

Assignment – 1

MEAN Stack (Detailed Answers)

1. What is Web Development?

Web development refers to the process of creating, designing, deploying, and maintaining websites and web-based applications that are accessed through the internet using web browsers. It combines programming, design, database management, and networking concepts to deliver functional and interactive applications.

The main objective of web development is to provide users with useful information and services in an efficient and secure manner. Modern web applications are dynamic, meaning the content changes based on user interaction and data fetched from servers.

Web development is broadly classified into three categories:

- **Frontend Development:** Focuses on user interface and experience using HTML, CSS, JavaScript, Angular, React, etc.
- **Backend Development:** Focuses on server-side logic, APIs, databases, and security using Node.js, Express, Java, Python, etc.
- **Full Stack Development:** Involves working with both frontend and backend technologies.

Examples of web applications include e-commerce platforms (Amazon), social networking sites (Facebook), online booking systems, and educational portals.

2. Difference between Frontend and Backend with Examples

Frontend Development:

Frontend development deals with the client-side part of a web application, which is visible to users. It focuses on layout, design, navigation, and interactivity. The goal is to provide a smooth and engaging user experience.

Technologies used in frontend development include HTML for structure, CSS for styling, and JavaScript for interactivity. Modern frameworks like Angular, React, and Vue.js are also used to build dynamic interfaces.

Example: Login forms, buttons, dashboards, menus, and animations.

Backend Development:

Backend development handles the server-side operations of a web application. It manages business logic, user authentication, data processing, and communication with databases.

Backend technologies include Node.js with Express, Java with Spring, Python with Django, and databases like MySQL, MongoDB, or PostgreSQL.

Example: Validating user login credentials, storing user data, processing payments, and managing sessions.

Key Differences:

Frontend focuses on user interface, while backend focuses on logic and data management.

3. Client–Server Communication with Neat Diagram

Client–server communication is a model where a client (browser or application) sends requests to a server, and the server processes these requests and returns responses. This communication usually occurs over the HTTP or HTTPS protocol.

Steps involved in client–server communication:

1. The client sends a request (such as login or data fetch).
2. The server receives and processes the request.
3. The server interacts with the database if required.
4. The server sends a response back to the client.

Neat Diagram (Textual Representation):

Client (Browser/Angular App) → HTTP Request → Server (Node.js + Express) → Database (MongoDB)

Client ← HTTP Response ← Server ← Database

This model helps in centralized data management, better security, and scalability.

4. What is MEAN Stack?

MEAN Stack is a popular full-stack JavaScript technology used for developing scalable and efficient web applications. The term MEAN is an acronym formed from the names of four technologies used together.

MongoDB: A NoSQL database that stores data in JSON-like documents.

Express.js: A backend web application framework for Node.js.

Angular: A frontend framework used to build dynamic single-page applications.

Node.js: A runtime environment that allows JavaScript to run on the server.

The MEAN stack allows developers to use JavaScript throughout the application, making development faster and easier.

5. Installation of Angular CLI

Angular CLI (Command Line Interface) is a tool used to create, manage, and build Angular applications. It simplifies development by providing predefined commands and project structure.

Installation command:

```
npm install -g @angular/cli
```

After installation, Angular CLI can be verified using the command: `ng version`.

6. MEAN Architecture Workflow

The MEAN architecture follows a layered approach where each component has a specific role.

Client (Angular): Handles user interface and sends requests.

Server (Node.js + Express): Processes requests and applies business logic.

Database (MongoDB): Stores and retrieves application data.

Workflow Diagram:

Client (Angular) → Server (Express + Node.js) → Database (MongoDB)

This architecture is scalable, efficient, and widely used in modern web applications.