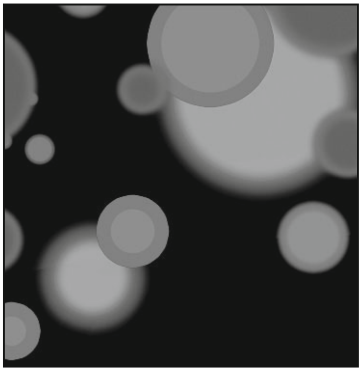

Chapter 13

Managing Content

Although you can use phpMyAdmin for a lot of database administration, you might want to set up areas where clients can log in to update some data without giving them full rein of your database. To do so, you need to build your own forms and create customized content management systems.

At the heart of every content management system lies what is sometimes called the CRUD cycle—create, read, update, and delete—which utilizes just four SQL commands: `INSERT`, `SELECT`, `UPDATE`, and `DELETE`. To demonstrate the basic SQL commands, this chapter shows you how to build a simple content management system for a table called `blog`.

Even if you don't want to build your own content management system, the four commands covered in this chapter are essential for just about any database-driven page, such as user login, user registration, search form, search results, and so on.

In this chapter, you'll learn how to do the following:

- Inserting new records in a database table
- Displaying a list of existing records
- Updating existing records
- Asking for confirmation before a record is deleted

Setting up a content management system

Managing the content in a database table involves four stages, which I normally assign to four separate but interlinked pages: one each for inserting, updating, and deleting records, plus a list of existing records. The list of records serves two purposes: first, to identify what's stored in the database; and more importantly, to link to the update and delete scripts by passing the record's primary key through a query string.

The `blog` table contains a series of titles and text articles to be displayed in the Japan Journey site, as shown in Figure 13-1. In the interests of keeping things simple, the table contains just five columns: `article_id` (primary key), `title`, `article`, `updated`, and `created`.

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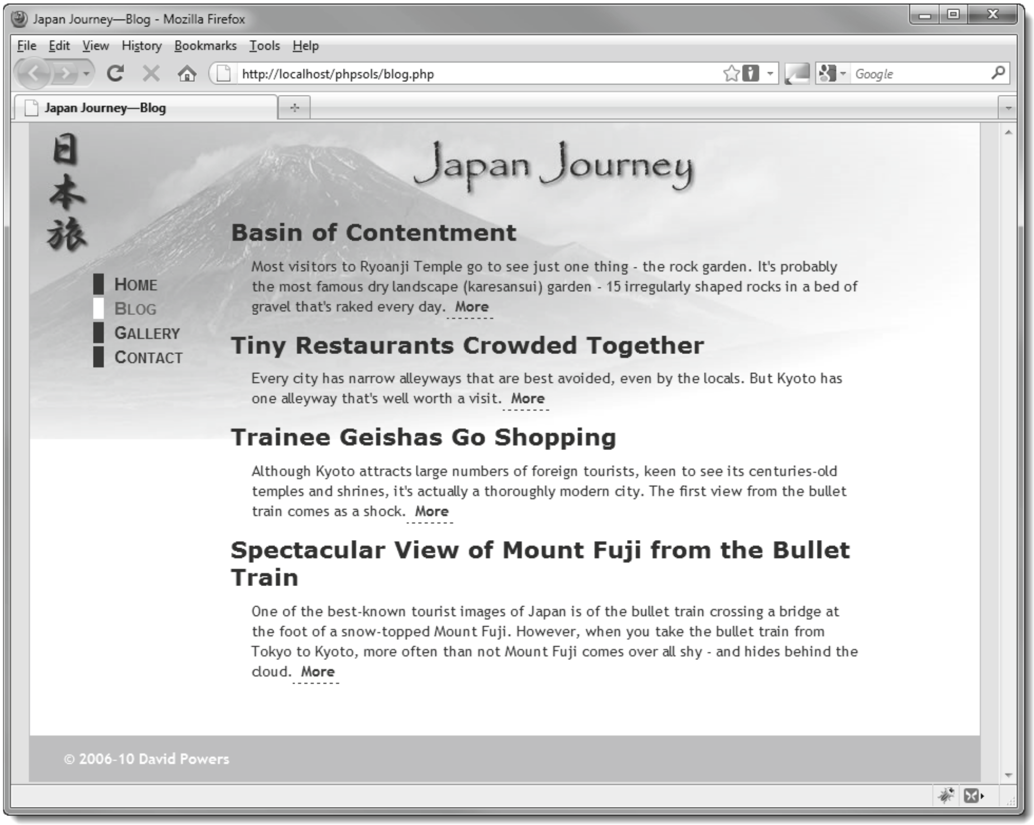

Japan Journey—Blog - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/phpsols/blog.php
Google
Japan Journey—Blog
日本旅
Japan Journey
HOME
BLOG
GALLERY
CONTACT
© 2006-10 David Powers

Basin of Contentment

Most visitors to Ryoanji Temple go to see just one thing - the rock garden. It's probably the most famous dry landscape (karesansui) garden - 15 irregularly shaped rocks in a bed of gravel that's raked every day. More

Tiny Restaurants Crowded Together

Every city has narrow alleyways that are best avoided, even by the locals. But Kyoto has one alleyway that's well worth a visit. More

Trainee Geishas Go Shopping

Although Kyoto attracts large numbers of foreign tourists, keen to see its centuries-old temples and shrines, it's actually a thoroughly modern city. The first view from the bullet train comes as a shock. More

Spectacular View of Mount Fuji from the Bullet Train

One of the best-known tourist images of Japan is of the bullet train crossing a bridge at the foot of a snow-topped Mount Fuji. However, when you take the bullet train from Tokyo to Kyoto, more often than not Mount Fuji comes over all shy - and hides behind the cloud. More

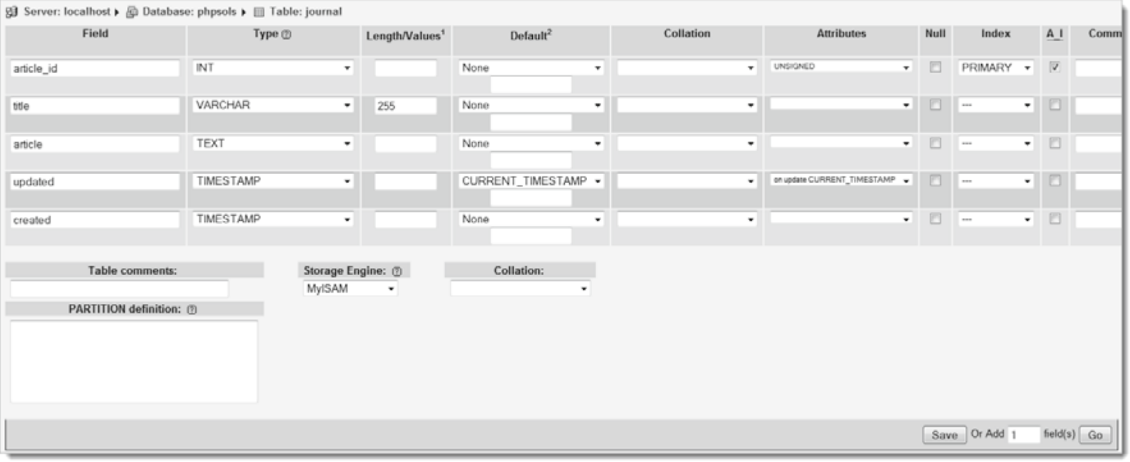
Figure 13-1. The contents of the `blog` table displayed in the Japan Journey website

The final two columns hold the date and time when the article was last updated and when it was originally created. Although it may seem illogical to put the `updated` column first, this is to take advantage of the way MySQL automatically updates the first `TIMESTAMP` column in a table whenever you make any changes to a record. The `created` column gets its value from a MySQL function called `NOW()`, neatly sidestepping the problem of preparing the date in the correct format for MySQL. The thorny issue of dates will be tackled in the next chapter.

Creating the blog database table

If you just want to get on with studying the content management pages, Open phpMyAdmin, select the `phpsols` database, and use `blog.sql` to import the table in the same way as in Chapter 10. The SQL file creates the table and populates it with four short articles.

If you would prefer to create everything yourself from scratch, open phpMyAdmin, select the `phpsols` database, and create a new table called `blog` with five fields (columns). Use the settings shown in the following screenshot and Table 13-1. Because there are more than three columns, phpMyAdmin displays the options horizontally. Because of the layout, the **AUTO_INCREMENT** check box is abbreviated as **A_I**.



Server: localhost ▸ Database: phpsols ▸ Table: journal

Field	Type	Length/Values[1]	Default[2]	Collation	Attributes	Null	Index	A_I	Comm
article_id	INT		None		UNSIGNED	□	PRIMARY	☑	
title	VARCHAR	255	None			□	---	□	
article	TEXT		None			□	---	□	
updated	TIMESTAMP		CURRENT_TIMESTAMP		on update CURRENT_TIMESTAMP	□	---	□	
created	TIMESTAMP		None			□	---	□	

Table comments:

Storage Engine: MyISAM

Collation:

PARTITION definition:

Table 13-1. Column definitions for the `blog` table

Field	Type	Length /Values	Default	Attributes	Null	Index	A_I
`article_id`	`INT`			`UNSIGNED`	Deselected	`PRIMARY`	Selected
`title`	`VARCHAR`	`255`			Deselected		
`article`	`TEXT`				Deselected		
`updated`	`TIMESTAMP`		`CURRENT_ TIMESTAMP`	`on update CURRENT_ TIMESTAMP`	Deselected		
`created`	`TIMESTAMP`				Deselected		

The `on update CURRENT_TIMESTAMP` and `CURRENT_TIMESTAMP` options aren't available on older versions of phpMyAdmin and/or MySQL. This doesn't matter, because the default is for the first `TIMESTAMP` column in a table to update automatically whenever a record is updated. To keep track of when a record was originally created, the value in the second `TIMESTAMP` column is never updated.

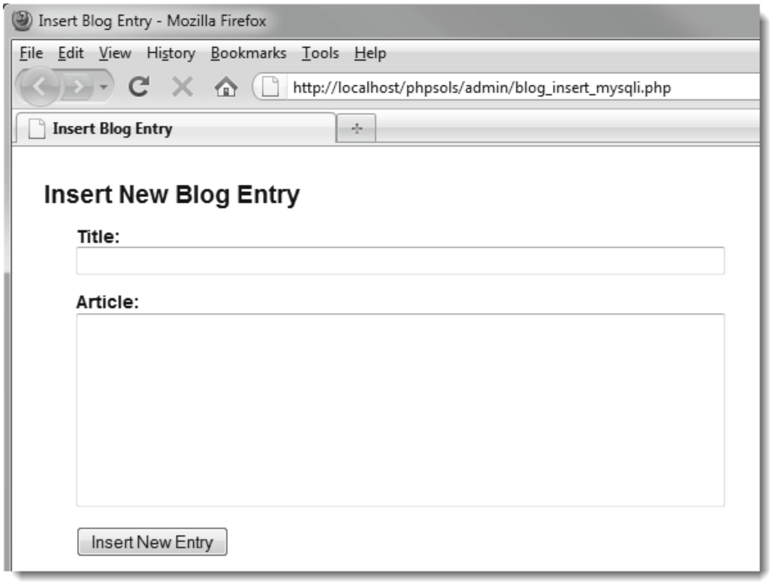
Creating the basic insert and update form

SQL makes an important distinction between inserting and updating records by providing separate commands. `INSERT` is used only for creating a brand new record. Once a record has been inserted, any changes must be made with `UPDATE`. Since this involves working with identical fields, it is possible to use the same page for both operations. However, this makes the PHP more complex, so I prefer to create the HTML for the insert page first, save a copy as the update page, and then code them separately.

The form in the insert page needs just two input fields: for the title and the article. The contents of the remaining three columns (the primary key and the two timestamps) are handled automatically either by MySQL or by the SQL query that you will build shortly. The code for the insert form looks like this:

```
<form id="form1" method="post" action="">
  <p>
    <label for="title">Title:</label>
    <input name="title" type="text" class="widebox" id="title">
  </p>
  <p>
    <label for="article">Article:</label>
    <textarea name="article" cols="60" rows="8" class="widebox" id="article"> ➥
      </textarea>
  </p>
  <p>
    <input type="submit" name="insert" value="Insert New Entry" id="insert">
  </p>
</form>
```

The form uses the post method. You can find the full code in blog_insert_01.php in the ch13 folder. The content management forms have been given some basic styling with admin.css, which is in the styles folder. When viewed in a browser, the form looks like this:


Insert Blog Entry - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/phpsols/admin/blog_insert_mysqli.php
Insert Blog Entry
Insert New Blog Entry
Title:
Article:
Insert New Entry

The update form is identical except for the heading and submit button. The button looks like this (the full code is in blog_update_mysqli_01.php and blog_update_pdo_01.php):

```
<input type="submit" name="update" value="Update Entry" id="update">
```

I've given the title and article input fields the same names as the columns in the blog table. This makes it easier to keep track of variables when coding the PHP and SQL later.

As a security measure, some developers recommend using different names from the database columns because anyone can see the names of input fields just by looking at the form's source code. Using different names makes it more difficult to break into the database. This shouldn't be a concern in a password-protected part of a site. However, you may want to consider the idea for publicly accessible forms, such as those used for user registration or login.

Inserting new records

The basic SQL for inserting new records into a table looks like this:

```
INSERT [INTO] table_name (column_names)
VALUES (values)
```

The INTO is in square brackets, which means that it's optional. It's purely there to make the SQL read a little more like human language. The column names can be in any order you like, but the values in the second set of parentheses must be in the same order as the columns they refer to.

Although the code is very similar for MySQLi and PDO, I'll deal with each one separately to avoid confusion.

Many of the scripts in this chapter use a technique known as setting a flag. A flag is a Boolean variable that is initialized to either true or false and used to check whether something has happened. For instance, if $OK is initially set to false and reset to true only when a database query executes successfully, it can be used as the condition controlling another code block.

PHP Solution 13-1: Inserting a new record with MySQLi

This PHP solution shows how to insert a new record into the blog table using a MySQLi prepared statement. Using a prepared statement avoids problems with escaping quotes and control characters. It also protects your database against SQL injection (see Chapter 11).

1. Create a folder called admin in the phpsols site root. Copy blog_insert_01.php from the ch13 folder, and save it as blog_insert_mysqli.php in the new folder.

2. The code that inserts a new record should be run only if the form has been submitted, so it's enclosed in a conditional statement that checks for the name attribute of the submit button (insert) in the $_POST array. Put the following above the DOCTYPE declaration:

```
<?php
if (isset($_POST['insert'])) {
  require_once('../includes/connection.inc.php');
  // initialize flag
  $OK = false;
  // create database connection
  // initialize prepared statement
  // create SQL
  // bind parameters and execute statement
  // redirect if successful or display error
}
?>
```

After including the connection function, the code sets `$OK` to `false`. This is reset to `true` only if there are no errors. The five comments at the end map out the remaining steps that we'll fill in below.

3. Create a connection to the database as the user with read and write privileges, initialize a prepared statement, and create the SQL with placeholders for data that will be derived from the user input like this:

```
// create database connection
$conn = dbConnect('write');
// initialize prepared statement
$stmt = $conn->stmt_init();
// create SQL
$sql = 'INSERT INTO blog (title, article, created)
        VALUES(?, ?, NOW())';
```

The values that will be derived from `$_POST['title']` and `$_POST['article']` are represented by question mark placeholders. The value for the `created` column is a MySQL function, `NOW()`, which generates a current timestamp. In the update query later, this column remains untouched, preserving the original date and time.

The code is in a slightly different order from Chapter 11. The script will be developed further in Chapter 16 to run a series of SQL queries, so the prepared statement is initialized first.

4. The next stage is to replace the question marks with the values held in the variables—a process called **binding the parameters**. Insert the code the following code:

```
if ($stmt->prepare($sql)) {
  // bind parameters and execute statement
  $stmt->bind_param('ss', $_POST['title'], $_POST['article']);
  $stmt->execute();
  if ($stmt->affected_rows > 0)
    $OK = true;
  }
}
```

This is the section that protects your database from SQL injection. Pass the variables to the `bind_param()` method in the same order as you want them inserted into the SQL query, together with a first argument specifying the data type of each variable, again in the same order as the variables. Both are strings, so this argument is `'ss'`.

Once the statement has been prepared, you call the `execute()` method.

The `affected_rows` property records how many rows were affected by an `INSERT`, `UPDATE`, or `DELETE` query. However, if the query triggers a MySQL error, the value of `affected_rows` is –1. Unlike some computing languages, PHP treats –1 as `true`. So, you need to check that `affected_rows` is greater than zero to be sure that the query succeeded. If it is greater than zero, `$OK` is reset to `true`.

5. Finally, redirect the page to a list of existing records or display any error message. Add this code after the previous step:

```
  // redirect if successful or display error
  if ($OK) {
    header('Location: http://localhost/phpsols/admin/blog_list_mysqli.php');
    exit;
  } else {
    $error = $stmt->error;
  }
}
```

6. Add the following code block in the body of the page to display the error message if the insert operation fails:

```
<h1>Insert New Blog Entry</h1>
<?php if (isset($error)) {
  echo "<p>Error: $error</p>";
} ?>
<form id="form1" method="post" action="">
```

The completed code is in `blog_insert_mysqli.php` in the `ch13` folder.

That completes the insert page, but before testing it, create `blog_list_mysqli.php`, which is described in PHP Solution 13-3.

To focus on the code that interacts with the database, the scripts in this chapter don't validate the user input. In a real-world application, you should use the techniques described in Chapter 5 to check the data submitted from the form and redisplay it if errors are detected.

PHP Solution 13-2: Inserting a new record with PDO

This PHP solution shows how to insert a new record in the blog table using a PDO prepared statement. If you haven't already done so, create a folder called `admin` in the `phpsols` site root.

1. Copy `blog_insert_01.php` to the `admin` folder and save it as `blog_insert_pdo.php`.

2. The code that inserts a new record should be run only if the form has been submitted, so it's enclosed in a conditional statement that checks for the `name` attribute of the submit button (`insert`) in the `$_POST` array. Put the following in a PHP block above the `DOCTYPE` declaration:

```
if (isset($_POST['insert'])) {
  require_once('../includes/connection.inc.php');
  // initialize flag
  $OK = false;
  // create database connection
  // create SQL
  // prepare the statement
  // bind the parameters and execute the statement
  // redirect if successful or display error
}
```

After including the connection function, the code sets `$OK` to `false`. This is reset to `true` only if there are no errors. The five comments at the end map out the remaining steps.

3. Create a PDO connection to the database as the user with read and write privileges, and build the SQL like this:

```
// create database connection
$conn = dbConnect('write', 'pdo');
// create SQL
$sql = 'INSERT INTO blog (title, article, created)
        VALUES(:title, :article, NOW())';
```

The values that will be derived from variables are represented by named placeholders consisting of the column name preceded by a colon (`:title` and `:article`). The value for the `created` column is a MySQL function, `NOW()`, which generates a current timestamp. In the update query later, this column remains untouched, preserving the original date and time.

4. The next stage is to initialize the prepared statement and bind the values from the variables to the placeholders—a process known as **binding the parameters**. Add the following code:

```
// prepare the statement
$stmt = $conn->prepare($sql);
// bind the parameters and execute the statement
$stmt->bindParam(':title', $_POST['title'], PDO::PARAM_STR);
$stmt->bindParam(':article', $_POST['article'], PDO::PARAM_STR);
// execute and get number of affected rows
$stmt->execute();
$OK = $stmt->rowCount();
```

This begins by passing the SQL query to the `prepare()` method of the database connection (`$conn`) and storing a reference to the statement as a variable (`$stmt`).

Next, the values in the variables are bound to the placeholders in the prepared statement, and the `execute()` method runs the query.

When used with an `INSERT`, `UPDATE`, or `DELETE` query, the PDO `rowCount()` method reports the number of rows affected by the query. If the record is inserted successfully, `$OK` is 1, which PHP treats as `true`. Otherwise, it's 0, which is treated as `false`.

5. Finally, redirect the page to a list of existing records or display any error message. Add this code after the previous step:

```
  // redirect if successful or display error
  if ($OK) {
    header('Location: http://localhost/phpsols/admin/blog_list_pdo.php');
    exit;
  } else {
    $error = $stmt->errorInfo();
    if (isset($error[2])) {
      $error = $error[2];
    }
  }
}
?>
```

Since the prepared statement has been stored as `$stmt`, you can access an array of error messages using `$stmt->errorInfo()`. The most useful information is stored in the third element of the array.

6. Add a PHP code block in the body of the page to display any error message:

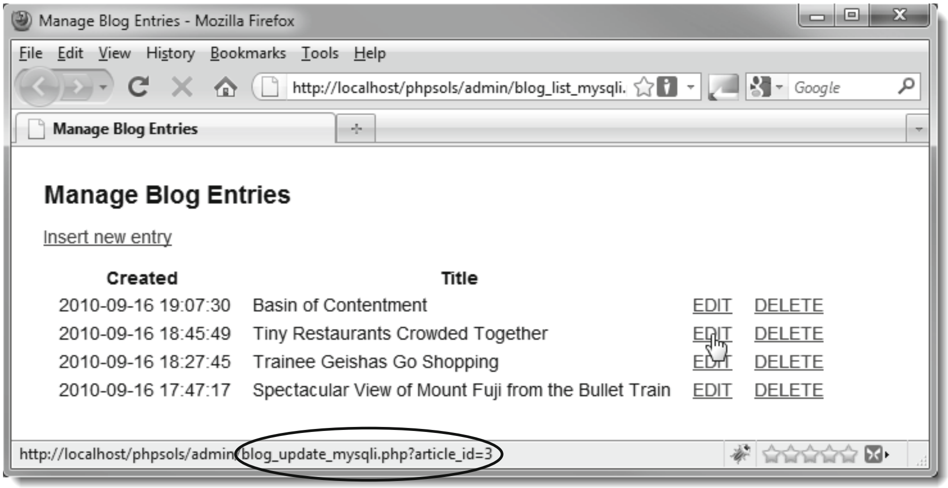
```
<h1>Insert New Blog Entry</h1>
<?php if (isset($error)) {
  echo "<p>Error: $error</p>";
} ?>
<form id="form1" method="post" action="">
```

The completed code is in `blog_insert_pdo.php` in the `ch13` folder.

That completes the insert page, but before testing it, create `blog_list_pdo.php`, which is described next.

Linking to the update and delete pages

Before you can update or delete a record, you need to find its primary key. A practical way of doing this is to query the database and display a list of all records. You can use the results of this query to display a list of all records, complete with links to the update and delete pages. By adding the value of `article_id` to a query string in each link, you automatically identify the record to be updated or deleted. As Figure 13-2 shows, the URL displayed in the browser status bar (bottom left) identifies the `article_id` of the article **Tiny Restaurants Crowded Together** as 3.


Manage Blog Entries - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/phpsols/admin/blog_list_mysqli.
Google
Manage Blog Entries

Manage Blog Entries

Insert new entry

Created	Title		
2010-09-16 19:07:30	Basin of Contentment	EDIT	DELETE
2010-09-16 18:45:49	Tiny Restaurants Crowded Together	EDIT	DELETE
2010-09-16 18:27:45	Trainee Geishas Go Shopping	EDIT	DELETE
2010-09-16 17:47:17	Spectacular View of Mount Fuji from the Bullet Train	EDIT	DELETE

http://localhost/phpsols/admin/blog_update_mysqli.php?article_id=3

Figure 13-2. The **EDIT** and **DELETE** links contain the record's primary key in a query string.

The update page uses this to display the correct record ready for updating. The same information is conveyed in the `DELETE` link to the delete page.

To create a list like this, you need to start with an HTML table that contains two rows and as many columns as you want to display, plus two extra columns for the **EDIT** and **DELETE** links. The first row is used for column headings. The second row is wrapped in a PHP loop to display all the results. The table in `blog_list_mysqli_01.php` in the `ch13` folder looks like this (the version in `blog_list_pdo_01.php` is the same, except that the links in the last two table cells point to the PDO versions of the update and delete pages):

```
<table>
  <tr>
    <th scope="col">Created</th>
    <th scope="col">Title</th>
    <th>&nbsp;</th>
    <th>&nbsp;</th>
  </tr>
  <tr>
    <td></td>
    <td></td>
    <td><a href="blog_update_mysqli.php">EDIT</a></td>
    <td><a href="blog_delete_mysqli.php">DELETE</a></td>
  </tr>
</table>
```

PHP Solution 13-3: Creating the links to the update and delete pages

This PHP solution shows how to create a page to manage the records in the blog table by displaying a list of all records and linking to the update and delete pages. There are only minor differences between the MySQLi and PDO versions, so these instructions describe both.

1. Copy blog_list_mysqli_01.php or blog_list_pdo_01.php to the admin folder, and save it as blog_list_mysqli.php or blog_list_pdo.php depending on which method of connection you plan to use. The different versions link to the appropriate insert, update, and delete files.

2. You need to connect to MySQL and create the SQL query. Add the following code in a PHP block above the DOCTYPE declaration:

```
require_once('../includes/connection.inc.php');
// create database connection
$conn = dbConnect('read');
$sql = 'SELECT * FROM blog ORDER BY created DESC';
```

   If you're using PDO, add 'pdo' as the second argument to the dbConnect() function.

   If you're using PDO, skip to step 4.

3. If you're using MySQLi, submit the query by adding the following line before the closing PHP tag:

```
$result = $conn->query($sql) or die(mysqli_error());
```

4. You now need to enclose the second table row in a loop and retrieve each record from the result set. The following code goes between the closing </tr> tag of the first row and the opening <tr> tag of the second row.

   For MySQLi, use this:

```
</tr>
<?php while($row = $result->fetch_assoc()) { ?>
<tr>
```

   For PDO, use this:

```
</tr>
<?php foreach ($conn->query($sql) as $row) { ?>
<tr>
```

   This is the same as in the previous chapter, so it should need no explanation.

5. Display the created and title fields for the current record in the first two cells of the second row like this:

```
<td><?php echo $row['created']; ?></td>
<td><?php echo $row['title']; ?></td>
```

6. In the next two cells, add the query string and value of the `article_id` field for the current record to both URLs like this (although the links are different, the highlighted code is the same for the PDO version):

```
<td><a href="blog_update_mysqli.php?article_id=<?php echo ➥
  $row['article_id']; ?>">EDIT</a></td>
<td><a href="blog_delete_mysqli.php?article_id=<?php echo ➥
  $row['article_id']; ?>">DELETE</a></td>
```

   What you're doing here is adding `?article_id=` to the URL and then using PHP to display the value of `$row['article_id']`. It's important that you don't leave any spaces that might break the URL or the query string. A common mistake is to leave spaces around the equal sign. After the PHP has been processed, the opening `<a>` tag should look like this when viewing the page's source code in a browser (although the number will vary according to the record):

```
<a href="blog_update_mysqli.php?article_id=2">
```

7. Finally, close the loop surrounding the second table row with a curly brace like this:

```
  </tr>
  <?php } ?>
</table>
```

8. Save `blog_list_mysqli.php` or `blog_list_pdo.php`, and load the page into a browser. Assuming that you loaded the contents of `blog.sql` into the `phpsols` database earlier, you should see a list of four items, as shown in Figure 13-2. You can now test `blog_insert_mysqli.php` or `blog_insert_pdo.php`. After inserting an item, you should be returned to the appropriate version of `blog_list.php`, and the date and time of creation, together with the title of the new item, should be displayed at the top of the list. Check your code against the versions in the `ch13` folder if you encounter any problems.

The code assumes that there will always be some records in the table. As an exercise, use the technique in PHP Solution 11-2 (MySQLi) or 11-3 (PDO) to count the number of results, and use a conditional statement to display a suitable message if no records are found. The solution is in `blog_list_norec_mysqli.php` and `blog_list_norec_pdo.php`.

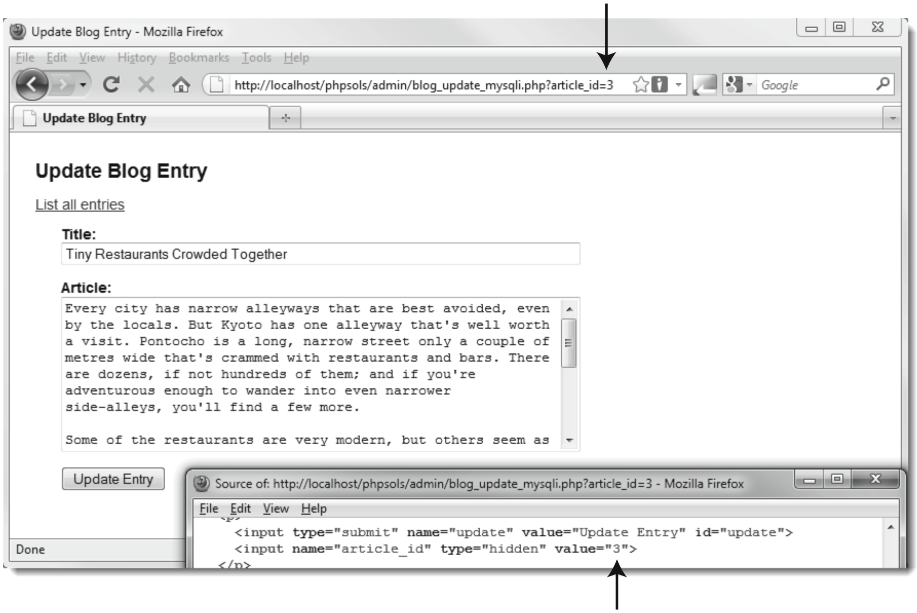
Updating records

An update page needs to perform two separate processes, as follows:

1. Retrieve the selected record, and display it ready for editing
2. Update the edited record in the database

The first stage uses the primary key passed in the URL query string to select the record and display it in the update form, as shown in Figure 13-3.

Primary key in query string gets correct record


Update Blog Entry - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/phpsols/admin/blog_update_mysqli.php?article_id=3
Google
Update Blog Entry
Done
Source of: http://localhost/phpsols/admin/blog_update_mysqli.php?article_id=3 - Mozilla Firefox
File Edit View Help

Update Blog Entry

List all entries

Title:

Tiny Restaurants Crowded Together

Article:

```
Every city has narrow alleyways that are best avoided, even
by the locals. But Kyoto has one alleyway that's well worth
a visit. Pontocho is a long, narrow street only a couple of
metres wide that's crammed with restaurants and bars. There
are dozens, if not hundreds of them; and if you're
adventurous enough to wander into even narrower
side-alleys, you'll find a few more.

Some of the restaurants are very modern, but others seem as
```

Update Entry

```
    <input type="submit" name="update" value="Update Entry" id="update">
    <input name="article_id" type="hidden" value="3">
  </p>
```

Primary key stored in hidden field
ready to be passed to UPDATE query

Figure 13-3. The primary key keeps track of a record during the update process.

The primary key is stored in a hidden field in the update form. After you have edited the record in the update page, you submit the form and pass all the details, including the primary key, to an `UPDATE` command.

The basic syntax of the SQL `UPDATE` command looks like this:

```
UPDATE table_name SET column_name = value, column_name = value
WHERE condition
```

The condition when updating a specific record is the primary key. So, when updating `article_id 3` in the `blog` table, the basic `UPDATE` query looks like this:

```
UPDATE blog SET title = value, article = value
WHERE article_id = 3
```

Although the basic principle is the same for both methods of connecting to MySQL, the code differs sufficiently to warrant separate instructions.

PHP Solution 13-4: Updating a record with MySQLi

This PHP solution shows how to load an existing record into the update form and then send the edited details to the database for updating using MySQLi. To load the record, you need to have created the management page that lists all records, as described in PHP Solution 13-3.

1. Copy blog_update_mysqli_01.php from the ch13 folder, and save it in the admin folder as blog_update_mysqli.php.

2. The first stage involves retrieving the details of the record that you want to update. Put the following code in a PHP block above the DOCTYPE declaration:

```
require_once('../includes/connection.inc.php');
// initialize flags
$OK = false;
$done = false;
// create database connection
$conn = dbConnect('write');
// initialize statement
$stmt = $conn->stmt_init();
// get details of selected record
if (isset($_GET['article_id']) && !$_POST) {
  // prepare SQL query
  $sql = 'SELECT article_id, title, article
          FROM blog WHERE article_id = ?';
  if ($stmt->prepare($sql)) {
    // bind the query parameter
    $stmt->bind_param('i', $_GET['article_id']);
    // bind the results to variables
    $stmt->bind_result($article_id, $title, $article);
    // execute the query, and fetch the result
    $OK = $stmt->execute();
    $stmt->fetch();
  }
}
// redirect if $_GET['article_id'] not defined
if (!isset($_GET['article_id'])) {
  header('Location: http://localhost/phpsols/admin/blog_list_mysqli.php');
  exit;
}
// display error message if query fails
if (isset($stmt) && !$OK && !$done) {
  $error = $stmt->error;
}
```

Although this is very similar to the code used for the insert page, the first few lines are *outside* the conditional statements. Both stages of the update process require the database connection and a prepared statement, so this avoids the need to duplicate the same code later. Two flags are initialized: $OK to check the success of retrieving the record, and $done to check whether the update succeeds.

The first conditional statement makes sure that $_GET['article_id'] exists and that the $_POST array is empty. So the code inside the braces is executed only when the query string is set, but the form hasn't been submitted.

You prepare the SELECT query in the same way as for an INSERT command, using a question mark as a placeholder for the variable. However, note that instead of using an asterisk to retrieve all columns, the query specifies three columns by name like this:

```
$sql = 'SELECT article_id, title, article
        FROM blog WHERE article_id = ?';
```

This is because a MySQLi prepared statement lets you bind the result of a SELECT query to variables, and to be able to do this, you must specify the column names and the order you want them to be in.

First, you need to initialize the prepared statement and bind $_GET['article_id'] to the query with $stmt->bind_param(). Because the value of article_id must be an integer, you pass 'i' as the first argument.

The next line binds the result to variables in the same order as the columns specified in the SELECT query.

```
$stmt->bind_result($article_id, $title, $article);
```

You can call the variables whatever you like, but it makes sense to use the same names as the columns. Binding the result like this avoids the necessity to use array names, such as $row['article_id'], later on.

Then the code executes the query and fetches the result.

The next conditional statement redirects the page to blog_list_mysqli.php if $_GET['article_id'] hasn't been defined. This prevents anyone from trying to load the update page directly in a browser.

The final conditional statement stores an error message if the prepared statement has been created, but both $OK and $done remain false. You haven't added the update script yet, but if the record is retrieved or updated successfully, one of them will be switched to true. So if both remain false, you know there was something wrong with one of the SQL queries.

3. Now that you have retrieved the contents of the record, you need to display them in the update form by using PHP to populate the value attribute of each input field. If the prepared statement succeeded, $article_id should contain the primary key of the record to be updated, because it's one of the variables you bound to the result set with the bind_result() method.

   However, if there's an error, you need to display the message onscreen. But if someone alters the query string to an invalid number, $article_id will be set to 0, so there is no point in displaying the update form. Add the following conditional statements immediately before the opening <form> tag:

```
<p><a href="blog_list_mysqli.php">List all entries </a></p>
<?php if (isset($error)) {
  echo "<p class='warning'>Error: $error</p>";
}
if($article_id == 0) { ?>
```

```
  <p class="warning">Invalid request: record does not exist.</p>
<?php } else { ?>
<form id="form1" name="form1" method="post" action="">
```

The first conditional statement displays any error message reported by the MySQLi prepared statement. The second wraps the update form in an `else` clause, so the form will be hidden if `$article_id` is 0.

4. Add the closing curly brace of the `else` clause immediately after the closing `</form>` tag like this:

```
</form>
<?php } ?>
</body>
```

5. If `$article_id` is not 0, you know that `$title` and `$article` also contain valid values and can be displayed in the update form without further testing. However, you need to pass text values to `htmlentities()` to avoid problems with displaying quotes. Display `$title` in the `value` attribute of the `title` input field like this:

```
<input name="title" type="text" class="widebox" id="title" ➥
  value="<?php echo htmlentities($title, ENT_COMPAT, 'utf-8'); ?>">
```

6. Do the same for the `article` text area. Because text areas don't have a value attribute, the code goes between the opening and closing `<textarea>` tags like this:

```
<textarea name="article" cols="60" rows="8" class="widebox" id="article"> ➥
  <?php echo htmlentities($article, ENT_COMPAT, 'utf-8'); ?></textarea>
```

Make sure there is no space between the opening and closing PHP and `<textarea>` tags. Otherwise, you'll get unwanted spaces in your updated record.

7. The `UPDATE` command needs to know the primary key of the record you want to change. You need to store the primary key in a hidden field so that it is submitted in the `$_POST` array with the other details. Because hidden fields are not displayed onscreen, the following code can go anywhere inside the form:

```
<input name="article_id" type="hidden" value="<?php echo $article_id; ?>">
```

8. Save the update page, and test it by loading `blog_list_mysqli.php` into a browser and selecting the **EDIT** link for one of the records. The contents of the record should be displayed in the form fields as shown in Figure 13-3.

   The **Update Entry** button doesn't do anything yet. Just make sure that everything is displayed correctly, and confirm that the primary key is registered in the hidden field. You can check your code, if necessary, against `blog_update_mysqli_02.php`.

9. The `name` attribute of the submit button is `update`, so all the update processing code needs to go in a conditional statement that checks for the presence of `update` in the `$_POST` array. Place the following code highlighted in bold immediately above the code in step 1 that redirects the page:

```
    $stmt->fetch();
  }
}
// if form has been submitted, update record
if (isset($_POST ['update'])) {
  // prepare update query
  $sql = 'UPDATE blog SET title = ?, article = ?
          WHERE article_id = ?';
  if ($stmt->prepare($sql)) {
    $stmt->bind_param('ssi', $_POST['title'], $_POST['article'], ➥
      $_POST['article_id']);
    $done = $stmt->execute();
  }
}
// redirect page on success or if $_GET['article_id']) not defined
if ($done || !isset($_GET['article_id'])) {
```

The `UPDATE` query is prepared with question mark placeholders where values are to be supplied from variables. The prepared statement has already been initialized in the code outside the conditional statement, so you can pass the SQL to the `prepare()` method and bind the variables with `$stmt->bind_param()`. The first two variables are strings, and the third is an integer, so the first argument is `'ssi'`.

If the `UPDATE` query succeeds, the `execute()` method returns `true`, resetting the value of `$done`. Unlike an `INSERT` query, using the `affected_rows` property has little meaning because it returns zero if the user decides to click the **Update Entry** button without making any changes, so we won't use it here. You need to add `$done ||` to the condition in the redirect script. This ensures that the page is redirected either if the update succeeds or if someone tries to access the page directly.

10. Save `blog_update_mysqli.php`, and test it by loading `blog_list_mysqli.php`, selecting one of the **EDIT** links, and making changes to the record that is displayed. When you click **Update Entry**, you should be taken back to `blog_list_mysqli.php`. You can verify that your changes were made by clicking the same **EDIT** link again. Check your code, if necessary, with `blog_update_mysqli_03.php`.

PHP Solution 13-5: Updating a record with PDO

This PHP solution shows how to load an existing record into the update form and then send the edited details to the database for updating using PDO. To load the record, you need to have created the management page that lists all records, as described in PHP Solution 13-3.

1. Copy `blog_update_pdo_01.php` from the `ch13` folder, and save it in the `admin` folder as `blog_update_pdo.php`.

2. The first stage involves retrieving the details of the record that you want to update. Put the following code in a PHP block above the `DOCTYPE` declaration:

```
require_once('../includes/connection.inc.php');
// initialize flags
```

```
$OK = false;
$done = false;
// create database connection
$conn = dbConnect('write', 'pdo');
// get details of selected record
if (isset($_GET['article_id']) && !$_POST) {
  // prepare SQL query
  $sql = 'SELECT article_id, title, article FROM blog
          WHERE article_id = ?';
  $stmt = $conn->prepare($sql);
  // bind the results
  $stmt->bindColumn(1, $article_id);
  $stmt->bindColumn(2, $title);
  $stmt->bindColumn(3, $article);
  // execute query by passing array of variables
  $OK = $stmt->execute(array($_GET['article_id']));
  $stmt->fetch();
}
// redirect if $_GET['article_id'] not defined
if (!isset($_GET['article_id'])) {
  header('Location: http://localhost/phpsols/admin/blog_list_pdo.php');
  exit;
}
// store error message if query fails
if (isset($stmt) && !$OK && !$done) {
  $error = $stmt->errorInfo();
  if (isset($error[2])) {
    $error = $error[2];
  }
}
```

Although this is very similar to the code used for the insert page, the first few lines are *outside* the first conditional statement. Both stages of the update process require the database connection, so this avoids the need to duplicate the same code later. Two flags are initialized: `$OK` to check the success of retrieving the record and `$done` to check whether the update succeeds.

The first conditional statement checks that `$_GET ['article_id']` exists and that the `$_POST` array is empty. This makes sure that the code inside is executed only when the query string is set, but the form hasn't been submitted.

When preparing the SQL query for the insert form, you used named placeholders for the variables. This time, let's use a question mark like this:

```
$sql = 'SELECT article_id, title, article FROM blog
        WHERE article_id = ?';
```

The results are then bound to $article_id, $title, and $article with the bindColumn() method. This time, I have used numbers (counting from 1) to indicate which column to bind each variable to.

When using question marks as placeholders, you pass the variables directly as an array to $stmt->execute() like this:

```
$OK = $stmt->execute(array($_GET['article_id']));
```

Even though there is only one variable this time, it must still be presented as an array. There's only one record to fetch in the result, so the fetch() method is called immediately.

The next conditional statement redirects the page to blog_list_pdo.php if $_GET['article_id'] hasn't been defined. This prevents anyone from trying to load the update page directly in a browser.

The final conditional statement stores an error message if the prepared statement has been created, but both $OK and $done remain false. You haven't added the update script yet, but if the record is retrieved or updated successfully, one of them will be switched to true. So if both remain false, you know there was something wrong with one of the SQL queries.

3. Now that you have retrieved the contents of the record, you need to display them in the update form by using PHP to populate the value attribute of each input field. If the prepared statement succeeded, $article_id should contain the primary key of the record to be updated, because it's one of the variables you bound to the result set with the bindColumn() method.

   However, if there's an error, you need to display the message onscreen. But if someone alters the query string to an invalid number, $article_id will be set to 0, so there is no point in displaying the update form. Add the following conditional statements immediately before the opening <form> tag:

```
<p><a href="blog_list_pdo.php">List all entries </a></p>
<?php if (isset($error)) {
  echo "<p class='warning'>Error: $error</p>";
}
if($article_id == 0) { ?>
  <p class="warning">Invalid request: record does not exist.</p>
<?php } else { ?>
<form id="form1" name="form1" method="post" action="">
```

   The first conditional statement displays any error message reported by the PDO prepared statement. The second wraps the update form in an else clause, so the form will be hidden if $article_id is 0.

4. Add the closing curly brace of the else clause immediately after the closing </form> tag like this:

```
</form>
<?php } ?>
</body>
```

5. If $article_id is not 0, you know that $title and $article also exist and can be displayed in the update form without further testing. However, you need to pass text values to htmlentities() to avoid problems with displaying quotes. Display $title in the value attribute of the title input field like this:

```
<input name="title" type="text" class="widebox" id="title" ➥
  value="<?php echo htmlentities($title, ENT_COMPAT, 'utf-8'); ?>">
```

6. Do the same for the article text area. Because text areas don't have a value attribute, the code goes between the opening and closing <textarea> tags like this:

```
<textarea name="article" cols="60" rows="8" class="widebox" id="article"> ➥
  <?php echo htmlentities($article, ENT_COMPAT, 'utf-8'); ?></textarea>
```

Make sure there is no space between the opening and closing PHP and <textarea> tags. Otherwise, you will get unwanted spaces in your updated record.

7. The UPDATE command needs to know the primary key of the record you want to change. You need to store the primary key in a hidden field so that it is submitted in the $_POST array with the other details. Because hidden fields are not displayed onscreen, the following code can go anywhere inside the form:

```
<input name="article_id" type="hidden" value="<?php echo $article_id; ?>">
```

8. Save the update page, and test it by loading blog_list_pdo.php into a browser and selecting the **EDIT** link for one of the records. The contents of the record should be displayed in the form fields as shown in Figure 13-3.

The **Update Entry** button doesn't do anything yet. Just make sure that everything is displayed correctly, and confirm that the primary key is registered in the hidden field. You can check your code, if necessary, against blog_update_pdo_02.php.

9. The name attribute of the submit button is update, so all the update processing code needs to go in a conditional statement that checks for the presence of update in the $_POST array. Place the following code highlighted in bold immediately above the code in step 1 that redirects the page:

```
  $stmt->fetch();
}
// if form has been submitted, update record
if (isset($_POST['update'])) {
  // prepare update query
  $sql = 'UPDATE blog SET title = ?, article = ?
          WHERE article_id = ?';
  $stmt = $conn->prepare($sql);
  // execute query by passing array of variables
  $stmt->execute(array($_POST['title'], $_POST['article'], ➥
    $_POST['article_id']));
  $done = $stmt->rowCount();
}
// redirect page on success or $_GET['article_id'] not defined
```

```
if ($done || !isset($_GET['article_id'])) {
```

Again, the SQL query is prepared using question marks as placeholders for values to be derived from variables. This time, there are three placeholders, so the corresponding variables need to be passed as an array to `$stmt->execute()`. Needless to say, the array must be in the same order as the placeholders.

10. If the `UPDATE` query succeeds, the `rowCount()` method sets `$done` to 1, which is treated as `true`. You'll notice we have added `$done ||` to the condition in the redirect script. This ensures that the page is redirected either if the update succeeds or if someone tries to access the page directly.

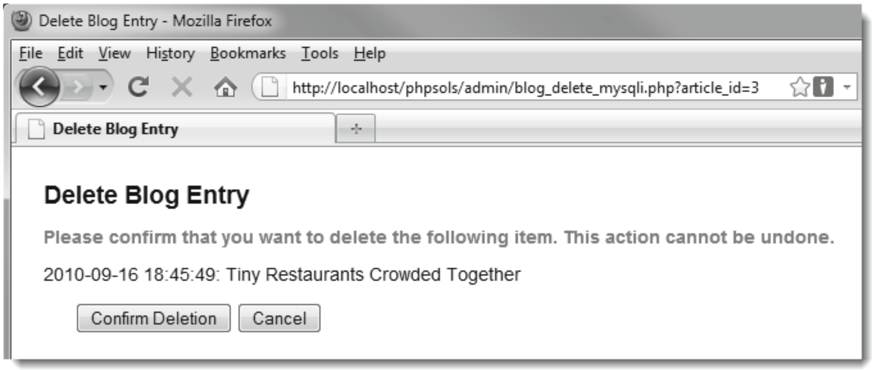
11. Save `blog_update_pdo.php`, and test it by loading `blog_list_pdo.php`, selecting one of the **EDIT** links, and making changes to the record that is displayed. When you click **Update Entry**, you should be taken back to `blog_list_pdo.php`. You can verify that your changes were made by clicking the same **EDIT** link again. Check your code, if necessary, with `blog_update_pdo_03.php`.

Deleting records

Deleting a record in a database is similar to updating one. The basic `DELETE` command looks like this:

```
DELETE FROM table_name WHERE condition
```

What makes the `DELETE` command potentially dangerous is that it is final. Once you have deleted a record, there's no going back—it's gone forever. There's no Recycle Bin or Trash to fish it out from. Even worse, the `WHERE` clause is optional. If you omit it, every single record in the table is irrevocably sent into cyber-oblivion. Consequently, it's a good idea to display details of the record to be deleted and ask the user to confirm or cancel the process (see Figure 13-4).


Delete Blog Entry - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost/phpsols/admin/blog_delete_mysqli.php?article_id=3
Delete Blog Entry

Delete Blog Entry

Please confirm that you want to delete the following item. This action cannot be undone.

2010-09-16 18:45:49: Tiny Restaurants Crowded Together

Figure 13-4. Deleting a record is irreversible, so get confirmation before going ahead.

Building and scripting the delete page is almost identical to the update page, so I won't give step-by-step instructions. However, here are the main points:

- Retrieve the details of the selected record.

- Display sufficient details, such as the title, for the user to confirm that the correct record has been selected.
- Give the **Confirm Deletion** and **Cancel** buttons different `name` attributes, and use each `name` attribute with `isset()` to control the action taken.
- Instead of wrapping the entire form in the `else` clause, use conditional statements to hide the **Confirm Deletion** button and the hidden field.

The code that performs the deletion for each method follows.

For MySQLi:

```
if (isset($_POST['delete'])) {
  $sql = 'DELETE FROM blog WHERE article_id = ?';
  if ($stmt->prepare($sql)) {
    $stmt->bind_param('i', $_POST['article_id']);
    $stmt->execute();
    if ($stmt->affected_rows > 0) {;
      $deleted = true;
    } else {
      $error = 'There was a problem deleting the record.';
    }
  }
}
```

For PDO:

```
if (isset($_POST['delete'])) {
  $sql = 'DELETE FROM blog WHERE article_id = ?';
  $stmt = $conn->prepare($sql);
  $stmt->execute(array($_POST['article_id']));
  // get number of affected rows
  $deleted = $stmt->rowCount();
  if (!$deleted) {
    $error = 'There was a problem deleting the record.';
  }
}
```

You can find the finished code in `blog_delete_mysqli.php` and `blog_delete_pdo.php` in the `ch13` folder. To test the delete script, copy the appropriate file to the `admin` folder.

Reviewing the four essential SQL commands

Now that you have seen `SELECT`, `INSERT`, `UPDATE`, and `DELETE` in action, let's review the basic syntax. This is not an exhaustive listing, but it concentrates on the most important options, including some that have not yet been covered. I have used the same typographic conventions as the MySQL online manual at `http://dev.mysql.com/doc/refman/5.1/en` (which you may also want to consult):

- Anything in uppercase is a SQL command.
- Expressions in square brackets are optional.

- Lowercase italics represent variable input.
- A vertical pipe (|) separates alternatives.

Although some expressions are optional, they must appear in the order listed. For example, in a SELECT query, WHERE, ORDER BY, and LIMIT are all optional, but LIMIT can never come before WHERE or ORDER BY.

SELECT

SELECT is used for retrieving records from one or more tables. Its basic syntax is as follows:

```
SELECT [DISTINCT] select_list
FROM table_list
[WHERE where_expression]
[ORDER BY col_name | formula] [ASC | DESC]
[LIMIT [skip_count,] show_count]
```

The DISTINCT option tells the database you want to eliminate duplicate rows from the results.

The *select_list* is a comma-separated list of columns that you want included in the result. To retrieve all columns, use an asterisk (*). If the same column name is used in more than one table, you must use unambiguous references by using the syntax *table_name.column_name*. Chapter 15 explains in detail about working with multiple tables.

The *table_list* is a comma-separated list of tables from which the results are to be drawn. All tables that you want to be included in the results *must* be listed.

The WHERE clause specifies search criteria, for example:

```
WHERE quotations.family_name = authors.family_name
WHERE article_id = 2
```

WHERE expressions can use comparison, arithmetic, logical, and pattern-matching operators. The most important ones are listed in Table 13-2.

Table 13-2. The main operators used in MySQL WHERE expressions

Comparison		Arithmetic	
<	Less than	+	Addition
<=	Less than or equal to	-	Subtraction
=	Equal to	*	Multiplication
!=	Not equal to	/	Division
<>	Not equal to	DIV	Integer division
>	Greater than	%	Modulo

Comparison		**Arithmetic**	
>=	Greater than or equal to		
IN()	Included in list		
BETWEEN *min* AND *max*	Between (and including two values)		
Logical		**Pattern matching**	
AND	Logical and	LIKE	Case-insensitive match
&&	Logical and	NOT LIKE	Case-insensitive nonmatch
OR	Logical or	LIKE BINARY	Case-sensitive match
||	Logical or (best avoided)	NOT LIKE BINARY	Case-sensitive nonmatch

Of the two operators that mean “not equal to,” <> is standard SQL. Not all databases support !=.

DIV is the counterpart of the modulo operator. It produces the result of division as an integer with no fractional part, whereas modulo produces only the remainder.

```
5 / 2       /* result 2.5 */
5 DIV 2     /* result 2  */
5 % 2       /* result 1  */
```

I suggest you avoid using || because it’s actually used as the string concatenation operator in standard SQL. By not using it with MySQL, you avoid confusion if you ever work with a different relational database. To join strings, MySQL uses the CONCAT() function (see http://dev.mysql.com/doc/refman/5.1/en/string-functions.html#function_concat).

IN() evaluates a comma-separated list of values inside the parentheses and returns true if one or more of the values is found. Although BETWEEN is normally used with numbers, it also applies to strings. For instance, BETWEEN 'a' AND 'd' returns true for *a, b, c,* and *d* (but not their uppercase equivalents). Both IN() and BETWEEN can be preceded by NOT to perform the opposite comparison.

LIKE, NOT LIKE, and the related BINARY operators are used for text searches in combination with the following two wildcard characters:

- %: matches any sequence of characters or none.
- _ (an underscore): matches exactly one character.

So, the following WHERE clause matches Dennis, Denise, and so on, but not Aiden:

```
WHERE first_name LIKE 'den%'
```

To match Aiden, put % at the front of the search pattern. Because % matches any sequence of characters or none, '%den%' still matches Dennis and Denise. To search for a literal percentage sign or underscore, precede it with a backslash (\% or _).

> *This explains why some drop-down menus in phpMyAdmin insert a backslash in names that contain an underscore. phpMyAdmin uses the value directly in a SQL query with LIKE.*

Conditions are evaluated from left to right but can be grouped in parentheses if you want a particular set of conditions to be considered together.

ORDER BY specifies the sort order of the results. This can be specified as a single column, a comma-separated list of columns, or an expression such as RAND(), which randomizes the order. The default sort order is ascending (a–z, 0–9), but you can specify DESC (descending) to reverse the order.

LIMIT followed by one number stipulates the maximum number of records to return. If two numbers are given separated by a comma, the first tells the database how many rows to skip (see “Selecting a subset of records” in Chapter 12).

For more details on SELECT, see http://dev.mysql.com/doc/refman/5.1/en/select.html.

INSERT

The INSERT command is used to add new records to a database. The general syntax is as follows:

```
INSERT [INTO] table_name (column_names)
VALUES (values)
```

The word INTO is optional; it simply makes the command read a little more like human language. The column names and values are comma-delimited lists, and both must be in the same order. So, to insert the forecast for New York (blizzard), Detroit (smog), and Honolulu (sunny) into a weather database, this is how you would do it:

```
INSERT INTO forecast (new_york, detroit, honolulu)
VALUES ('blizzard', 'smog', 'sunny')
```

The reason for this rather strange syntax is to allow you to insert more than one record at a time. Each subsequent record is in a separate set of parentheses, with each set separated by a comma:

```
INSERT numbers (x,y)
VALUES (10,20),(20,30),(30,40),(40,50)
```

You’ll use this multiple insert syntax in Chapter 16. Any columns omitted from an INSERT query are set to their default value. *Never set an explicit value for the primary key where the column is set to* auto_increment; leave the column name out of the INSERT statement. For more details, see http://dev.mysql.com/doc/refman/5.1/en/insert.html.

UPDATE

This command is used to change existing records. The basic syntax looks like this:

```
UPDATE table_name
SET col_name = value [, col_name = value]
[WHERE where_expression]
```

The `WHERE` expression tells MySQL which record or records you want to update (or perhaps in the case of the following example, dream about):

```
UPDATE sales SET q1_2011 = 25000
WHERE title = 'PHP Solutions, Second Edition'
```

For more details on `UPDATE`, see `http://dev.mysql.com/doc/refman/5.1/en/update.html`.

DELETE

`DELETE` can be used to delete single records, multiple records, or the entire contents of a table. The general syntax for deleting from a single table is as follows:

```
DELETE FROM table_name [WHERE where_expression]
```

Although phpMyAdmin prompts you for confirmation before deleting a record, MySQL itself takes you at your word and performs the deletion immediately. `DELETE` is totally unforgiving—once the data is deleted, it is gone *forever*. The following query will delete all records from a table called `subscribers` where the date in `expiry_date` has already passed:

```
DELETE FROM subscribers
WHERE expiry_date < NOW()
```

For more details, see `http://dev.mysql.com/doc/refman/5.1/en/delete.html`.

> *Although the `WHERE` clause is optional in both `UPDATE` and `DELETE`, you should be aware that if you leave `WHERE` out, the entire table is affected. This means that a careless slip with either of these commands could result in every single record being identical—or wiped out.*

Security and error messages

When developing a website with PHP and MySQL, it's essential to display error messages so that you can debug your code if anything goes wrong. However, raw error messages look unprofessional in a live website. They can also reveal clues about your database structure to potential attackers. Therefore, before deploying your scripts live on the Internet, you should go through them, removing all instances of `mysqli_error()` (MySQLi) or `$error = $error[2]` (PDO).

The simplest way to handle this is to replace the MySQL error messages with a neutral message of your own, such as "Sorry, the database is unavailable." A more professional way is to replace `or die()` routines with an `if... else` conditional statement, and to use the error control operator (`@`) to suppress the display of error messages. For example, you may have the following line in a current script:

```
$result = $conn->query($sql) or die(mysqli_error());
```

You can rewrite it like this:

```
$result = @ $conn->query($sql);
if (!$result) {
   // redirect to custom error page
}
```

You should also remove the conditional statements surrounding MySQLi prepared statements once you have verified that they don't generate SQL syntax errors. For example, your development code might look like this:

```
if ($stmt->prepare($sql)) {
  $stmt->bind_param('s', $searchterm);
  $stmt->bind_result($image_id, $filename, $caption);
  $stmt->execute();
  $stmt->store_result();
  $numRows = $stmt->num_rows;
} else {
  echo $stmt->error;
}
```

To deploy it on a live website, change it to this:

```
$stmt->prepare($sql);
$stmt->bind_param('s', $searchterm);
$stmt->bind_result($image_id, $filename, $caption);
$stmt->execute();
$stmt->store_result();
$numRows = $stmt->num_rows;
```

Chapter review

Content management with a database involves inserting, selecting, updating, and deleting records. Each record's primary key plays a vital role in the update and delete processes. Most of the time, generating the primary key is handled automatically by MySQL when a record is first created. Thereafter, finding a record's primary key is simply a matter of using a `SELECT` query, either by displaying a list of all records, or by searching for something you know about the record, such as a title or words in an article.

MySQLi and PDO prepared statements make database queries more secure by removing the need to ensure that quotes and control characters are properly escaped. They also speed up your application if the same query needs to be repeated during a script using different variables. Instead of validating the SQL every time, the script needs do it only once with the placeholders.

Although this chapter has concentrated on content management, the same basic techniques apply to most interaction with a database. Of course, there's a lot more to SQL—and to PHP. In the next chapter, I'll address some of the most common problems, such as displaying only the first sentence or so of a long text field and handling dates. Then, in Chapter 15 and 16, we'll explore working with more than one table in a database.