

School of Computer Science Engineering and Information Systems

Winter Semester –2023-24

B. Tech IT – Capstone Project

2nd Review

Register Number	20BIT0262
Student Name	Eshan Gupta
Project Domain (Capstone Project)	Web Development using NextJS
Project Title (Capstone Project)	DevOverFlow - An Advanced Q&A Platform with AI Integration
Project Guide Name	Dr. Suganya P
Project Reviewers	Prof. Brindha K, Prof. Balaganesh N
Date of Review-2	04.04.2024/5.04.2024

1. Proposed Methodology & Architecture

DevOverFlow adopts a robust architecture built on NextJS version 13.5, MongoDB, and other cutting-edge technologies to ensure scalability, performance, and maintainability. The architecture comprises several components, each contributing to the overall functionality and efficiency of the platform.

- i. Frontend Layer: The presentation layer is developed using NextJS, incorporating React components for dynamic user interfaces. Tailwind CSS is utilized for responsive styling, ensuring optimal user experience across devices.
- ii. Backend Infrastructure: The backend consists of API routes, server-side form validation, and authentication mechanisms implemented using NextJS.

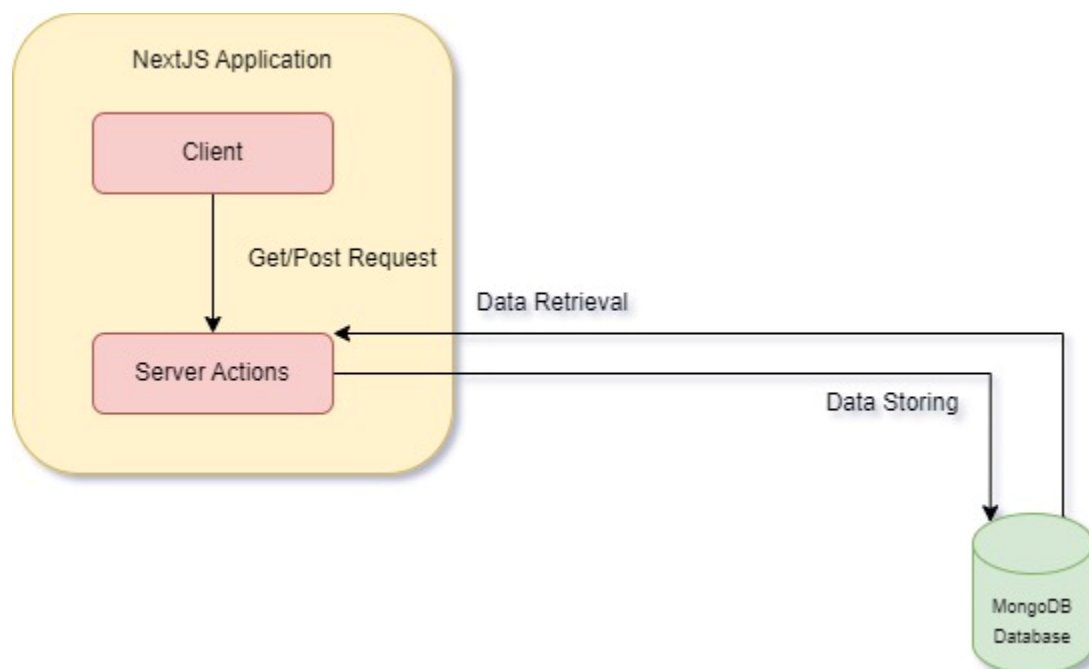
MongoDB serves as the database management system, facilitating efficient data storage, retrieval, and manipulation.

- iii. AI-Powered Text Generation: OpenAI technology is integrated into the platform to generate instant and accurate answers to user queries. Natural language processing (NLP) techniques are employed to analyze and interpret user input, generating relevant responses in real-time.
- iv. Recommendation System: Classic algorithms are utilized to develop a robust recommendation system, suggesting relevant questions, answers, and resources based on user preferences and browsing history.
- v. Authentication and Access Control: A comprehensive authentication system manages user accounts, permissions, and access control, ensuring secure interactions and protecting user data from unauthorized access. I will be using clerk auth service for establishing the authentication and the users data from the site will also be saved in MongoDB for the purpose of data privacy.
- vi. Responsive Design and Performance Optimization: The platform is designed to be fully responsive, adapting seamlessly to various screen sizes and resolutions. Strategies such as server-side rendering (SSR), incremental static regeneration (ISR), and client-side rendering (CSR) are employed to optimize performance and minimize latency.

2. Complete Design and Module Wise Description

-> Figma Design Link-: [Link](#)

-> Data flow Diagram-:



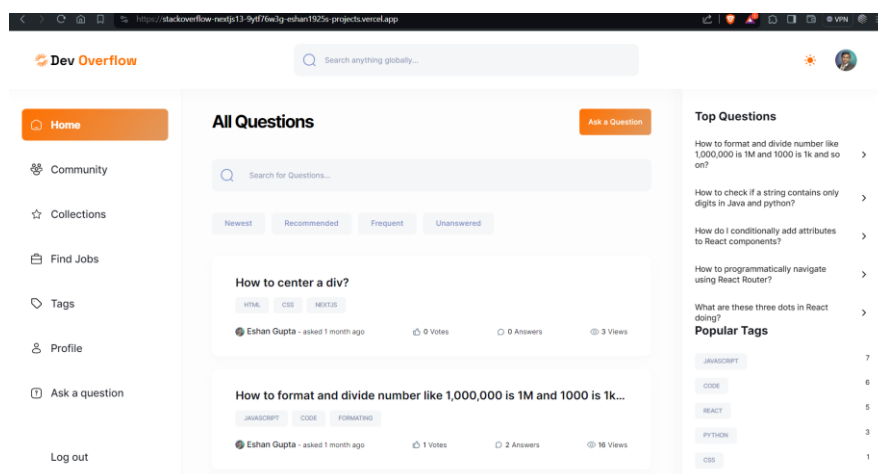
Module Description:-

Let's elaborate on the breakdown of the website's modules:

i. Home Page:

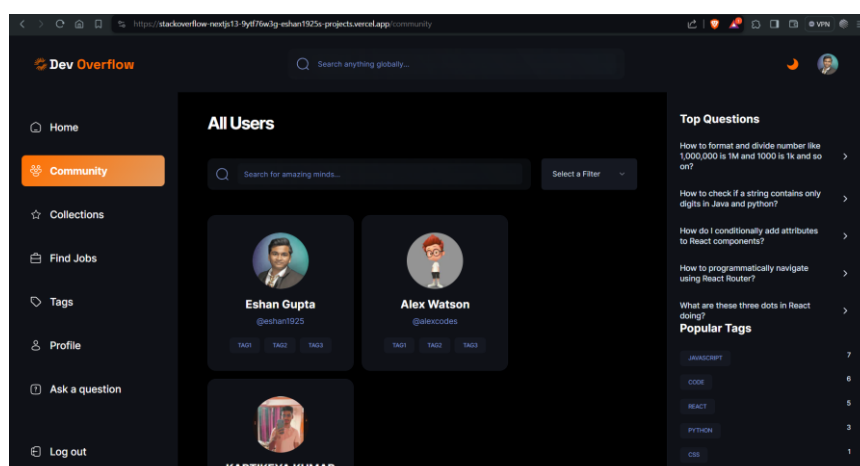
- Upon opening the deployed website, users encounter the Home Page, comprising three key components:

1. A section displaying all questions for user perusal.
2. A Local Search bar enabling users to search for specific questions and apply predefined filters such as Newest, Recommended, Frequent, and Unanswered.
3. A right-side bar showcasing the latest trending questions and hashtags, facilitating easy navigation to relevant content for user engagement.



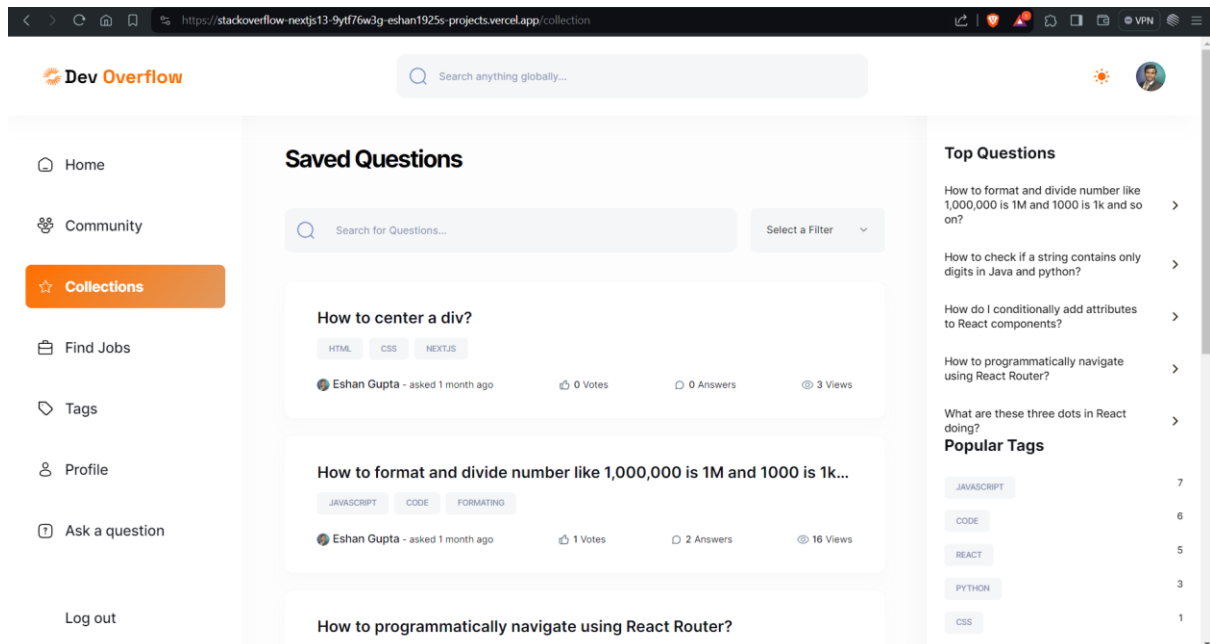
ii. Community Page:

- The Community Page showcases all website users, highlighting their most-used hashtags along with their usernames and profile pictures. Users can navigate to individual profiles by clicking on them, or utilize the search bar to find specific users by name or username.



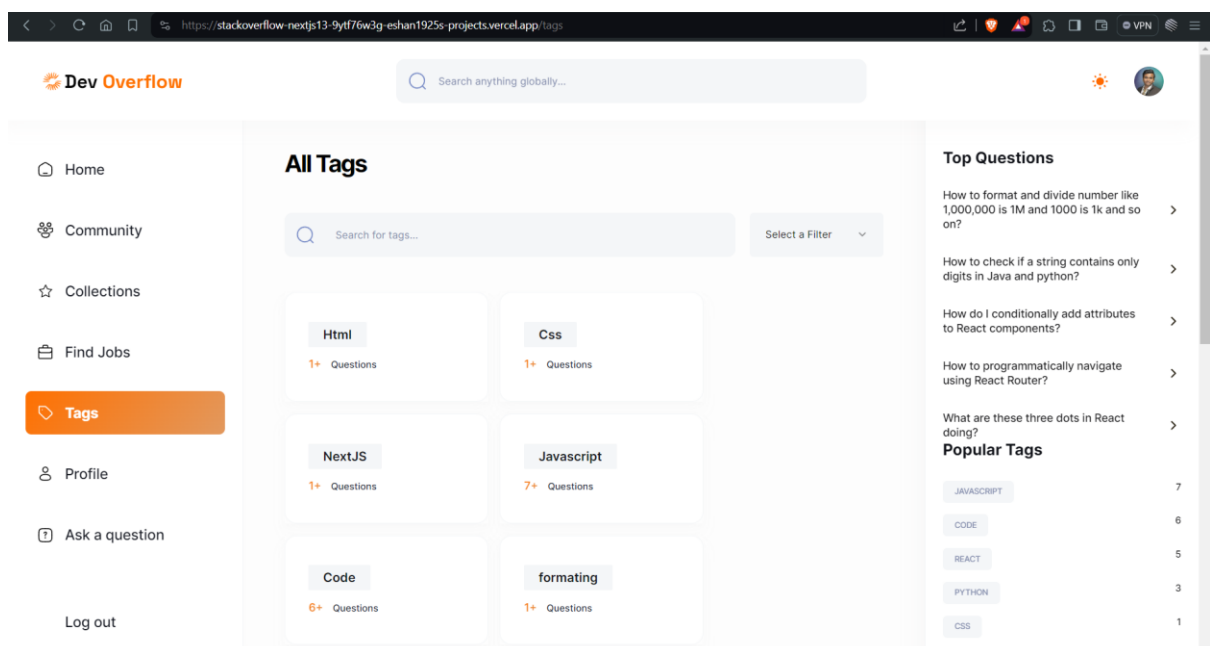
iii. Collections Page:

- Users can access their saved questions on the Collections Page, where questions they've interacted with, including those they've upvoted/downvoted or saved for future reference, are stored. The page offers filtered search functionality for easy retrieval of saved content.



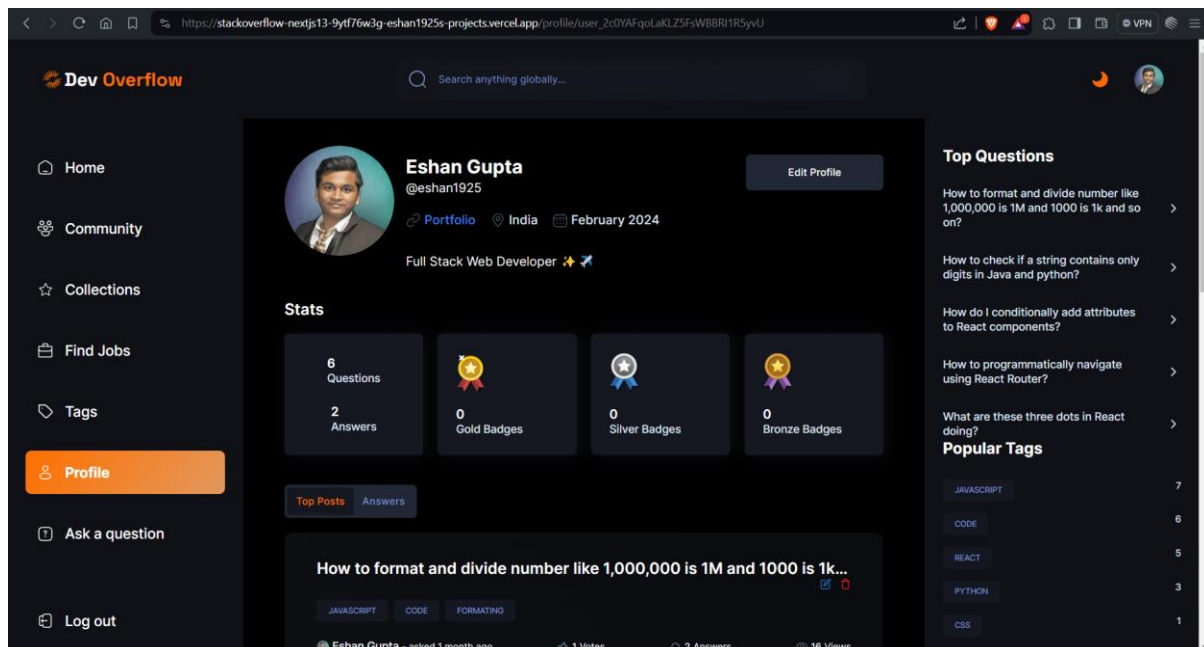
iv. Tags Page:

- The Tags Page displays all tags utilized on the website along with their frequency of use. Users can explore questions associated with specific tags by clicking on them, facilitating navigation based on topics of interest.



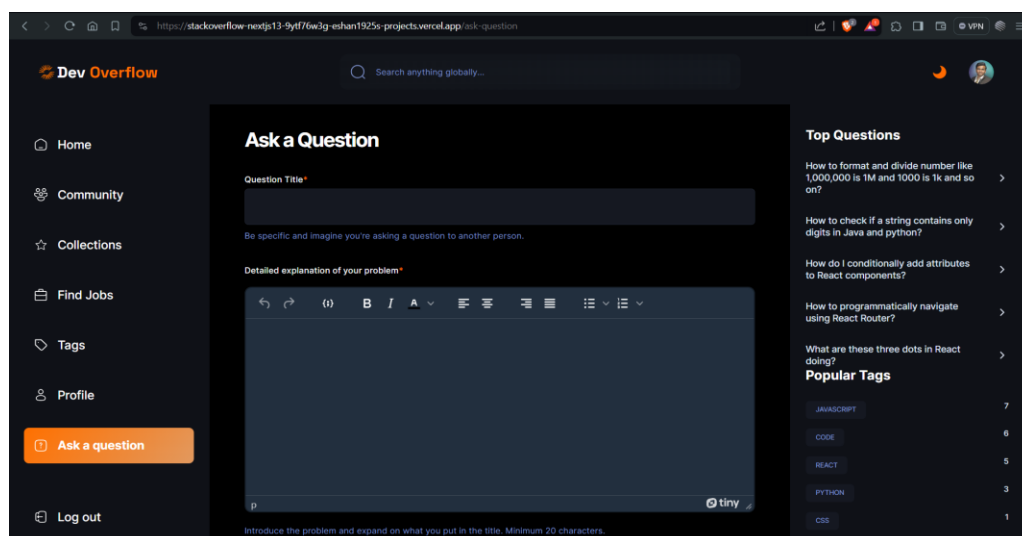
v. Profile Page:

- The Profile Page allows users to view and edit their personal profiles, displaying metrics such as the number of questions asked and answers given. Additionally, users can view badges (Gold, Silver, Bronze) earned based on their interaction with the website, as determined by the Interaction algorithm.



vi. Ask a Question Page:

- On the Ask a Question Page, users can post new questions directly to the website, instantly making them available for other users to view and engage with.



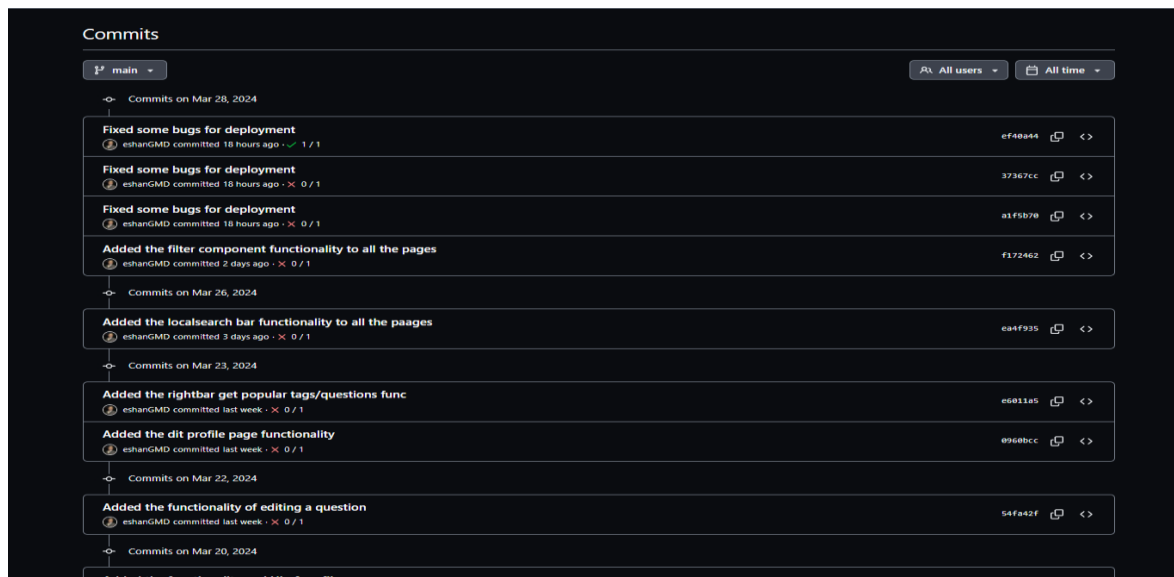
These modules represent approximately 70% completion of the website, each offering distinct functionalities to enhance user experience and interaction.

3. Implementation:-

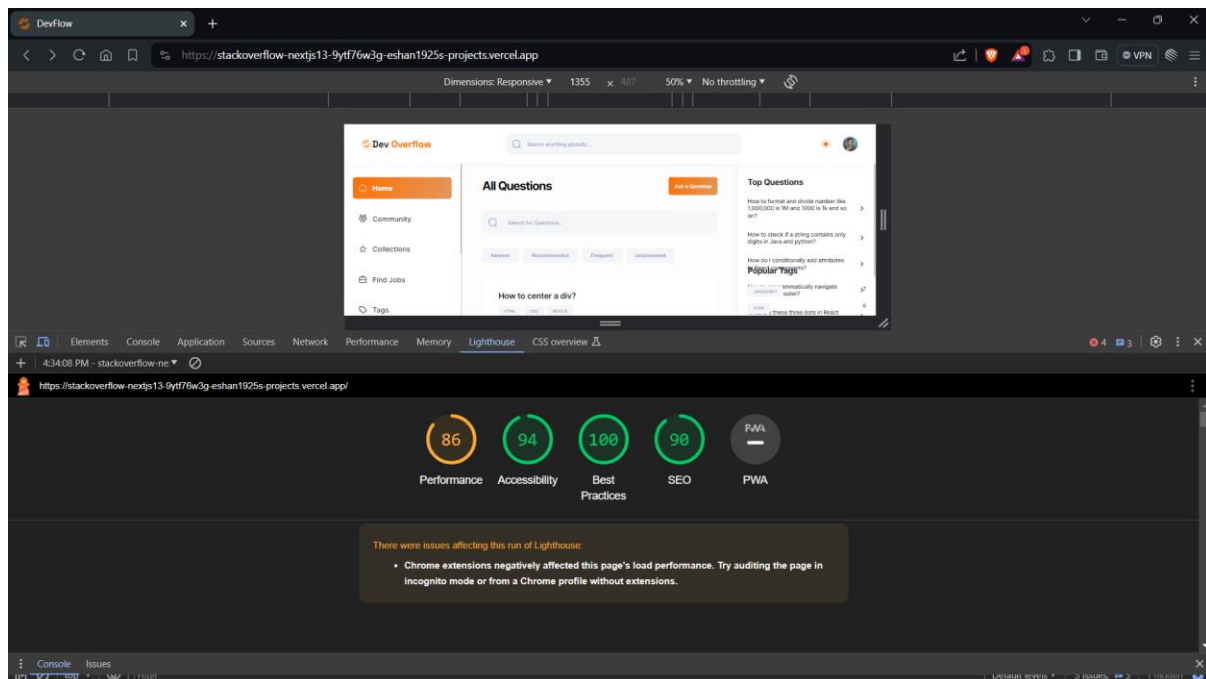
So here is the link to the website that is 70% ready -: [Link](#)

GitHub Repo Link:- [Link](#)

This is the GitHub repo link in which you can see the entire timeline of my project using the commit history.



4. Testing and Performance Metrics:-



Now for testing and performance metrics we have a tool called Lighthouse that is provided to us by google let's discuss more about this tool-:

Lighthouse is an open-source tool created by Google that audits the performance, accessibility, best practices, and SEO of web pages. It is integrated into Chrome DevTools and can also be run as a Node.js module.

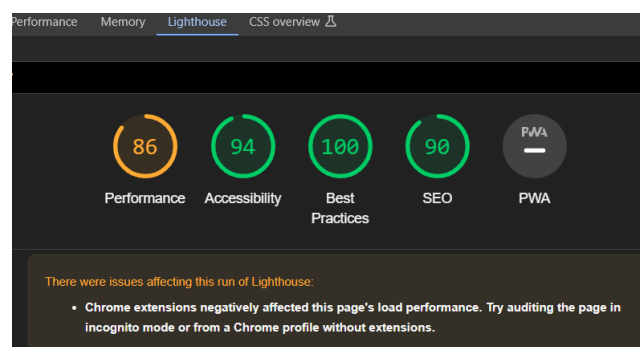
Here's how Lighthouse works:

1. **Audits:** Lighthouse runs a series of audits against a web page, checking for things like performance, accessibility, best practices, and SEO.
2. **Scores:** Lighthouse assigns a score of 0-100 for each audit category. A higher score indicates that the page is doing well in that area.
3. **Recommendations:** For each failing audit, Lighthouse provides specific recommendations on how to fix the issue.

Lighthouse parameters include:

- **Performance:** This category audits how fast a web page loads. It includes metrics like First Contentful Paint (FCP), Largest Contentful Paint (LCP), Time to Interactive (TTI), and Total Blocking Time (TBT).
- **Accessibility:** This category audits how easy a web page is to use for people with disabilities. It includes checks for things like proper use of alt text for images, keyboard accessibility, and color contrast.
- **Best Practices:** This category audits for web development best practices that can improve the overall quality of a web page. It includes checks for things like efficient use of JavaScript, proper caching of resources, and avoiding render-blocking resources.
- **SEO:** This category audits how well a web page is optimized for search engines. It includes checks for things like proper use of title tags, meta descriptions, and header tags.

There is no hard and fast rule for what constitutes a "good" score on Lighthouse. However, a score of 70 or above is generally considered to be good.



Now let's analyse the Lighthouse score that our website currently has.

This report analyses DevFlow's performance using Lighthouse, a tool that audits key website metrics. The results are overwhelmingly positive, indicating an exceptional website experience.

✓ **Exceptional Performance and User Experience (Score: 86):**

DevFlow excels in performance with a score of 86. This translates to a website that loads very quickly, ensuring a smooth and enjoyable experience for visitors. Fast loading times are crucial for user engagement and contribute to positive SEO rankings.

✓ **Outstanding Accessibility (Score: 94):**

DevFlow scores an impressive 94 for accessibility, signifying an inclusive website that caters to users with disabilities. This reflects well on DevFlow's commitment to providing an exceptional user experience for everyone.

✓ **Adherence to Best Practices (Score: 100):**

Achieving a perfect score of 100 in best practices is a remarkable feat. This indicates that DevFlow's code adheres to all recommended practices, resulting in a clean, efficient, and well-maintained website.

✓ **Strong SEO Optimization (Score: 90):**

With a score of 90, DevFlow is well-optimized for search engines. This suggests the website is likely to rank highly for relevant keywords, making it easier for potential users to discover DevFlow organically through search queries.

✓ **Overall, DevFlow's Lighthouse test results are incredibly positive.** The exceptional scores across all categories solidify DevFlow's position as a fast, accessible, well-coded, and SEO-friendly website. This combination lays the foundation for a successful online presence, ensuring a positive user experience and strong search engine visibility.

5. Future Scope (Left out 30%):-

Now talking about the future scopes of the project, these are the features that will be implemented by the completion of this project:-

- **Pagination** -: Each of these search results will have a feature of page numbers as we see in websites like google.
- **Global Search**:- This will enable the users to search among all the content present on the website right from a single search bar.

- **Reputation-:** So, this will be a part of the Interaction Algorithm that will provide each user with a reputation based on how the user interacts with the website.
- **Badge System-:** Based on the reputation and some other parameters from the website a user will be getting badges (Gold, Silver and Bronze) that will be displayed on the user's profile.
- **Generate AI Answer-:** So, this will be the most exciting feature that will be used on the website, a user can directly use AI to get its answers and post them.
- **Loading and Toasts-:** This will be basically all the loading and other popups that the user will be getting and that also has to be implemented.
- **Bug Fixes-:** After all this the entire website would have been grown so much so we will need to fix all the bugs and then deploy it finally.
- **Jobs Feature (Proposed)-:** If I am able to complete the website (above all features) before the final review then I am going to also enable a section on the website where a user can come and post the job and other users can view it and apply for it.

After all this our website will be completed entirely and will be ready for the final review.