Chapter 1

Introduction
to web development
with PHP

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Objectives

Applied

1. Use the XAMPP control panel to start or stop Apache or MySQL when it is running on your own computer.
2. Deploy a PHP application on your own computer.
3. Run a web application that's on your own computer (1) by entering its URL into the address bar of a browser or (2) by getting and using an index of the applications that are on the web server.
4. View the source code for a web page in a web browser.

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Objectives (continued)

Knowledge

1. Describe the components of a client-server architecture.
2. Describe HTTP requests and responses.
3. Distinguish between the way a web server processes static web pages and dynamic web pages.
4. Explain what these software components do as a web application runs: Apache, PHP, Chrome, and MySQL.
5. Describe the difference between MySQL and MariaDB.
6. Describe the way a PHP application is deployed on your own computer or on an Internet server.
7. Describe the components of an HTTP URL.
8. Describe what happens if you omit one or more parts of a URL when you try to run an application or if you code a URL that specifies a directory that doesn't contain a default page.

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Objectives (continued)

Knowledge

9. Describe the benefits of using an IDE like NetBeans for application development.

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The architecture of a web application

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The architecture of the Internet

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Key terms

- server
- client
- network
- router
- Local Area Network (LAN)
- Wide Area Network (WAN)
- Internet
- Internet Exchange Point (IXP)
- Internet Service Provider (ISP)

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Two protocols that web applications depend upon

- HyperText Transfer Protocol (HTTP)
- Transmission Control Protocol/Internet Protocol (TCP/IP)

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How static web pages are processed

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How dynamic web pages are processed with PHP

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A simple HTTP request

```
GET / HTTP/1.1
Host: www.example.com
```

A simple HTTP response

```
HTTP/1.1 200 OK
Content-Type: text/html
Content-Length: 136
Server: Apache/2.2.3

<html>
<head>
    <title>Example Web Page</title>
</head>
<body>
    <p>This is a sample web page</p>
</body>
</html>
```

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Key terms

- HyperText Markup Language (HTML)
- static web page
- HTTP request
- HTTP response.
- dynamic web page
- PHP interpreter
- database server
- render
- round trip

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Web browsers
- Chrome
- Firefox
- Internet Explorer
- Edge
- Safari
- Opera

Web servers
- Apache
- IIS

Highlights in the history of MySQL

Version	Year	Description
3.23	1995	The original version of MySQL
4.0	2003	Introduced support for unions.
4.1	2004	Introduced support for subqueries and prepared statements.
5.0	2005	Introduced support for stored procedures, triggers, views, and transactions.
5.1	2008	Introduced support for row-based replication and server log tables.
5.5	2010	Default storage engine now supports referential integrity.
5.6	2011	Introduced support for big data.
5.7	2017	Included security improvements and other enhancements.

Server-side languages
- PHP
- JSP
- ASP.NET
- Perl
- Python

Database servers
- MySQL
- Oracle
- DB2
- MS SQL Server

MySQL notes
- MySQL is owned and sponsored by MySQL AB, a for-profit firm.
- In 2008, Sun Microsystems acquired MySQL AB.
- In 2009, Oracle Corporation acquired Sun Microsystems.
- In 2009, many of the original developers of MySQL left MySQL AB and begin working on different forks of the open-source code. One of the most popular of these forks is MariaDB.
- In 2012, several Linux distributions, as well as Wikipedia and Google, began to replace MySQL with MariaDB.
- MariaDB intends to maintain high compatibility with MySQL so it can work as a drop-in replacement for MySQL.
- XAMPP 5.6 and later include MariaDB, not MySQL.

Highlights in the history of PHP

Version	Year	Description
2	1995	Personal Home Page
3	1998	PHP: Hypertext Processor
4	2000	Introduced the Zend Engine
5	2004	Introduced the Zend Engine 2 Improved support for OOP Added the PHP Data Objects extension
6	N/A	Abandoned and never released
7	2015	Introduced the Zend Engine 3 Improved performance

The first page of an application

The second page (display_discount.php)

Product Discount Calculator

Product Description:	Guitar
List Price:	$1,250.00
Standard Discount:	12.5%
Discount Amount:	$156.25
Discount Price:	$1,093.75

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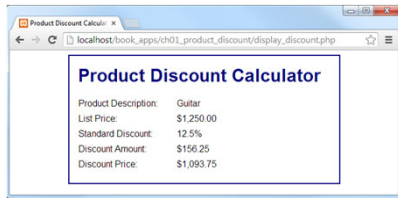
The CSS file (main.css)

```css
body {
    font-family: Arial, Helvetica, sans-serif;
    margin: 1em;
    padding: 0;
}
main {
    display: block;
    width: 450px;
    margin: 0 auto;
    padding: 1.5em;
    background: white;
    border: 2px solid navy;
}
h1 {
    color: navy;
}

label {
    width: 10em;
    padding-right: 1em;
    float: left;
}
```

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The HTML file (index.html)

```html
<!DOCTYPE html>
<html>

<head>
    <title>Product Discount Calculator</title>
    <link rel="stylesheet" type="text/css" href="main.css">
</head>

<body>
    <main>
        <h1>Product Discount Calculator</h1>
        <form action="display_discount.php" method="post">

            <div id="data">
                <label>Product Description:</label>
                <input type="text" name="product_description"><br>

                <label>List Price:</label>
                <input type="text" name="list_price"><br>
```

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The CSS file (main.css) (continued)

```css
#data input {
    float: left;
    width: 15em;
    margin-bottom: .5em;
}

#data span {
    padding-left: .25em;
}

#buttons input {
    float: left;
    margin-bottom: .5em;
}

br {
    clear: left;
}
```

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The HTML file (index.html) (continued)

```html
                <label>Discount Percent:</label>
                <input type="text" name="discount_percent">
                <span>%</span><br>
            </div>

            <div id="buttons">
                <label> </label>
                <input type="submit" value="Calculate Discount"><br>
            </div>

        </form>
    </main>
</body>
</html>
```

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The PHP file (display_discount.php)

```php
<?php
    // get the data from the form
    $product_description = $_POST['product_description'];
    $list_price = $_POST['list_price'];
    $discount_percent = $_POST['discount_percent'];

    // calculate the discount
    $discount = $list_price * $discount_percent * .01;
    $discount_price = $list_price - $discount;

    // apply currency formatting to the dollar and percent amounts
    $list_price_formatted = "$".number_format($list_price, 2);
    $discount_percent_formatted = number_format
                            ($discount_percent, 1)."%";
    $discount_formatted = "$".number_format($discount, 2);
    $discount_price_formatted = "$".number_format($discount_price,2);

    // escape the unformatted input
    $product_description_escaped =
        htmlspecialchars($product_description);
?>
```

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The PHP file (display_discount.php) (continued)

```
<!DOCTYPE html>
<html>

<head>
    <title>Product Discount Calculator</title>
    <link rel="stylesheet" type="text/css" href="main.css">
</head>

<body>
    <main>
        <h1>Product Discount Calculator</h1>

        <label>Product Description:</label>
        <span><?php echo $product_description_escaped; ?></span><br>

        <label>List Price:</label>
        <span><?php echo $list_price_formatted; ?></span><br>
```

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How to open files in Notepad++
- Use the Open button in the toolbar.
- Right-click on the file in Windows Explorer and select Edit with Notepad++.

How to save the current file
- Use the Save button in the toolbar.
- Press Ctrl+S.

How to save all open files
- Use the Save All button.

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The PHP file (display_discount.php) (continued)

```
        <label>Standard Discount:</label>
        <span><?php echo $discount_percent_formatted; ?></span><br>

        <label>Discount Amount:</label>
        <span><?php echo $discount_formatted; ?></span><br>

        <label>Discount Price:</label>
        <span><?php echo $discount_price_formatted; ?></span><br>
    </main>
</body>
</html>
```

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How to close the current file in Notepad++
- Use the Close button in the toolbar.

How to close all open files
- Use the Close All button.

How to open a new file in a new tab
- Use the New button in the toolbar.

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Notepad++ with three tabs open
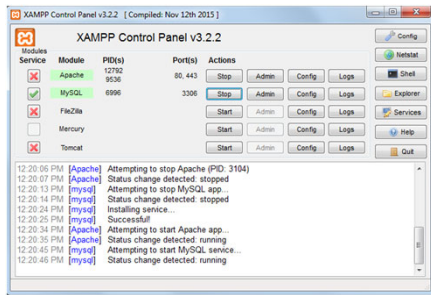

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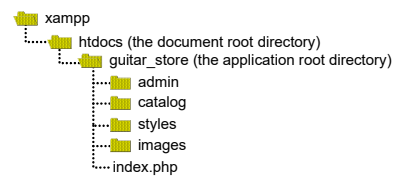**How to change the Notepad++ style for comments**
- Start the Settings→Styler Configurator command.
- Select PHP in the language list and COMMENT in the style list.
- Change the font name and font size in the drop-down lists to the blank entries at the top of the lists.
- Repeat this for COMMENTLINE for the PHP language, for COMMENT for the HTML language, and for COMMENT for the CSS language.

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The XAMPP control panel

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The directories for a PHP app on a local server

- xampp
  - htdocs (the document root directory)
    - guitar_store (the application root directory)
      - admin
      - catalog
      - styles
      - images
      - index.php

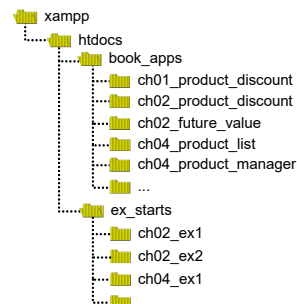*Murach's PHP and MySQL (3rd Ed.)*   C1, Slide 34

How to start the XAMPP control panel

- Select the XAMPP Control Panel item from the Windows Start menu or double-click on the XAMPP icon on your desktop.

How to start and stop Apache or MySQL

- Click on its Start or Stop button.
- To start Apache or MySQL automatically when your computer starts, click the Services button in the XAMPP control panel.

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The structure for book_apps and ex_starts

- xampp
  - htdocs
    - book_apps
      - ch01_product_discount
      - ch02_product_discount
      - ch02_future_value
      - ch04_product_list
      - ch04_product_manager
      - ...
    - ex_starts
      - ch02_ex1
      - ch02_ex2
      - ch04_ex1
      - ...

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About XAMPP

- XAMPP is a free, open-source web server package.
- The package consists of Apache, MySQL, and interpreters for PHP.
- XAMPP can be easily installed.
- XAMPP is available for Windows, Linux, Solaris, and Mac OS X systems (the X in XAMPP stands for cross-platform).

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How to deploy a PHP application on a local server

- Copy all of the directories and files for an application to the \xampp\htdocs directory on the server.

How to deploy the downloadable applications on a local server

- Copy the book_apps and ex_starts directories and all their contents to the \xampp\htdocs directory on the server.

How to deploy an application on an Internet server

- Use an FTP (File Transfer Protocol) program to upload the tested directories and files to the htdocs directory of the Apache web server.

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## The components of an HTTP URL

```
http://www.murach.com/shop-books/all/index.php
```

protocol   domain name   path   filename

What happens if you omit parts of a URL

- If you omit the protocol, the default of http:// will be used.
- If you omit the filename, one of the default filenames for the Apache web server will be used: index.htm, index.html, or index.php.
- If you omit the filename and there is no default file, Apache will display an index of the files and directories in the path.

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The Product Discount application in Chrome

Murach's PHP and MySQL (3rd Ed.) C1, Slide 40
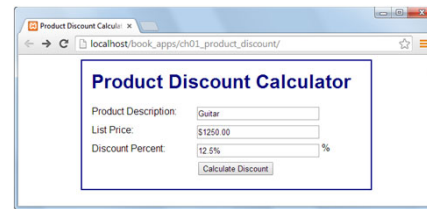
Requesting pages from an Internet web server

A request for a specific page
```
http://www.murach.com/shop-books/all/index.php
```
A request for the default (home) page of a website
```
http://www.murach.com/
```
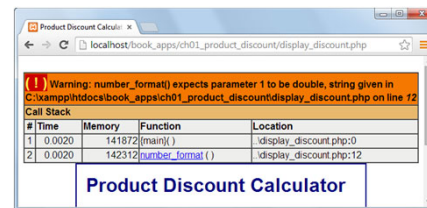
Requesting applications from a local web server

A request for the default page in an application directory
```
http://localhost/book_apps/ch01_product_discount/
```
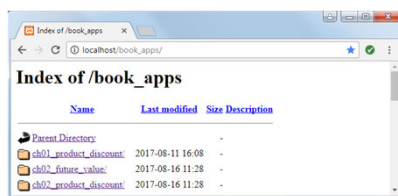### A request for a directory with no default page
```
http://localhost/book_apps/
```

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An error displayed in Chrome

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An index of the apps in the book_apps directory

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How to test a PHP page for the first time

1. Make sure the Apache and MySQL servers are running.
2. Start a web browser and enter the URL for the application as shown in the last figure.
3. Test the page by entering both valid and invalid data, clicking on all links, and so on.

How to retest a PHP page after changes

- Click the Reload or Refresh button in the browser.

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The source code for a PHP page

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How to work with NetBeans projects

- To open a project, use the Open Project button in the toolbar.
- To start a new project, use the New Project button in the toolbar.
- To close a project, right-click on the project in the Projects tab and select the Close command from the resulting menu.

How to work with files

- To open a file, use the Projects tab to navigate to the file and double-click the file.
- To start a new file, select the project and click the New File button in the toolbar.

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How to view the source code for a page in Chrome and Firefox

- Right-click the page, then select the ViewPage Source command.

How to view the source code for a page in IE and Edge

- Right-click on the page, then select the View Source command.

Note about Microsoft Edge

- The View Source command isn't available by default for this browser. To enable it, you can press F12 to display the Developer Tools. Then, when you select the View Source command, the source code will be displayed in the Debugger tab within the Developer Tools window.

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About NetBeans

- NetBeans is an Integrated Development Environment (IDE) for developing PHP applications.
- NetBeans can make it easier to create, edit, and test the HTML, CSS, and PHP files that you need for a web application.
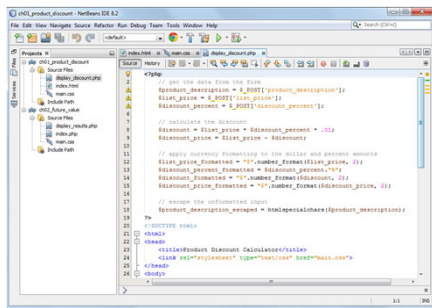
About NetBeans projects

- A NetBeans project consists of a top-level directory that contains the subdirectories and files for an application.
- Netbeans adds an nbproject subdirectory that contains the extra files that NetBeans needs for managing the project.
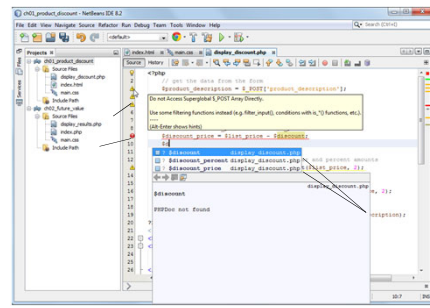
Mac OS X note

- To enable right-clicking with Mac OS X, you can edit the system preferences for the mouse.

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NetBeans with three files in a project open

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Auto-completion and error marking in NetBeans

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How to edit a PHP file with NetBeans

- Use normal editing techniques as you enter PHP code.
- When you see an auto-completion list, you can highlight an entry and press the Enter key to enter it into your code or you can double-click on it.
- If you see a red error icon at the start of a line that you have entered, you should fix whatever errors the line contains before you test the application.

How to test a PHP application with NetBeans

- To run the current project, click on the Run Project button in the toolbar or press F6.
- To run other projects, right-click on the project and select the Run command.
- To run a file, right-click on the file and select the Run command.

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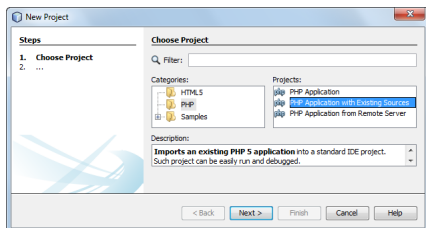**How to check the run configuration for a project**

- Right-click on a project in the Projects tab and select the Properties command.
- Then, click on Run Configuration in the Categories list and check the Project URL.

How to import a project

- Use the New Project command, but select PHP Application with Existing Sources in the Projects list.
- This will step you through the import procedure.
- In the third step, you are asked to check the run configuration. Here, you need to make sure the URL for running the project is correct.

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The dialog box for starting a new project

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The dialog box for configuring a project

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