Webops

AND BLOCKCHAIN

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Let's get started
WEBOPS

TECHNICAL QUESTIONNAIRE

1.What is asynchronous JavaScript? How is it different from synchronous JavaScript?

Asynchronous JavaScript

Asynchronous JavaScript is a programming method where operations run independently, allowing the program to continue running while waiting for certain tasks to complete.

It is non-blocking, which means it sends multiple requests to a server at the same time and does not wait for each request to be answered before moving on to the next.

Asynchronous JavaScript is multi-threaded, which means operations can run in parallel, increasing throughput and enhancing the user experience by decreasing lag time between function calls.

When the asynchronous operation finishes, a callback function is typically invoked to handle the result.

Eg,.   OUTPUT

console.log('Start');   Start

setTimeout(() => {   End

console.log('Inside setTimeout');   Inside setTimeout //This will be printed after 2sec

}, 2000);

console.log('End');

Synchronous JavaScript

Synchronous means the code runs in a particular sequence of instructions given in the program. Each instruction waits for the previous instruction to complete its execution.

In synchronous JavaScript, if an operation takes a long time to complete (such as fetching data from a server), it can cause the entire program to become unresponsive until that operation finishes.

It is single-threaded, meaning only one operation or program will run at a time, and it is blocking, which means it sends only one request to a server at a time and waits for that

request to be answered before moving on to the next iteration.

Eg.,   OUTPUT

console.log('First');   First

console.log('Second');   Second

console.log('Third');   Third

The key difference between asynchronous and synchronous JavaScript lies in how they handle the flow of execution: asynchronous JavaScript allows operations to be executed concurrently, while synchronous JavaScript executes operations sequentially, one after the other.

2.What is an API? Explain in brief how it works and how you will create an API with technical details.

What is an API?

API stands for Application Programming Interface. The application can be any software that performs a specific task and the interface is a point where two applications communicate.

One application act as a client and the other acts as a server. A client asks for some resource, say for example a photo, and the server sends that photo to the client.

The client here can be your mobile phone, desktop or laptop computer, or any device you use to surf the internet. And the server is a bigger computer that stores the data you want (a photo in our case).

There are three main types of APIs, which are:

1.Private

2.Public

3.External

How do APIs work?

APIs facilitate communication between different software systems by allowing them to send requests and receive responses. Here's a simplified summary of how they work:

1. Client Initiation: An API client, such as a user or another application, sends a request to the API server.

2. Request Components: The request includes an endpoint (URL), method (like GET or POST), parameters (data to be processed), headers (additional details), and sometimes a request body (more data).

3. Server Processing: The API server receives the request, performs necessary actions like authentication and data retrieval, and prepares a response.

4. Response Components: The server sends back a response with a status code (success or error), response headers (additional details), and a response body (requested data or error message).

To create an API

1. Define the purpose and goals of your API: Understand why you are creating the API and what you hope to accomplish with it.

2. Choose an appropriate web service protocol: Select the protocol that is best suited to your specific needs.

3. Design the structure and format of your API: Define the endpoints, data formats, and methods that your API will support.

4. Implement authentication and authorization: Secure your API by implementing authentication and authorization mechanisms.

5. Develop and test your API: Write the code that will handle requests and responses, and thoroughly test your API to ensure it is reliable and performs as expected.

6. Provide comprehensive documentation: Create documentation that describes how the API works and how to use it, including details about the endpoints, data formats, authentication methods, and other technical details.

7. Monitor and maintain your API: Once your API is live, ensure that it is performing as expected and make any necessary updates or improvements.

3.What is the difference between a library and a framework? Is React a library or a framework?

Library

a. In a library, you have the inversion of control. Your code drives the control flow, and you decide when to call the library functions.

b. Libraries offer more flexibility because you can choose which parts of the library to use and how to integrate them into your application.

c. You control the flow of your application. You use libraries by calling their functions or methods where and when you need them. The library doesn't dictate the overall structure or flow of your application.

d. Libraries are typically smaller in scope and focus on specific tasks or functionalities. They are designed to be reusable across different projects.

Eg,. React, Axios (for making HTTP requests)

Framework

a. In a framework, the control is inverted. The framework dictates the flow of control, and your code plugs into predefined points or interfaces provided by the framework. Your code is called by the framework when needed.

b. Frameworks provide a more structured approach, which can be beneficial for larger projects but may be less flexible as you're bound by the framework's conventions and patterns.

c. The framework controls the flow of your application. Your code is called by the framework, often following certain predefined patterns or conventions. Frameworks typically provide a skeleton or architecture for your application, and you fill in the details.

d. Frameworks are larger in scope and provide a comprehensive structure for building applications. They often include multiple libraries and tools for various aspects of development.

Eg,. Angular, Django and Express

React

React is commonly referred to as a library rather than a framework. It provides a way to build user interfaces through components, but it doesn't dictate the overall structure or flow of your application. With React, you have more flexibility and control over how you integrate it into your application and how you manage the application's state and data flow. Therefore, React is typically categorized as a library for building user interfaces in JavaScript applications.

4.List some databases that are currently being used. Explain the advantages and disadvantages of each.

MySQL

MySQL is one of the most popular databases for web-based applications. It's freeware, but it is frequently updated with features and security improvements.

This database engine allows you to select from a variety of storage engines that enable you to change the functionality of the tool and handle data from different table types. It also has an easy to use interface, and batch commands let you process enormous amounts of data.

Advantages

- It's available for free.
- It offers a lot of functionality even for a free database engine.
- There are a variety of user interfaces that can be implemented.
- It can be made to work with other databases, including DB2 and Oracle.
- It supports structured data (SQL) as well as semi-structured data (JSON).

Disadvantages

- You may spend a lot of time and effort to get MySQL to do things that other systems do automatically, like create incremental backups.
- There is no built-in support for XML or OLAP.
- Support is available for the free version, but you'll need to pay for it.

PostgreSQL

PostgreSQL is one of several free popular databases, and it is frequently used for web databases. It was one of the first database management systems to be developed, and it allows users to manage both structured and unstructured data. It can also be used on most

major platforms, including Linux-based ones, and it's fairly simple to import information from other database types using the tool.

Advantages

- This database management engine is scalable and can handle terabytes of data.
- It supports JSON.
- There are a variety of predefined functions.
- A number of interfaces are available.
- It is a multi-model database supporting Spatial Data, Key-Value, Structured Data (SQL), and Semi-Structured Data (JSON, XML).

Disadvantages

- Configuration can be confusing.
- Speed may suffer during large bulk operations or read queries.
- Requires more resources compared to other databases

MongoDB

MongoDB is designed for applications that use both structured and unstructured data. The database engine is very versatile, and it works by connecting databases to applications via MongoDB database drivers. There is a comprehensive selection of drivers available, so it's easy to find a driver that will work with the programming language being used.

Advantages

- It's fast and easy to use.
- The engine supports JSON and other NoSQL documents.
- Data of any structure can be stored and accessed quickly and easily.
- Schema can be written without downtime.

Disadvantages

- SQL is not used as a query language.
- Tools to translate SQL to MongoDB queries are available, but they add an extra step to using the engine.
- Setup can be a lengthy process.
- Default settings are not secure.

Microsoft SQL server

Microsoft SQL server database management engine works on cloud-based servers as well as local servers, and it can be set up to work on both at the same time.

The last version is the most Azure-ready version of SQL Server yet published and offers further innovations in security, performance, and availability.

Advantages

- It is very fast and stable.
- The engine offers the ability to adjust and track performance levels, which can reduce resource use.
- You are able to access visualizations on mobile devices.
- It works very well with other Microsoft products.
- It is a multi-Model database supporting Spatial Data, Structured Data (SQL), and Semi-Structured Data(JSON)

Disadvantages

- Enterprise pricing may be beyond what many organizations can afford.
- Even with performance tuning, Microsoft SQL Server can gobble resources.
- Many individuals have issues using the SQL Server Integration Services to import files.

5. What are the advantages and disadvantages of using custom styles over existing styling frameworks? Which one do you prefer among the two?

Advantages of Custom Styles:

1. Tailored to Needs: Custom styles allow for precise control over the styling of elements, ensuring they match the specific design requirements of the project.

2. Optimized Performance: Since only necessary styles are included, custom styles can result in leaner CSS files, which can lead to better performance compared to including an entire styling framework.

3. Learning Experience: Creating custom styles provides an opportunity for developers to deepen their understanding of CSS and improve their skills.

4. Unique Look: Custom styles offer the possibility of creating a unique look and feel for a website or application that may not be achievable with pre-built frameworks.

Disadvantages of Custom Styles:

1. Time-consuming: Developing custom styles can be time-consuming, especially for

complex designs, as it involves writing CSS from scratch.

2. Maintenance Overhead: Custom styles require ongoing maintenance to ensure consistency and compatibility across different browsers and devices.

3. Compatibility Challenges: Ensuring compatibility with various browsers and devices can be challenging when using custom styles, as it may require extensive testing and debugging.

4. Reinventing the Wheel: Custom styles may replicate functionality and features already available in existing frameworks, leading to unnecessary work.

Advantages of Existing Styling Frameworks:

1. Rapid Development: Styling frameworks provide pre-built components and stylesheets that can significantly speed up the development process by eliminating the need to write CSS from scratch.

2. Consistency: Frameworks often come with a set of predefined styles and components, ensuring consistency in design across different parts of the project.

3. Community Support: Popular styling frameworks have large communities of developers who contribute to their development, provide support, and share resources such as tutorials and plugins.

4. Cross-browser Compatibility: Frameworks are often tested across multiple browsers and devices, ensuring better cross-browser compatibility out of the box.

Disadvantages of Existing Styling Frameworks:

1. Overhead: Including an entire styling framework can result in bloated CSS files, leading to longer load times and potentially impacting performance.

2. Limited Customization: While frameworks offer a wide range of pre-built styles and components, customization options may be limited, making it challenging to achieve a unique design.

3. Learning Curve: Developers may need to invest time in learning how to use a particular framework effectively, especially if they are not familiar with its conventions and practices.

4. Dependency: Relying on a third-party framework introduces a dependency that may complicate maintenance and updates, especially if the framework undergoes significant changes or becomes obsolete.

As for my preference, it really depends on the project requirements. For rapid prototyping or projects with tight deadlines, I might opt for an existing styling framework to speed up development. However, for projects that require a highly customized design or have specific performance considerations, I might lean towards creating custom styles to have more control over the output and optimize performance.

6. Which project do you want to join? Why do you want to join this project specifically? What is your approach for solving this problem statement? What all tech stacks will you utilize for this project? What challenges will we be facing during the entire project and how would you solve them? Explain everything in detail.

I'm willing to join "TradeCraft" project.

Why I want to join this project: TradeCraft - Paper trading and Predictive Trading Platform

- I always dreamt of working in an organization like this. This project is not only about web development . It is a mix of web development and artificial intelligence. So being part of this fantastic project would be a great learning experience.
- Also this projects blends technology with financial market and additionally, working on a project that addresses real-life situations is incredibly exciting.
- Most important reason of joining this project is because I love coding. After JEE, the thing that fascinated me more was coding.
- As this project creates a tool that simplifies stock market trading and provides educational values, if feel that this project would have a positive impact on our lives.
- Also the experience of working on a project along with Nirmaan is a fantastic experience which make our project more special.

Approach for solving this problem statement

- I want the application to be as far as user friendly so that all type of people can access and train in it.
- I will try to create a basic web page with html css and js. Then use API for integration of real-time stock data.
- Also can use chart.js to implement it in graphs.
- I would try to also implement the AI model for the paper trading functionality.
- I would try to ensure that the predictive models develop provide accurate and reliable predictions.

All the tech stacks that can be used

- HTML
- CSS
- JAVASCRIPT
- React

- WebSockets for real-time data updates
- NumPy
- Pandas
- Matplotlib
- PyTorch

Challenges and their solutions

- The most important thing is the accuracy of the predictive model. We can use PyTorch to train and develop the predictive model on very large data sets.
- The paper trading platform must be user friendly. As people of all age groups might want to learn trading and it should be uniform for all ages. So with the help good UI design and some innovative feature we can make it user friendly.
- Also in future when we bring it to the real market after Nirmaan we would need to ensure data privacy of our customers. We can use HTTPs and data encryption for it.

PROJECT 2 AND 3

1.https://github.com/Abijith27UK/Trading_StockPrice.git

Abijith27UK/
Trading_StockPrice

| 1 Contributor | 0 Issues | 0 Stars | 0 Forks |
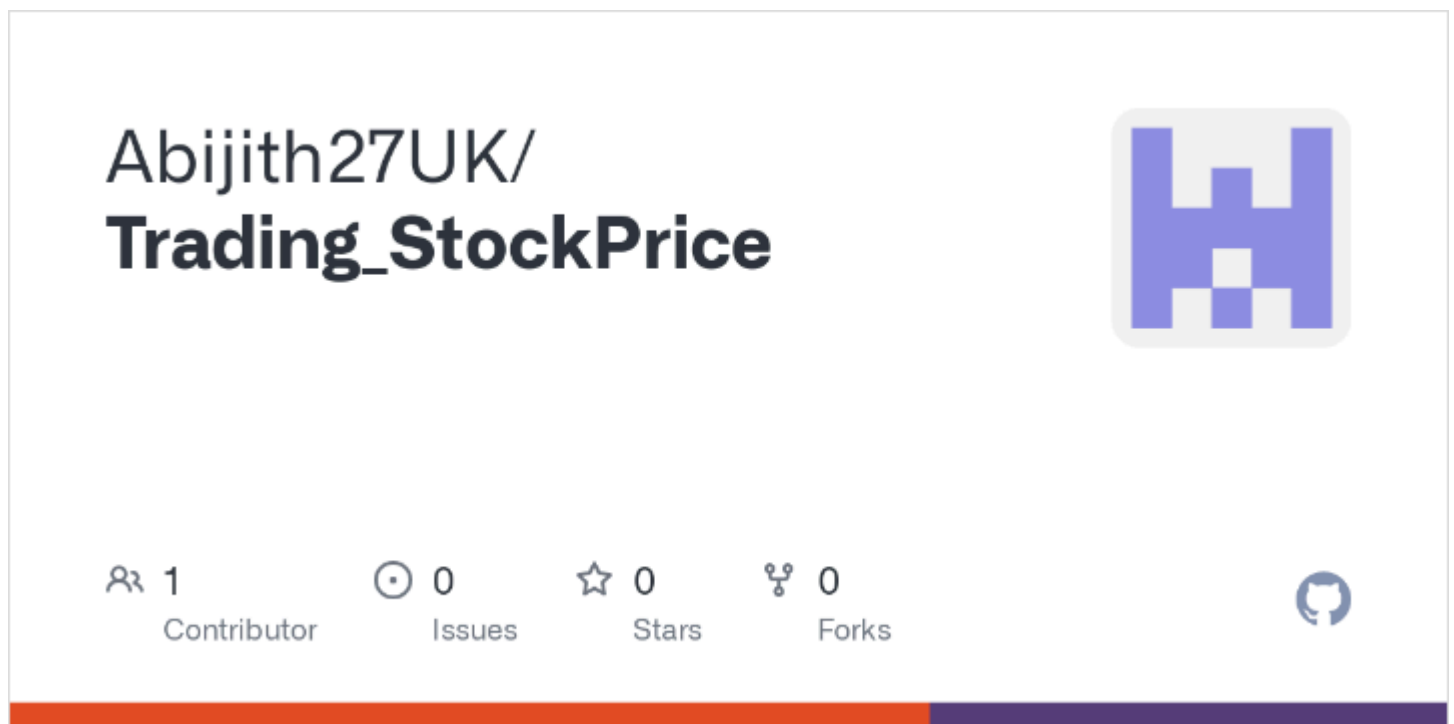
2.

   a. Numpy- It is a python library used for handling data with the help of mathematical functions like arrays, matrices, etc. It would be very useful in creating the model as we can use numpy to normalize the data and also ensuring data is in suitable format.
   b. Pandas- It is a python library and the best tool used for analyzing, exploring, cleaning and manipulating data. We can use this to prepare the dataset for creating the prediction model.
   c. Matplotlib-It is a python library and it is a low level level graph plotting library that serves as a visualization utility. For our project we need would require to express stocks in the form of graphs.
   d. Django- It is backend server side web framework which makes us build webpages using python. It is very useful for database driven websites. As our project is also about trading which is more related to tonnes of historic data of stock trading.
   e. Pytorch- It is an open source machine learning library used for developing and training ML models. It is based on python and it resides inside the torch module. We can use this platform to train our model.

   I have little experience in python as I attended summerschool for AI conducted by IITM along with my sibling who is in college. So I had little exposure on that AI and ML side of coding. Also 12th NCERT had python.

   For the integration of the Webpage and predictive algorithms I plan to use React for the frontend and use python(like django) for the backend. Also as we need to show the updates of stock in the paper trading web application I would prefer using WebSockets so that we can have proper real-time data handling. Also need to use API to get the information from the stock websites to know about the stock prices and would use the data to process on the predictive model.