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50 Backend Interview Q/A

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1. What is a server?

- A server is a computer or system that provides resources, data, services, or programs to other computers, known as clients, over a network.

2. **What is REST?**

- REST (Representational State Transfer) is an architectural style for designing networked applications, relying on stateless, client-server communication.

3. **What is an API?**

- An API (Application Programming Interface) allows different software applications to communicate with each other.

4. **Explain CRUD operations.**

- CRUD stands for Create, Read, Update, Delete—basic operations for interacting with databases.

5. **What is a database?**

- A database is an organized collection of structured information or data, typically stored electronically.

6. **What is SQL?**

- SQL (Structured Query Language) is used for managing and manipulating relational databases.

7. **What is NoSQL?**

- NoSQL databases are non-relational databases designed for large-scale data storage and real-time web applications.

8. **Explain indexing in databases.**

- Indexing improves the speed of data retrieval operations on a database table at the cost of additional storage space.

9. **What is normalization?**

- Normalization is the process of organizing data to reduce redundancy and improve data integrity.

10. **What is ACID in databases?**

- ACID stands for Atomicity, Consistency, Isolation, Durability, ensuring reliable transaction processing.

11. What is a primary key?

- A primary key is a unique identifier for a record in a database table.

12. **What is a foreign key?**

- A foreign key is a field in a database table that creates a link between two tables.

13. **What is ORM?**

- ORM (Object-Relational Mapping) is a technique for converting data between incompatible type systems in object-oriented programming.

14. **What is a microservice?**

- Microservices are a software development technique where an application is composed of small, loosely coupled services.

15. **What is Docker?**

- Docker is a platform for developing, shipping, and running applications in containers.

16. **What is a container?**

- A container is a lightweight, portable, and self-sufficient environment that includes everything needed to run a piece of software.

17. **What is Kubernetes?**

- Kubernetes is an open-source platform for automating the deployment, scaling, and management of containerized applications.

18. **What is load balancing?**

- Load balancing distributes incoming network traffic across multiple servers to ensure no single server is overwhelmed.

19. **What is a reverse proxy?**

- A reverse proxy forwards client requests to backend servers and returns the server's response to the client.

20. **Explain the concept of middleware.**

- Middleware is software that sits between the client and server, handling requests and responses, often used for logging, authentication, etc.

21. What is a web server?

- A web server is software that serves web pages to users in response to their requests.

22. **What is caching?**

- Caching stores copies of files or data in a temporary storage location to reduce data access time.

23. **What is a session?**

- A session is a way to store information (in variables) to be used across multiple pages.

24. **Explain token-based authentication.**

- Token-based authentication involves generating a token that the user sends with each request for access to protected resources.

25. **What is JWT?**

- JWT (JSON Web Token) is an open standard for securely transmitting information between parties as a JSON object.

26. **What is OAuth?**

- OAuth is an open standard for access delegation, commonly used for token-based authentication and authorization.

27. **What is HTTPS?**

- HTTPS (Hypertext Transfer Protocol Secure) is an extension of HTTP for secure communication over a computer network.

28. **What is a firewall?**

- A firewall is a network security system that monitors and controls incoming and outgoing network traffic based on security rules.

29. **What is the purpose of SSL/TLS?**

- SSL/TLS protocols provide secure communication over a computer network by encrypting data in transit.

30. **What is a VPN?**

- A VPN (Virtual Private Network) extends a private network across a public network, allowing secure remote access.

31. What is SQL injection?

- SQL injection is a code injection technique that exploits vulnerabilities in an application's software by inserting malicious SQL statements.

32. **What is XSS?**

- Cross-Site Scripting (XSS) is a security vulnerability that allows attackers to inject malicious scripts into web pages viewed by other users.

33. **What is CSRF?**

- Cross-Site Request Forgery (CSRF) is an attack that forces a user to execute unwanted actions on a web application in which they're authenticated.

34. **What is hashing?**

- Hashing transforms input data into a fixed-size string of characters, which is typically a digest that uniquely identifies the input.

35. **What is encryption?**

- Encryption converts data into a coded form to prevent unauthorized access.

36. **What is a RESTful API?**

- A RESTful API adheres to REST principles and is used to interact with RESTful web services.

37. **What is GraphQL?**

- GraphQL is a query language for APIs and a runtime for executing those queries by using a type system you define for your data.

38. **What is JSON?**

- JSON (JavaScript Object Notation) is a lightweight data interchange format that's easy for humans to read and write and for machines to parse and generate.

39. **What is RPC?**

- RPC (Remote Procedure Call) allows a program to cause a procedure to execute on another address space, often on another physical machine.

40. **What is gRPC?**

- gRPC is a high-performance, open-source framework for making remote procedure calls (RPCs) across machines, with features like authentication, load balancing, and more.

41. What is message queue?

- A message queue is a form of asynchronous service-to-service communication used in serverless and microservices architectures.

42. **What is RabbitMQ?**

- RabbitMQ is an open-source message broker software that facilitates the exchange of messages between different applications.

43. **What is Kafka?**

- Apache Kafka is a distributed event streaming platform capable of handling trillions of events a day, used for building real-time data pipelines and streaming apps.

44. **What is the difference between synchronous and asynchronous operations?**

- Synchronous operations wait for tasks to complete before moving on, while asynchronous operations can move to the next task before the previous one completes.

45. **What is middleware in Express.js?**

- Middleware in Express.js is a function that executes during the lifecycle of a request to the server, performing tasks like logging, authentication, and more.

46. **What is a RESTful endpoint?**

- A RESTful endpoint is a URL at which a RESTful web service accepts requests from clients and provides responses.

47. **What is the MVC architecture?**

- MVC (Model-View-Controller) is a software design pattern for developing web applications, dividing an application into three interconnected components.

48. **What is server-side rendering (SSR)?**

- SSR is the process of rendering web pages on the server and then sending the fully rendered page to the client.

49. **What is a WebSocket?**

- WebSocket is a protocol that provides full-duplex communication channels over a single TCP connection, allowing real-time data transfer.

50. **What is rate limiting?**

- Rate limiting controls the rate at which a user can make requests to a server, preventing abuse and ensuring fair usage.

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1. What is HTML?

- HTML (HyperText Markup Language) structures web content and elements on a webpage.

2. **What is the DOM?**

- The Document Object Model (DOM) is a programming interface for HTML and XML documents, representing the page so programs can change the document structure, style, and content.

3. **What is CSS?**

- CSS (Cascading Style Sheets) describes the presentation of a document written in HTML or XML.

4. **Explain the box model in CSS.**

- The box model includes margins, borders, padding, and the actual content, defining the space an element occupies.

5. **What is Flexbox?**

- Flexbox is a CSS layout model that allows items to align and distribute space within a container efficiently.

6. **What are CSS preprocessors?**

- CSS preprocessors like SASS and LESS extend CSS with variables, nested rules, and functions.

7. **What is JavaScript?**

- JavaScript is a programming language for creating dynamic web content, such as interactive forms and animations.

8. **Explain event delegation.**

- Event delegation involves attaching a single event listener to a parent element to manage events for multiple child elements.

9. **What is AJAX?**

- AJAX (Asynchronous JavaScript and XML) enables web pages to update asynchronously by exchanging data with a server behind the scenes.

10. **What is React?**

- React is a JavaScript library for building user interfaces, focusing on component-based architecture and state management.

11. What is JSX?

- JSX is a syntax extension for JavaScript, used in React to describe UI elements.

12. **Explain virtual DOM.**

- The virtual DOM is a lightweight copy of the actual DOM, used by React to optimize updates and rendering.

13. **What are hooks in React?**

- Hooks are functions that let you use state and lifecycle features in functional components.

14. **What is Redux?**

- Redux is a state management library for JavaScript applications, centralizing the application state in a single store.

15. **What is the difference between props and state in React?**

- Props are read-only data passed from parent to child components, while state is mutable data managed within a component.

16. **What is Angular?**

- Angular is a platform and framework for building single-page client applications using HTML and TypeScript.

17. **What are directives in Angular?**

- Directives are special markers in the DOM that tell Angular to extend HTML with new behavior.

18. **Explain data binding in Angular.**

- Data binding in Angular synchronizes data between the model and the view, using one-way and two-way binding techniques.

19. **What is Vue.js?**

- Vue.js is a progressive JavaScript framework for building user interfaces and single-page applications.

20. **What is the Vue instance?**

- The Vue instance is the root of a Vue application, controlling the lifecycle of the Vue app.

21. What are single-file components in Vue.js?

- Single-file components encapsulate HTML, CSS, and JavaScript in a single **.vue** file.

22. **Explain the lifecycle hooks in Vue.js.**

- Lifecycle hooks are methods that run at specific stages of a Vue component's lifecycle, such as **created**, **mounted**, and **destroyed**.

23. **What is TypeScript?**

- TypeScript is a superset of JavaScript that adds static types, enhancing code quality and developer productivity.

24. **What are the benefits of using TypeScript?**

- Benefits include improved code readability, early error detection, and better tooling support.

25. **What is Webpack?**

- Webpack is a module bundler for JavaScript applications, transforming and packaging code for deployment.

26. **Explain lazy loading.**

- Lazy loading delays loading of non-critical resources until they are needed, improving initial load time.

27. **What are service workers?**

- Service workers are scripts that run in the background, enabling offline capabilities and background syncing.

28. **What is Progressive Web App (PWA)?**

- PWAs are web applications that provide native app-like experiences, including offline access and push notifications.

29. **What is responsive design?**

- Responsive design ensures web content adapts to different screen sizes and orientations for optimal viewing on any device.

30. **What is a media query**

- Media queries are CSS techniques used to apply styles based on device characteristics, such as screen width.

31. What is a CSS grid?

- CSS Grid Layout is a two-dimensional layout system for the web, allowing designers to create complex layouts more easily.

32. **Explain the difference between == and === in JavaScript.**

- **==** checks for equality with type coercion, while **===** checks for equality without type coercion.

33. **What is a closure in JavaScript?**

- A closure is a function that retains access to its lexical scope, even when called outside that scope.

34. **What is the this keyword in JavaScript?**

- The **this** keyword refers to the context in which a function is called, which can vary based on how the function is invoked.

35. **What is the event loop in JavaScript?**

- The event loop is a mechanism that handles asynchronous operations by executing callbacks in the queue when the call stack is empty.

36. **Explain async and await in JavaScript.**

- **async** and **await** simplify working with promises, allowing asynchronous code to be written in a synchronous style.

37. **What is Cross-Origin Resource Sharing (CORS)?**

- CORS is a security feature that allows or restricts resources on a web page requested from another domain.

38. **What is a REST API?**

- REST API is an architectural style for designing networked applications, using HTTP requests to perform CRUD operations.

39. **What is GraphQL?**

- GraphQL is a query language for APIs, enabling clients to request specific data and aggregate responses in a single request.

40. **What is the difference between localStorage and sessionStorage?**

- **localStorage** persists data indefinitely until explicitly deleted, while **sessionStorage** persists data only for the duration of the page session.

41 .What is JSON?

- JSON (JavaScript Object Notation) is a lightweight data-interchange format that is easy to read and write for humans and machines.

42. **What is an IIFE in JavaScript?**

- An Immediately Invoked Function Expression (IIFE) is a function that runs as soon as it is defined, often used to avoid polluting the global scope.

43. **What is the Shadow DOM?**

- The Shadow DOM encapsulates a part of the DOM tree, allowing for scoped styling and behavior.

44. **What is a CSS transition?**

- CSS transitions provide a way to control the speed of changes to CSS properties, enabling smooth animations.

45. **What is a polyfill?**

- A polyfill is code that provides modern functionality on older browsers that do not natively support it.

46. **What is BEM in CSS?**

- BEM (Block Element Modifier) is a naming convention for CSS classes, aiming to make CSS more maintainable and scalable.

47. **What is a CSS variable?**

- CSS variables, or custom properties, are entities defined by CSS authors that contain specific values to be reused throughout the document.

48. **What is a higher-order component (HOC) in React?**

- An HOC is a function that takes a component and returns a new component, adding additional functionality.

49. **What is memoization?**

- Memoization is an optimization technique where the results of expensive function calls are cached, improving performance.

50. **What is the difference between let and const in JavaScript?**

- **let** allows variable reassignment, while **const** declares constants whose values cannot be reassigned.