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Experiment 11

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

Theory :

What is Google Lighthouse?
Google Lighthouse is an open-source automated tool designed to improve the quality, performance, accessibility, SEO, and best practices of web applications. It is commonly used by developers and website owners to audit their websites and identify areas for optimization.

Key Features of Google Lighthouse

Lighthouse provides a detailed report in five key categories:

1. Performance:
   Measures page speed, load time, and responsiveness.
   Includes metrics like First Contentful Paint (FCP), Largest Contentful Paint (LCP), Cumulative Layout Shift (CLS), and Time to Interactive (TTI).

2. Accessibility:
   Evaluates how easily users (especially those with disabilities) can interact with a webpage.
   Checks for proper contrast ratios, alt text, ARIA attributes, keyboard navigability, and screen reader compatibility.

3. Best Practices:
   Ensures the website follows modern web development standards.
   Checks for HTTPS security, proper image formats, JavaScript errors, and vulnerabilities.

4. SEO (Search Engine Optimization):
   Analyzes on-page SEO elements to improve search engine ranking.
   Checks for meta descriptions, mobile-friendliness, structured data, and canonical tags.

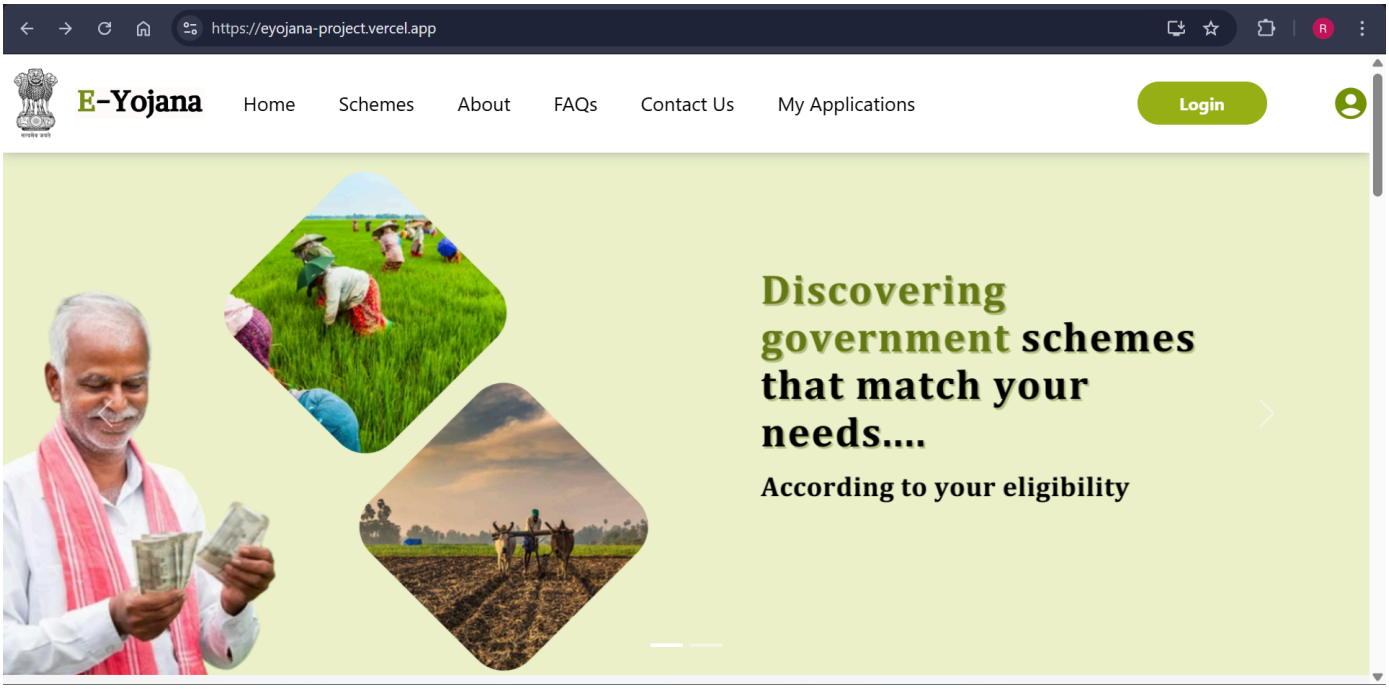
5. Progressive Web App (PWA):
   Evaluates if a website meets PWA standards, allowing it to function like a native app.
   Checks for service workers, offline capabilities, and fast load times.

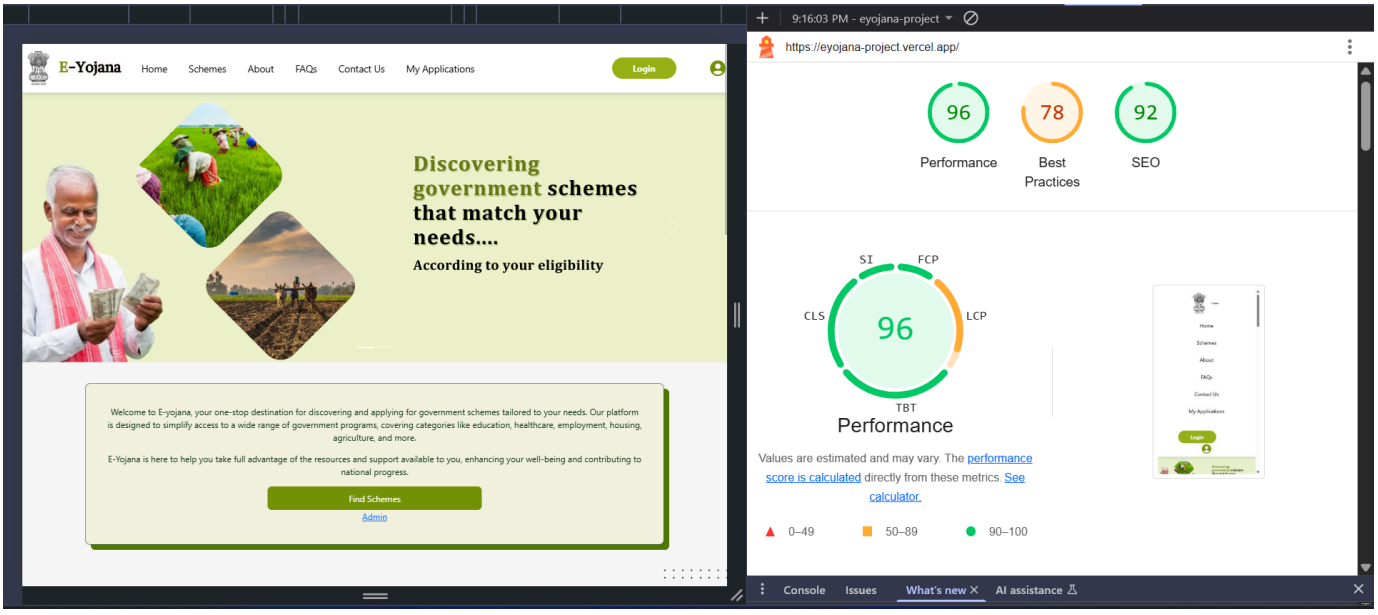
How Lighthouse Scores Are Calculated
Lighthouse assigns scores between 0 and 100 based on various metrics.

- 90-100: Excellent
- 50-89: Needs improvement
- 0-49: Poor

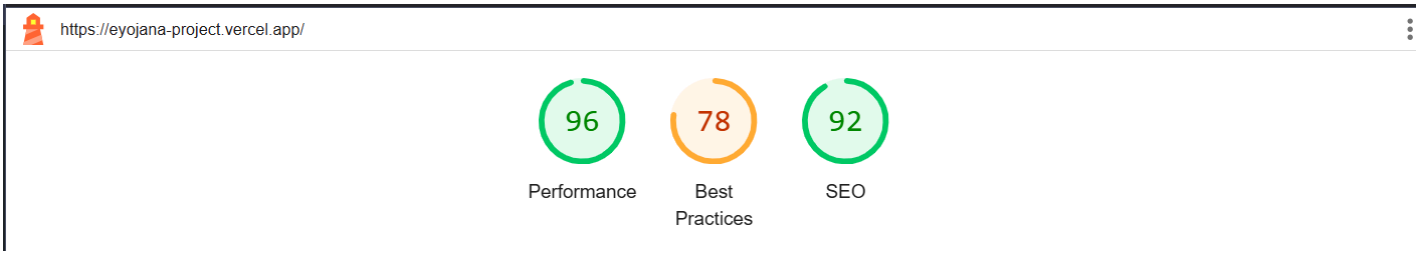
Each score is based on real-world performance data and lab tests.

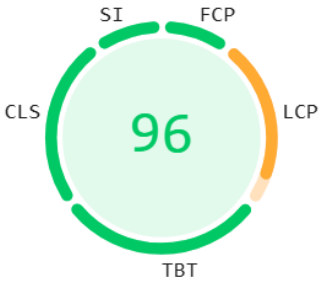
Deployed website:





Lighthouse Report:





Performance

Values are estimated and may vary. The performance score is calculated directly from these metrics. See calculator.

▲ 0–49 ■ 50–89 ● 90–100

METRICS

● First Contentful Paint 0.6 s	■ Largest Contentful Paint 1.3 s
● Total Blocking Time 0 ms	● Cumulative Layout Shift 0.007
● Speed Index 0.6 s	

DIAGNOSTICS

- ▲ Serve images in next-gen formats — Potential savings of 1,113 KiB
- ▲ Properly size images — Potential savings of 916 KiB
- ▲ Preload Largest Contentful Paint image — Potential savings of 40 ms
- ▲ Reduce unused JavaScript — Potential savings of 267 KiB
- ▲ Largest Contentful Paint element — 1,320 ms
- ▲ Reduce unused CSS — Potential savings of 33 KiB
- ▲ Eliminate render-blocking resources — Potential savings of 250 ms
- ■ Image elements do not have explicit `width` and `height`
- ■ Minify JavaScript — Potential savings of 25 KiB

Conclusion: Thus we successfully used google Lighthouse PWA Analysis Tool for testing the PWA functioning.