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Date : ***21-july-2024***

Day 5: Testing, Error Handling, and Backend Integration Refinement

Overview:

Day 5 was dedicated to thoroughly testing all components of the marketplace, refining error handling, and ensuring backend integration works seamlessly. The goal was to make the marketplace reliable, user-friendly, and performance-optimized, so it's ready for real-world deployment.

Key Accomplishments:

1. Functional Testing of Core Features

We validated the functionality of every major component, including:

Product Listing Page: Ensured products load dynamically and are filtered/sorted correctly. The search bar implementation was tested for delivering accurate results based on keywords.

Detail Page: Verified that individual product details (name, price, description, images, etc.) load correctly when clicked.

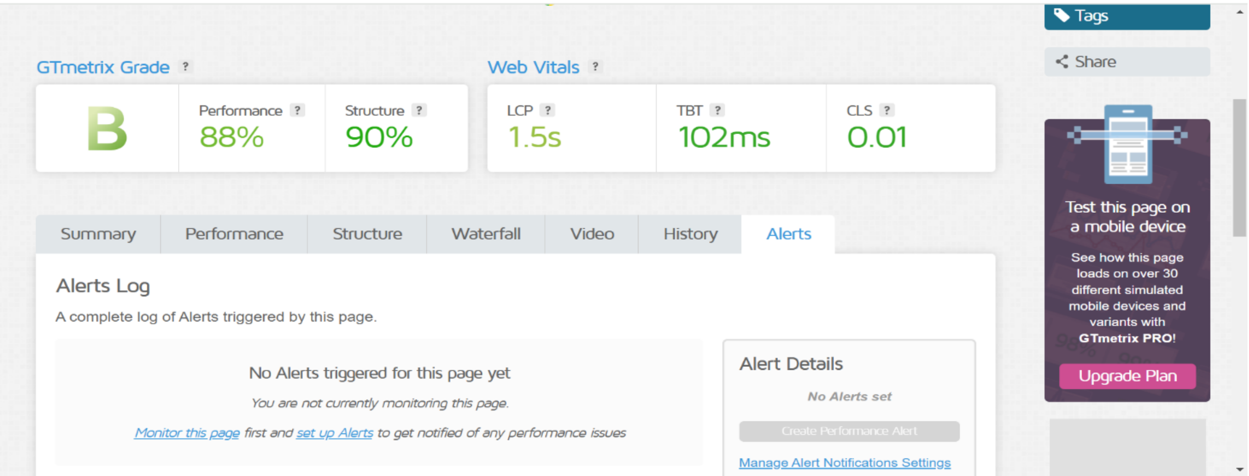
Cart Operations: Tested adding items, updating quantities, and removing items to ensure smooth cart functionality.

Checkout Page: Simulated checkout processes to confirm all input fields (name, email, address, etc.) function correctly and send data securely.

Wishlist: Verified that products could be saved for later viewing.

1. Website Speed Optimization

Tool Used: *GTmetrix*



GTmetrix Grade ?

B

Performance ? 88%

Structure ? 90%

Web Vitals ?

LCP ? 1.5s

TBT ? 102ms

CLS ? 0.01

Alerts Log

A complete log of Alerts triggered by this page.

No Alerts triggered for this page yet

You are not currently monitoring this page.

Monitor this page first and set up Alerts to get notified of any performance issues

Alert Details

No Alerts set

Test this page on a mobile device

See how this page loads on over 30 different simulated mobile devices and variants with **GTmetrix PRO!**

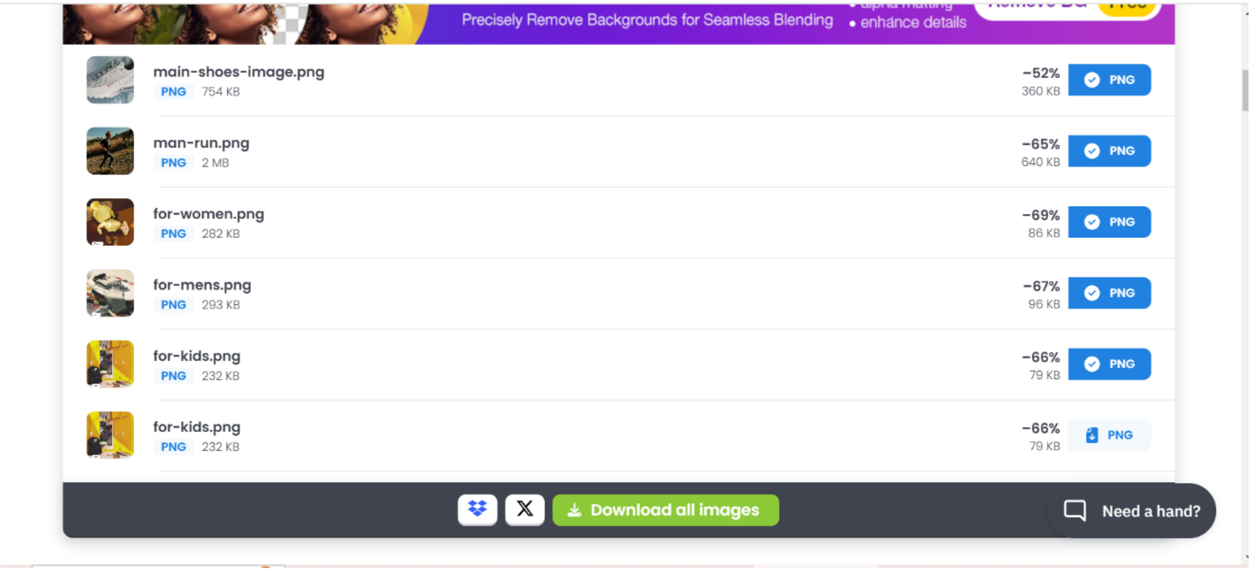
Results: The website achieved an 88% performance score and a 90% structure score.

Impact:

- Faster page load times enhance user experience.
- Improved SEO rankings due to better performance metrics.
- Reduced bounce rates, ensuring users stay engaged longer.

2. Image Optimization

Tool Used: *TinyPNG*



main-shoes-image.png	PNG 754 KB	-52%	360 KB	PNG
man-run.png	PNG 2 MB	-65%	640 KB	PNG
for-women.png	PNG 282 KB	-69%	86 KB	PNG
for-mens.png	PNG 293 KB	-67%	96 KB	PNG
for-kids.png	PNG 232 KB	-66%	79 KB	PNG
for-kids.png	PNG 232 KB	-66%	79 KB	PNG

Process: Compressed images while maintaining quality to reduce file sizes.

Impact:

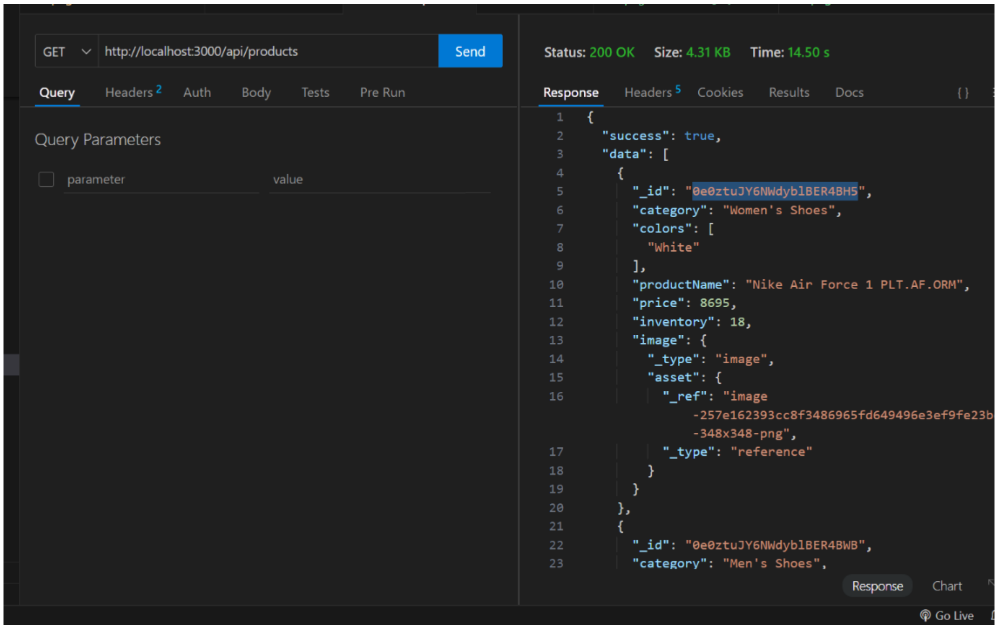
- Reduced image loading time, especially on slower networks.
- Improved overall performance scores in tools like Lighthouse and GTmetrix.
- Seamless browsing experience across devices.

3. API Testing

Tool Used: *Thunder Client (VS Code Extension)*

Process: Tested API endpoints to ensure reliable and accurate data fetching, especially for critical features like:

- Product listing
- Product Detail Page



GET http://localhost:3000/api/products

Query Parameters

parameter value

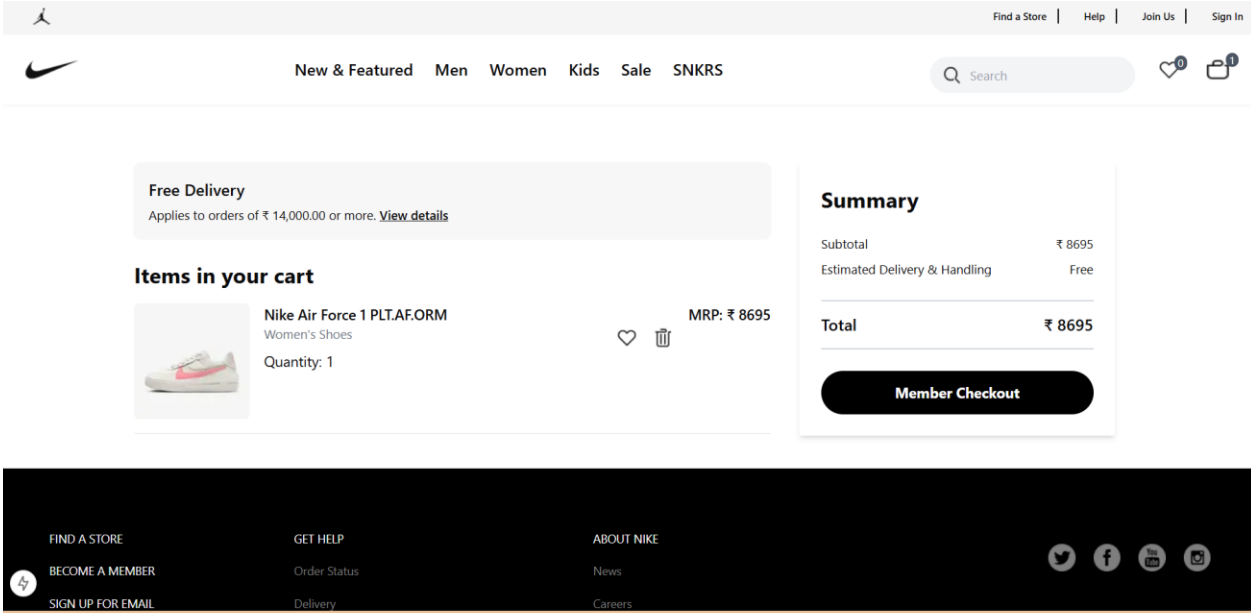
Status: 200 OK Size: 4.31 KB Time: 14.50 s

```
{
  "success": true,
  "data": [
    {
      "_id": "0e0ztuJY6NWdyblBER4BH5",
      "category": "Women's Shoes",
      "colors": [
        "White"
      ],
      "productName": "Nike Air Force 1 PLT.AF.ORM",
      "price": 8695,
      "inventory": 18,
      "image": {
        "_type": "image",
        "asset": {
          "_ref": "image
            -257e162393cc8f3486965fd649496e3ef9fe23b
            -348x348-png",
          "_type": "reference"
        }
      }
    },
    {
      "_id": "0e0ztuJY6NWdyblBER4BWB",
      "category": "Men's Shoes",
```

Impact:

- Verified API reliability to prevent downtime or incorrect data.
- Ensured faster debugging by visualizing API responses.

4. Add to Cart Feature Validation



Free Delivery

Applies to orders of ₹ 14,000.00 or more. View details

Items in your cart

Nike Air Force 1 PLT.AF.ORM
Women's Shoes
Quantity: 1
MRP: ₹ 8695

Summary

Subtotal	₹ 8695
Estimated Delivery & Handling	Free
Total	₹ 8695

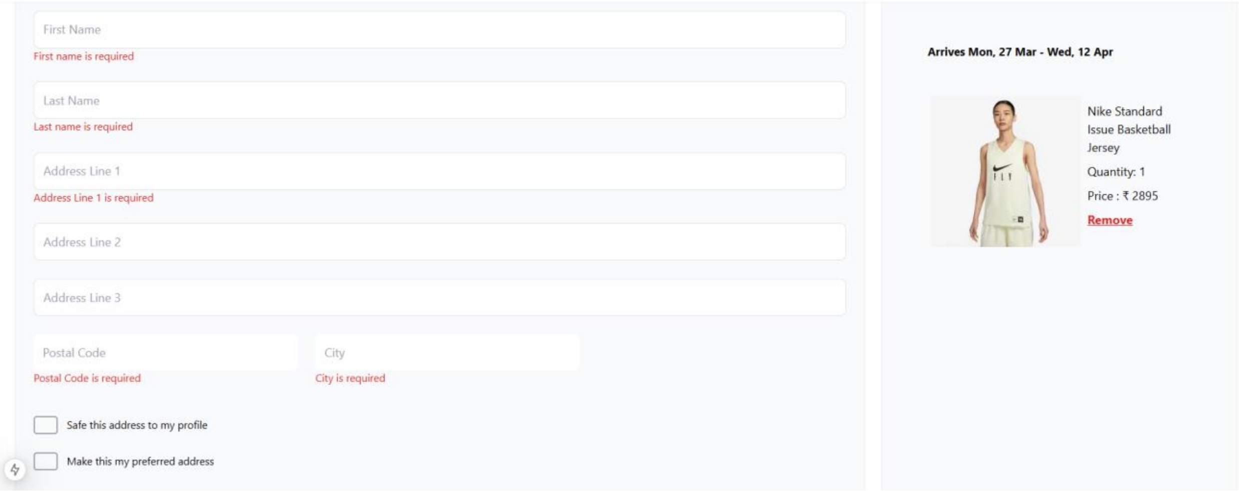
Process: Conducted manual testing of the "Add to Cart" feature to confirm:

- Products are added and displayed in the cart accurately.
- Total cost calculation updates dynamically.

Impact:

- Enhanced user convenience with real-time cart updates.
- Strengthened trust by providing an error-free shopping experience.

5. Form Validation on Checkout Page



First Name

First name is required

Last Name

Last name is required

Address Line 1

Address Line 1 is required

Address Line 2

Address Line 3

Postal Code

Postal Code is required

City

City is required

□ Safe this address to my profile

□ Make this my preferred address

Arrives Mon, 27 Mar - Wed, 12 Apr

Nike Standard Issue Basketball Jersey

Quantity: 1

Price : ₹ 2895

Remove

Implementation: Applied client-side validation to ensure data accuracy and prevent errors during checkout.

Validation Points:

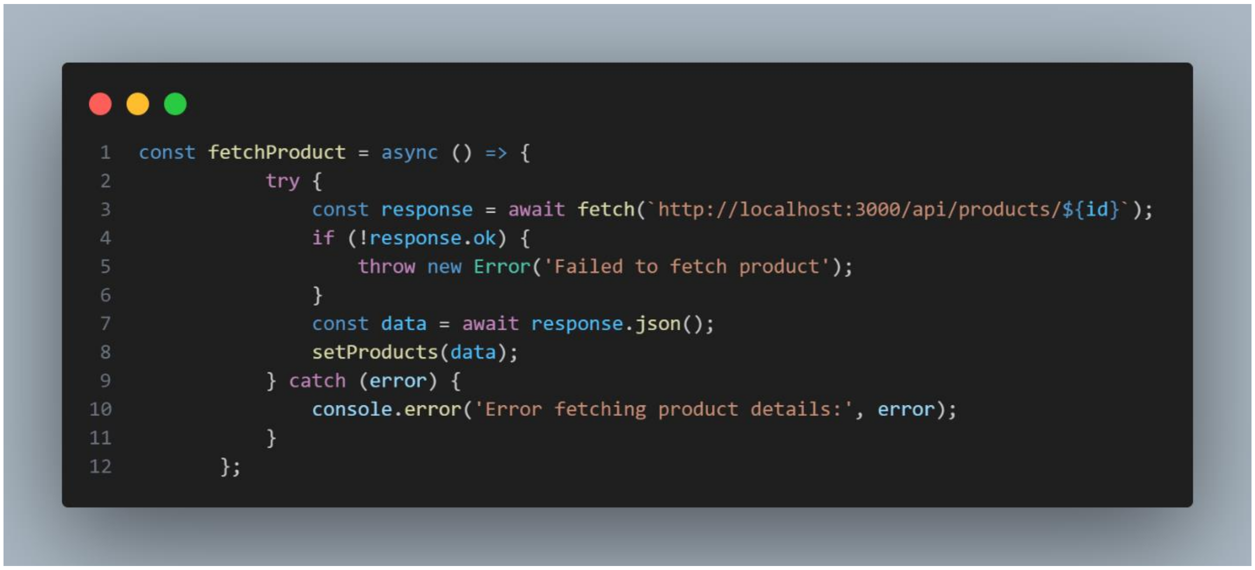
- Required fields for name, email, address, city, and zip code.
- Specific formats for email and zip code.

Impact:

- Reduced errors and incomplete orders.
- Improved user satisfaction by guiding them through a smooth checkout process.

6. Error Handling Mechanisms

Error handling was a priority to ensure users don’t encounter a broken or confusing experience. Specific implementations included:



```
const fetchProduct = async () => {
           try {
               const response = await fetch(`http://localhost:3000/api/products/${id}`);
               if (!response.ok) {
                   throw new Error('Failed to fetch product');
               }
               const data = await response.json();
               setProducts(data);
           } catch (error) {
               console.error('Error fetching product details:', error);
           }
       };
```

Empty States: For scenarios like a no Product Found , user-friendly messages like "No Product Found " or "No items match your search" were added.

Result:

These mechanisms ensure users are guided clearly in case of errors, improving usability and reducing frustration.

4. Security Enhancements

Security measures were implemented to protect both user and application data:

- **Input Validation:** All user inputs were sanitized to prevent injection attacks. Regular expressions were used to validate fields like email and phone numbers.
- **API Security:** API keys were stored securely in environment variables, ensuring they are not exposed on the client side.
- **HTTPS Communication:** All API requests were routed over HTTPS for secure communication.

Result:

These steps make the marketplace safe for users and maintain the integrity of backend data.

5. Cross-Browser and Device Compatibility

To ensure a consistent experience across different platforms:

- **Browser Testing:** The site was tested on major browsers like Chrome, Firefox, Safari, and Edge. Adjustments were made for consistent rendering.
- **Device Testing:** Both manual and tool-based testing (e.g., BrowserStack) ensured the site works smoothly on desktops, tablets, and mobile devices.

Result:

The marketplace is now fully responsive and accessible on all major browsers and devices, enhancing its reach and usability.

CSV-Based Report

TEST CASE ID	TEST CASE DESCRIPTION	TEST STEPS	EXPECTED RESULT	ACTUAL RESULT	STATUS	SEVERITY LEVEL	REMARKS
TC001	Test Product Listing	Visit product page	Products display correctly	Products show up as expected	Passed	Low	No Issue
TC002	Search functionality	Enter product keyword	Accurate results shown	Products show up as expected	Passed	Medium	No Issue Found
TC003	Add to cart functionality	Add item to cart	Cart updates correctly	Cart Update As expected	Passed	High	No Issue
TC004	Product filtering by category	Apply multiple filters	Accurate results displayed	As expected	Passed	Medium	Test with more categories

Benefits of This Refinement

1. **Enhanced User Trust:** Clear error messages and seamless functionality build confidence among users.
2. **Improved Performance:** Faster load times and smoother navigation reduce bounce rates and improve engagement.
3. **Better Scalability:** Optimized backend integrations ensure the site is ready to handle higher traffic.

4. **Higher Accessibility:** Cross-browser and device compatibility ensures a wide audience can access the marketplace.
5. **Robust Security:** Data is protected, fostering trust in handling sensitive user information.
6. **Professional Standards:** Adhering to form validation, API testing, and performance optimization ensures the website meets industry best practices.
7. **Reliable Features:** Ensured core functionalities like "Add to Cart" and checkout work flawlessly under different scenarios.

Conclusion

The efforts on Day 5 have transformed the marketplace into a polished, high-performing, and reliable platform. The focus on testing, error handling, and optimization ensures users will have a seamless experience, whether browsing products, managing their cart, or completing a purchase.