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Subject : MPL Exp 11

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

Theory:
Progressive Web App : A Progressive Web App (PWA) is a type of application software delivered through the web. It leverages modern web technologies to deliver an app-like experience to users. PWAs are reliable, fast, and engaging, designed to work on any platform that uses a standards-compliant browser. The key features of PWAs include offline functionality, push notifications, and home screen installation, providing users with an experience similar to native mobile applications.

Google Lighthouse : Google Lighthouse is an open-source, automated tool designed for improving the quality of web pages. It provides audits for performance, accessibility, SEO, and PWA (Progressive Web App) functionality. When testing a Progressive Web App using Lighthouse, the tool checks if the app meets specific criteria and best practices, such as offline support, performance optimizations, and the ability to be installed on a user's home screen.

PWA Audit Using Google Lighthouse : Lighthouse performs a series of checks to assess how well a website or web app adheres to PWA principles. Some of the key checks include:

1. **Service Worker :** Ensures that the app uses a service worker to cache assets and enable offline functionality.
2. **Web App Manifest :** Checks for the presence of a web app manifest file that defines the app's metadata, including the app’s name, icons, theme color, and display type.
3. **HTTPS :** Ensures the app is served over HTTPS for security and performance.
4. **Responsive Design :** Ensures the app works well on mobile devices.
5. **Installability :** Verifies that the app can be added to the user's home screen.
6. **Performance :** Assesses how quickly the app loads and responds to user interactions.
7. **User Experience :** Checks for smooth interactions, such as the presence of splash screens, and that the app is usable offline.

How Google Lighthouse PWA Analysis Tool Works :

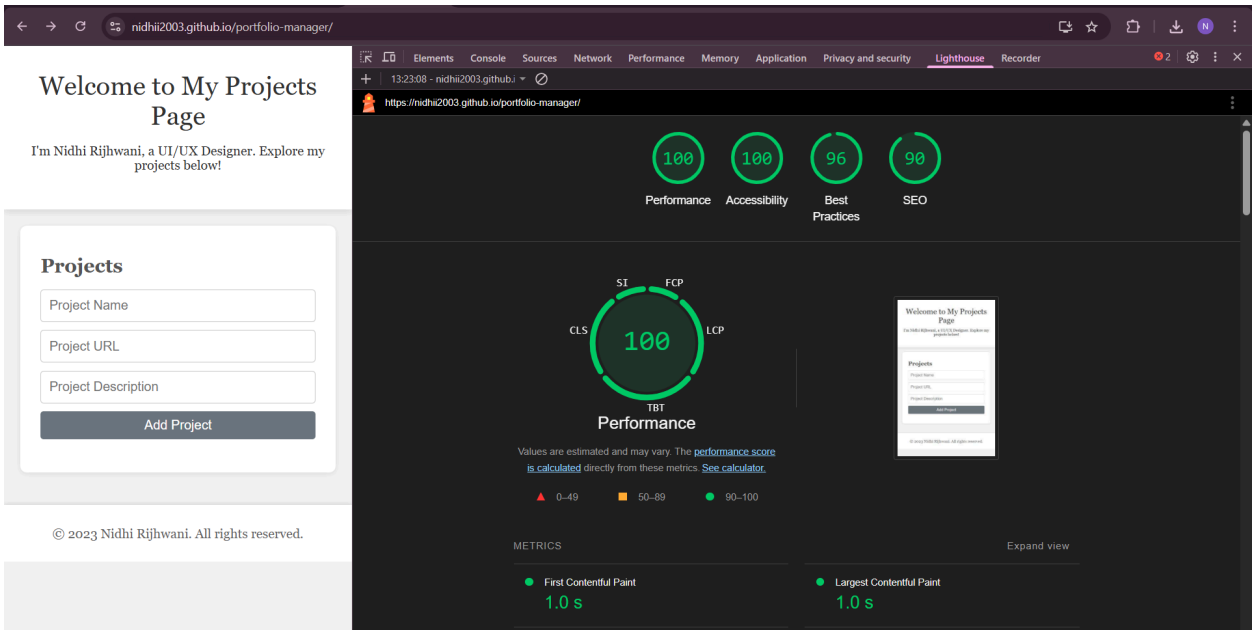
1. **Running the Lighthouse Audit :** The user runs a Lighthouse audit on the web application or website. This can be done via Chrome DevTools, the Lighthouse

CLI, or using the Lighthouse web app.

2. **Results and Insights :** After performing the audit, Lighthouse provides an overall score (ranging from 0 to 100) for the PWA, alongside a detailed report for various aspects such as performance, accessibility, best practices, and SEO.

3. **Specific Metrics :** For the PWA audit, the score will depend on various factors, such as:
    - **Service Worker Availability :** Whether the app works offline and can handle network issues.
    - **Web App Manifest :** Ensures that essential app information is defined, like icons, theme colors, etc.
    - **Performance Metrics :** Lighthouse also evaluates core metrics like loading speed, interactivity, and smoothness.
    - **Installability :** Whether users can install the app on their home screen.

Output :



Conclusion :

Using Google Lighthouse PWA Analysis Tool helps assess how well a PWA meets industry standards. It provides a score and insights into areas like offline support, performance, and installability. A high score indicates a well-functioning PWA, while a low score highlights areas for improvement, enabling developers to optimize the app for a better user experience.