

Chapter 5

How to use the MVC pattern to organize your code

Objectives

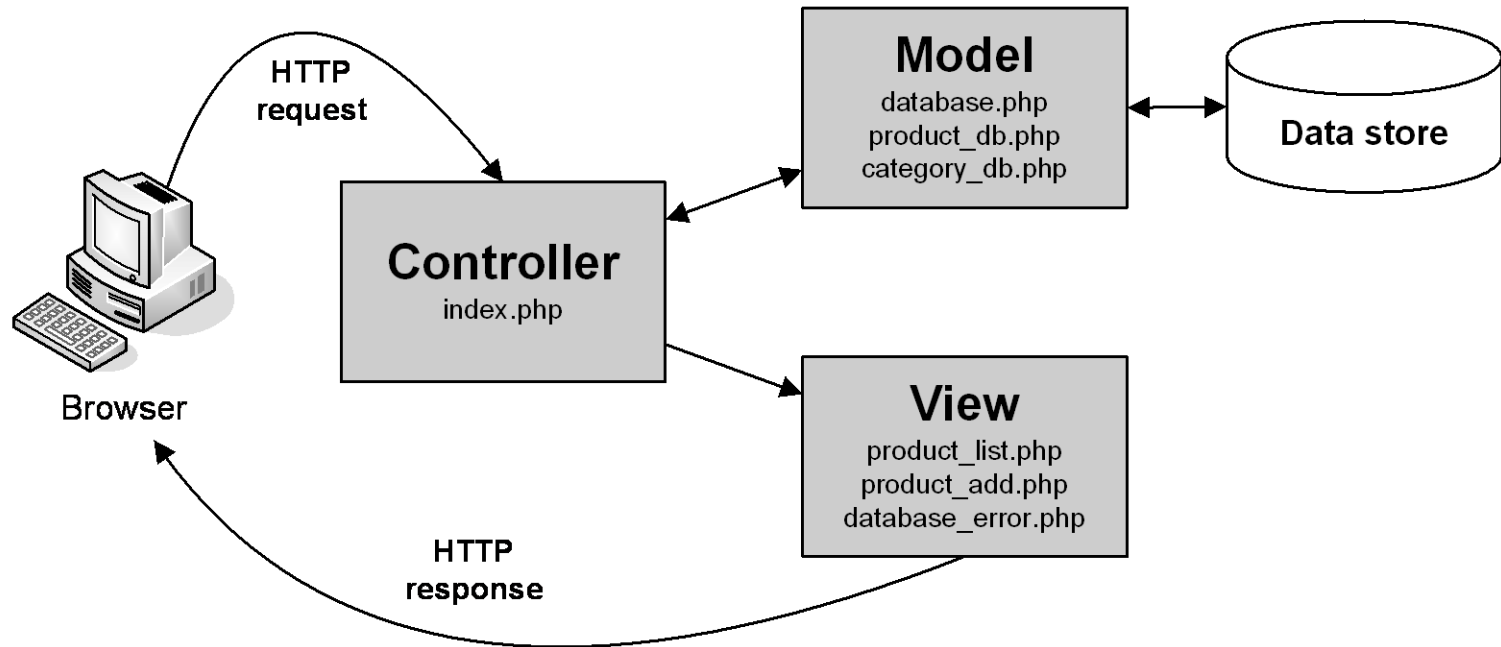
Applied

1. Use the MVC pattern to develop your web applications.
2. Create and use functions that do the database processing for the model of your MVC applications.
3. Use the built-in header function to redirect HTTP requests.

Knowledge

1. Describe the Model-View-Controller pattern.
2. Explain how the MVC pattern can improve application development.
3. In general terms, describe the code for creating and calling a function.
4. Distinguish between forwarding an HTTP request and redirecting a request.

The MVC pattern



Recall: The syntax for creating an object from any class

```
new ClassName(arguments) ;
```

The syntax for creating a database object from the PDO class

```
new PDO($dsn, $username, $password) ;
```

The syntax for a DSN (Data Source Name) for a MySQL database

```
mysql:host=host_address;dbname=database_name
```

How to connect to a MySQL database

```
$dsn = 'mysql:host=localhost;dbname=abc1234' ;  
$username = 'abc1234' ; //your username  
$password = 'xxxxxx' ; //your sql password  
  
// creates PDO object  
$db = new PDO($dsn, $username, $password) ;
```

The syntax for executing a method of any object

`$objectName->methodName (argumentList)`

A method of the PDO class for executing a SELECT statement

`query ($select_statement)`

The syntax for executing the query method of the database object

`$PDO_object->query ($select_statement)`

A query method with the SELECT statement in a variable

```
$query = 'SELECT * FROM products
        WHERE categoryID = 1
        ORDER BY productID';
$products = $db->query($query);
```

A query method with the SELECT statement as the argument

```
$products = $db->query('SELECT * FROM products');
```

A method of the PDO class for modifying the database : INSERT, UPDATE, DELETE

```
exec($sql_statement)//returns the number of rows affected
```

How to execute an INSERT statement

```
$category_id = 1;  
$code = 'strat';  
$name = 'Fender Stratocaster';  
$price = 699.99;  
  
$query = "INSERT INTO products  
        (categoryID, productCode, productName, listPrice)  
        VALUES  
        ($category_id, '$code', '$name', $price)";  
  
$insert_count = $db->exec($query);
```

How to execute an UPDATE statement

```
$product_id = 4;  
$price = 599.99;
```

```
$query = "UPDATE products  
        SET listPrice = $price  
        WHERE productID = $product_id";
```

```
$update_count = $db->exec($query);
```

How to execute a DELETE statement

```
$product_id = 4;
```

```
$query = "DELETE FROM products  
        WHERE productID = $product_id";
```

```
$delete_count = $db->exec($query);
```


The syntax for coding a function

```
function function_name([parameter_list]) {  
    // statements that are executed by the function  
}
```

A function with no parameters that returns a PDOStatement object

```
function get_products() {  
    global $db;  
    $query = 'SELECT * FROM products';  
    $products = $db->query($query);  
    return $products;  
}
```

A function with one parameter that deletes a product row and returns a count

```
function delete_product($product_id) {  
    global $db;  
    $query = "DELETE FROM products  
              WHERE productID = '$product_id'";  
    $row_count = $db->exec($query);  
    return $row_count;  
}
```

A function with four parameters that adds a product to a database table

```
function add_product($category_id, $name, $description,
    $price) {
    global $db;
    $query = "INSERT INTO products
        (categoryID, productCode, productName, listPrice)
        VALUES
        ('$category_id', '$code', '$name', '$price')";
    $row_count = $db->exec($query);
    return $row_count;
}
```

Recall from Chapter 2: *forwarding a request*

The include function

```
include 'index.php';    // parentheses are optional
include('index.php');    // index.php in the current
                        // directory
```

The require function

```
require('index.php');    // index.php in the current
                        // directory
```

The exit function

```
exit;                    // parentheses are optional
exit();
exit('Unable to connect to DB.');
```

// passes a message to the browser

How to pass control to another PHP file in the current directory

```
if ($is_valid) {  
    include('process_data.php');  
    exit();  
}
```

How to navigate up and down directories

```
include('view/header.php'); // down one directory  
include('./error.php');     // in the current directory  
include('../error.php');    // up one directory  
include('../../error.php'); // up two directories
```

A PHP function for redirecting a request

`header($header) //send an HTTP header to the browser`

The header function

```
header('Location: .');           // the current directory
header('Location: ..');          // up one directory
header('Location: ./admin');     // down one directory
header('Location: error.php');
header('Location: http://www.murach.com/');
```

How to redirect a request

```
if ($action == 'delete') {
    $product_id = $_POST['product_id'];
    delete_product($product_id);
    header('Location: .');
    //redirect to the default file of the current directory
}
```

How to redirect a request that includes a parameter

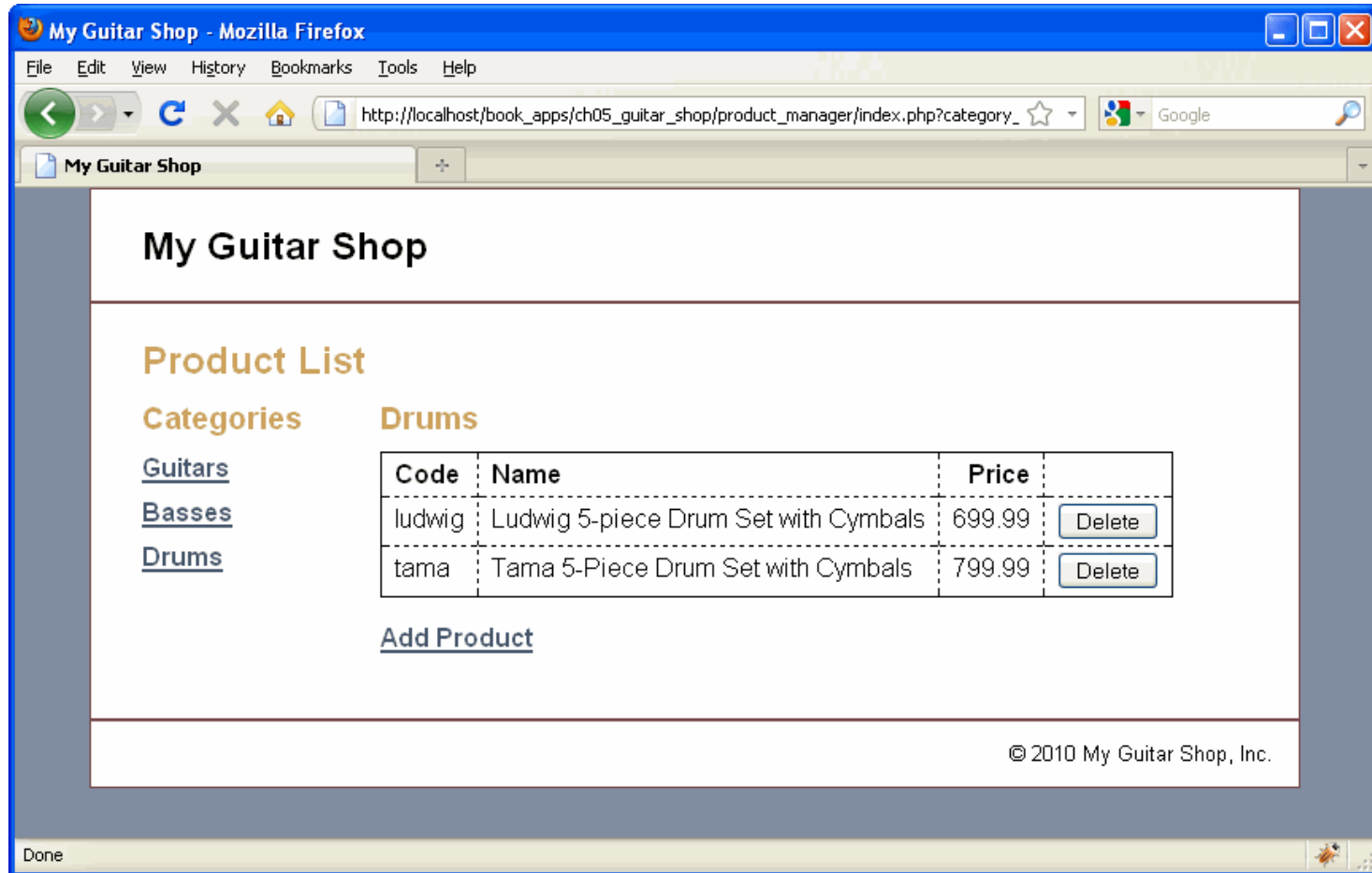
```
if ($action == 'delete') {  
    $product_id = $_POST['product_id'];  
    $category_id = $_POST['category_id'];  
  
    delete_product($product_id);  
  
    header("Location: .?category_id=$category_id");  
}
```

Terms

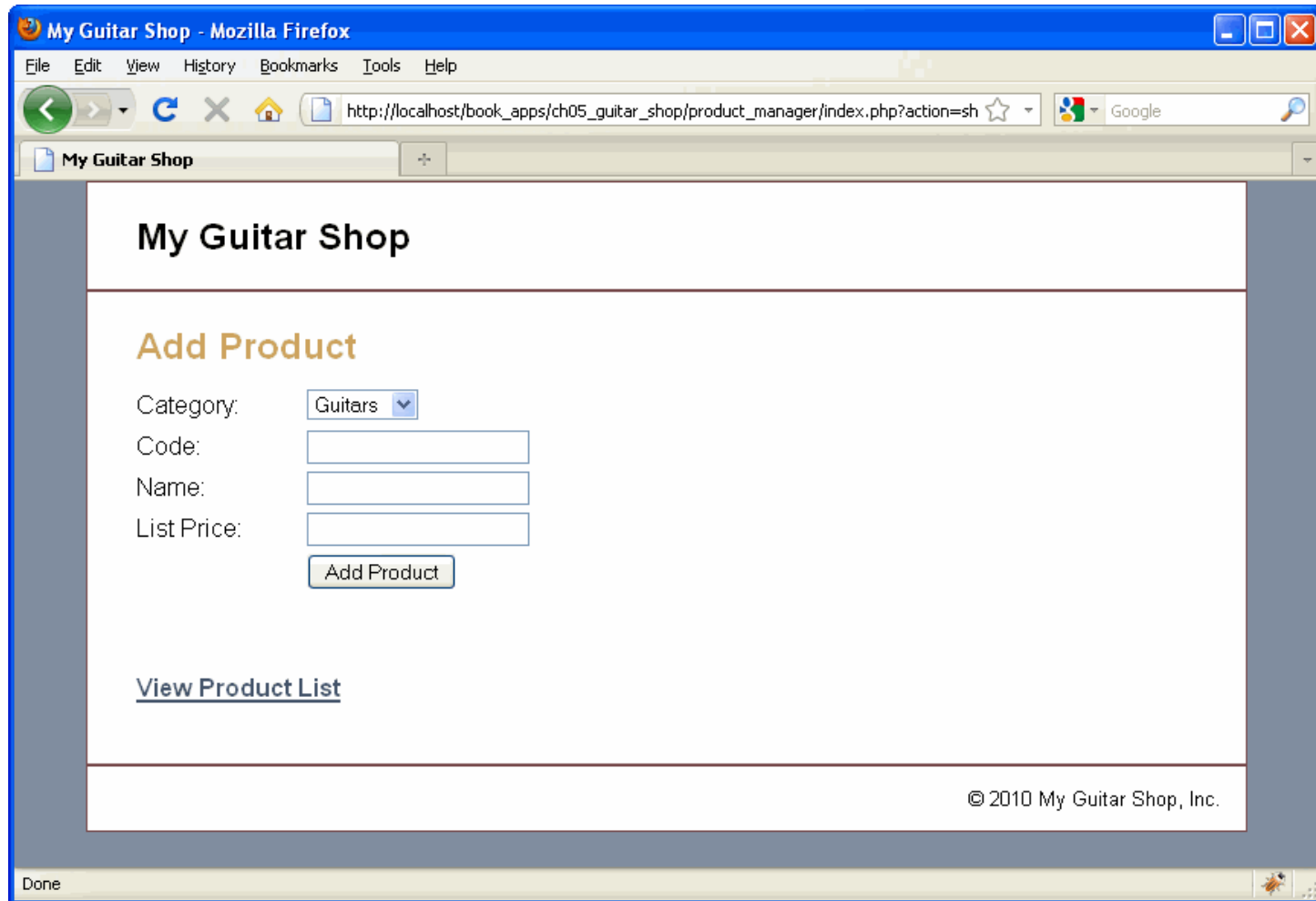
forward a request : include, require, exit, die. All processing takes place on the server

redirect a request: header. The server returns a response that tells the browser to request another URL

The Product List page: *The user interface*



The Add Product page: *The user interface*



The model: category_db.php file

```
<?php
function get_categories() {
    global $db;
    $query = 'SELECT *
              FROM categories
              ORDER BY categoryID';
    $result = $db->query($query);
    return $result;
}

function get_category_name($category_id) {
    global $db;
    $query = "SELECT *
              FROM categories
              WHERE categoryID = $category_id";
    $category = $db->query($query);
    $category = $category->fetch();
    $category_name = $category['categoryName'];
    return $category_name;
}
?>
```

The model: product_db.php file

```
<?php
function get_products_by_category($category_id) {
    global $db;
    $query = "SELECT * FROM products
              WHERE products.categoryID = '$category_id'
              ORDER BY productID";
    $products = $db->query($query);
    return $products;
}

function get_product($product_id) {
    global $db;
    $query = "SELECT * FROM products
              WHERE productID = '$product_id'";
    $product = $db->query($query);
    $product = $product->fetch();
    return $product;
}
```

The model: product_db.php file (continued)

```
function delete_product($product_id) {
    global $db;
    $query = "DELETE FROM products
              WHERE productID = '$product_id'";
    $db->exec($query);
}

function add_product($category_id, $code, $name, $price) {
    global $db;
    $query = "INSERT INTO products
              (categoryID, productCode, productName, listPrice)
              VALUES
              ('$category_id', '$code', '$name', '$price')";
    $db->exec($query);
}
?>
```

The Controller: product_manager/index.php

```
<?php
require('../model/database.php');
require('../model/product_db.php');
require('../model/category_db.php');

if (isset($_POST['action'])) {
    $action = $_POST['action'];
} else if (isset($_GET['action'])) {
    $action = $_GET['action'];
} else {
    $action = 'list_products';
}
```

The controller (continued)

```
if ($action == 'list_products') {  
  
    // Get the current category ID  
    $category_id = $_GET['category_id'];  
    if (!isset($category_id)) {  
        $category_id = 1;  
    }  
  
    // Get the product and category data  
    $category_name = get_category_name($category_id);  
    $categories = get_categories();  
    $products = get_products_by_category($category_id);  
  
    // Display the product list  
    include('product_list.php');
```

The controller (continued)

```
} else if ($action == 'delete_product') {  
    // Get the IDs and delete the product  
    $product_id = $_POST['product_id'];  
    $category_id = $_POST['category_id'];  
    delete_product($product_id);  
  
    // Display the Product List page  
    // for the current category  
    header("Location: .?category_id=$category_id");  
  
} else if ($action == 'show_add_form') {  
    $categories = get_categories();  
    include('product_add.php');
```


The controller (continued)

```
} else if ($action == 'add_product') {
    $category_id = $_POST['category_id'];
    $code = $_POST['code'];
    $name = $_POST['name'];
    $price = $_POST['price'];

    if (empty($code) || empty($name) || empty($price)) {
        $error = "Invalid product data.
                Check all fields and try again.";
        include('../errors/error.php');
    } else {
        add_product($category_id, $code, $name, $price);

        // Display the Product List page
        // for the current category
        header("Location: .?category_id=$category_id");
    }
}
?>
```

The view: header.php file

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 ...>
<html xmlns="http://www.w3.org/1999/xhtml">
  <!-- the head section -->
  <head>
    <title>My Guitar Shop</title>
    <link rel="stylesheet" type="text/css"
          href="/book_apps/ch05_guitar_shop/main.css" />
  </head>

  <!-- the body section -->
  <body>
    <div id="page">
      <div id="header">
        <h1>My Guitar Shop</h1>
      </div>
```

The view: footer.php file

```
<div id="footer">
    <p>
        &copy; <?php echo date("Y"); ?>
        My Guitar Shop, Inc.
    </p>
</div>
</div><!-- end page -->
</body>
</html>
```

product_manager/product_list.php (a view)

```
<?php include '../view/header.php'; ?>
<div id="main">

    <h1>Product List</h1>

    <div id="sidebar">
        <!-- display a list of categories -->
        <h2>Categories</h2>
        <ul class="nav">
            <?php foreach ($categories as $category) : ?>
                <li>
                    <a href="?category_id=<?php
                        echo $category['categoryID']; ?>">
                        <?php echo $category['categoryName']; ?>
                    </a>
                </li>
            <?php endforeach; ?>
        </ul>
    </div>
```

product_manager/product_list.php (cont.)

```
<div id="content">
  <!-- display a table of products -->
  <h2><?php echo $category_name; ?></h2>
  <table>
    <tr>
      <th>Code</th>
      <th>Name</th>
      <th class="right">Price</th>
      <th>&nbsp;</th>
    </tr>
```

product_manager/product_list.php (cont.)

```
<?php foreach ($products as $product) : ?>
<tr>
    <td><?php echo
        $product['productCode']; ?></td>
    <td><?php echo
        $product['productName']; ?></td>
    <td class="right"><?php echo
        $product['listPrice']; ?></td>
    <td><form action="." method="post">
        <input type="hidden" name="action"
            value="delete_product" />
        <input type="hidden" name="product_id"
            value="<?php echo
                $product['productID']; ?>" />
        <input type="hidden" name="category_id"
            value="<?php echo
                $product['categoryID']; ?>" />
        <input type="submit" value="Delete" />
    </form></td>
</tr>
<?php endforeach; ?>
```

product_manager/product_list.php (cont.)

```
        </table>
        <p><a href="?action=show_add_form">
            Add Product</a></p>
    </div>
```

```
</div>
<?php include '../view/footer.php'; ?>
```

product_manager/product_add.php

```
<?php include '../view/header.php'; ?>
<div id="main">
    <h1>Add Product</h1>
    <form action="index.php" method="post"
        id="add_product_form">
        <input type="hidden" name="action"
            value="add_product" />

        <label>Category:</label>
        <select name="category_id">
        <?php foreach ( $categories as $category ) : ?>
            <option value="<?php echo
                $category['categoryID']; ?>">
                <?php echo $category['categoryName']; ?>
            </option>
        <?php endforeach; ?>
        </select>
        <br />

        <label>Code:</label>
        <input type="input" name="code" /><br />
    </form>
</div>
```


product_manager/product_add.php (cont.)

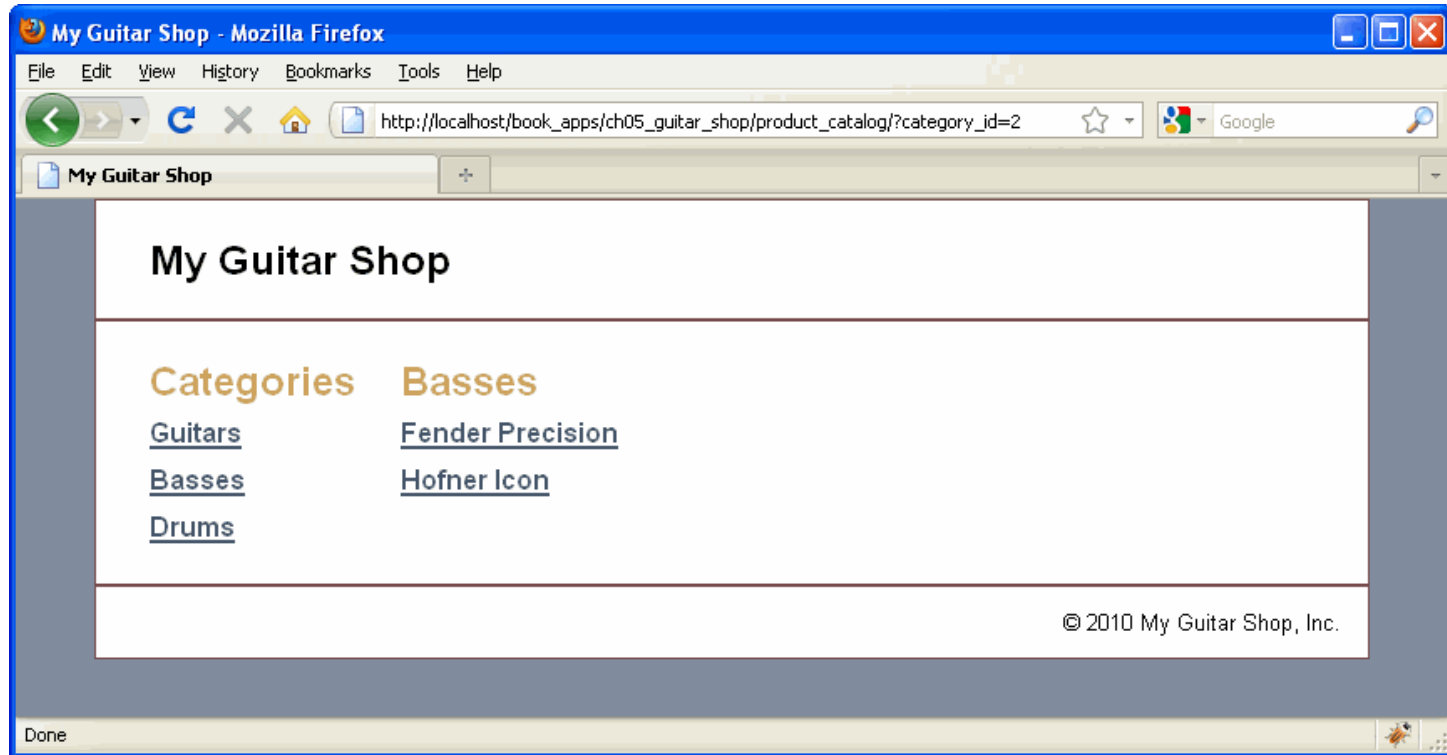
```
<label>Name:</label>
<input type="input" name="name" />
<br />

<label>List Price:</label>
<input type="input" name="price" />
<br />

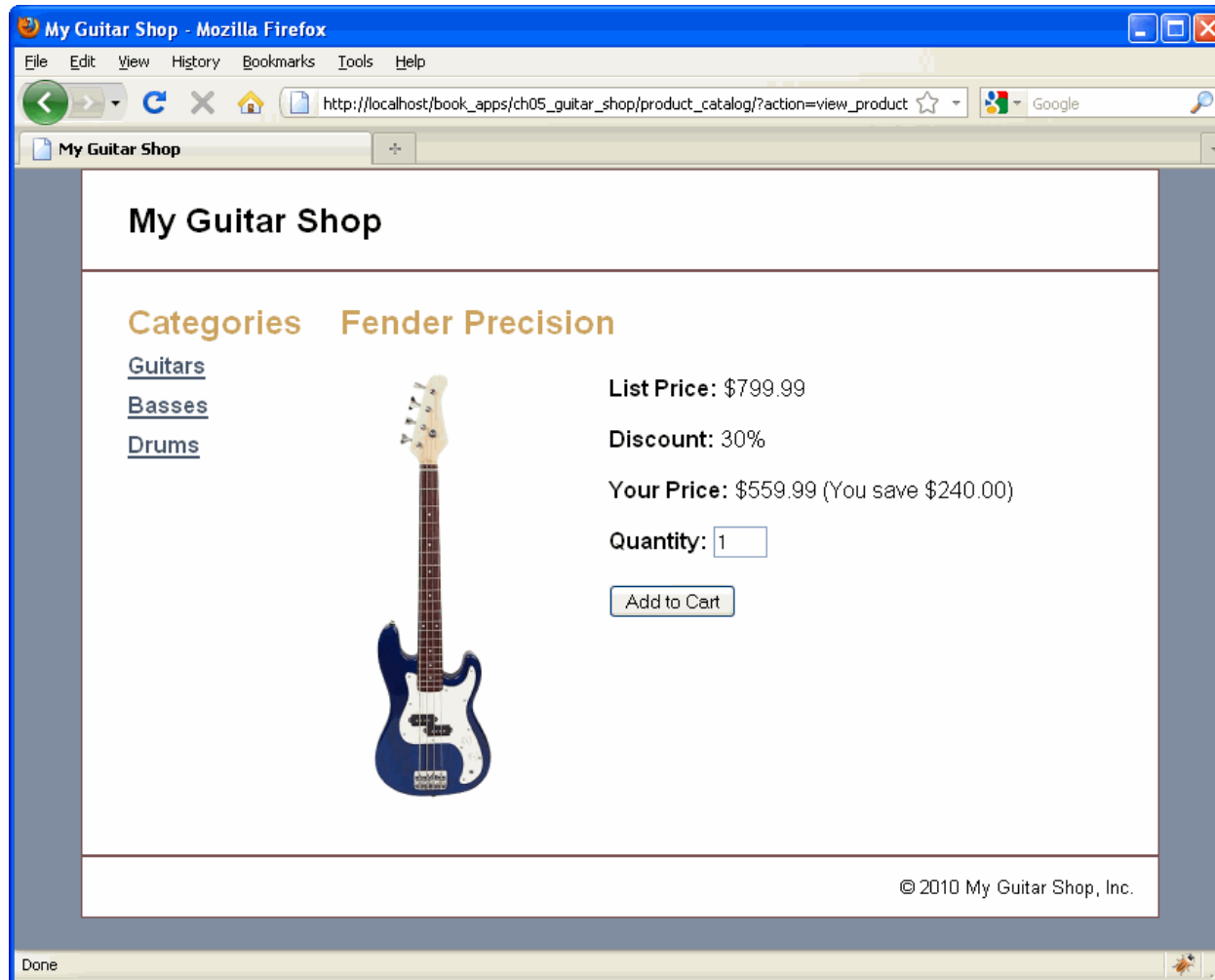
<label>&nbsp;</label>
<input type="submit" value="Add Product" />
<br />
</form>
<p><a href="index.php?action=list_products">
    View Product List</a></p>

</div>
<?php include '../view/footer.php'; ?>
```

The Product List page



The Product page



The product_catalog/index.php file (*the controller*)

```
<?php
require('../model/database.php');
require('../model/product_db.php');
require('../model/category_db.php');

if (isset($_POST['action'])) {
    $action = $_POST['action'];
} else if (isset($_GET['action'])) {
    $action = $_GET['action'];
} else {
    $action = 'list_products';
}
```

The controller (continued)

```
if ($action == 'list_products') {  
    $category_id = $_GET['category_id'];  
    if (empty($category_id)) {  
        $category_id = 1;  
    }  
  
    $categories = get_categories();  
    $category_name = get_category_name($category_id);  
    $products = get_products_by_category($category_id);  
  
    include('product_list.php');
```

The controller (continued)

```
} else if ($action == 'view_product') {  
    $categories = get_categories();  
  
    $product_id = $_GET['product_id'];  
    $product = get_product($product_id);  
  
    // Get product data  
    $code = $product['productCode'];  
    $name = $product['productName'];  
    $list_price = $product['listPrice'];  
  
    // Set the discount percent (for all web orders)  
    $discount_percent = 30;  
  
    // Calculate discounts  
    $discount_amount =  
        round($list_price * ($discount_percent / 100.0), 2);  
    $unit_price = $list_price - $discount_amount;
```

The controller (continued)

```
// Format the calculations
$discount_amount = number_format($discount_amount, 2);
$unit_price = number_format($unit_price, 2);

// Get image URL and alternate text
$image_filename = '../images/' . $code . '.png';
$image_alt = 'Image: ' . $code . '.png';

include('product_view.php');
}
?>
```

The product_catalog/product_list.php file (a view)

```
<?php include '../view/header.php'; ?>
<div id="main">
    <div id="sidebar">
        <h1>Categories</h1>
        <ul class="nav">
            <!-- display links for all categories -->
            <?php foreach($categories as $category) : ?>
            <li>
                <a href="?category_id=<?php echo
                    $category['categoryID']; ?>">
                    <?php echo $category['categoryName']; ?>
                </a>
            </li>
            <?php endforeach; ?>
        </ul>
    </div>
```


The product_catalog/product_list.php file (cont.)

```
<div id="content">
    <h1><?php echo $category_name; ?></h1>
    <ul class="nav">
        <?php foreach ($products as $product) : ?>
            <li>
                <a href="?action=view_product&product_id=
                    <?php echo $product['productID']; ?>">
                    <?php echo $product['productName']; ?>
                </a>
            </li>
        <?php endforeach; ?>
    </ul>
</div>
</div>
<?php include '../view/footer.php'; ?>
```

The product_catalog/product_view.php file

```
<?php include '../view/header.php'; ?>
<div id="main">
    <div id="sidebar">
        <h1>Categories</h1>
        <ul class="nav">
            <!-- display links for all categories -->
            <?php foreach($categories as $category) : ?>
            <li>
                <a href="?category_id=<?php echo
                    $category['categoryID']; ?>">
                    <?php echo $category['categoryName']; ?>
                </a>
            </li>
            <?php endforeach; ?>
        </ul>
    </div>
```

The product_catalog/product_view.php file (cont.)

```
<div id="content">
    <h1><?php echo $name; ?></h1>
    <div id="left_column">
        <p>
            " />
        </p>
    </div>

    <div id="right_column">
        <p><b>List Price:</b>
            $<?php echo $list_price; ?></p>
        <p><b>Discount:</b> <?php echo
            $discount_percent; ?>%</p>
        <p><b>Your Price:</b>
            $<?php echo $unit_price; ?>
            (You save $<?php echo $discount_amount;
                ?>)</p>
    </div>
</div>
```

The product_catalog/product_view.php file (cont.)

```
<form action="<?php echo '../cart' ?>"
    method="post">
    <input type="hidden" name="action"
        value="add" />
    <input type="hidden" name="product_id"
        value="<?php echo $product_id; ?>" />
    <b>Quantity:</b>
    <input type="text" name="quantity" value="1"
        size="2" />
    <input type="submit" value="Add to Cart" />
</form>
</div>
</div>
</div>
<?php include '../view/footer.php'; ?>
```