04
CHAPTER

HAKFV9

Introduction to Hypertext Pre-Processor

LEARNING OBJECTIVES

- To understand the importance of Web Application
- To know the Server side Scripting Language
- To know the features of PHP (Hyper Text Pre-processor)
- To know the Basics of Web development process
- To understand Webserver Installation and Configurations

4.1 Introduction to Hypertext Pre-Processor (PHP)

AHH7HB

Internet and Web based online applications are performing very important role in business and entertainment industry. Two decades back, a famous quote

> **"If your business establishment is not on the Internet (online based), then your business will be out of business context."**
>
> **Founder of Microsoft- Bill Gates**

The Web based Internet application ensures the success of critical business in real world competitions. The legacy programing languages didn't meet out the expectations of latest Internet concepts and executions.

In earlier 1990's British scientist Tim Berners-Lee introduced the concept of Internet and **W**orld **W**ide **W**eb (WWW). These concepts required a new set of programming languages over the network communication. These programming languages are recently called as Web scripting languages.

The Web scripting languages has many policies which is easy to handle and solve the critical business problems around the world. In Later 1990's many Web scripting languages were introduced to support the Internet online business.

PHP is one of the most widely used and recognizable technologies in use on the internet. Originally PHP stood for "Personal Home Page", though more recently it has been changed to stand for "PHP: Hypertext Preprocessor". However, no matter what it is called, PHP is a fundamental part of any dynamic web page.

PHP (Hypertext Pre-processor) is a one of the important server side Web

and general purpose scripting language invented by Rasmus Lerdorf in 1994. It is very simple and lightweight open source server side scripting language. It can easily embed with HTML and other client side scripting languages like CSS (Cascading Style Sheets) and Java script. It also creates dynamic and interactive Webpages in the real time Web development projects.

It is a competitor and alternative for other server side scripting languages like Microsoft ASP (Active Server Page) and JSP (Java Server page). Recent statistics of server side scripting language usage depict that 78.9 % of Website are developed by PHP scripting language.

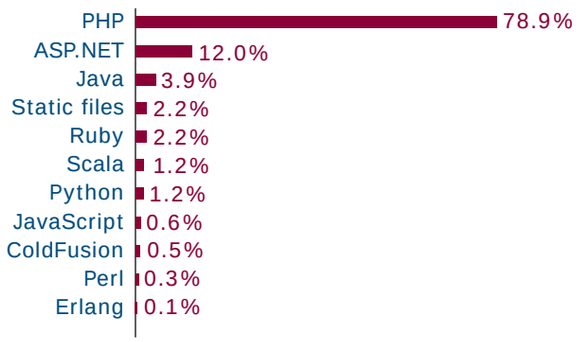

Figure 4.1 Server side Scripting Language Comparison

4.2 Various Server-side Programming Languages Global Usage Statistics

PHP scripting language can be executed via an interpreter which is installed in the Webservers or CGI (Common Gateway Interface). Most of the Webservers such as Apache Tomcat, Microsoft IIS (Internet Information server) supports the PHP interpreter module. Refer Figure 4.1

PHP is an open source community development initiation. It has many versions to ensure quality and ease of Web development activities. The current version of PHP, 7.3 is released by the official team on 30 November 2017.

4.3 Client Server Architecture

In the evolution of network architecture, various critical networks related problems are getting resolved by client server architecture model. The client server architecture introduces application sharing mechanism between two different hardware systems over the network (Internet/intranet). In 1990's Internet was emerging in the computer network field. The main objective of Internet implies that an application is shared by more than one hardware either it could be a server or client machine.

The server is a high performance hardware machine which can run more than one application concurrently. The client is a separate hardware machine which is connected with server in the network (Internet/intranet). It could send the request and receive the response from the server hardware. The Server and client are also called as service provider and service requester respectively.

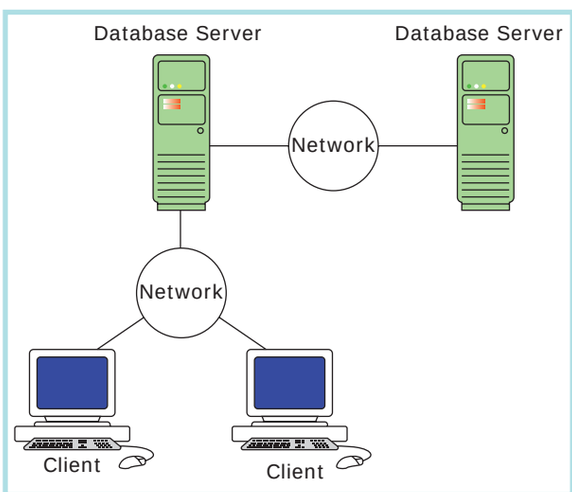

Figure 4.2 Client Server Architecture Model

Client Server Architecture Model

Client server architecture shown above in Figure 4.2 is classified into three types, as follows

- Single Tier Architecture
- Two Tier Architecture
- N/Multi/Three tire architecture

Single Tier Architecture

This architecture is used for the server, accessed by client. The client application runs inside the server machine itself. This acts as a single layer interaction as in Figure 4.3.

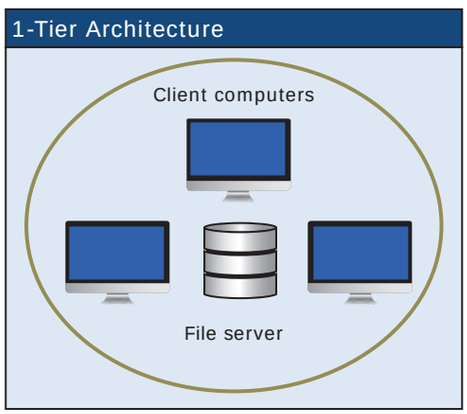

Figure 4.3 Single Tier Architecture

Two Tier Architecture

This architecture is used for the server, accessed by client as two layer interactions. Such as Client layer in tire one and server layer in tire Two. Refer Figure 4.4

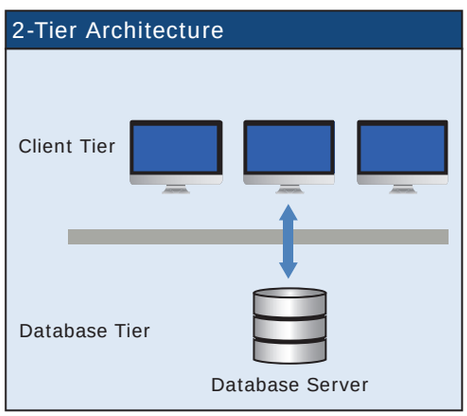

Figure 4.4 Two- Tier Architecture

Multi/Three Tier Architecture:

This architecture is used for the server, accessed by client through more than one layer interaction. The programmer could decide the count of business logic layers according to the software requirement that is the reason this model is also known as Multi three Tire Architecture as shown in Figure 4.5.

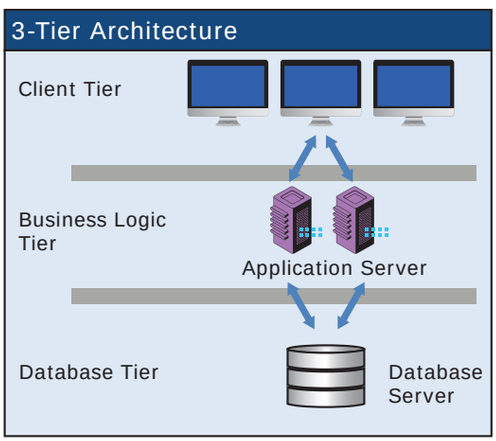

Figure 4.5 Multi/Three- Tier Architecture

Most of the server side scripting languages are working on any one the client server architecture model. Webserver is software which is running in server hardware. It takes the responsibilities for compilation and execution of server side scripting languages.

4.4 Server side scripting language

Web scripting languages are classified into two types, client side and server side scripting language. PHP is completely different from Client side scripting language like Java script. The PHP code entirely executes on Webserver which is installed in the remote machine and it is generating HTML code which is sent to the user. The user receives the HTML code

and sees the Website contents via Internet browser in their computer or laptop. PHP also supports OOPs (Object Oriented Programing) concepts. It is applicable to implement all OOPs features such as class, object and inheritance etc. The action is shown in Figure 4.6.

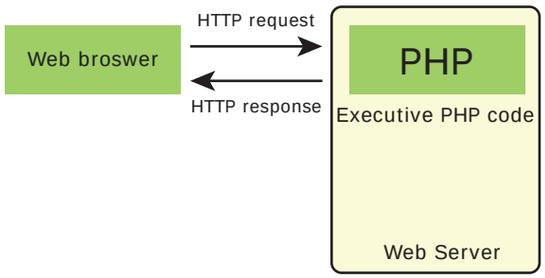

Figure 4.6 Website Request and Response from Web server to Browser

4.5 Web Server Installation & Configuration Files

Web server software that runs on server hardware, governs the server side scripting compilation into an intermediate byte-code that is then interpreted by the runtime engine.

VW1TNS

Web server software is available as open source or licensed version in the market. Recent statistics of Web server usage depict that more than 130% Websites are running under the open source Web servers such as Tomcat Apache, Nginx etc. Refer Figure 4.7.

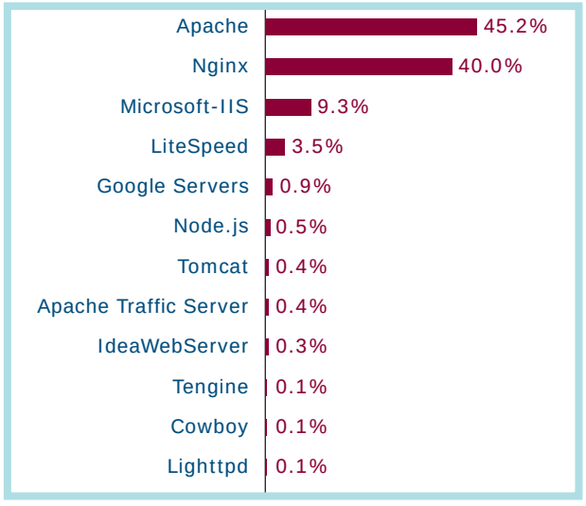

Figure 4.7 Webserver global usage

The following are the steps to install and configure Apache Httpd Webserver and PHP module in windows server machine.

Step 1:

Go to Apache foundation Website and download the Httpd Webserver Software.

https://httpd.apache.org/download.cgi

Step2:

After downloading .MSI file from Apache foundation Website, user launches the .MSI file and clicks next and next button to finish the installation on server machine. The software takes default port number 130 or 130130. Once the user finished, the Web server software is installed and configured on server hardware machine as a service.

Step 3:

To test the installation of Apache Httpd Webserver, enter the following URL from your Web browser which is installed in your client machine.

https://localhost:130/ or https://localhost:130130

The output page that says "Its works"

Step 4:

Administrator user can start, stop and restart the Web server service at any time via windows Control panel. Once the services stops, the client machine will not receive the response message from server machine.

Step 5:

Webserver's configuration setting file "httpd.conf" is located in the **conf** directory under the apache installation directory. Edit this file and enable the PHP module to run PHP scripting language.

4.6 Web Development Concept

Web development concept describes in detail about Website development and hosting through network (Internet/Intranet). The process of development also includes Web content generation, Web page designing, Website security and so on.

4.6.1 How PHP Script Work

Website or Web page is developed by the programmer using PHP script. Finally the entire Website codes are moved to Web server path in a remote server machine.

From client side, the end user opens a browser, types the URL of the Website or Webpage and initiates the request to remote server machine over the network.

After receiving the request from client machine the Web server tries to compile and interpret the PHP code which is available in remote machine. Next a response will be generated and sent back to the client machine over the network from Webserver.

Finally the browser which is installed in the client machine receives the response and displays the output to user, as shown in Figure 4.8

4.6.2 PHP Syntax

PHP uses three diffrents types of Syntax. They are as follows

1. Default Syntax
2. Short open Tags
3. HTML Script embed Tags

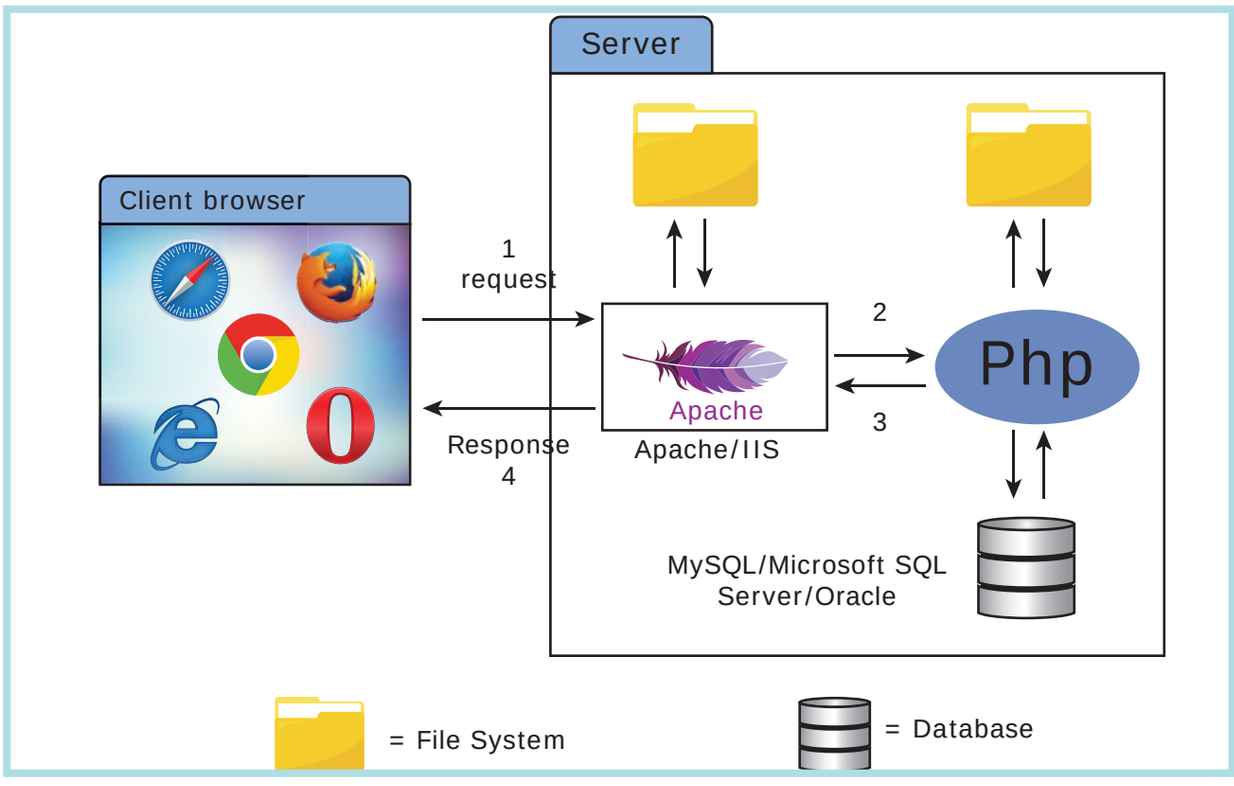

Figure 4.8 Client to server Request

Default Syntax:

The default Syntax begins with "**<?php**" and closes with "**?>**". Also refer Figure 4.9

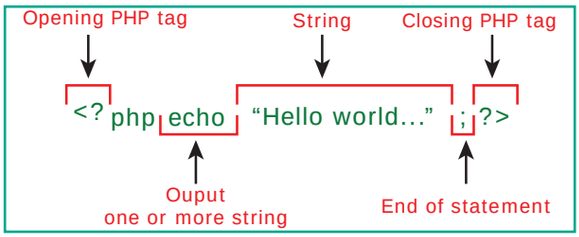

Figure 4.9 PHP Syntax

Short open Tags

The Short open Tags begins with "**<?**" and closes with "**?>**". But admin user has to enable Short style tags settings in php.ini file on the server. Refer the syntax in Figure 4.10

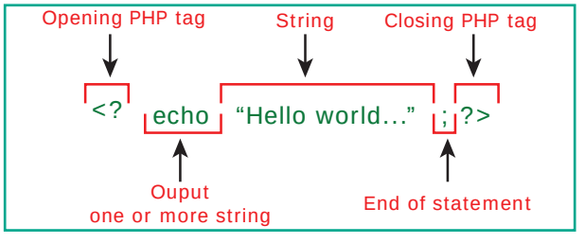

Figure 4.10 PHP Short Syntax

HTML Script embed Tags:

HTML Script embed Tags looks just like HTML script tag. The syntax is shown in Figure 4.11.

```
<script language="php">
echo "This is HTML script tags.";
</script>
```

Figure 4.11 HTML Syntax

The above syntax is created and saved in a file with extension of .php. This .php file is ready to execute from Webserver and generates response to client machine.

4.6.3 Embed PHP in HTML

PHP script can be written in side the HTML code and save the file with extension of .php. The embedded PHP file get executed in the Webserver, the browser receives only the HTML and other client side files. None of the raw PHP code is visible in browser which means that PHP interpreter produces raw HTML files to browsers in the client machine. Refer Figure 4.12 for Web response

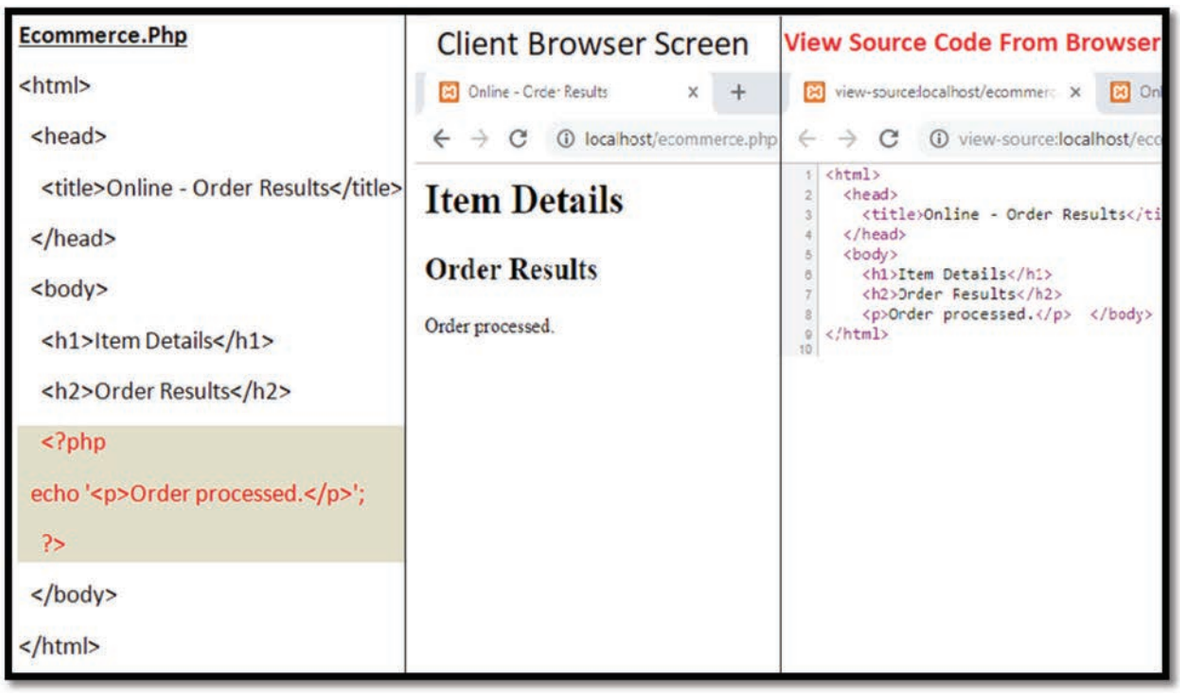

Figure 4.12 HTML Web Response

4.6.4 Variable in PHP

PHP has variables like other programing languages such as C, C++ and Python etc. Variables are the storage location, which can store the values for the later manipulations in the program.

The variable in PHP begins with a dollar ($) symbol and the assignment activity implemented using "=" operator, finally the statement ends with semi colon ";" The semicolon indicates the end of statement.

The main advantage of the PHP variable declaration is, it does not requires to specify the data type keyword separately such as int, char, float, double or string etc.

Basic Rules for Variable Declaration

- Variable name must always begin with a $ symbol.
- Variable name can never start with a number.
- Variable names are case-sensitive.

Example:

```
$a=5; $b=10;
$a_1="Computer Application"
$c=$a+$b;
echo $c;
```

4.6.5 PHP Data Type

PHP scripting language supports 13 primitive data types. Data Types play important role in all programing languages to classify the data according to the logics. PHP supports the following data types.

1. String
2. Integer
3. Float
4. Boolean
5. Array
6. Object
7. NULL
8. Resource

String:

String is a collection of characters within the double or single quotes like

"Computer Application" or 'Computer Application'. Space is also considered as a character.

Example:

```
<?php
$x = "Computer Application!";
$y = 'Computer Application';
echo $x;
echo "<br>";
echo $y;
?>
```

Integer:

Integer is a data type which contains non decimal numbers.

Example:

```
<?php
$x = 59135;
var_dump($x);
?>
```

Float:

Float is a data type which contains decimal numbers.

Example:

```
<?php
$x = 19.15;
var_dump($x);
?>
```

Boolean:

Boolean is a data type which denotes the possible two states, TRUE or FALSE

Example:

```
<?php
$x = true;
$y = false;
echo $x;
echo $y;
?>
```

Array:

Array is a data type which has multiple values in single variable. You will learn about arrays in the next chapter.

Example:

```
<?php
$cars = array("Computer","Laptop","Mobile");
var_dump($cars);
?>
```

OUTPUT:

```
array(3) { [0]=> string(5) "Computer " [1]=> string(3) "Laptop " [2]=> string(6) "Mobile " }
```

Var_dump:

The var_dump() system define function, returns structured information (type and value) about variables in PHP.

Object:

In PHP object is a data type which contains information about data and function inside the class.

```
<?php
class School {
   function marks() {
      $this->sec = "A";
   }
}
// create an object
$school_obj = new School ();
// show object properties
echo $school_obj ->sec;
?>
```

NULL:

Null is a special data type which contains no value:

```
<?php
$x = "COMPUTER APPLICATION!";
$x = null;
var_dump($x);
?>
OUTPUT:
NULL
```

Resources

Resource is a specific variable, it has a reference to an external resource. These variables hold specific handlers to handle files and database connections in respective PHP program.

```
<?php
// Open a file for reading
$handle = fopen("note.txt", "r");
var_dump($handle);
echo "<br>";

// Connect to MySQL database server with default setting
$link = mysql_connect("localhost", "root", "");
var_dump($link);
?>
```

4.6.6. Operators in PHP

Operator is a symbol which is used to perform mathematical and logical operations in the programing languages. Different types of operator in PHP are:

1. Arithmetic operators,
2. Assignment operators,
3. Comparison operators,
4. Increment/Decrement operators,
5. Logical operators, and
6. String operators.

Arithmetic operators

The arithmetic operators in PHP perform general arithmetical operations, such as addition, subtraction, multiplication and division etc. Refer Table 4.1.

Table 4.1 PHP Arithmetic operators

Symbol	Operator Name	Purpose
+	Addition	This operator performs the process of adding numbers
-	Subtraction	This operator performs the process of subtracting numbers
*	Multiplication	This operator performs the process of multiplying numbers
/	Division	This operator performs the process of dividing numbers
%	Modulus	This operator performs the process of finding remainder in division operation of two numbers

Assignment Operators:

Assignment operators are performed with numeric values to store a value to a variable. The default assignment operator is "=". This operator sets the left side operant value of expression to right side variable. Refer Table 4.2.

Table 4.2 PHP Assignment operators

Assignment	Similar to	Description
x = y	x = y	This operator sets the left side operant value of expression to right side variable
x += y	x = x + y	Addition
x -= y	x = x - y	Subtraction
x *= y	x = x * y	Multiplication
x /= y	x = x / y	Division
x %= y	x = x % y	Modulus

Comparison Operators:

Comparison operators perform an action to compare two values. These values may contain integer or string data types (Number or Strings). Refer Table 4.3.

Table 4.3 PHP Comparison operators

Symbol	Operator Name	Symbol	Operator Name
==	Equal	>	Greater than
===	Identical	<	Less than
!=	Not equal	>=	Greater than or equal to
<>	Not equal	<=	Less than or equal to
!==	Not identical		

Increment and Decrement Operators:

Increment and decrement operators are used to perform the task of increasing or decreasing variable's value. This operator is mostly used during iterations in the program logics. Refer Table 4.4.

Table 4.4 PHP Increment and Decrement operators

Operator	Name	Description
++$x	Pre-increment	Increments $x value by one, then returns $x
$x++	Post-increment	Returns $x, then increments $x by one
--$x	Pre-decrement	Decrements $x by one, then returns $x
$x--	Post-decrement	Returns $x, then decrements $x by one

Logical Operators:

Logical Operators are used to combine conditional statements. Refer Table 4.5.

Table 4.5 PHP Logical operators

Symbol	Operator Name	Example	Result
&&	And	$x && $y	True if both $x and $y are true
||	Or	$x || $y	True if either $x or $y is true
!	Not	!$x	True if $x is not true
xor	Xor	$x xor $y	True if either $x or $y is true, but not both

String Operators:

Two operators are used to perform string related operations such as Concatenation and Concatenation assignment (Appends). Refer Table 4.6.

Table 4.6 PHP String operators

Operator	Name	Example	Result
.	Concatenation	$text1 . $ text2	Concatenation of $txt1 and $txt2
.=	Concatenation assignment	$text1 .= $ text2	Appends $txt2 to $txt1

POINTS TO REMEMBER

- PHP is an Open Source
- PHP is a Case Sensitive
- PHP is a Simplicity Program language
- PHP is a Efficiency Program language
- PHP is a Platform Independent Program language
- PHP is a Security Program language
- PHP is a Flexibility Program language
- PHP is a Real-Time Access Monitoring Program language

A-Z GLOSSARY

PHP	PHP abbreviated as "HYPER TEXT PREPROCESSOR". It is a server-side scripting language
URL	Uniform Resource Locator, the address of a specific Web page or file on the Internet.
HTTP	HTTP means HyperText Transfer Protocol. HTTP is the underlying protocol used by the World Wide Web and this protocol defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands

Webserver	A Web server is a Software that uses HTTP (Hypertext Transfer Protocol) to serve the files that form Web pages to users
Web Browser	A Web browser (commonly referred to as a browser) is a software application for accessing information on the World Wide Web. Each individual Web page, image, and video is identified by a distinct URL, enabling browsers to retrieve and display them on the user's device.
SERVER	A server is a computer or a device that provides functionality for other programs or devices, called "clients". This architecture is called the client server model, and a single overall computation is distributed across multiple processes or devices.

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EVALUATION

Part - I

Choose the correct answer

1. What does PHP stand for?

   a) Personal Home Page

   b) Hypertext Preprocessor

   c) Pretext Hypertext Processor

   d) Pre-processor Home Page

2. What does PHP files have a default file extension?

   a) .html

   b) .xml

   c) .php

   d) .ph

3. A PHP script should start with ___ and end with ___:

   a) <php>

   b) < ? php ?>

   c) < ? ? >

   d) < ?php ? >

4. Which of the following must be installed on your computer so as to run PHP script?

   a) Adobe

   b) windows

   c) Apache

   d) IIS

5. We can use ___ to comment a single line?

   i) /? ii) // iii) # iv) /* */

   a) Only (ii)

   b) (i), (iii) and (iv)

   c) (ii), (iii) and (iv)

   d) Both (ii) and (iv)

6. Which of the following PHP statement will store 41 in variable num?

(i) num = 41 (ii) num = 41 (iiI) echcho num (iv) echo 41

a) Both (i) and (ii)

b) All of the above.

c) Only (ii)

d) Only (i)

7. What will be the output of the following PHP code?

```
< ?php
$num = 1;
$num1 = 2;
print $num . "+". $num1 ;
?>
```

a) 3

b) 1+2

c) 1.+.2

d) Error

8. Which of the following PHP statements will output Hello World on the screen?

a) echo ("Hello World");

b) print ("Hello World");

c) printf ("Hello World");

d) sprintf ("Hello World");

9. Which statement will output $x on the screen?

a) echo "\$x";

b) echo "$$x";

c) echo "/$x";

d) echo "$x;

10. Which of the below symbols is a newline character?

a) \r

b) \n

c)/n

d)/r

Part - II

Short Answers

1. What are the common usages of PHP?
2. What is Webserver?
3. What are the types scripting language?
4. Difference between Client and Server?
5. Give few examples of Web Browser?
6. What is URL?
7. Is PHP a case sensitive language?
8. How to declare variables in PHP?
9. Define Client Server Architecture.
10. Define Webserver.

Part - III

Explain in Brief Answer

1. Write the features of server side scripting language.
2. Write is the purpose of Web servers?
3. Differentiate Server side and Client Side Scripting language.
4. In how many ways you can embed PHP code in an HTML page?
5. Write short notes on PHP operator.

Part - IV

Explain in detail

1. Explain client side and server side scripting language.
2. Discuss in detail about Website development activities.
3. Explain the process of Webserver installation.
4. Discuss in detail about PHP data types.
5. Explain operators in PHP with example.

STUDENT ACTIVITY

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1. Programing details
2. Webserver details
3. Hosting Country details