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**Advanced Database**

Hosted to:

https://keanu999.herokuapp.com

Code available to GitHub: https://github.com/Keanu999/ADVDB/

The MERN Stack is a JavaScript stack that may be used to create full-stack apps. It's built using some of the most cutting-edge web technologies available today. The stack is named after the first of the four technologies: MongoDB, Express, React, and Node.js.

MongoDB is a cross-platform Document Oriented database that runs on NoSQL. Because of the numerous and powerful capabilities it provides, it is one of the most widely used databases today. When compared to relational databases (such as MySql), it is also relatively simple to use; in fact, it allows you to use unstructured data, which means you don't need to construct a schema before adding data to the database. This makes creating and updating the database a lot easier, faster, and without any downtime or service interruptions. Another reason MongoDB and non-relational databases are so popular is because of their built-in scaling capabilities, which allow you to extend horizontally without having to acquire larger, more expensive servers (scaling Vertically).

Express.js, a server-side framework that runs inside the Node.js server, is the next technology employed by the MERN stack. Express is a lightweight framework for building backends that handle HTTP requests and responses. It can be thought of as a bridge between the front end and the database. In reality, by making GET, POST, PUT, and DELETE requests from the front, Express can turn those functions into Node.js drivers that can access the database and return a result that fulfils the front-end promise.

React.js is a Facebook-owned JavaScript library that serves as a framework for developing dynamic client-side apps. The key benefit is that React will update and render only the components that have been modified, rather than the entire application. React is much faster and more dependable as a result of this factor. Furthermore, the React principle is to separate the code into as few parts as possible to make it easier to manage, update, and reuse. Components are code pieces that can manage their own state, allowing them to store and utilise data directly within the component. However, for this project, I chose Redux, which enables for the creation of a global state that can be accessed by all components via reducers, ensuring that when data in one component changes, all of the other components have access to the new data. React is highly scalable, similar to MongoDB and Express.js, making it ideal for any project.

Finally, the MERN Stack employs Node.js, a Javascript Runtime based on the V8 JavaScript engine (the same one used by Google Chrome) that allows users to use Javascript on the machine rather than in the browser. It's written in C++, a powerful and speedy low-level programming language. Allows Javascript to be used as a server-side language. Because it is event driven and runs on a single thread with non-blocking I/O requests, Node is a suitable choice because it is quick, efficient, and highly scalable. So, unlike MultiThread languages like PHP, Node does not have to wait for the first process to finish before initiating a new one.

Because of Node's asynchronous nature, it can accommodate tens of thousands of concurrent connections. It is also well-liked in the business since it enables for the usage of the same language in both the front end and the back end. Node works with everything that doesn't require a lot of CPU power (such CPU calculations), therefore it's ideal for REST API and Microservices, Real-Time Services (like Chat apps), and CRUD Apps (like Blogs, Shopping Carts, Social Networks).

The goal of this project is to establish a full-stack e-commerce website that the owner can maintain without the help of a professional developer. The project will need some really powerful features in order to perform as well as today's most popular websites. As a result, the MERN stack is well-suited to this type of online application. E-commerce will be able to use a Cart system to keep track of all products and store their values in the state using redux reducer methods. In addition, the web app will require a login system that can trace each customer's order (thanks to web tokens that allow the customer to be authenticated to the web app). In addition, the web app will require a login system that can keep track of each customer's order (thanks to web tokens that allow to authenticate the customer to their account). It will also conduct a variety of CRUD actions on the database's data, such as creating or editing an existing user or product, or changing the status of a delivery in MongoDB's order collection.

The database is composed by 3 collections: Orders, Users, Products. Each one with a specific schema defined.

Because of the technology used, the application is both highly scalable and secure. SQL Injections aren't a problem because it doesn't use relational databases. It also saves the most critical data in a.env file that isn't uploaded to GitHub, but the variables have been added into heroku's env variables. As a result, the software is safe. It also allows "admin users" to make changes to product and user databases via a dedicated Screen page, as well as mark an order as delivered and notify the consumer of the delivery date. When we log in with an admin user, we have access to the Settings section of the programme, which allows us to edit the user and user settings. [(test@gmail.com,](mailto:(test@gmail.com,%20)  test ). Once at the product screen, there will be  the option to remove or alter the product, as well as create a new one from scratch. This enables the owner to make modifications without the assistance of a professional.

Even though it is working, the website is not yet complete. It can be enhanced. In fact, it might have a search bar that searches for specific products, as well as a Stripe API that allows for alternative payment methods (like Apple Pay and Google Pay). There may be a filter in place that only allows persons who have actually purchased an item to leave a review. However, it is a highly full MERN Stack web App that maintains complex data for the most part

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