

FULL STACK DEVELOPMENT

Full Stack Web Development

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Introduction

Full Stack Development

- Full stack development refers to the end-to-end application software development, including the front end and back end. The front end consists of the user interface, and the back end takes care of the business logic and application workflows
- It refers to the practice of working with both software application, covering the entire technology stack.
- A full-stack developer is capable of handling all aspects of web development, from designing user interfaces to managing server-side logic and databases.
- They work on the frontend, backend, database and debugging of web applications or websites.
- Full Stack Web Development is crucial in today's web world because it enables a developer to create entire, functional websites or applications independently.



FRONT-END DEVELOPMENT

- Front-end development is like building the face of a website – it's all about what users see and interact with.
- It is the visible part of website or web application which is responsible for user experience. The user directly interacts with the front end portion of the web application or website.
- Involves creating the visual elements of a website or application. This includes the layout, design, and interactivity using technologies like HTML, CSS, and JavaScript.
- Full-stack developers often work with frameworks and libraries to expedite the development process. Popular choices include React.js, Angular, and Vue.js for building dynamic and responsive user interfaces.
- Responsive Design: Ensuring that the user interface is optimized for various devices and screen sizes is crucial for a positive user experience.



HYPER TEXT MARKUP LANGUAGE



- HTML is the combination of Hypertext and Markup language. It is used to design the front end portion of web pages using markup language.
- Hypertext defines the link between the web pages and the markup language is used to define the text documentation within tag which defines the structure of web pages.
- HTML is the code that is used to structure a web page and its content. For example, content could be structured within a set of paragraphs, a list of bulleted points, or using images and data tables.
- It consists of a series of elements, which can be use to enclose, or wrap, different parts of the content to make it appear a certain way, or act a certain way. The enclosing tags can make a word or image hyperlink to somewhere else



Basic structure of HTML code:

```
<html>  
<head>  
<title>Your Page Title</title>  
</head>  
<body>  
  
</body>  
</html>
```

Heading :

```
<h1>Heading 1</h1>  
<h2>Heading 2</h2>
```

Paragraph :

```
<p>This is a paragraph.</p>
```

Links:

```
<a href="https://www.google.com">Visit Google.com</a>
```

Images:

```
 <!unordered list>
<li>Item 1</li>
<li>Item 2</li>
<li>Item 3</li>
</ul>
```

```
<ol> <!ordered list
  <li>First Item</li>
  <li>Second Item</li>
  <li>Third Item</li>
</ol>
```

HTML5

[illegible]

Basic structure of HTML code:

Tables :

```
<table>
<tr>
<th>Header 1</th>
<th>Header 2</th>
</tr>
<tr>
<td>Data 1</td>
<td>Data 2</td>
</tr>
</table>
```

Form :

```
<form action="/submit" method="post">
<label for="username">Username:</label>
<input type="text" id="username" name="username">
<br>
<label for="password">Password:</label>
<input type="password" id="password" name="password">
<br>
<input type="submit" value="Submit">
</form>
```



JAVASCRIPT



- JavaScript is a famous scripting language used to create the magic on the sites to make the site interactive for the user. It is used to enhancing the functionality of a website to running cool games and web-based software.
- AngularJs is a JavaScript open source front-end framework that is mainly used to develop single page web applications(SPAs). It is a continuously growing and expanding framework which provides better ways for developing web applications. It changes the static HTML to dynamic HTML. It is an open source project which can be freely used and changed by anyone. It extends HTML attributes with Directives, and data is bound with HTML.
- React is a declarative, efficient, and flexible JavaScript library for building user interfaces. ReactJS is an open-source, component-based front end library responsible only for the view layer of the application. It is maintained by Facebook.
- Bootstrap is a free and open-source tool collection for creating responsive websites and web applications. It is the most popular HTML, CSS, and JavaScript framework for developing responsive, mobile-first web sites.
- Some other libraries and frameworks are: Semantic-UI, Foundation, Materialize, Backbone.js, Express.js, Ember.js etc.

CASCADING STYLE SHEETS

- Referred to as CSS, is a simply designed language intended to simplify the process of making web pages presentable.
- CSS is a stylesheet language that is used to describe the presentation of a document written in HTML. It controls the layout, style, and appearance of elements on a web page.
- CSS is made up of selectors and declaration blocks. A selector is used to target HTML elements, and the declaration block contains one or more declarations separated by semicolons.

```
selector {  
  property: value;  
}
```

Element selector:

```
p {  
  color: blue;  
}
```



Back-End Technologies

PHP: PHP is a server-side scripting language designed specifically for web development. Since, PHP code executed on server side so it is called server side scripting language.

PHP is a server-side scripting language that is often used with databases like MySQL. Many content management systems (CMS) like WordPress are built using PHP.

While PHP has been a staple in web development for many years, it's important to note that the landscape is continuously evolving, and developers may choose other languages or frameworks based on specific project requirements and preferences.

C++ It is a general purpose programming language and widely used now a days for competitive programming. It is also used as backend language.

C++ is a versatile language that has been a foundation for many other languages and continues to be an important tool in the software development landscape. Its combination of low-level control and high-level abstractions makes it suitable for a wide range of applications.



Back-End Technologies

Java: Java is one of the most popular and widely used programming language and platform. It is highly scalable. Java components are easily available.

Java is a popular programming language for backend development, and it is known for its platform independence, object-oriented features, and robustness.

When working with Java for backend development, developers often leverage frameworks like Spring Boot for building microservices, RESTful APIs, and modern web applications.

Python: Python is a programming language that lets you work quickly and integrate systems more efficiently.

Python is a versatile and widely-used programming language, and it's commonly employed in backend development

Python's readability, extensive libraries, and frameworks make it a popular choice for backend development, especially in web applications and APIs.

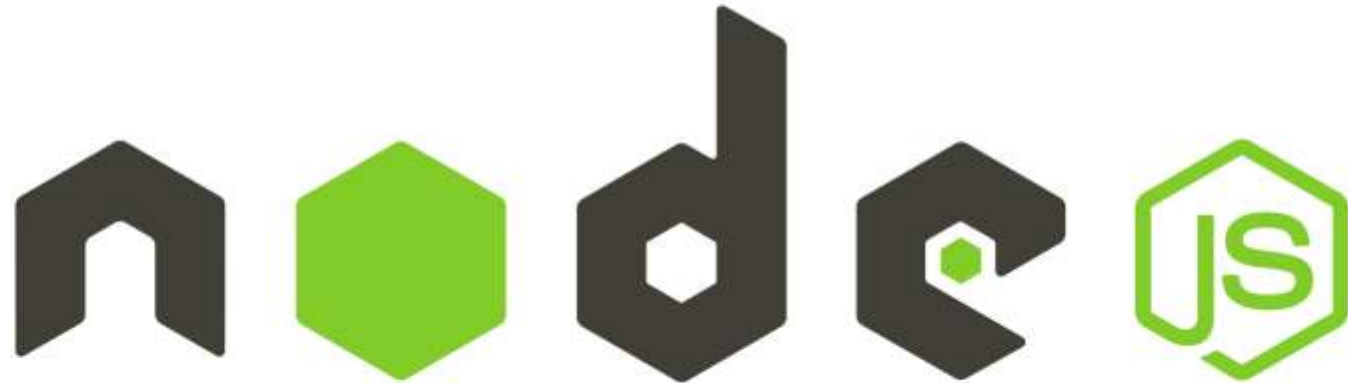


Back-End Technologies

Node.js: Node.js is an open source and cross-platform runtime environment for executing JavaScript code outside of a browser.

You need to remember that NodeJS is not a framework and it's not a programming language.

We often use Node.js for building back-end services like APIs like Web App or Mobile App. It's used in production by large companies such as Paypal, Uber, Netflix, Walmart and so on.

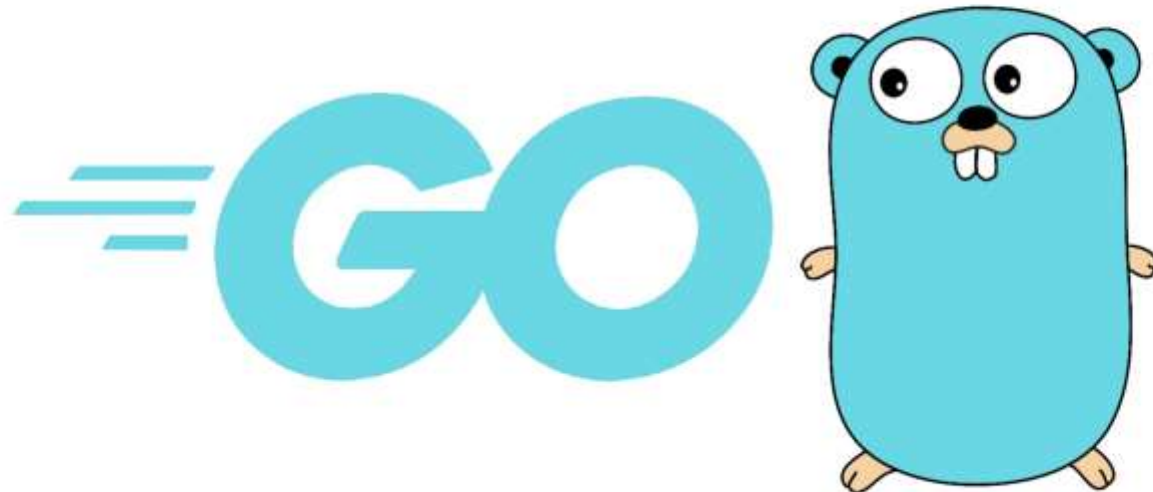


Back-End Technologies

Golang is a procedural and statically typed programming language having the syntax similar to C programming language. Sometimes it is termed as Go Programming Language.

It provides a rich standard library, garbage collection, and dynamic-typing capability.

}
It was developed in 2007 by Robert Griesemer, Rob Pike, and Ken Thompson at Google but launched in 2009 as an open-source programming language and mainly used in Google's production systems. Golang is one of the most trending programming languages among developers.



Back-End Technologies

R is an open-source programming language that is widely used as a statistical software and data analysis tool. R generally comes with the Command-line interface. R is available across widely used platforms like Windows, Linux, and macOS. Also, the R programming language is the latest cutting-edge tool.

R programming language is an implementation of the S programming language. It also combines with lexical scoping semantics inspired by Scheme. Moreover, the project was conceived in 1992, with an initial version released in 1995 and a stable beta version in 2000.



Database

Database: Database is the collection of inter-related data which helps in efficient retrieval, insertion and deletion of data from database and organizes the data in the form of tables, views, schemas, reports etc.



Oracle: Oracle database is the collection of data which is treated as a unit. The purpose of this database is to store and retrieve information related to the query. It is a database server and used to manages information.

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Database

MongoDB: MongoDB, the most popular NoSQL database, is an open source document-oriented database. The term 'NoSQL' means 'non-relational'. It means that MongoDB isn't based on the table-like relational database structure but provides an altogether different mechanism for storage and retrieval of data.



Sql Structured Query Language is a standard Database language which is used to create, maintain and retrieve the relational database.



Database

Relational Databases (RDBMS) and Non-Relational Databases (NoSQL) are two broad categories of database systems, each designed to handle different types of data and use cases. Here are the key differences between the two:

1. Data Structure:

- Relational Databases (RDBMS):
 - Use a structured schema with predefined tables and relationships.
 - Data is organized into rows and columns.
 - Emphasize on maintaining data integrity through ACID (Atomicity, Consistency, Isolation, Durability) properties.
- Non-Relational Databases (NoSQL):
 - Embrace various data models, including document-oriented, key-value, column-family, or graph databases.
 - Structure varies based on the specific NoSQL database type, allowing for more flexibility in handling diverse and unstructured data.



RELATIONAL DATABASE VERSUS NONRELATIONAL DATABASE

RELATIONAL DATABASE	NONRELATIONAL DATABASE
A database based on the relational model of the data, as proposed by E.F. Codd in 1970	A type of database that provides a mechanism for storing and retrieving data that is modeled in a way other than the tabular relations used in relational databases
Also called SQL databases	Also called NoSQL databases
Tables can be joined together	There is no joint concept
Use SQL	Do not use SQL
Cannot be categorized further	Types include key-value, documents, column, and graph databases
Help to achieve complex querying, provide flexibility and help to analyze data	Work well with a large amount of data, reduce latency and improve throughput
Ex: MySQL, SQLite3, and, PostgreSQL	Ex: Cassandra, Hbase, MongoDB, and, Neo4

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Database



2. Use Cases:

- Relational Databases (RDBMS):
 - Best suited for applications with complex relationships and transactions, such as financial systems and traditional business applications.
 - Suitable for situations where data integrity and consistency are critical.
- Non-Relational Databases (NoSQL):
 - Ideal for scenarios with dynamic and rapidly changing data, like content management systems, real-time big data applications, and projects with evolving requirements.
 - Well-suited for scenarios where scalability and flexibility are essential.

3. Examples:

- Relational Databases (RDBMS):
 - MySQL, PostgreSQL, Oracle Database, Microsoft SQL Server.
- Non-Relational Databases (NoSQL):
 - MongoDB (document-oriented), Cassandra (column-family), Redis (key-value), Neo4j (graph).

It's important to note that the choice between a relational and non-relational database depends on the specific needs and characteristics of the application or system being developed. Many modern applications use a combination of both types of databases to address various requirements within the same system.



Thank You