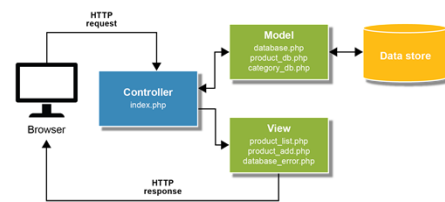


## Chapter 5

# How to use the MVC pattern to organize your code

### The MVC pattern



### 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.

### Key terms

- MVC pattern
- model
- view
- controller

### Objectives (continued)

#### 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 syntax for coding a function

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

#### A function with one parameter that returns an array of products

```
function get_products_by_category($category_id) {
    global $db;
    $query = 'SELECT * FROM products
            WHERE products.categoryID = :category_id
            ORDER BY productID';
    $statement = $db->prepare($query);
    $statement->bindValue(':category_id', $category_id);
    $statement->execute();
    $products = $statement->fetchAll();
    $statement->closeCursor();
    return $products;
}
```

### A function with four parameters that adds a product

```
function add_product($category_id, $code, $name, $price) {
    global $db;
    $query = 'INSERT INTO products
              (categoryID, productCode, productName, listPrice)
              VALUES
              (:category_id, :code, :name, :price)';
    $statement = $db->prepare($query);
    $statement->bindValue(':category_id', $category_id);
    $statement->bindValue(':code', $code);
    $statement->bindValue(':name', $name);
    $statement->bindValue(':price', $price);
    $statement->execute();
    $statement->closeCursor();
}
```

### A built-in function for redirecting a request

```
header($header)
```

#### 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') {
    $product_id = filter_input(INPUT_POST, 'product_id',
        FILTER_VALIDATE_INT);
    if ($product_id != NULL || $product_id != FALSE) {
        delete_product($product_id);
        header("Location: .");
    }
}
```

### A function call with one argument and a returned array

```
$products = get_products_by_category($category_id);
```

### A function call with four arguments and no returned value

```
add_product($category_id, $code, $name, $price);
```

### How to redirect a request that includes a parameter

```
if ($action == 'delete_product') {
    $product_id = filter_input(INPUT_POST, 'product_id',
        FILTER_VALIDATE_INT);
    $category_id = filter_input(INPUT_POST, 'category_id',
        FILTER_VALIDATE_INT);
    if ($category_id != NULL || $category_id != FALSE ||
        $product_id != NULL || $product_id != FALSE) {
        delete_product($product_id);
        header("Location: .?category_id=$category_id");
    }
}
```

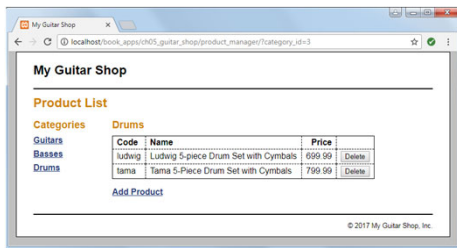
### Key terms

- parameter list
- parameter
- return statement
- scope
- global keyword

### Key terms

- forward a request
- redirect a request

### The Product List page

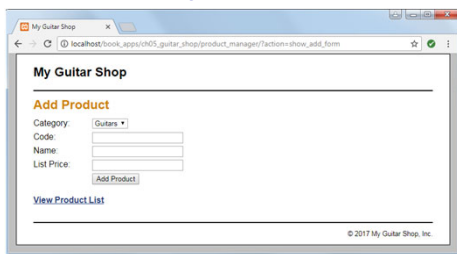


### The model/product\_db.php file

```
<?php
function get_products_by_category($category_id) {
    global $db;
    $query = 'SELECT * FROM products
            WHERE products.categoryID = :category_id
            ORDER BY productID';
    $statement = $db->prepare($query);
    $statement->bindValue(':category_id', $category_id);
    $statement->execute();
    $products = $statement->fetchAll();
    $statement->closeCursor();
    return $products;
}

function get_product($product_id) {
    global $db;
    $query = 'SELECT * FROM products
            WHERE productID = :product_id';
    $statement = $db->prepare($query);
    $statement->bindValue(':product_id', $product_id);
    $statement->execute();
    $product = $statement->fetch();
    $statement->closeCursor();
    return $product;
}
```

### The Add Product page



### The model/product\_db.php file (continued)

```
function delete_product($product_id) {
    global $db;
    $query = 'DELETE FROM products
            WHERE productID = :product_id';
    $statement = $db->prepare($query);
    $statement->bindValue(':product_id', $product_id);
    $statement->execute();
    $statement->closeCursor();
}

function add_product($category_id, $code, $name, $price) {
    global $db;
    $query = 'INSERT INTO products
            (categoryID, productCode, productName, listPrice)
            VALUES
            (:category_id, :code, :name, :price)';
    $statement = $db->prepare($query);
    $statement->bindValue(':category_id', $category_id);
    $statement->bindValue(':code', $code);
    $statement->bindValue(':name', $name);
    $statement->bindValue(':price', $price);
    $statement->execute();
    $statement->closeCursor();
}
?>
```

### The model/category\_db.php file

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

function get_category_name($category_id) {
    global $db;
    $query = 'SELECT * FROM categories
            WHERE categoryID = :category_id';
    $statement = $db->prepare($query);
    $statement->bindValue(':category_id', $category_id);
    $statement->execute();
    $category = $statement->fetch();
    $statement->closeCursor();
    $category_name = $category['categoryName'];
    return $category_name;
}
?>
```

### product\_manager/index.php (the controller)

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

$action = filter_input(INPUT_POST, 'action');
if ($action == NULL) {
    $action = filter_input(INPUT_GET, 'action');
    if ($action == NULL) {
        $action = 'list_products';
    }
}
}
```

### The controller (continued)

```

if ($action == 'list_products') {
    $category_id = filter_input(INPUT_GET, 'category_id',
        FILTER_VALIDATE_INT);
    if ($category_id == NULL || $category_id == FALSE) {
        $category_id = 1;
    }
    $category_name = get_category_name($category_id);
    $categories = get_categories();
    $products = get_products_by_category($category_id);
    include('product_list.php');
} else if ($action == 'delete_product') {
    $product_id = filter_input(INPUT_POST, 'product_id',
        FILTER_VALIDATE_INT);
    $category_id = filter_input(INPUT_POST, 'category_id',
        FILTER_VALIDATE_INT);
    if ($category_id == NULL || $category_id == FALSE ||
        $product_id == NULL || $product_id == FALSE) {
        $error = "Missing or incorrect product id or category id.";
        include('../errors/error.php');
    } else {
        delete_product($product_id);
        header("Location: ../category_id=$category_id");
    }
}

```

### The view/footer.php file

```

<footer>
    <p class="copyright">
        &copy; <?php echo date("Y"); ?> My Guitar Shop, Inc.
    </p>
</footer>
</body>
</html>

```

### The controller (continued)

```

} else if ($action == 'show_add_form') {
    $categories = get_categories();
    include('product_add.php');
} else if ($action == 'add_product') {
    $category_id = filter_input(INPUT_POST, 'category_id',
        FILTER_VALIDATE_INT);
    $code = filter_input(INPUT_POST, 'code');
    $name = filter_input(INPUT_POST, 'name');
    $price = filter_input(INPUT_POST, 'price');
    if ($category_id == NULL || $category_id == FALSE ||
        $code == NULL || $name == NULL ||
        $price == NULL || $price == FALSE) {
        $error = "Invalid product data. Try again.";
        include('../errors/error.php');
    } else {
        add_product($category_id, $code, $name, $price);
        header("Location: ../category_id=$category_id");
    }
}
?>

```

### product\_manager/product\_list.php (a view)

```

<?php include '../view/header.php'; ?>
<main>
    <h1>Product List</h1>
    <aside>
        <!-- display a list of categories -->
        <h2>Categories</h2>
        <nav>
            <ul>
                <?php foreach ($categories as $category) : ?>
                    <li>
                        <a href="?category_id=<?php
                            echo $category['categoryID']; ?>">
                            <?php echo $category['categoryName']; ?>
                        </a>
                    </li>
                <?php endforeach; ?>
            </ul>
        </nav>
    </aside>

```

### The view/header.php file

```

<!DOCTYPE html>
<html>
<!-- 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>
<header>
    <h1>My Guitar Shop</h1>
</header>

```

### product\_manager/product\_list.php (continued)

```

<section>
    <!-- display a table of products -->
    <h2><?php echo $category_name; ?></h2>
    <table>
        <tr>
            <th>Code</th>
            <th>Name</th>
            <th class="right">Price</th>
            <th>&nbsp;&nbsp;&nbsp;</th>
        </tr>
        <?php foreach ($products as $product) : ?>
            <tr>
                <td><?php echo $product['productCode']; ?></td>
                <td><?php echo $product['productName']; ?></td>
                <td class="right"><?php
                    echo $product['listPrice']; ?></td>
            </tr>
        </tr>
    </table>

```

**product\_manager/product\_list.php (continued)**

```

<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; ?>
</table>
<p class="last_paragraph">
  <a href="action=show_add_form">Add Product</a>
</p>
</section>
</main>
<?php include '../view/footer.php'; ?>

```

**The Product List page**



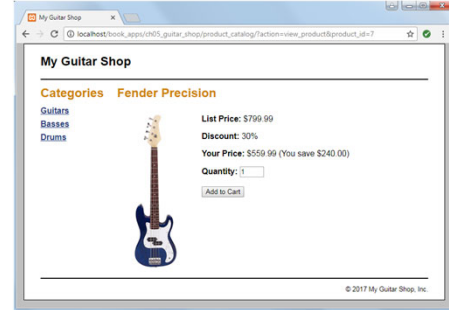
**product\_manager/product\_add.php (another view)**

```

<?php include '../view/header.php'; ?>
<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>
      </select>
    </form>
    <input type="text" name="code" />
  </main>

```

**The Product page**



**product\_manager/product\_add.php (continued)**

```

<label>Name:</label>
<input type="text" name="name" />
<br>
<label>List Price:</label>
<input type="text" name="price" />
<br>
<label>&nbsp;&nbsp;&nbsp;</label>
<input type="submit" value="Add Product" />
</form>
<p class="last_paragraph">
  <a href="index.php?action=list_products">
    View Product List
  </a>
</p>
</main>
<?php include '../view/footer.php'; ?>

```

**The product\_catalog/index.php file (the controller)**

```

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

$action = filter_input(INPUT_POST, 'action');
if ($action == NULL) {
  $action = filter_input(INPUT_GET, 'action');
  if ($action == NULL) {
    $action = 'list_products';
  }
}

```

### The controller (continued)

```

if ($action == 'list_products') {
    $category_id = filter_input(INPUT_GET, 'category_id',
        FILTER_VALIDATE_INT);
    if ($category_id == NULL || $category_id == FALSE) {
        $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 product\_catalog/product\_list.php file (a view)

```

<?php include '../view/header.php'; ?>
<main>
    <aside>
        <h1>Categories</h1>
        <nav>
            <ul>
                <!-- 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>
                </ul>
            </nav>
        </aside>

```



### The controller (continued)

```

) else if ($action == 'view_product') {
    $product_id = filter_input(INPUT_GET, 'product_id',
        FILTER_VALIDATE_INT);
    if ($product_id == NULL || $product_id == FALSE) {
        $error = 'Missing or incorrect product id.';
        include('../errors/error.php');
    } else {
        $categories = get_categories();
        $product = get_product($product_id);

        // Get product data
        $code = $product['productCode'];
        $name = $product['productName'];
        $list_price = $product['listPrice'];

        // Calculate discounts
        $discount_percent = 30; // 30% off for all web orders
        $discount_amount = round($list_price *
            ($discount_percent/100.0), 2);
        $unit_price = $list_price - $discount_amount;
    }
}

```



### The product\_catalog/product\_list.php file (cont.)

```

<section>
    <h1><?php echo $category_name; ?></h1>
    <nav>
        <ul>
            <!-- display links for products in selected category -->
            <?php foreach ($products as $product) : ?>
                <li>
                    <a href="?action=view_product&product_id=<?php
                        echo $product['productID']; ?>">
                        <?php echo $product['productName']; ?>
                    </a>
                </li>
            </ul>
        </nav>
    </section>
</main>
<?php include '../view/footer.php'; ?>

```



### The controller (continued)

```

// Format the calculations
$discount_amount_f = number_format($discount_amount, 2);
$unit_price_f = number_format($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\_view.php file (another view)

```

<?php include '../view/header.php'; ?>
<main>
    <aside>
        <h1>Categories</h1>
        <nav>
            <ul>
                <!-- 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>
                </ul>
            </nav>
        </aside>

```



### The product\_catalog/product\_view.php file (cont.)

```

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

  <div id="right_column">
    <p><b>List Price:</b></p>
    <p><?php echo $list_price; ?></p>
    <p><b>Discount:</b></p>
    <p><?php echo $discount_percent; ?></p>
    <p><b>Your Price:</b> <?php echo $unit_price_f; ?>
      (You save <?php echo $discount_amount_f; ?>)</p>
  </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 id="quantity" type="text" name="quantity"
            value="1" size="2">
      <br><b>
      <input type="submit" value="Add to Cart">
    </form>
  </div>
</section>
</main>
<?php include './view/footer.php'; ?>

```