Mirpur University of Science and technology

Department of software engineering

Assignment#2

Submitted to:

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Subject

Web engineering

Submitted by:

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Web Application Evaluation Report

1.Introduction

This report evaluates the performance and accessibility of two web applications:

1.Gym Website – A personal fitness website hosted on GitHub Pages
 https://hira-0534.github.io/gym-website/.
It contains images, navigation menus, and forms for user interaction.
2.SparkReceipt – An online service website
    https://sparkreceipt.com/
 providing digital receipt management with diverse content including forms, images, and interactive elements.

The evaluation uses Google Lighthouse and other industry-standard tools to identify performance bottlenecks, accessibility issues, and optimization opportunities.

2.Key Metrics

Performance Metrics

Metric	Gym Website	SparkReceipt	Description
First Contentful Paint (FCP)	1.1 s	5.1 s	Time when first text or image appears on the page
Largest Contentful Paint (LCP)	1.1 s	14.6 s	Time when main content is fully loaded
Total Blocking Time (TBT)	150 ms	3,980 ms	Time blocked due to JavaScript execution
Cumulative Layout Shift (CLS)	0	0.001	Measures visual stability during page load
Speed Index (SI)	1.9 s	7.3 s	How quickly the page visually renders

Usability Metrics

Usability =best practices

For gym website: best practice=96

For SparkReceipt: best practices=77

| Metric	Gym Website	SparkReceipt	Description
Usability Score	96/100	77/100	Overall ease of use and user satisfaction
Navigation Clarity	Good	Moderate	Ease of finding information and features
Page Responsiveness	Fast	Moderate	Response time to user actions
Visual Consistency	Good	Very Good	Consistency of layout, colors, and design

Accessibility Metrics

Metric	Gym Website	SparkReceipt	Description
Accessibility Score	97/100	86/100	Measures usability for users with disabilities
Keyboard Navigation	Good	Moderate	Ability to navigate using keyboard
Alt Text for Images	Some missing	Several missing	Screen readers need descriptive text
Color Contrast	Good	Needs improvement	Text readability for visually impaired users

## 3.Performance Analysis

Gym Website

- **Performance Score:** 98/100 (Excellent)
- **Observations:**
    - Fast page load (FCP + LCP ~1.1 s)
    - Stable layout (CLS = 0)
    - Bottlenecks: large images, render-blocking CSS/JS, missing width/height for images, minor JS tasks, caching.
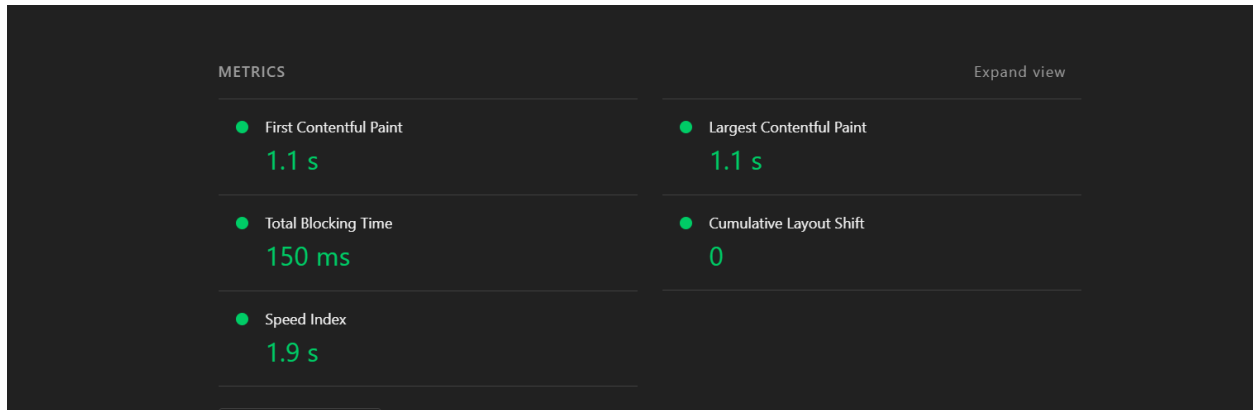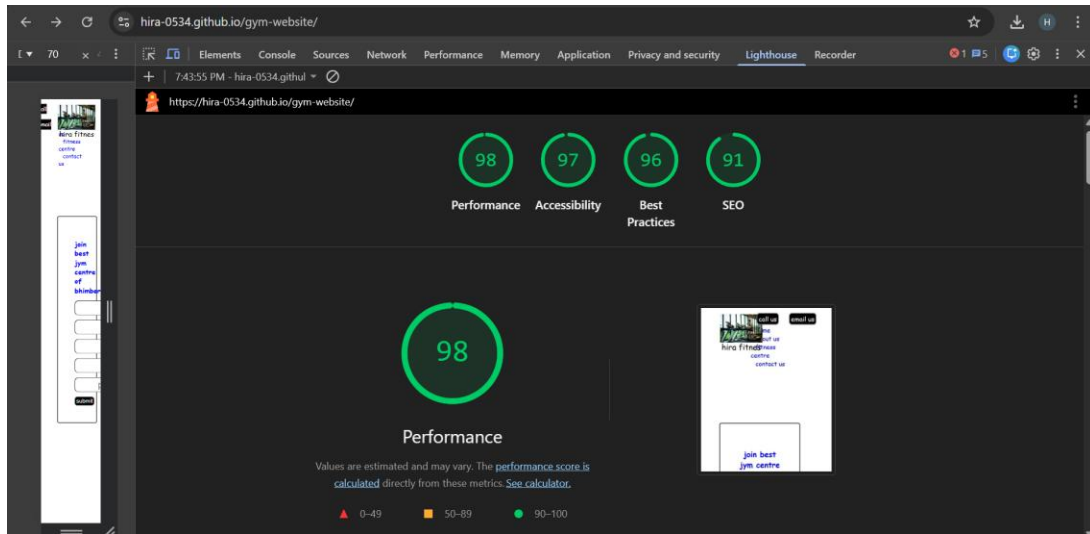
SparkReceipt

- **Performance Score:** 29/100 (Poor)

- **Observations:**

    o Slow load (FCP 5.1 s, LCP 14.6 s)

    o Heavy JS execution (TBT 3,980 ms)

- Bottlenecks: render-blocking requests, large images, inefficient caching, long main-thread tasks, DOM size issues
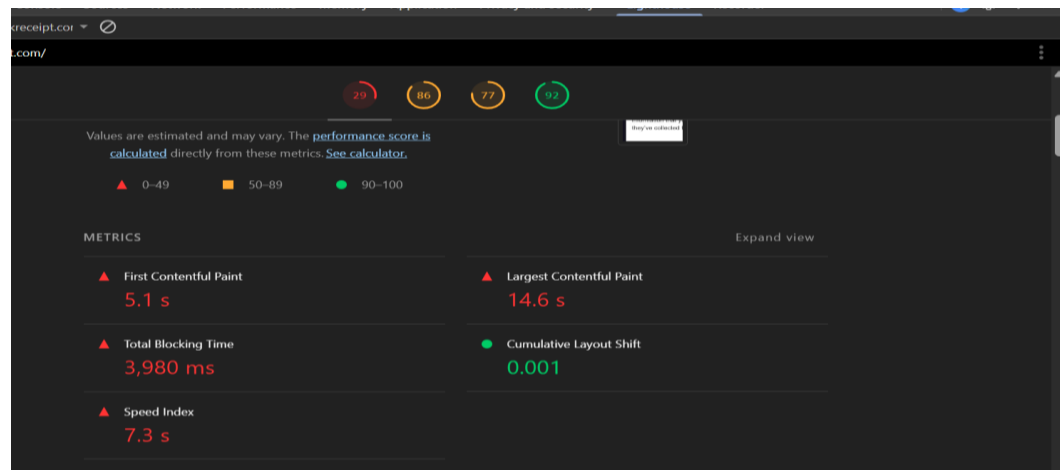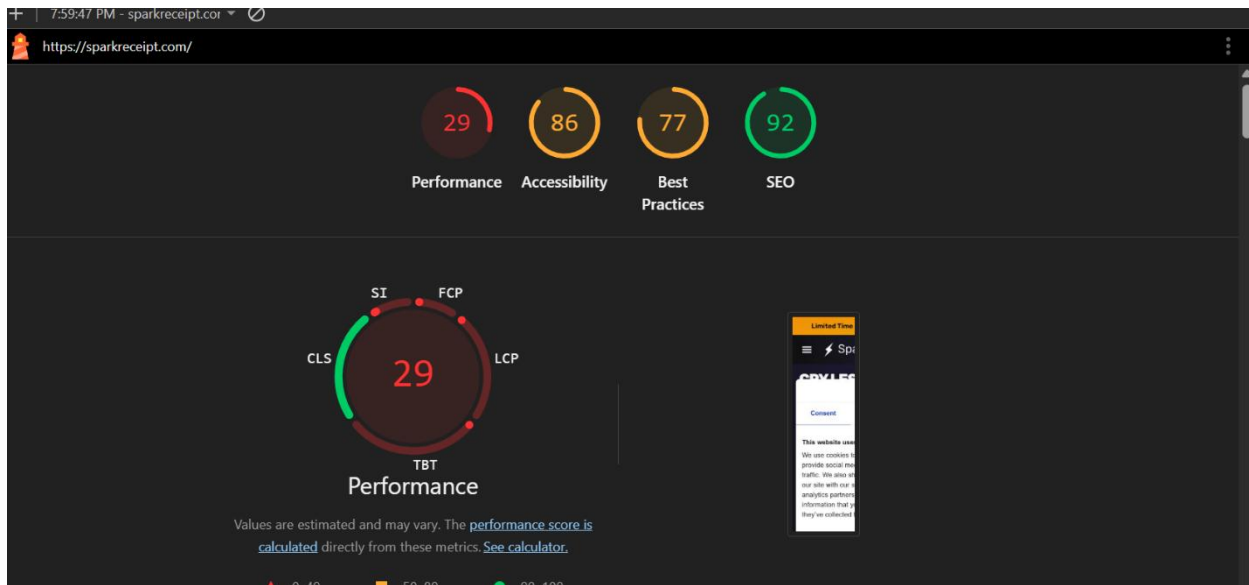
4.Accessibility Analysis

Gym Website

- **Accessibility Score:** *97/100*

Minor issues:

- Missing main landmark
- Some images without alt text

- Form labels missing in a few fields

SparkReceipt

- **Accessibility Score:** 86/100

  ### *Issues identified:*

    - ARIA attributes mismatch

    - Low contrast between text and background

    - Missing link names

    - Headings not sequential

5.Recommendations for Optimization

Website	Recommendations	Issue Addressed	Proposed Solution	Expected Impact
Gym Website	Compress images	Large images	Use WebP or optimized formats	Faster load, improved LCP
Gym Website	Minify CSS/JS	Render-blocking	Defer non-critical scripts	Reduced page blocking, better performance
Gym Website	Set width/height for images	Layout shift	Add attributes to images	Prevent layout shifts, improve CLS
Gym Website	Enable caching	Inefficient resource loading	Set proper cache headers	Faster repeat visits
SparkReceipt	Compress images	Large LCP	Use WebP or optimized formats	Faster load, better LCP
SparkReceipt	Optimize JS	Long main-thread tasks	Reduce unused JS, break tasks	Improved responsiveness, lower TBT
SparkReceipt	Minify CSS/JS	Render-blocking	Defer non-critical scripts	Reduced page blocking, faster rendering
SparkReceipt	Improve color contrast	Low readability	Adjust colors to meet WCAG AA	Better readability for all users
SparkReceipt	Fix ARIA / link names	Accessibility issues	Correct ARIA attributes, add link names	Better support for assistive technologies
SparkReceipt	Fix heading structure	Keyboard navigation	Use sequential headings (H1 → H2 → H3)	Improved accessibility and navigation

Conclusion

Gym Website is highly performant and mostly accessible. Minor optimizations such as caching and alt text will further improve quality.

 SparkReceipt has significant performance issues (especially LCP and TBT) and moderate accessibility issues. Optimizing JS, images, and ARIA attributes will greatly enhance both speed and user experience.

Overall, these analyses demonstrate the importance of **performance optimization and accessibility compliance** for modern web applications, ensuring better user experience and adherence to web standards.