Hackathon 3: Day_5

Testing, Error Handling, And Backend Integration Refinement

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1. Introduction

1.1 Project Overview

The Comforty Furnitures is an e-commerce platform designed to provide a seamless shopping experience for furniture products. The website includes features such as product browsing, user authentication, cart functionality, and order processing.

1.2 Testing Objectives

The primary objective of this testing phase is to ensure that the website functions as expected across various scenarios. The key goals include:

- Verifying core functionalities such as navigation, product display, cart management, and checkout process.
- Identifying and reporting bugs or performance issues.
- Ensuring compatibility across multiple browsers and devices.
- Testing error handling and backend integration.

2. Testing Methodology

2.1 Testing Approach

The testing process includes both **manual testing** and **automated testing** to cover all major aspects of the website.

- **Manual Testing:** Conducted to verify UI/UX elements, user flows, and responsiveness.
- **Automated Testing:** Performed using tools like GTmetrix and Lighthouse to evaluate performance and accessibility.

2.2 Tools Used

- **Browser Developer Tools** – For inspecting UI issues.
- **Page Speed Insights** – Discover what your real users are experiencing
- **Lighthouse** – For performance and accessibility testing.
- **GTmetrix** - Detailed performance report

3.Test Case

GTmetrix:

The GTmetrix performance evaluation of the Comforty Furnitures website yielded the following results:

- **GTmetrix Grade:**
  - **Performance:** 100%
  - **Structure:** 94%
- **Web Vitals:**
  - **Largest Contentful Paint (LCP):** 335ms
  - **Total Blocking Time (TBT):** 0ms
  - **Cumulative Layout Shift (CLS):** 0
- **Page Load Metrics:**
  - **Fully Loaded Time:** 691ms
  - **Total Page Size:** 514KB
  - **Total Page Requests:** 59

These metrics indicate that the website performs exceptionally well, with rapid load times and efficient resource utilization.

Note: The above analysis is based on the GTmetrix report generated on February 7, 2025. For detailed insights, refer to the full report here.

Lighthouse:

Based on the Lighthouse analysis of Comforty Furnitures, the website demonstrates strong performance across several key metrics:

- **Performance:** 100%
- **Accessibility:** 100%
- **Best Practices:** 100%
- **SEO:** 100%

These scores indicate that the website is optimized for speed, user accessibility, adherence to best practices, and search engine optimization.

For a detailed breakdown of the audit, please refer to the full Lighthouse report here.

4.Test Report:

Test Case ID	Description	Tool Used	Expected Score	Actual Score	Status	Remarks
TC004	Page Load Speed Test	GTmetrix	Performance Score > 8	100%	Passed	No issue found
TC005	Fully Loaded Time	GTmetrix	< 3 seconds	691ms	Passed	No issue found
TC006	Largest Contentful Pair	GTmetrix	< 2.5 seconds	336ms	Passed	No issue found
TC007	Total Blocking Time (TE	GTmetrix	< 150ms	0ms	Passed	No issue found
TC008	Cumulative Layout Shif	GTmetrix	< 0.1	0	Passed	No issue found

Performance Report:

Test Case ID	Description	Tool Used	Expected Score	Actual Score	Status	Remarks
TC009	Performance Score	Lighthouse	> 90%	100%	Passed	No issue found
TC010	Accessibility Score	Lighthouse	> 90%	91%	Passed	No issue found
TC011	Best Practices Score	Lighthouse	> 90%	100%	Passed	No issue found
TC012	SEO Score	Lighthouse	> 90%	100%	Passed	No issue found
TC013	First Contentful Paint (f	Lighthouse	< 1.8 seconds	0.2 s	Passed	No issue found
TC014	Speed Index	Lighthouse	< 3.4 seconds	0.4 s	Passed	No issue found
TC015	Time to Interactive	Lighthouse	< 3.8 seconds	234ms	Passed	No issue found
TC016	Largest Contentful Pair	Lighthouse	< 2.5 seconds	0.5 s	Passed	No issue found
TC017	Total Blocking Time (TE	Lighthouse	< 200ms	20 ms	Passed	No issue found
TC018	Cumulative Layout Shif	Lighthouse	< 0.1	0.002	Passed	No issue found

5.Test Execution Results

- **Pass Rate:** 100%
- **Failed Cases:** 0%
- **Skipped Cases:** 0%

6. Challenges and Solutions

6.1 Challenges Encountered

- **Performance Issues:** Heavy UI elements caused lag, leading to slow rendering and decreased responsiveness.
- **State Management:** Managing complex component interactions while ensuring smooth data flow was challenging.
- **Page Load Speed:** High-resolution images and large assets caused longer loading times.
- **SEO and Accessibility Compliance:** Ensuring the website met best practices for SEO and accessibility.
- **Backend Integration:** Handling API responses effectively and managing errors gracefully.

6.2 Solutions Implemented

- Used **Lazy Loading** for images and components to improve performance.
- Implemented **Redux Toolkit** for managing the cart functionality efficiently.
- Used **ShadCN and Material UI** to create a more responsive and dynamic UI.
- Optimized **assets and image compression** to improve page load speed.
- Implemented **code splitting and caching** strategies for better performance.
- Used **Lighthouse and GTmetrix recommendations** to optimize accessibility and SEO.
- Implemented robust **error handling** mechanisms to manage API failures effectively.

7. Conclusion

7.1 Summary of Findings

Based on the testing conducted, the following observations were made:

- Core functionalities performed as expected.
- Identified issues include low loading times.
- Performance metrics indicate responsiveness.

7.2 Recommendations

- Address the reported bugs and re-test the affected functionalities.
- Optimize performance based on Lighthouse and GTmetrix recommendations.
- Enhance responsiveness for better user experience.