Name:Bhushan Mukund Kor **Academic Year:2024-2025**

Division: D15C **Roll No: 28**

Experiment 11

Aim: To use google Lighthouse PWA Analysis Tool to test the PWA functioning.

Theory:

A Progressive Web App (PWA) is a web application designed to offer an app-like experience to users by leveraging modern web technologies. PWAs are characterized by the following features:

- Reliable – Load instantly and function offline.
- Fast – Respond quickly to user interactions.
- Engaging – Provide a native app-like feel with features such as push notifications and home screen installation.

What is Google Lighthouse?

Google Lighthouse is an open-source, automated auditing tool created by Google to assess web applications based on various parameters, including:

- Performance (loading speed, interactivity)
- PWA Compliance
- Accessibility (compatibility with screen readers)
- Best Practices (e.g., HTTPS, deprecated APIs)
- SEO (search engine optimization)

Lighthouse generates a comprehensive report with scores (0–100) and offers actionable recommendations for improvement.

Key Features and Audit Metrics

Google Lighthouse can run audits for both desktop and mobile versions of your webpage. The primary metrics evaluated during the audit include:

- **Performance:** This score reflects the page's performance in aspects such as loading speed, the time taken to load key frames, and how quickly meaningful content is displayed to the user. A score of 100 places the site in the 98th percentile, while a score of 50 corresponds to the 75th percentile, indicating how well the site performs overall.

- **PWA Score (Mobile):** With the rise of Service Workers, app manifests, and other technologies, many web applications are evolving into PWAs, which aim to behave like native mobile apps. Scoring for this metric is based on a baseline checklist by Google, including factors like Service Worker implementation, offline functionality, and performance in script-disabled environments.

- **Accessibility:** This metric evaluates how accessible the website is, considering various accessibility features such as aria attributes, audio captions, and proper

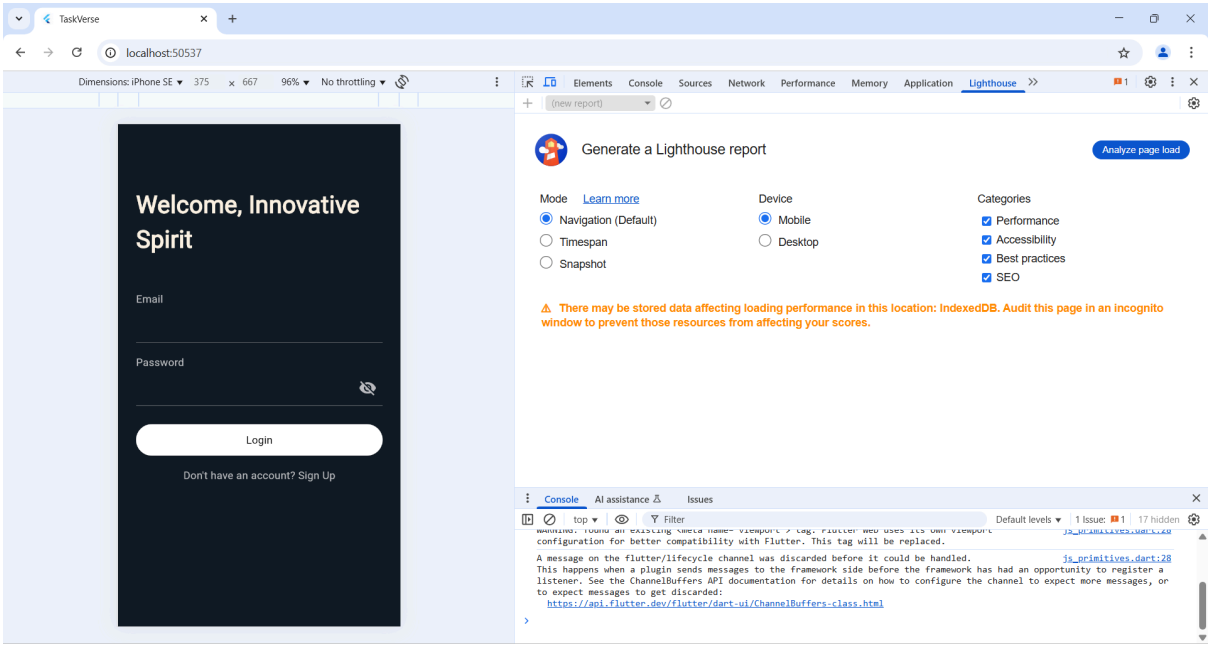
labeling of interactive elements. Accessibility is scored on a pass/fail basis, meaning that if any elements are not screen reader-friendly (e.g., missing aria- attributes), the score will be affected.

- **Best Practices:** This score aggregates multiple best practices that improve website functionality and security, including:
  - Using HTTPS
  - Avoiding deprecated code, tags, or libraries
  - Disabling paste-into for password fields
  - Alerting users about geo-location and cookie usage

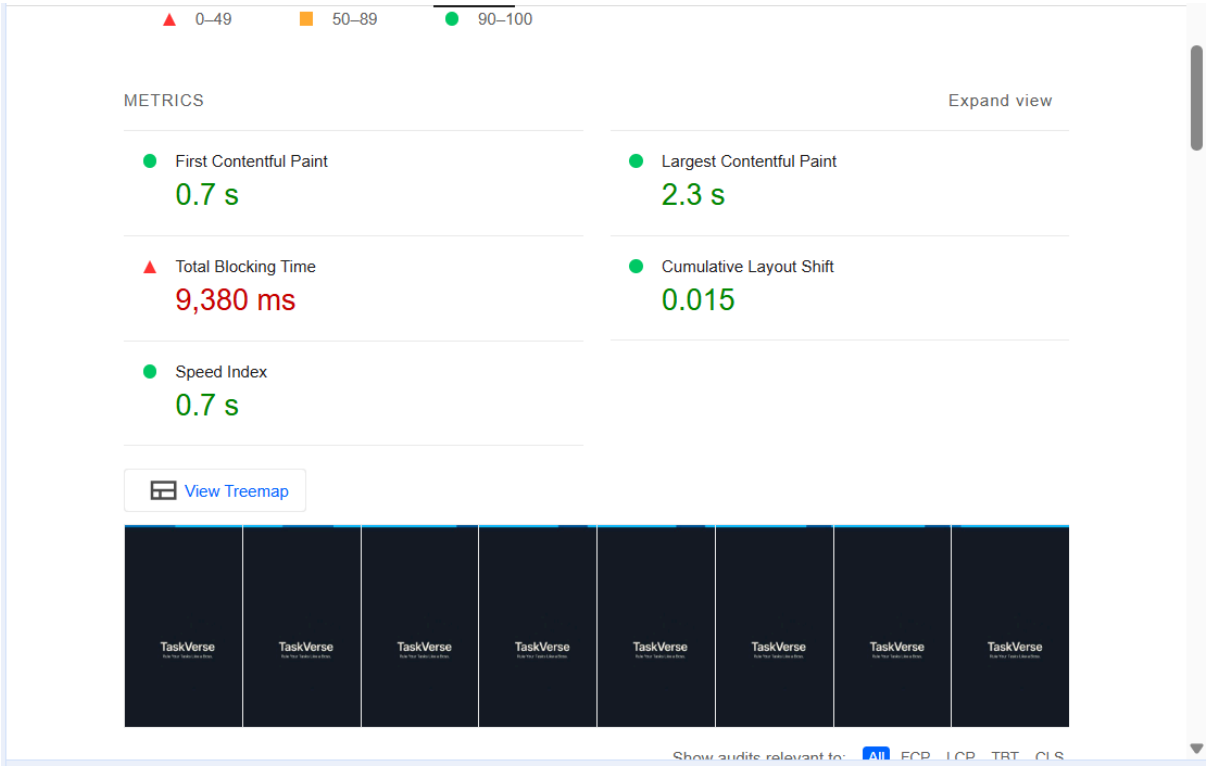
Lighthouse's audit provides valuable insights into how well a web application is optimized and highlights areas for improvement.

Steps:

1. **Go to developer tools -> Lighthouse**

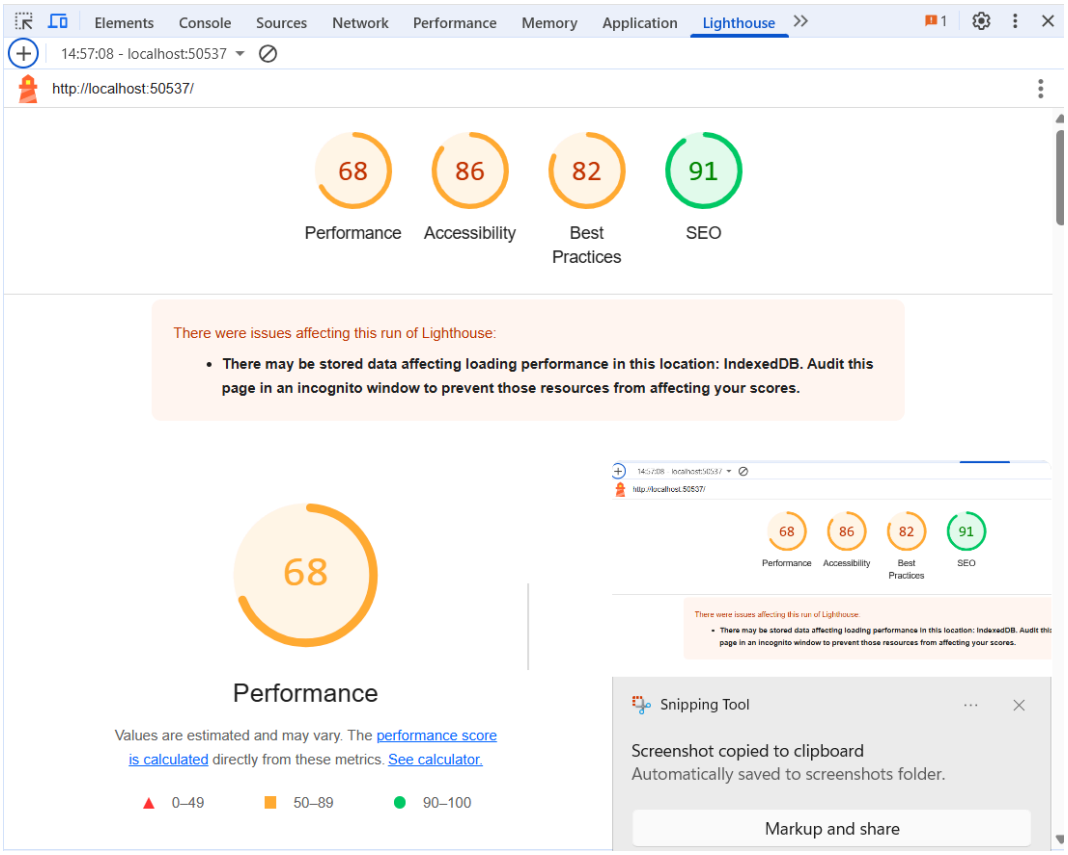


Analyze page load.



2. Lighthouse scores

To check any particular score, click on it, it will show you the modifications that should be made.



There are Some issues we will try to fix SEO and Best Practices related issues.

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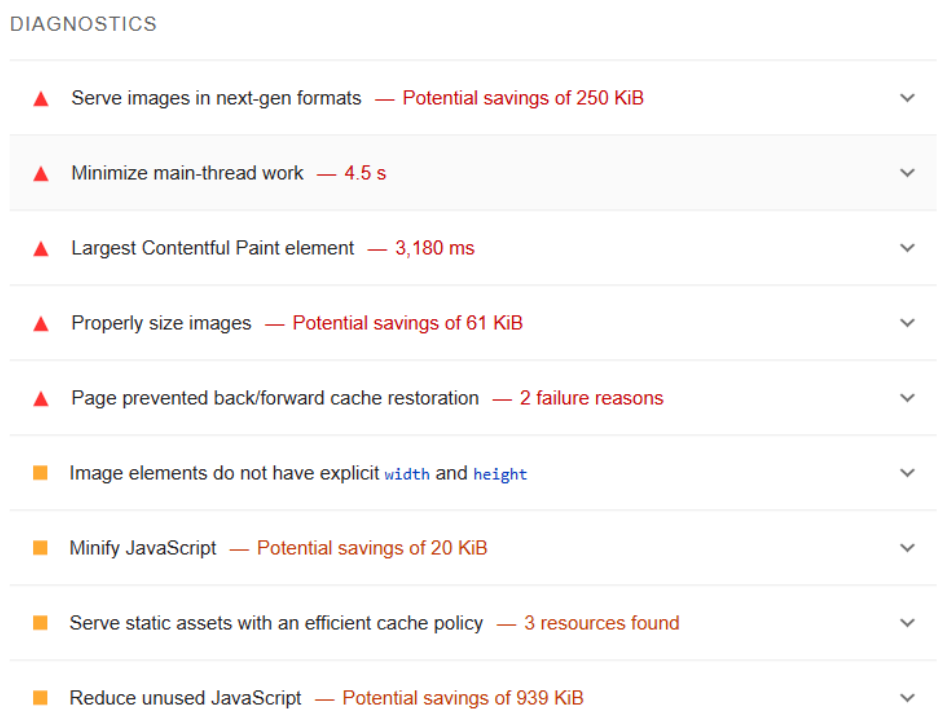
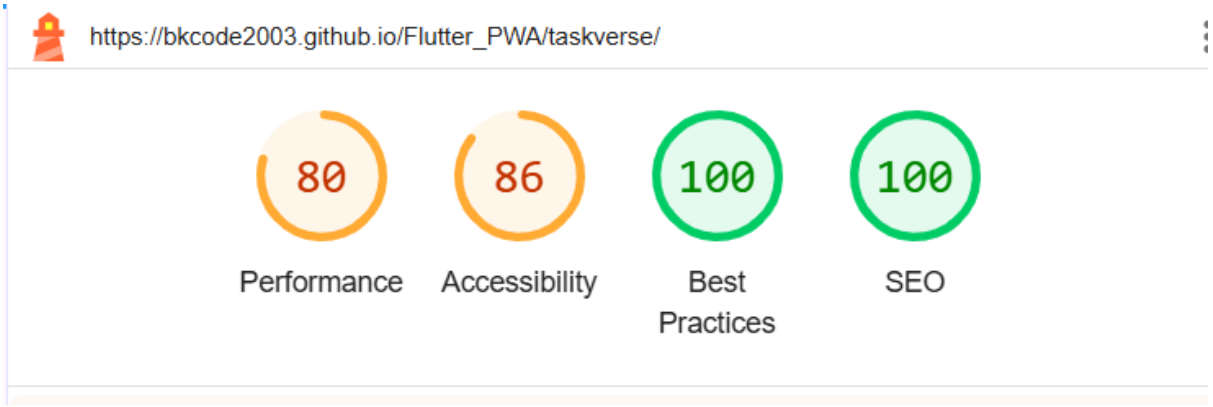


After Modification Score:



GitHub Link: https://github.com/BKCODE2003/Flutter_PWA

Conclusion: Using the Google Lighthouse tool, we thoroughly evaluated the PWA's performance, accessibility, and compliance with web standards. The audit report offered insightful feedback and practical recommendations, enabling us to enhance the overall functionality and user experience of the ToDo PWA. As a result, the app became more dependable and user-friendly across various platforms.