Enter a suitable caption.

? Including an ampersand (&) in the caption creates a shortcut key from the letter immediately following the ampersand. Shortcut keys can be invoked using the Alt-<letter> combination (the letter is underlined). In this case, Alt-U moves the focus directly to the button.



Command Button Wizard

Sample:

Update Credits

Do you want text or a picture on the button?

If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

[✓ Text:] &Update Credits

Picture: Append Query

Command Button Wizard

Sample:

Update Credits

What do you want to name the button?

A meaningful name will help you to refer to the button later.

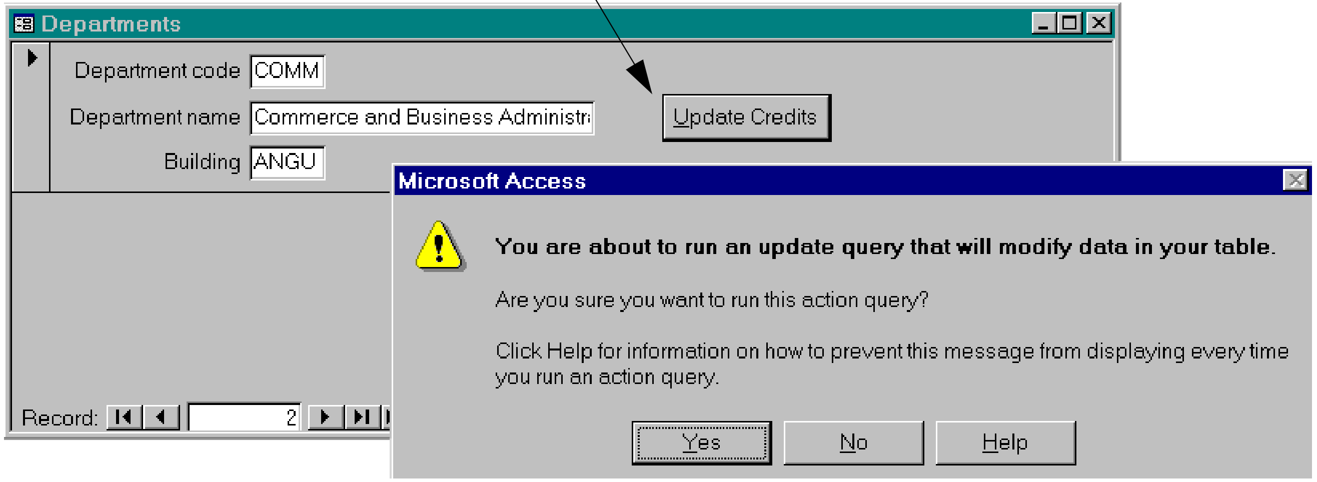
cmdUpdateCredits

That's all the information the wizard needs to create your command button.

d Provide a meaningful name for the button. The `cmd` prefix indicates a command button.

FIGURE 11.10: Execute the action query by pressing the button.

a Press the button to execute the action query (or press Alt-U to use the shortcut).



You are about to run an update query that will modify data in your table.

Are you sure you want to run this action query?

Click Help for information on how to prevent this message from displaying every time you run an action query.

The easiest way to rollback the `BackOrders` table is to delete all the records it contains and use an append query to replace the records from the backup.

- Open your `BackOrders` table in datasheet mode and select *Edit > Select All Records* from the menu (alternatively, press *Control-A*)
- Press the *Delete* key.
- Create an append query that adds the records in the backup table to the `BackOrders` table.

Once you learn the Access macro language or Visual Basic for Applications, you will be able to write a small procedure to execute these steps for you. For the assignment, however, this "manual rollback" is sufficient.

11.4.2 Processing transactions

You are now in a position to combine parameter queries and action queries into parameter-action queries. These queries will allow you to perform reasonably complex transaction processing operations on your master tables.

- Create an update query to add all products in a shipment to inventory.

Note that this query should only process shipment details for the current shipment (i.e., it should be based on a parameter query similar to the one you created in Section 10.4).

- Create a button on the shipments form to perform this update.
- Create an update query to subtract items from inventory when you process an order from your customers. Do not attach this query to a button at this point.

This query should only process order details from the current order.