**Assignment No:10**

**Title:** Development of a three-tier application using a suitable front end, database, and application server.

**Problem Statement:** Design and implement a three-tier application using PHP and MySQL, incorporating a suitable front-end interface, a MySQL database for data management, and a PHP-based application server for business logic processing.

**Objective:** To Understand the workings of two-tier and three-tier architecture.

**Outcome:** Construct a two-tier and three-tier application using a suitable programming language and database.

**Tools Required:** Ubuntu OS, MySql, Xampp Server.

**Theory:**

**1. Three-Tier Application**

A **three-tier application** follows a structured approach by dividing an application into three distinct layers:

* **Presentation Layer (Front-End)** – Built using **HTML, CSS, and JavaScript**, this layer provides the user interface.
* **Application Layer (Business Logic)** – Developed using **PHP**, this layer processes user inputs, communicates with the database, and applies business logic.
* **Data Layer (Database)** – Uses **MySQL** to store, retrieve, and manage data.

**2. XAMPP**

XAMPP is a free and open-source web server solution that includes **Apache, MySQL (MariaDB), PHP, and Perl**. It is widely used for developing and testing PHP-based web applications on a local server. Go to the official website: <https://www.apachefriends.org> to download the latest version for your operating system (Windows, macOS, or Linux). Run the installer and follow the setup instructions. Choose the components (Apache, MySQL, PHP) and install them. Once installed, open the XAMPP Control Panel.

3. **HTML**

HTML stands for **H**yper**t**ext **M**arkup **L**anguage, and it is the most widely used language to write Web Pages.

**Hypertext** refers to the way in which Web pages (HTML documents) are linked together. Thus the link available on a webpage are called Hypertext.

As its name suggests, HTML is a **Markup Language** which means you use HTML to simply "mark up" a text document with tags that tell a Web browser how to structure it to display.

Originally, HTML was developed with the intent of defining the structure of documents like headings, paragraphs, lists, and so forth to facilitate the sharing of scientific information between researchers.

Now, HTML is being widely used to format web pages with the help of different tags available in HTML language.

**3.1. HTML Tags**

As told earlier, HTML is a markup language and makes use of various tags to format the content. These tags are enclosed within angle braces **<Tag Name>**. Except few tags, most of the tags have their corresponding closing tags. For example **<html>** has its closing tag **</html>** and **<body>** tag has its closing tag **</body>** tag etc.

|  |  |
| --- | --- |
| **Tag** | **Description** |
| <!DOCTYPE...> | This tag defines the document type and HTML version. |
| <html> | This tag encloses the complete HTML document and mainly comprises of document header which is represented by **<head>...</head>** and document body which is represented by **<body>...</body>** tags. |
| <head> | This tag represents the document's header which can keep other HTML tags like <title>, <link> etc. |
| <title> | The **<title>** tag is used inside the <head> tag to mention the document title. |
| <body> | This tag represents the document's body which keeps other HTML tags like <h1>, <div>, <p> etc. |

**4. CSS?**

* **CSS** stands for **C**ascading **S**tyle **S**heets
* CSS describes **how HTML elements are to be displayed on screen, paper, or in other media**
* CSS **saves a lot of work**. It can control the layout of multiple web pages all at once
* External stylesheets are stored in **CSS files**
* CSS is used to define styles for your web pages, including the design, layout and variations in display for different devices and screen sizes.

**4.1 CSS Syntax:**

A CSS rule-set consists of a selector and a declaration block:

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AI-generated content may be incorrect.

* The selector points to the HTML element you want to style.
* The declaration block contains one or more declarations separated by semicolons.
* Each declaration includes a CSS property name and a value, separated by a colon.
* A CSS declaration always ends with a semicolon, and declaration blocks are surrounded by curly braces.

**5. PHP Basics**

PHP (Hypertext Preprocessor) is a server-side scripting language used for web development. It processes logic on the server and sends the output to the browser.

**5.1 Features of PHP**

* **Open-source** – Free to use and modify.
* **Server-side execution** – PHP runs on the server, and only the output (HTML) is sent to the client.
* **Easy to learn** – Simple syntax similar to C and JavaScript.
* **Platform-independent** – Works on Windows, Linux, and macOS.
* **Supports databases** – Works with MySQL, PostgreSQL, MongoDB, etc.
* **Interpreted language** – No need for compilation.

**5.2 PHP Syntax**

PHP scripts are written inside <?php ... ?> tags and are executed on the server.  
Example:

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| --- |
| <?php  echo "Hello, World!";  ?> |

**6. Database Connection**

PHP provides built-in functions to connect with MySQL databases and perform operations like inserting, updating, deleting, and retrieving data.

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| <?php  $servername = "localhost";  $username = "root"; // Default username for XAMPP/WAMP  $password = ""; // Default password is empty for XAMPP  $dbname = "mydatabase";  // Create connection  $conn = new mysqli($servername, $username, $password, $dbname);  // Check connection  if ($conn->connect\_error) {  die("Connection failed: " . $conn->connect\_error);  }  echo "Connected successfully";  ?> |

* **$servername**: Specifies the database host (usually localhost for local development).
* **$username**: The MySQL username (default is root for XAMPP/WAMP).
* **$password**: The MySQL password (default is empty for XAMPP).
* **$dbname**: The database name (mydatabase).
* **new mysqli($servername, $username, $password, $dbname);**: Creates a connection to the MySQL database.
* **$conn->connect\_error**: Checks if the connection failed; if so, it stops execution using die().
* **echo "Connected successfully";**: Displays a success message if the connection is established.

**Conclusion:**

We have successfully implemented implement a three-tier application using PHP, MySQL, and XAMPP Server.