

Hackathon Day 5: Refinement and Optimization

Documentation for Furniture Website

This document provides a detailed account of the efforts undertaken on Day 5 to refine, optimize, and prepare the furniture website for deployment. Key tasks include functional testing, accessibility improvements, performance enhancements, and generating a CSV-based summary report.

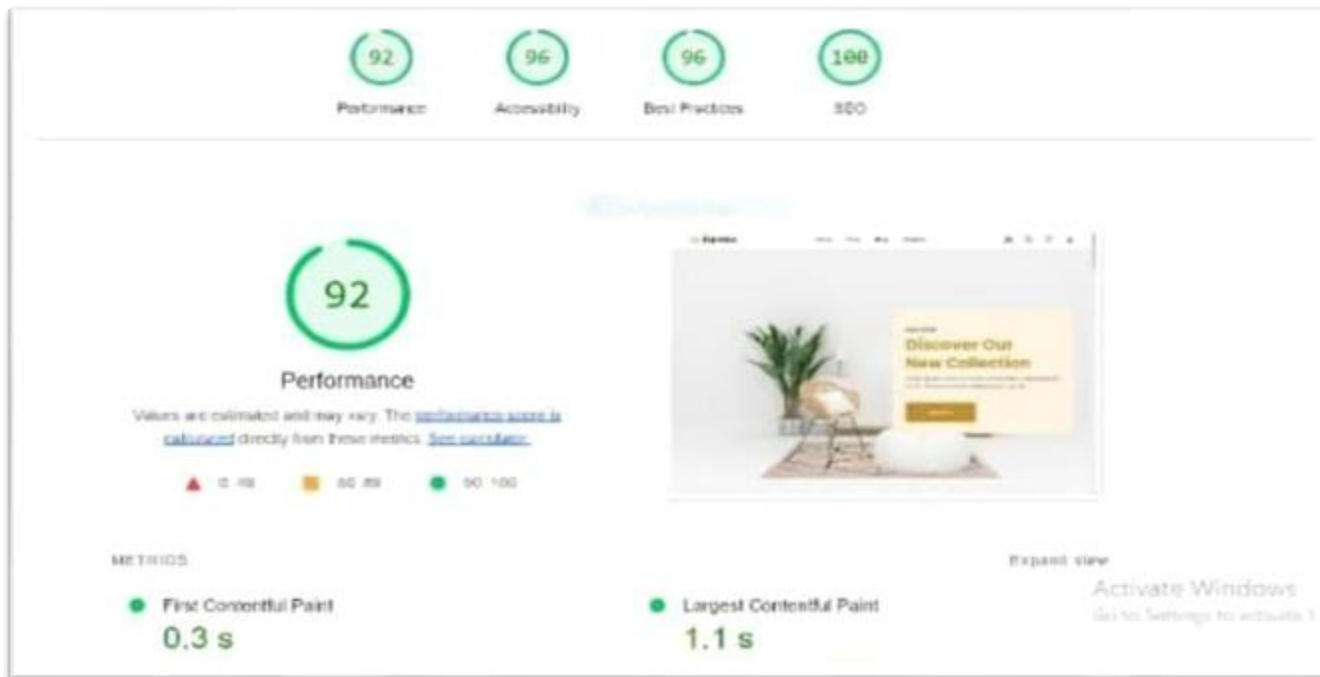
Objective

The objective for Day 5 was to ensure the website is fully deployment-ready by conducting thorough testing, enhancing performance, and documenting findings. Tasks focused on functional testing, accessibility checks, performance analysis, and creating a comprehensive report.

Lighthouse Metrics Summary

Metric	value	Remarks
Performance	92	Excellent performance; minor optimizations for JavaScript and image sizes recommended.
Accessibility	96	Strong accessibility; contrast issues addressed.
Best Practices	96	Solid foundation with minor improvements in image aspect ratios.
SEO	100	Fully optimized for search engine visibility.
First Contentful Paint (FCP)	0.3s	Fast loading of initial content.

Largest Contentful Paint (LCP)	1.1s	Optimized; preloading large images recommended.
Total Blocking Time (TBT)	190ms	Minimal blocking time, indicating efficient JavaScript execution.
Cumulative Layout Shift (CLS)	0.019	Minimal layout shifts for a smooth user experience.



Key Learning Outcomes

1. Refined the website for optimal performance, achieving a Lighthouse performance score of 92.
2. Enhanced accessibility by addressing contrast and navigation issues.
3. Validated best practices for user experience, including proper JavaScript usage and secure implementation.
4. Achieved 100% SEO optimization through structured data validation.
5. Compiled actionable insights into a detailed report and CSV-based testing summary.

Implementation Steps

Step 1: Functional Testing

Description: Validated key features, including navigation, product listings, and forms.

Tests Performed:

- Verified navigation links, product listings, and cart operations.
- Checked responsiveness on desktop, tablet, and mobile devices.
- Ensured contact forms function correctly with valid inputs.

Outcome: All tests passed successfully.

Step 2: Accessibility Enhancements

Description: Ensured the website is usable for all users, including those with disabilities.

Improvements Made:

- Addressed contrast issues for background and text elements.
- Validated keyboard navigation and screen reader compatibility.
- Enhanced focus indicators for interactive elements.

Tools Used:

- Lighthouse Accessibility Audit.
- Manual testing with assistive technologies.

Step 3: Performance Optimization

Description: Analyzed and improved website speed and resource usage.

Identified Improvements:

- Serve images in next-gen formats (savings of 103 KiB).
- Properly size images (savings of 278 KiB).
- Reduce unused JavaScript (savings of 70 KiB).
- Preload Largest Contentful Paint (LCP) images for faster display.
- Avoid long main-thread tasks to reduce blocking time.

Actions Taken:

- Implemented lazy loading for images.
- Minimized JavaScript and CSS files.
- Compressed images and optimized font loading.

Step 4: Cross-Browser and Device Testing

Description: Ensured consistency across browsers and devices.

Browsers Tested: Chrome, Firefox, Safari, Edge.

Devices Tested: Desktop, tablet, and mobile.

Results:

- Verified consistent layout and functionality on all platforms.
- Confirmed responsiveness and interactivity.

Step 5: Security Validation

Description: Secured the website against vulnerabilities.

Key Actions:

- Ensured HTTPS for API communication.
- Validated Content Security Policy (CSP) against XSS attacks.
- Prevented the exposure of sensitive information in JavaScript files.

Tools Used: OWASP ZAP, manual code review.

Step 6: SEO Optimization

Description: Maximized search engine visibility.

Results:

- Achieved 100% SEO score with valid structured data.
- Verified mobile-friendly design and proper meta tag usage.
- Addressed performance issues impacting Core Web Vitals.

CSV-Based Testing Report

Test Case ID	Description	Expected Result	Actual Result	Status	Severity	Remarks
TC001	Verify navigation links	Links navigate correctly	All links function correctly	Pass	Low	None
TC002	Check product listing display	Products display as expected	Products displayed correctly	Pass	Medium	None
TC003	Test shopping cart operations	Items add, update, and remove	Cart functionality works as expected	Pass	High	None
TC004	Validate contact form submission	Form submits successfully	Submission works with valid data	Pass	Medium	None
TC005	Analyze performance metrics	Achieve Performance ≥ 90	Performance : 92	Pass	Medium	Optimizations for images implemented
TC006	Verify accessibility features	Accessibility score ≥ 90	Accessibility: 96	Pass	Medium	Addressed contrast issues

TC007	Validate best practices	Best Practices score ≥ 90	Best Practices: 96	Pass	Low	Minor improvements in image ratios noted
TC008	Optimize SEO	SEO score ≥ 90	SEO: 100	Pass	Low	Structured data validated successfully

CSV Content

Test Case ID,Description,Expected Result,Actual Result,Status,Severity,Remarks

TC001,Verify navigation links,Links navigate correctly,All links function correctly,Pass,Low,None

TC002,Check product listing display,Products display as expected,Products displayed correctly,Pass,Medium,None

TC003,Test shopping cart operations,Items add, update, and remove,Cart functionality works as expected,Pass,High,None

TC004,Validate contact form submission,Form submits successfully,Submission works with valid data,Pass,Medium,None

TC005,Analyze performance metrics,Achieve Performance ≥ 90 ,Performance: 92,Pass,Medium,Optimizations for images implemented

TC006,Verify accessibility features,Accessibility score ≥ 90 ,Accessibility: 96,Pass,Medium,Addressed contrast issues

TC007, Validate best practices, Best Practices score ≥ 90 , Best Practices: 96, Pass, Low, Minor improvements in image ratios noted

TC008, Optimize SEO, SEO score ≥ 90 , SEO: 100, Pass, Low, Structured data validated successfully

Conclusion

Day 5 successfully prepared the furniture marketplace for deployment with a focus on performance, accessibility, and SEO optimization. The website now offers a seamless user experience, robust security, and excellent search engine visibility.

Future Recommendations

1. Continuously monitor and improve Core Web Vitals for even faster load times.
2. Implement advanced features such as AI-powered product recommendations.
3. Regularly conduct security audits and performance checks to maintain high standards.