

# Introduction to Full Stack Development

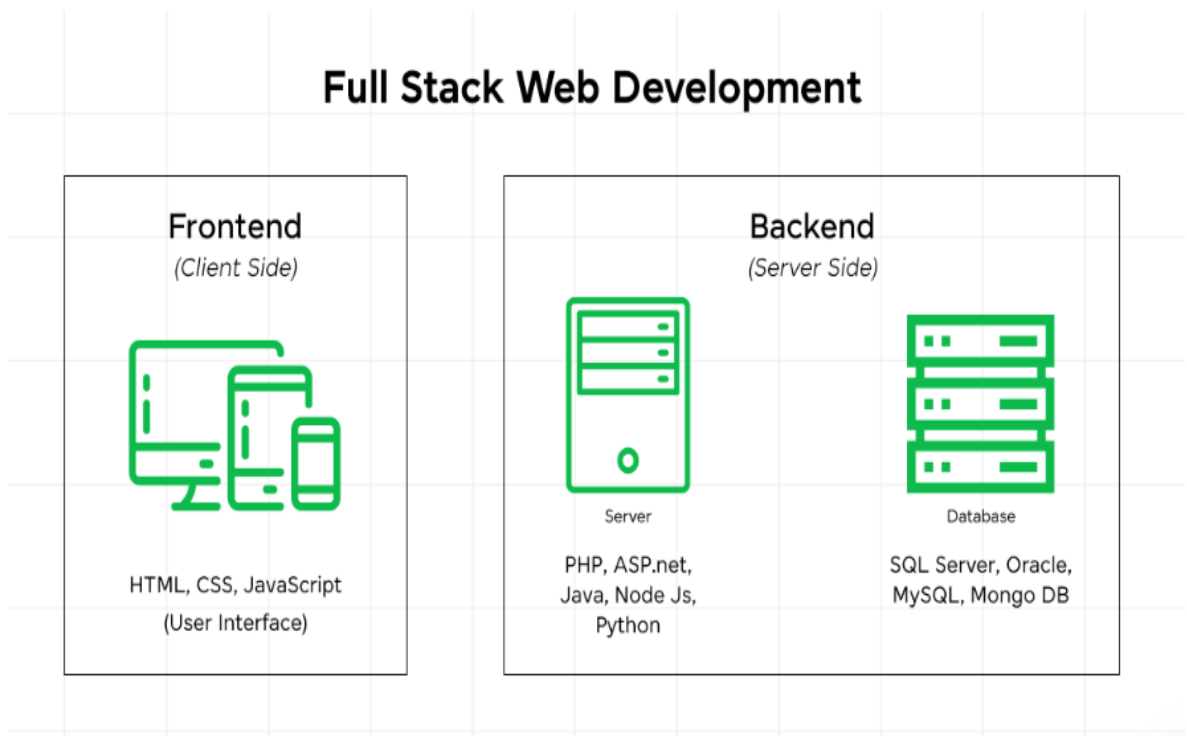
## 1. What is Full Stack Development?

Full Stack Development involves working on both the **frontend** (user interface) and **backend** (server, database, and logic) of a web application. A Full Stack Developer handles the complete development process from UI design to database management.

### Example:

Imagine an online shopping website like **Amazon**:

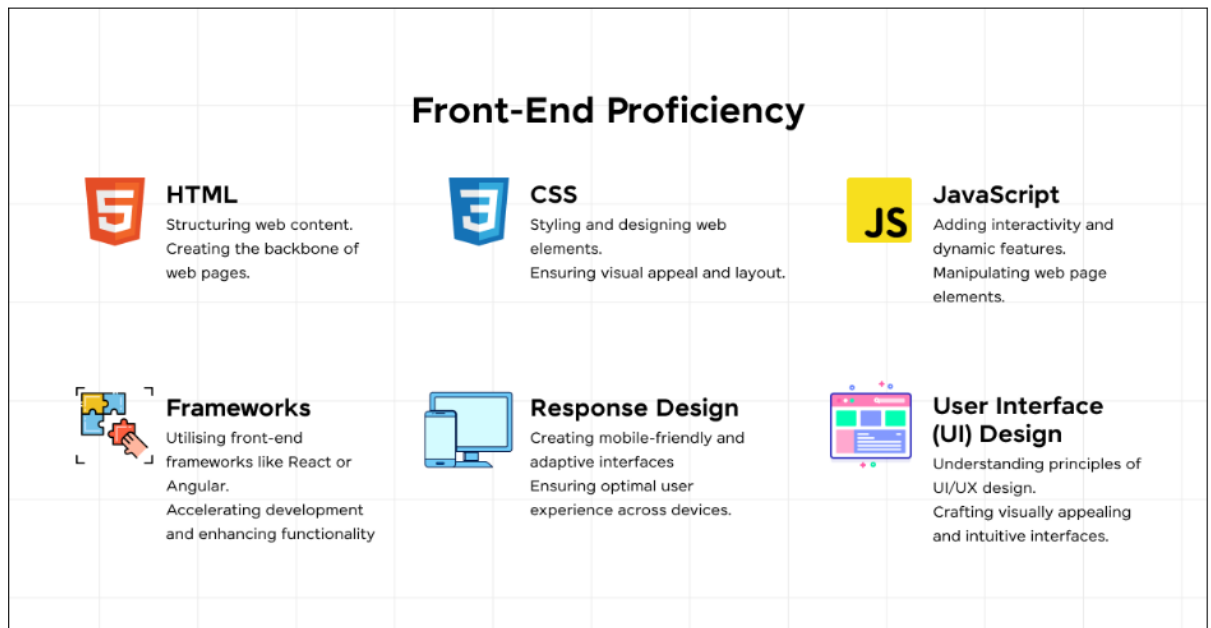
- The **frontend** displays the homepage, product images, buttons, etc.
- The **backend** processes orders, payments, and manages user details.
- The **database** stores product details, user information, and order history.



## 2. Frontend vs Backend vs Database

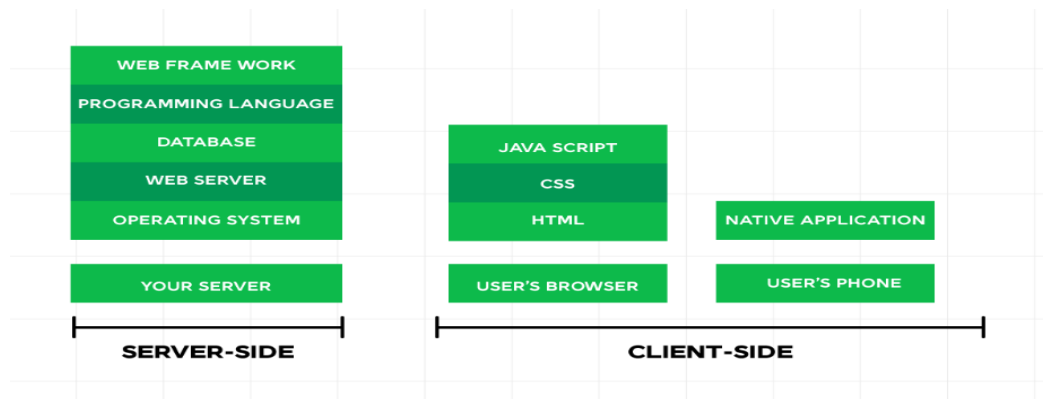
### 1. Frontend (Client-side) – User Interface (UI)

- **Technologies:** HTML, CSS, JavaScript, **React.js**
- **Runs in the browser** and handles design, buttons, forms, and animations.
- **Example:** Clicking a "Buy Now" button adds a product to the cart.



### 2. Backend (Server-side) – Business Logic

- **Technologies:** Python (Flask), Node.js (Express.js)
- **Runs on the server** and processes authentication, payments, and logic.
- **Example:** After clicking "Buy Now," the backend processes the payment and confirms the order.



### 3. Database – Stores & Manages Data

- **Technologies:**
  - **MongoDB (NoSQL)** – Stores data as flexible JSON-like documents.
  - **PostgreSQL/MySQL (SQL)** – Stores data in structured tables with relations.
- **Example:** When you log in, the database retrieves your saved address and past orders.

### 3. Difference Between SQL and NoSQL Databases

Feature	SQL (PostgreSQL, MySQL)	NoSQL (MongoDB)
<b>Data Structure</b>	Structured (tables, rows, columns)	Flexible (JSON-like documents)
<b>Schema</b>	Fixed schema (predefined tables)	Dynamic schema (data can change anytime)
<b>Scalability</b>	Vertical scaling (powerful servers)	Horizontal scaling (distributed across servers)
<b>Best For</b>	Complex queries, transactions, banking	Real-time data, flexible applications, big data
<b>Example Use Case</b>	Banking, e-commerce (Amazon, Flipkart)	Social media, IoT apps (Facebook, Netflix)

#### 💡 In Full Stack Development:

- Use **MongoDB** if you need flexibility (e.g., user-generated content).
- Use **PostgreSQL/MySQL** if you need structured relationships (e.g., banking apps).

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#### 4. Why Full Stack Development is in Demand?

✓ **Faster Development:** Companies prefer developers who can work on both frontend & backend. ✓ **More Job Opportunities:** Full Stack Developers are highly valued in startups and tech companies. ✓ **High Salaries:** Demand for Full Stack skills in **JavaScript (React.js, Node.js) and Python (Flask)** is growing. ✓ **Better Understanding:** Knowing both frontend & backend helps build complete applications.

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#### 5. Docker (Last Topic)

Docker is a tool that helps developers **package applications into containers**, making deployment easier.