INTRODUCTION TO WEB DEVELOPMENT

WEB APPLICATION DEVELOPMENT | IT6315

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(A Member of AMA Education System)

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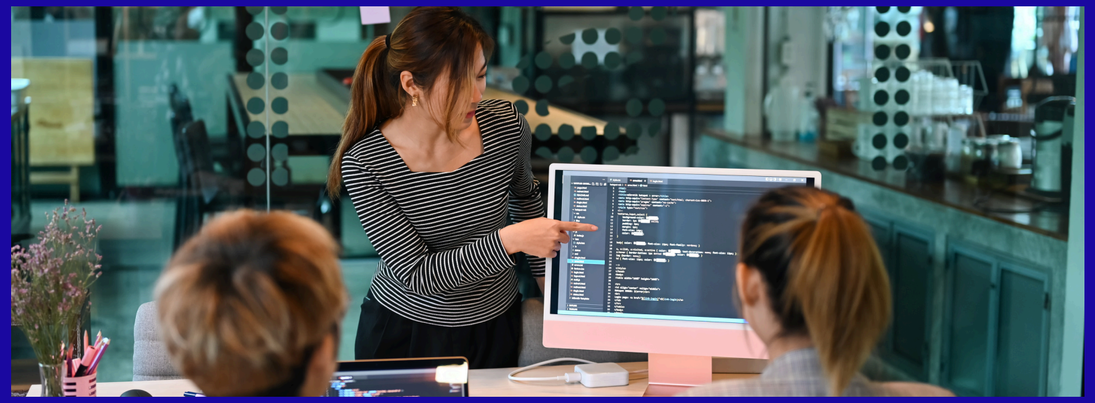
WHAT IS WEB DEVELOPMENT?

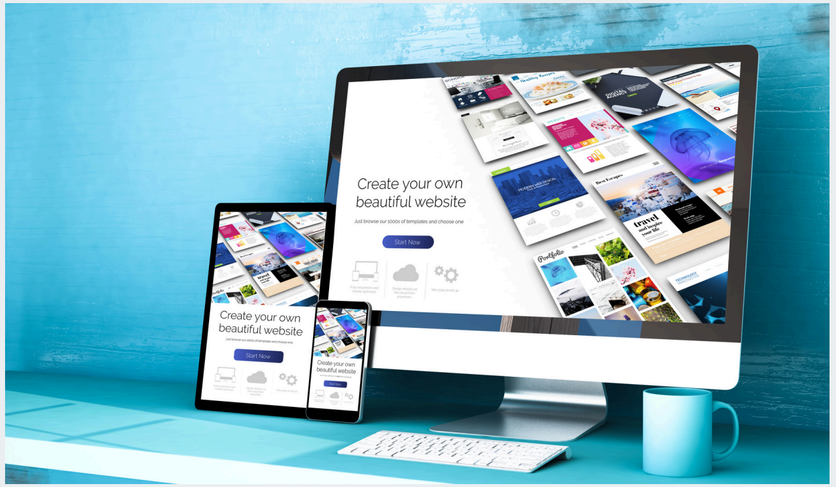
refers to the creating, building, and maintaining of websites. It includes aspects such as web design, web publishing, web programming, and database management. It is the creation of an application that works over the internet i.e. websites.



WEB DEV CLASSIFICATION

FRONTEND DEVELOPMENT

Front-end Development is the development or creation of a user interface using some markup languages and other tools. It is basically the development of the user side where only user interaction will be counted. It consists of the interface where buttons, texts, alignments, etc are involved and used by the user.



FRONTEND DEVELOPMENT

POPULAR FRONTEND TECHNOLOGIES

- **HTML**: HTML stands for HyperText Markup Language. It is used to design the front end portion of web pages using markup language. It acts as a skeleton for a website since it is used to make the structure of a website.

- **CSS**: Cascading Style Sheets fondly referred to as CSS is a simply designed language intended to simplify the process of making web pages presentable. It is used to style our website.

- **JavaScript**: JavaScript is a scripting language used to provide a dynamic behavior to our website.

FRONTEND DEVELOPMENT

WHAT IS HTML?

HTML stands for HyperText Markup Language. It is the standard language used to create and design web pages on the internet. It was introduced by Tim Berners-Lee in 1991 at CERN as a simple markup language. Since then, it has evolved through versions from HTML 2.0 to HTML5 (the latest 2024 version).

HTML is a combination of Hypertext and Markup language. Hypertext defines the link between the web pages and Markup language defines the text document within the tag.

FRONTEND DEVELOPMENT

WHAT IS CSS?

CSS or Cascading Style Sheets is a stylesheet language used to add styles to the HTML document. It describes how HTML elements should be displayed on the web page. CSS was first proposed by Håkon Wium Lie in 1994 and later developed by Lie and Bert Bos, who published the CSS1 specification in 1996.

CSS has 3 ways to style your HTML:

- **Inline**: Add styles directly to HTML elements (limited use).
- **Internal**: Put styles inside the HTML file in a <style> tag.
- **External**: Create a separate CSS file (.css) and link it to your HTML.

FRONTEND DEVELOPMENT

WHAT IS JAVASCRIPT ?

JavaScript is a lightweight, cross-platform, single-threaded, and interpreted compiled programming language. It is also known as the scripting language for webpages. It is well-known for the development of web pages, and many non-browser environments also use it.

JavaScript is a weakly typed language (dynamically typed). JavaScript can be used for Client-side developments as well as Server-side developments. JavaScript is both an imperative and declarative type of language. JavaScript contains a standard library of objects, like Array, Date, and Math, and a core set of language elements like operators, control structures, and statements.

WEB DEV CLASSIFICATION

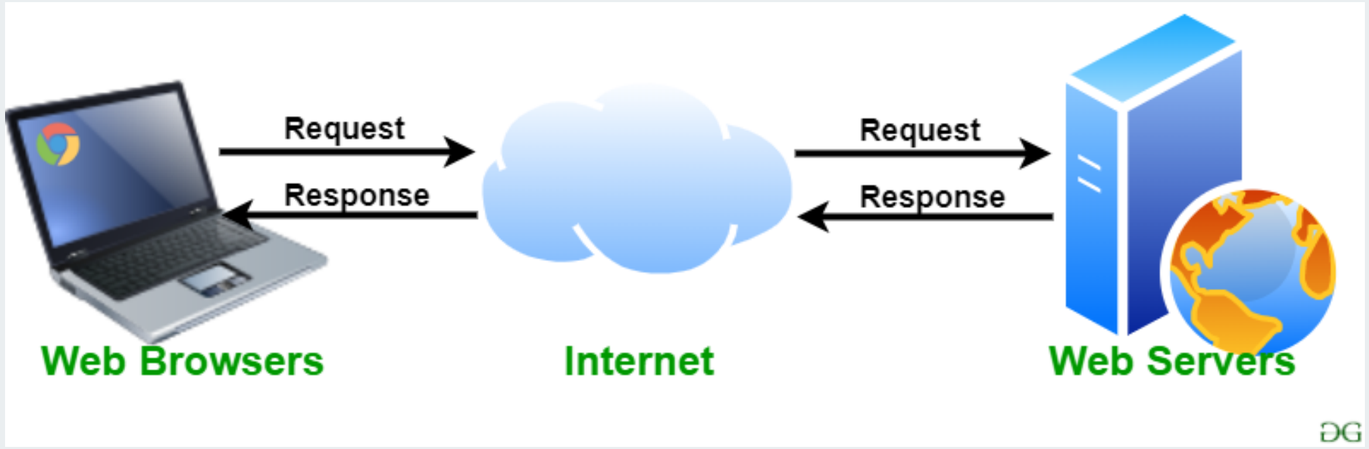
BACKEND DEVELOPMENT

Backend Development involves the logic, database, and other operations that are built behind the scenes to run the web servers efficiently. Backend Development refers to the server-side development of the web application. It is the part of the application where the server and database reside and the logics is build to perform operations. It includes the main features and functionalities of the application on the server. Programming languages for the backend are mainly Node. JS (for JavaScript), Django (for Python), Spring (Java), etc.

BACKEND DEVELOPMENT

KNOWLEDGE OF WEB SERVER

The web server runs websites, it stores, processes, and delivers (response) web pages to the user's request. When the user makes a request by the web server, it is accepted by an HTTP server which finds and sends back the content to the browser through HTTP. Some examples of web servers are Apache and NGINX which are open-source platforms used to deliver content as per requests made.



BACKEND DEVELOPMENT

KNOWLEDGE OF WEB SECURITY

Various threats can attack a website which could result in its poor performance. Web security refers to the protective measures and protocols developers should follow to build an optimized and effective website. It includes scanning a website for vulnerabilities to defend against thefts or loss that occurs due to digital hackers.

Types of Risks developers face could be malware, backlisting, buffer overflow, and sensitive data exposure. Various techniques can be followed to avoid such issues:

Using HTTPS: HTTPS is a secured HTTP. When data is sent using HTTPS, it is protected via the Transport Layer Security protocol, which has three layers of protection:

BACKEND DEVELOPMENT

APIS (APPLICATION PROGRAMMING INTERFACE)

An API (Application Programming Interface) is a set of functions that perform accessing data and interacting with external software components, microservices, and OS. In short, it delivers users' responses to the system and sends responses back to the user. It is because of APIs (which act as a software intermediary) that two applications talk to each other. APIs are used by backend developers to create connections between services or applications to initiate communication to improve user experience. Some of the APIs you should know about are:

- REST
- JSON
- SOAP

BACKEND DEVELOPMENT

BACKEND DEVELOPMENT FRAMEWORKS/ TECHNOLOGIES

- **Laravel** : Laravel is a PHP framework for web applications, created by Taylor Otwell in 2011. It follows the Model-View-Controller (MVC) architectural pattern.

- **Node JS** : Node JS is an open-source and cross-platform runtime environment built on Chrome’s V8 JavaScript engine for executing JavaScript code outside of a browser.

- **Django** : Django is a Python-based web framework that allows you to quickly create efficient web applications. It provides built-in features for everything including Django Admin Interface, default database – SQLlite3, etc.

BACKEND DEVELOPMENT

BACKEND DEVELOPMENT FRAMEWORKS/ TECHNOLOGIES

- **Spring Boot** : Spring Boot is a Java framework that makes it easier to create and run Java applications. It simplifies the configuration and setup process, allowing developers to focus more on writing code for their applications.

- **Flask** : Flask is an API of Python that allows us to build up web-applications. It was developed by Armin Ronacher. Flask is based on WSGI(Web Server Gateway Interface) toolkit and Jinja2 template engine.

BACKEND DEVELOPMENT

BACKEND DEVELOPMENT FRAMEWORKS/ TECHNOLOGIES

- **Express** : Express is a minimal and flexible Node.js web application framework that provides a robust set of features for web and mobile applications. It was developed by TJ Holowaychuk. Express is based on the Node.js runtime and simplifies the process of building server-side applications by offering a powerful routing system, middleware support, and a variety of HTTP utility methods.

- **Ruby on Rails** : Ruby on Rails or also known as rails is a server-side web application development framework that is written in the Ruby programming language, and it is developed by David Heinemeier Hansson under the MIT License. It supports MVC architecture.

BACKEND DEVELOPMENT

BACKEND DEVELOPMENT FRAMEWORKS/ TECHNOLOGIES

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PHP DEVELOPMENT

WHAT IS PHP?

PHP is an open-source general purpose scripting language, widely used for website development. It is developed by Rasmus Lerdorf. PHP stands for a recursive acronym PHP: Hypertext Preprocessor.

PHP is the world’s most popular server-side programming language. Its latest version PHP 8.3.13, released on October 24th, 2024.

PHP is a server-side scripting language that is embedded in HTML. PHP is a cross-platform language, capable of running on all major operating system platforms and with most of the web server programs such as Apache, IIS, lighttpd and nginx.

PHP DEVELOPMENT

ADVANTAGES OF USING PHP

- PHP is a multi-paradigm language that supports imperative, functional, object-oriented, and procedural programming methodologies.

- PHP is a server-side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites.

- PHP is integrated with a number of popular databases including MySQL, PostgreSQL, Oracle, Sybase, Informix, and Microsoft SQL Server.

PHP DEVELOPMENT

ADVANTAGES OF USING PHP

- PHP is pleasingly zippy in its execution, especially when compiled as an Apache module on the Unix side. The MySQL server, once started, executes even very complex queries with huge result sets in record-setting time.

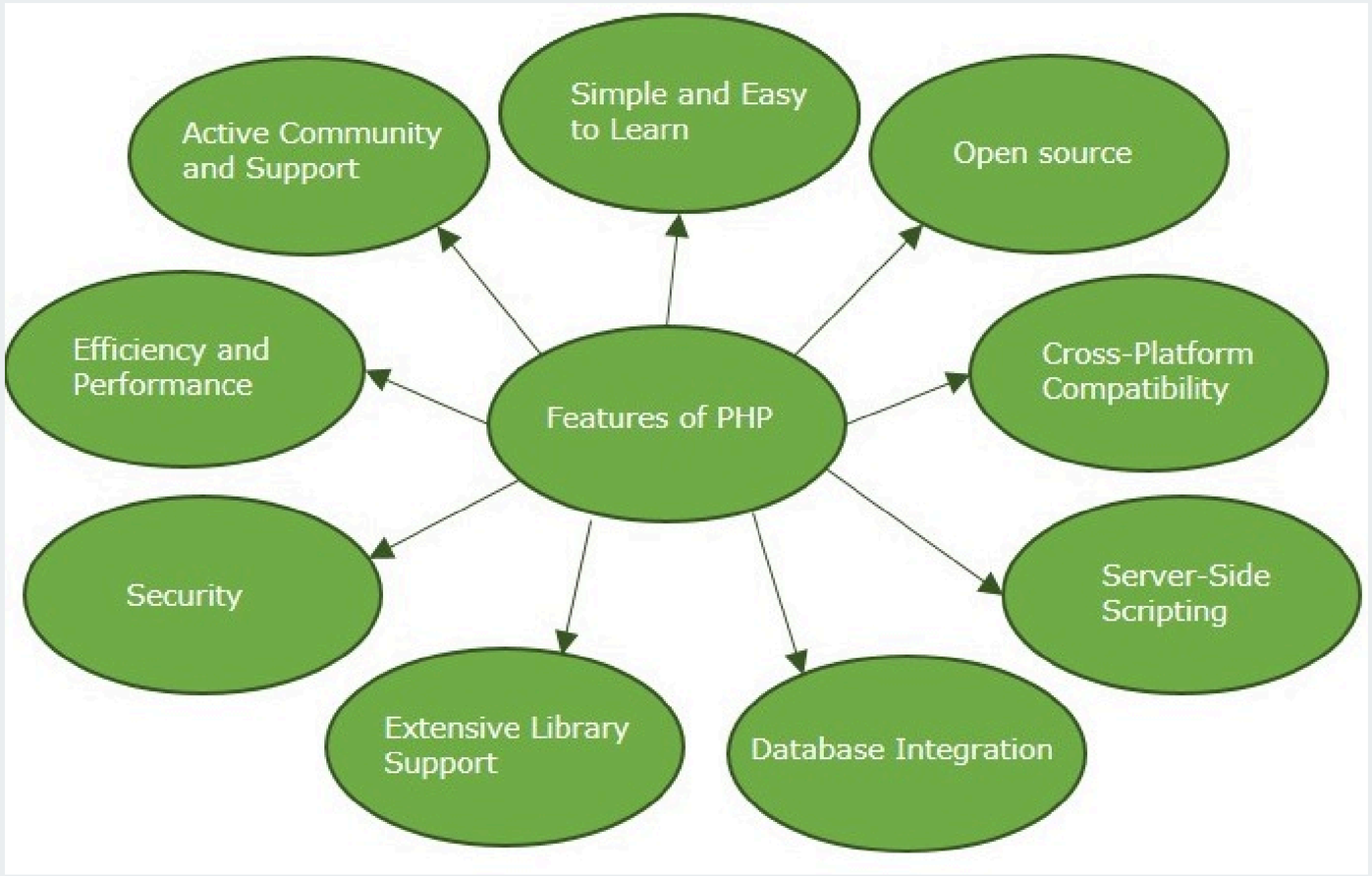
- PHP supports a number of protocols such as POP3, IMAP, and LDAP. PHP supports distributed object architectures (COM and CORBA), which makes n-tier development possible.

- PHP is forgiving: PHP language tries to be as forgiving as possible.

- PHP has a familiar C-like syntax.

PHP DEVELOPMENT

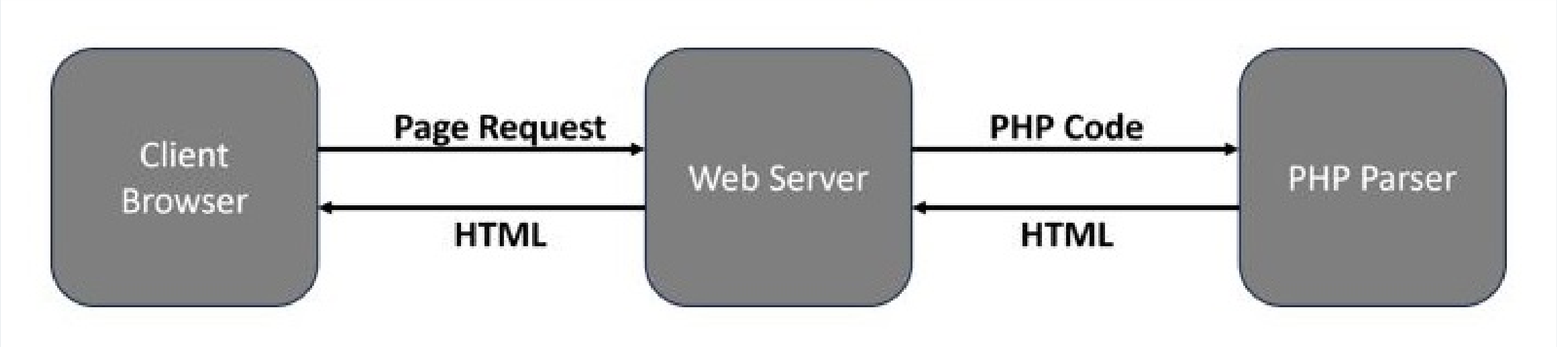
FEATURES OF PHP



PHP DEVELOPMENT

PHP - SYNTAX

A ".php" file may contain HTML, CSS and JavaScript code blocks along with the PHP code. Hence, the PHP parser must differentiate between the PHP code from the other elements. When a ".php" file is opened in the web browser, the HTML engine renders the HTML/CSS/JavaScript part and escapes out of the HTML block as soon as the statements included in PHP tags are encountered. The PHP parser interpreter processes this block and returns the response to the browser.



PHP DEVELOPMENT

ESCAPING FROM HTML

The PHP parser ignores everything outside of a pair of opening and closing tags. Thus, a PHP file can have mixed content. This allows PHP to be embedded in HTML documents –

```
<p>This is a HTML statement</p>
<?php echo 'This is a PHP statement.'; ?>
<p>This is another HTML statement.</p>


<?php if ($expression == true): ?>
   This HTML statement will be rendered.
<?php else: ?>
   Otherwise this HTML statement will be rendered.
<?php endif; ?>
```

PHP DEVELOPMENT

BASIC SYNTAX OF PHP

Statements are expressions terminated by semicolons
A statement in PHP is any expression that is followed by a semicolon (;). Any sequence of valid PHP statements that is enclosed by the PHP tags is a valid PHP program.

```
$greeting = "Welcome to PHP!";
```

A physical line in the text editor doesn't have any significance in a PHP code. There may be multiple semicolon-terminated statements in a single line. On the other hand, a PHP statement may spill over more than one line if required.

PHP DEVELOPMENT

SINGLE LINE COMMENT

Single-line Comments Using "#"

A line in PHP code starting with the "#" symbol is treated as a single-line comment.

```
<?php
     # Single line comment starting with # symbol
     echo 'Hello World';
?>
```

Single-line Comments Using "//"

PHP also supports C style of single-line comments with "//" symbol. A line starting with double oblique symbol is treated as a comment.

```
<?php
    // Single line comment starting with // symbol
    echo 'Hello World';
?>
```

PHP DEVELOPMENT

MULTI-LINE COMMENTS

Multi-line comments are generally used to provide pseudocode algorithms and more detailed explanations when necessary.
The multiline style of commenting is the same as in C. One or more lines embedded inside the "/*" and "*/" symbols are treated as a comment.

```
<?php
   /* This is a multiline comment example
      program to add two numbers
      Variables used - $x for first number,
      $y for second number */
    $x=10;$y=20;
    print "Total = ". $x+$y;
?>
```

PHP DEVELOPMENT

PHP - VARIABLES

A variable in PHP is a named memory location that holds data belonging to one of the data types.

- PHP uses the convention of prefixing a dollar sign ($) to the name of a variable.
- Variable names in PHP are case-sensitive.
- Variable names follow the same rules as other labels in PHP. A valid variable name starts with a letter or underscore, followed by any number of letters, numbers, or underscores.
- As per the naming convention, "$name", "$rate_of_int", "$Age", "$mark1" are examples of valid variable names in PHP.
- Invalid variable names: "name" (not having $ prefix), "$rate of int" (whitespace not allowed), "$Age#1" (invalid character #), "$11" (name not starting with alphabet).

Variables are assigned with the "=" operator, with the variable on the left hand side and the expression to be evaluated on the right.

PHP DEVELOPMENT

NO NEED TO SPECIFY THE TYPE OF A VARIABLE

PHP is a dynamically typed language. There is no need to specify the type of a variable. On the contrary, the type of a variable is decided by the value assigned to it. The value of a variable is the value of its most recent assignment.

Take a look at this following example −

```
<?php
    $x = 10;
    echo "Data type of x: " . gettype($x) . "\n";
    $x = 10.55;
    echo "Data type of x now: " . gettype($x) . "";
?>
```

It will produce the following output −

```
Data type of x: integer
Data type of x now: double
```

ACTIVITY 1

Form a group that contains 1-2 members
create a single PHP page that contains the following:

- Full Name
- Birthdate
- Motto
- Personal Image (Minimum of 3)
- Address
- Educational Background
- Hobbies and Talents

Submission is until 9:45AM only