

```
1. <?php
2.
3.     // enable sessions
4.     session_start();
5.
6.     // check counter
7.     if (isset($_SESSION["counter"]))
8.     {
9.         $counter = $_SESSION["counter"];
10.    }
11.    else
12.    {
13.        $counter = 0;
14.    }
15.
16.    // increment counter
17.    $_SESSION["counter"] = $counter + 1;
18.
19. ?>
20.
21. <!DOCTYPE html>
22.
23. <html>
24.     <head>
25.         <title>counter</title>
26.     </head>
27.     <body>
28.         You have visited this site <?= $counter ?> time(s).
29.     </body>
30. </html>
```

```
1. <?php
2.
3.     /**
4.      * index.php
5.      *
6.      * David J. Malan
7.      * malan@harvard.edu
8.      *
9.      * A home page for the course.
10.     */
11.
12. ?>
13.
14. <!DOCTYPE html>
15.
16. <html>
17.     <head>
18.         <title>CS50</title>
19.     </head>
20.     <body>
21.         <h1>CS50</h1>
22.         <ul>
23.             <li><a href="lectures.php">Lectures</a></li>
24.             <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/syllabus/cs50/cs50.html">Syllabus</a></li>
25.         </ul>
26.     </body>
27. </html>
```

```
1. <?php
2.
3.     /**
4.      * lectures.php
5.      *
6.      * David J. Malan
7.      * malan@harvard.edu
8.      *
9.      * Links to lectures.
10.     */
11.
12. ?>
13.
14. <!DOCTYPE html>
15.
16. <html>
17.     <head>
18.         <title>Lectures</title>
19.     </head>
20.     <body>
21.         <h1>Lectures</h1>
22.         <ul>
23.             <li><a href="week0.php">Week 0</a></li>
24.             <li><a href="week1.php">Week 1</a></li>
25.         </ul>
26.     </body>
27. </html>
```

1. mvc/0/README
- 2.
3. David J. Malan
4. malan@harvard.edu
- 5.
6. index.php - home page for course
7. lectures.php - a list of weeks
8. week0.php - a week
9. week1.php - a week

```
1. <?php
2.
3.     /**
4.      * week0.php
5.      *
6.      * David J. Malan
7.      * malan@harvard.edu
8.      *
9.      * Represents Week 0.
10.     */
11.
12. ?>
13.
14. <!DOCTYPE html>
15.
16. <html>
17.     <head>
18.         <title>Week 0</title>
19.     </head>
20.     <body>
21.         <h1>Week 0</h1>
22.         <ul>
23.             <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/week0w.pdf">Wednesday</a></li>
24.             <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/f/week0f.pdf">Friday</a></li>
25.         </ul>
26.     </body>
27. </html>
```

```
1. <?php
2.
3.     /**
4.      * week1.php
5.      *
6.      * David J. Malan
7.      * malan@harvard.edu
8.      *
9.      * Represents Week 1.
10.     */
11.
12. ?>
13.
14. <!DOCTYPE html>
15.
16. <html>
17.     <head>
18.         <title>Week 1</title>
19.     </head>
20.     <body>
21.         <h1>Week 1</h1>
22.         <ul>
23.             <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/m/week1m.pdf">Monday</a></li>
24.             <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/w/week1w.pdf">Wednesday</a></li>
25.         </ul>
26.     </body>
27. </html>
```

1. `</body>`
2. `</html>`

---

```
1. <!DOCTYPE html>
2.
3. <html>
4.   <head>
5.     <title>CS50</title>
6.   </head>
7.   <body>
8.     <h1>CS50</h1>
```



```
1. <?php require("header.php"); ?>
2.
3. <ul>
4.     <li><a href="lectures.php">Lectures</a></li>
5.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/syllabus/cs50/cs50.html">Syllabus</a></li>
6. </ul>
7.
8. <?php require("footer.php"); ?>
```

```
1. <?php require("header.php"); ?>
2.
3. <ul>
4.     <li><a href="week0.php">Week 0</a></li>
5.     <li><a href="week1.php">Week 1</a></li>
6. </ul>
7.
8. <?php require("footer.php"); ?>
```

1. mvc/1/README
- 2.
3. David J. Malan
4. malan@harvard.edu
- 5.
6. Improves upon mvc/0 by factoring out pages' header and footer.
- 7.
8. footer.php - pages' footer
9. header.php - pages' header
10. index.php - home page for course
11. lectures.php - a list of weeks
12. week0.php - a week
13. week1.php - a week

```
1. <?php require("header.php"); ?>
2.
3. <ul>
4.   <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/week0w.pdf">Wednesday</a></li>
5.   <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/f/week0f.pdf">Friday</a></li>
6. </ul>
7.
8. <?php require("footer.php"); ?>
```

```
1. <?php require("header.php"); ?>
2.
3. <ul>
4.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/m/week1m.pdf">Monday</a></li>
5.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/w/week1w.pdf">Wednesday</a></li>
6. </ul>
7.
8. <?php require("footer.php"); ?>
```

1. `</body>`
2. `</html>`

---

```
1. <!DOCTYPE html>
2.
3. <html>
4.   <head>
5.     <title><?= htmlspecialchars($title) ?></title>
6.   </head>
7.   <body>
8.     <h1><?= htmlspecialchars($title) ?></h1>
```

```
1. <?php
2.
3.     /**
4.      * Renders footer.
5.      */
6.     function renderFooter($data = [])
7.     {
8.         extract($data);
9.         require("footer.php");
10.    }
11.
12.    /**
13.     * Renders header.
14.     */
15.    function renderHeader($data = [])
16.    {
17.        extract($data);
18.        require("header.php");
19.    }
20.
21. ?>
```



```
1. <?php require("helpers.php"); ?>
2.
3. <?php renderHeader(["title" => "CS50"]); ?>
4.
5. <ul>
6.     <li><a href="lectures.php">Lectures</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/syllabus/cs50/cs50.html">Syllabus</a></li>
8. </ul>
9.
10. <?php renderFooter(); ?>
```

```
1. <?php require("helpers.php"); ?>
2.
3. <?php renderHeader(["title" => "Lectures"]); ?>
4.
5. <ul>
6.     <li><a href="week0.php">Week 0</a></li>
7.     <li><a href="week1.php">Week 1</a></li>
8. </ul>
9.
10. <?php renderFooter(); ?>
```

1. mvc/2/README
- 2.
3. David J. Malan
4. malan@harvard.edu
- 5.
6. Improves upon mvc/1 by wrapping header and footer with a parameterized function.
- 7.
8. footer.php - pages' footer
9. header.php - pages' header
10. helpers.php - helper functions
11. index.php - home page for course
12. lectures.php - a list of weeks
13. week0.php - a week
14. week1.php - a week

```
1. <?php require("helpers.php"); ?>
2.
3. <?php renderHeader(["title" => "Week 0"]); ?>
4.
5. <ul>
6.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/week0w.pdf">Wednesday</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/f/week0f.pdf">Friday</a></li>
8. </ul>
9.
10. <?php renderFooter(); ?>
```

```
1. <?php require("helpers.php"); ?>
2.
3. <?php renderHeader("title" => "Week 1"); ?>
4.
5. <ul>
6.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/m/week1m.pdf">Monday</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/w/week1w.pdf">Wednesday</a></li>
8. </ul>
9.
10. <?php renderFooter(); ?>
```

1. `</body>`
2. `</html>`

---

```
1. <!DOCTYPE html>
2.
3. <html>
4.   <head>
5.     <title><?= htmlspecialchars($title) ?></title>
6.   </head>
7.   <body>
8.     <h1><?= htmlspecialchars($title) ?></h1>
```

```
1. <?php
2.
3.     /**
4.      * Renders template.
5.      */
6.     function render($template, $data = [])
7.     {
8.         $path = $template . ".php";
9.         if (file_exists($path))
10.        {
11.            extract($data);
12.            require($path);
13.        }
14.    }
15.
16. ?>
```



```
1. <?php require("helpers.php"); ?>
2.
3. <?php render("header", ["title" => "CS50"]); ?>
4.
5. <ul>
6.     <li><a href="lectures.php">Lectures</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/syllabus/cs50/cs50.html">Syllabus</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

```
1. <?php require("helpers.php"); ?>
2.
3. <?php render("header", ["title" => "Lectures"]); ?>
4.
5. <ul>
6.     <li><a href="week0.php">Week 0</a></li>
7.     <li><a href="week1.php">Week 1</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

1. mvc/3/README
- 2.
3. David J. Malan
4. malan@harvard.edu
- 5.
6. Improves upon mvc/2 by generalizing header and footer as templates.
- 7.
8. footer.php - pages' footer
9. header.php - pages' header
10. helpers.php - helper functions
11. index.php - home page for course
12. lectures.php - a list of weeks
13. week0.php - a week
14. week1.php - a week

```
1. <?php require("helpers.php"); ?>
2.
3. <?php render("header", ["title" => "Week 0"]); ?>
4.
5. <ul>
6.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/week0w.pdf">Wednesday</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/f/week0f.pdf">Friday</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

```
1. <?php require("helpers.php"); ?>
2.
3. <?php render("header", ["title" => "Week 1"]); ?>
4.
5. <ul>
6.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/week1m.pdf">Monday</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/week1w.pdf">Wednesday</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

```
1. <?php
2.
3.     /**
4.      * Renders template.
5.      */
6.     function render($template, $data = [])
7.     {
8.         $path = __DIR__ . '/../templates/' . $template . ".php";
9.         if (file_exists($path))
10.        {
11.            extract($data);
12.            require($path);
13.        }
14.    }
15.
16. ?>
```

```
1. <?php require("includes/helpers.php"); ?>
2.
3. <?php render("header", ["title" => "CS50"]); ?>
4.
5. <ul>
6.     <li><a href="lectures.php">Lectures</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/syllabus/cs50/cs50.html">Syllabus</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

```
1. <?php require("includes/helpers.php"); ?>
2.
3. <?php render("header", ["title" => "Lectures"]); ?>
4.
5. <ul>
6.     <li><a href="week0.php">Week 0</a></li>
7.     <li><a href="week1.php">Week 1</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```



1. mvc/4/README
- 2.
3. David J. Malan
4. malan@harvard.edu
- 5.
6. Improves upon mvc/3 by organizing files into subdirectories.
- 7.
8. includes/
  9. helpers.php - helper functions
10. index.php - home page for course
11. lectures.php - a list of lectures
12. templates/
  13. footer.php - pages' footer
  14. header.php - pages' header
15. week0.php - a week
16. week1.php - a week

1. `</body>`
2. `</html>`

```
1. <!DOCTYPE html>
2.
3. <html>
4.   <head>
5.     <title><?= htmlspecialchars($title) ?></title>
6.   </head>
7.   <body>
8.     <h1><?= htmlspecialchars($title) ?></h1>
```

```
1. <?php require("includes/helpers.php"); ?>
2.
3. <?php render("header", ["title" => "Week 0"]); ?>
4.
5. <ul>
6.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/week0w.pdf">Wendesday</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/f/week0f.pdf">Friday</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

```
1. <?php require("includes/helpers.php"); ?>
2.
3. <?php render("header", ["title" => "Week 1"]); ?>
4.
5. <ul>
6.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/week1m.pdf">Monday</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/week1w.pdf">Wednesday</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

```
1. <?php
2.
3.     /**
4.      * Renders template.
5.      */
6.     function render($template, $data = [])
7.     {
8.         $path = __DIR__ . '/../templates/' . $template . ".php";
9.         if (file_exists($path))
10.        {
11.            extract($data);
12.            require($path);
13.        }
14.    }
15.
16. ?>
```

```
1. <?php require("../includes/helpers.php"); ?>
2.
3. <?php render("header", ["title" => "CS50"]); ?>
4.
5. <ul>
6.     <li><a href="lectures.php">Lectures</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/syllabus/cs50/cs50.html">Syllabus</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

```
1. <?php require("../includes/helpers.php"); ?>
2.
3. <?php render("header", ["title" => "Lectures"]); ?>
4.
5. <ul>
6.     <li><a href="week0.php">Week 0</a></li>
7.     <li><a href="week1.php">Week 1</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```



```
1. <?php require("../includes/helpers.php"); ?>
2.
3. <?php render("header", ["title" => "Week 0"]); ?>
4.
5. <ul>
6.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/w/week0w.pdf">Wednesday</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/0/f/week0f.pdf">Friday</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

```
1. <?php require("../includes/helpers.php"); ?>
2.
3. <?php render("header", ["title" => "Week 1"]); ?>
4.
5. <ul>
6.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/m/week1m.pdf">Monday</a></li>
7.     <li><a href="http://cdn.cs50.net/2015/fall/lectures/1/w/week1w.pdf">Wednesday</a></li>
8. </ul>
9.
10. <?php render("footer"); ?>
```

1. mvc/5/README
- 2.
3. David J. Malan
4. malan@harvard.edu
- 5.
6. Improves upon mvc/4 by isolating web-accessible content in its own subdirectory.
- 7.
8. html/
  9. index.php - home page for course
  10. lectures.php - a list of lectures
  11. week0.php - a week
  12. week1.php - a week
13. includes/
  14. helpers.php - helper functions
15. templates/
  16. footer.php - pages' footer
  17. header.php - pages' header

1. `</body>`
2. `</html>`

```
1. <!DOCTYPE html>
2.
3. <html>
4.   <head>
5.     <title><?= htmlspecialchars($title) ?></title>
6.   </head>
7.   <body>
8.     <h1><?= htmlspecialchars($title) ?></h1>
```

```
1. <?php
2.
3. /**
4.  * Returns a stock by symbol (case-insensitively) else false if not found.
5.  */
6. function lookup($symbol)
7. {
8.     // reject symbols that start with ^
9.     if (preg_match("/^\^/", $symbol))
10.    {
11.        return false;
12.    }
13.
14.    // reject symbols that contain commas
15.    if (preg_match("/,/ ", $symbol))
16.    {
17.        return false;
18.    }
19.
20.    // headers for proxy servers
21.    $headers = [
22.        "Accept" => "*/*",
23.        "Connection" => "Keep-Alive",
24.        "User-Agent" => sprintf("curl/%s", curl_version()["version"])
25.    ];
26.
27.    // open connection to Yahoo
28.    $context = stream_context_create([
29.        "http" => [
30.            "header" => implode(array_map(function($value, $key) { return sprintf("%s: %s\r\n", $key, $value); }, $headers,
array_keys($headers))),
31.            "method" => "GET"
32.        ]
33.    ]);
34.    $handle = @fopen("http://download.finance.yahoo.com/d/quotes.csv?f=sn11&s={$symbol}", "r", false, $context);
35.    if ($handle === false)
36.    {
37.        // trigger (big, orange) error
38.        trigger_error("Could not connect to Yahoo!", E_USER_ERROR);
39.        exit;
40.    }
41.
42.    // download first line of CSV file
43.    $data = fgetcsv($handle);
44.    if ($data === false || count($data) == 1)
45.    {
46.        return false;
47.    }
```

```
48.
49.     // close connection to Yahoo
50.     fclose($handle);
51.
52.     // ensure symbol was found
53.     if ($data[2] === "N/A" || $data[2] === "0.00")
54.     {
55.         return false;
56.     }
57.
58.     // return stock as an associative array
59.     return [
60.         "symbol" => $data[0],
61.         "name" => $data[1],
62.         "price" => floatval($data[2])
63.     ];
64. }
65.
66. ?>
```

```
1. #!/usr/bin/env php
2. <?php
3.
4.     require("functions.php");
5.
6.     // ensure proper usage
7.     if ($argc != 2)
8.     {
9.         print("Usage: php quote.php symbol\n");
10.        exit(1);
11.    }
12.
13.    // look up stock
14.    $stock = lookup($argv[1]);
15.
16.    // report price
17.    print("1 share of {$stock["name"]} costs {$stock["price"]}.\n");
18.
19. ?>
```



```
1. <?php
2.
3.     require("functions.php");
4.
5.     // ensure proper usage
6.     if ($argc != 2)
7.     {
8.         print("Usage: php quote.php symbol\n");
9.         exit(1);
10.    }
11.
12.    // look up stock
13.    $stock = lookup($argv[1]);
14.
15.    // report price
16.    print("1 share of {$stock["name"]} costs {$stock["price"]}.\n");
17.
18. ?>
```