Full-Stack Web Development

Full-Stack viva/interview questions.

General MERN Stack Questions

1. What is the MERN stack?

The MERN stack is a collection of four powerful technologies used to build full-stack web applications. "MERN" is an acronym for:

- **M**ongodb (Database)
- **E**xpress.js (Backend Framework)
- **R**eact.js (Frontend Library)
- **N**ode.js (Server-side Runtime)

These four technologies are all based on JavaScript (or a JavaScript-like syntax), which makes it a popular choice for developers as they only need to be proficient in one language to build an entire application.

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1. How do the components of the MERN stack work together?

- **React.js (Frontend):** This is what the user sees and interacts with in their browser. It sends requests to the backend.
- **Node.js & Express.js (Backend):** This is the server. It receives requests from the React frontend, processes them, and talks to the database. It handles the business logic and provides a RESTful API.
- **MongoDB (Database):** This stores the application's data. The Express.js server communicates with MongoDB to perform CRUD (Create, Read, Update, Delete) operations.

2. How does the frontend communicate with the backend?

The React frontend communicates with the Node.js/Express.js backend using API calls (typically HTTP requests like GET, POST, PUT, and DELETE). The frontend sends a request to a specific backend endpoint, and the backend responds with data, usually in JSON format. Libraries like Axios or the native fetch() API are commonly used in React for this purpose.

3. What is an API and how does it fit into the MERN stack?

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API stands for Application Programming Interface. It's a set of rules that allows different software applications to communicate with each other. In the MERN stack, your Express.js backend provides a RESTful API that serves as the bridge between your React frontend and your MongoDB database. The frontend makes requests to this API to get, send, or update data.

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1. Why use a NoSQL database like MongoDB for a MERN stack application?

MongoDB's document-based model is a natural fit for JavaScript. Since both use JSON (or BSON in MongoDB's case), there's no need to convert data between different formats. This makes development faster and more seamless compared to using a relational database with JavaScript.

2. What is a "full-stack" application?

A full-stack application is one that includes both the frontend (the client-side code that the user interacts with) and the backend (the server-side code that handles data and logic). The MERN stack is considered a full-stack solution because it provides all the necessary components to build a complete, end-to-end application.

Basic HTML Questions

1. **What does HTML stand for?**
    - **Answer:** HTML stands for **HyperText Markup Language**.
2. **What is a tag in HTML?**
    - **Answer:** A tag is a keyword enclosed in angle brackets (<>), like <body> or <p>. Tags are used to create elements and define their purpose.
3. **What is the purpose of the DOCTYPE declaration?**
    - **Answer:** The DOCTYPE declaration tells the browser which version of HTML the page is written in. For HTML5, it's a simple <!DOCTYPE html>.
4. **What is the difference between <head> and <body>?**

- **Answer:** The <head> section contains meta-information about the webpage, like the title and links to CSS files. The <body> contains the visible content of the page, like text, images, and links.

5. **How do you create a hyperlink?**
   - **Answer:** You use the <a> tag with the href attribute, like this: Visit Example.
6. **How do you insert an image?**
   - **Answer:** You use the <img> tag with the src attribute for the image source and the alt attribute for alternative text, like this: <img src="image.jpg" alt="A beautiful landscape">.

Basic CSS Questions

7. **What does CSS stand for?**
   - **Answer:** CSS stands for **Cascading Style Sheets**.
8. **What is the purpose of CSS?**
   - **Answer:** CSS is used to control the **presentation and styling** of a webpage, including colors, fonts, layouts, and animations.
9. **What are the three ways to add CSS to an HTML file?**
   - **Answer:** You can use **inline styles**, an **internal stylesheet** (<style> tag in the <head>), or an **external stylesheet** (<link> tag), which is the most common method.
10. **Explain the CSS Box Model.**
    - **Answer:** The Box Model describes how elements are rendered. It consists of four parts: **content**, **padding** (space inside the border), **border**, and **margin** (space outside the border).
11. **What is the difference between class and id?**

- **Answer:** A **class** is a reusable selector that can be applied to multiple elements, while an **id` is a unique identifier that can be used only once per page.

12. **How do you select an element with a specific class?**
    - **Answer:** You use a dot (.) followed by the class name, like .my-class.

Basic JavaScript Questions

13. **What is JavaScript?**
    - **Answer:** JavaScript is a programming language that adds **interactivity and dynamic behavior** to web pages.
14. **What is a variable?**
    - **Answer:** A variable is a container for storing data. You can declare a variable using var, let, or const.
15. **Explain the difference between var, let, and const.**
    - **Answer:** var is an older way to declare a variable and has function scope. let and const were introduced in ES6 and are block-scoped. const is used for values that should not be reassigned, while let is used for values that may change.
16. **What is the DOM?**
    - **Answer:** The **Document Object Model (DOM)** is a tree-like representation of an HTML page. JavaScript can use the DOM to access and manipulate the content and structure of the page.
17. **How do you handle user events in JavaScript?**
    - **Answer:** You use an **event listener**, such as addEventListener(), to wait for a user action (like a click) and then execute a function in response.
18. **What is an array?**
    - **Answer:** An array is a special variable that can hold more than one value, typically in a list-like structure.

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Basic Node/Express.js Questions

19. **What is Node.js?**
    - **Answer:** Node.js is a **JavaScript runtime environment** that allows you to run JavaScript on the server side, outside of a web browser.
20. **What is Express.js?**
    - **Answer:** Express.js is a **web application framework** for Node.js. It simplifies the creation of web servers and APIs.
21. **What is a "route" in Express.js?**
    - **Answer:** A route is a part of the URL that a server listens for. It defines how an application responds to a client request.

Basic MongoDB Questions

22. **What is MongoDB?**
    - **Answer:** MongoDB is a **NoSQL database** that stores data in flexible, JSON-like documents.
23. **What is the main difference between MongoDB and MySQL?**
    - **Answer:** MongoDB is non-relational and uses **collections of documents**, while MySQL is relational and uses **tables with rows**.

Basic MERN Stack Questions

24. **What do the letters in "MERN" stand for?**
    - **Answer:** MERN stands for **M**ongoDB, **E**xpress.js, **R**eact, and **N**ode.js.
25. **How does the MERN stack handle full-stack communication?**

- **Answer:** The **React** frontend sends API requests to the **Express.js** server, which then interacts with the **MongoDB** database to get or save data.