Day 5 - Testing and Backend Refinement – Car Rental Marketplace

Objective

Day 5 was dedicated to ensuring the marketplace was optimized for real-world deployment by performing thorough testing, refining backend integrations, and implementing robust error handling mechanisms. The primary goals included:

- Conducting comprehensive functional, security, and performance testing.
- Implementing clear and user-friendly error handling.
- Optimizing marketplace speed and responsiveness.
- Ensuring cross-browser and device compatibility.
- Preparing detailed documentation and a structured testing report.

Key Activities and Implementations

1. Functional Testing

Objective: Validate core functionalities to ensure seamless user experience.

Tested Features:

- **Product Listing**: Verified accurate product display.
- **Filters & Search**: Ensured accurate results based on input queries.
- **Wishlist Operations**: Added, updated, and removed items to verify smooth transactions.
- **Dynamic Routing**: Confirmed proper loading of individual product pages.

Tools Used:

- **Postman**: For API response validation.
- **React Testing Library**: For component-level behavior testing.
- **Cypress**: For end-to-end testing.

Approach:

- Wrote and executed test cases for each feature.
- Simulated user interactions (e.g., clicking, form submissions, navigation).
- Validated expected vs. actual results.

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2. Error Handling Implementation

Objective: Ensure clear and informative error messages with fallback UI.

Implemented Mechanisms:

- **Try-Catch Blocks** for API calls.
- **Fallback UI Elements** to handle errors gracefully (e.g., "No products available" messages).
- **Logging Mechanisms** to capture backend errors.

Example Code Snippet:

```
try {
  const data = await fetchProducts();
  setProducts(data);
} catch (error) {
  console.error("Failed to fetch products:", error);
  setError("Unable to load products. Please try again later.");
}
```

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3. Performance Optimization

Objective: Enhance speed and responsiveness of the marketplace.

Optimization Steps Taken:

- **Image Compression**: Used TinyPNG for optimized image sizes.
- **Lazy Loading**: Implemented for large images and assets.
- **Code Optimization**: Minimized JavaScript and CSS, enabled browser caching.
- **Performance Testing**: Used Lighthouse and Google PageSpeed Insights to identify bottlenecks.

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4. Cross-Browser & Device Testing

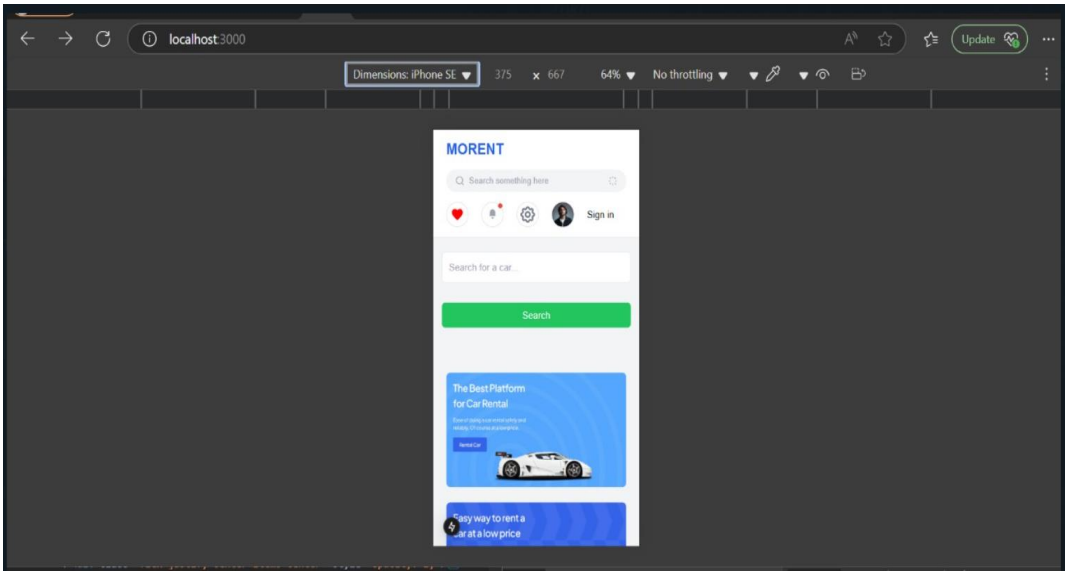
Objective: Ensure a consistent experience across different browsers and devices.

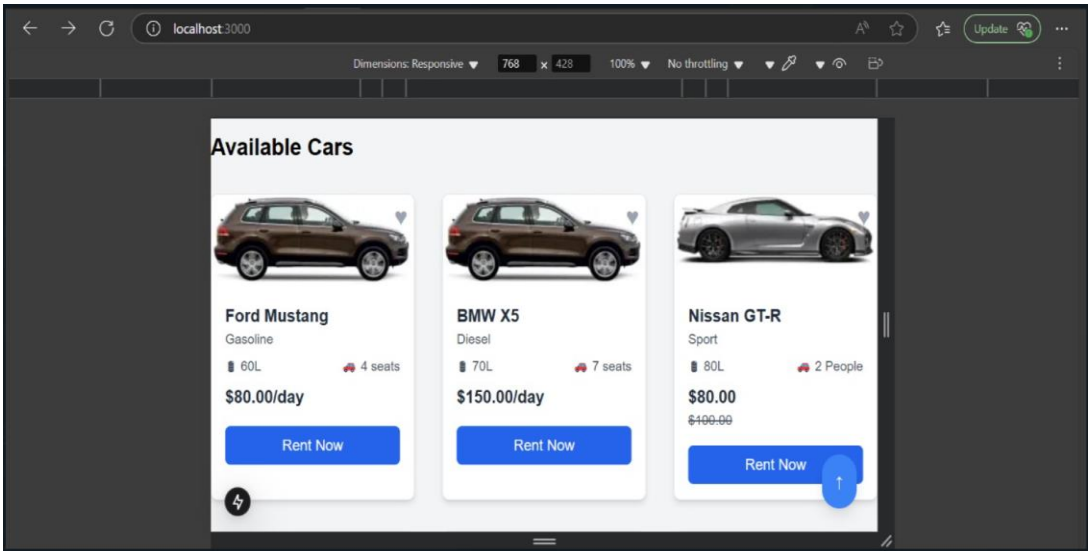
Browsers Tested:

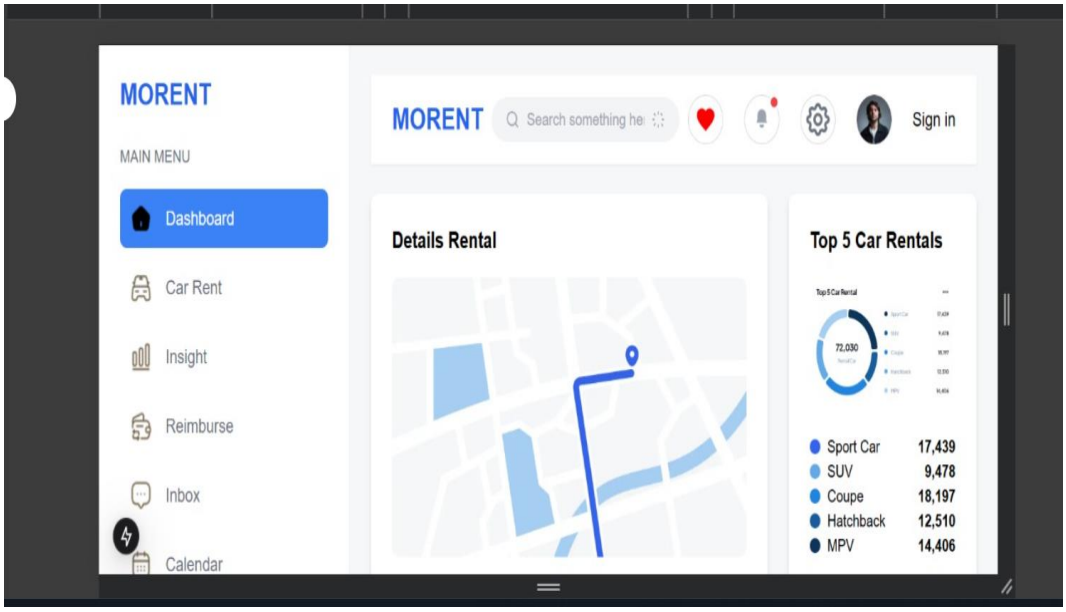
- Google Chrome
- Mozilla Firefox
- Safari
- Microsoft Edge

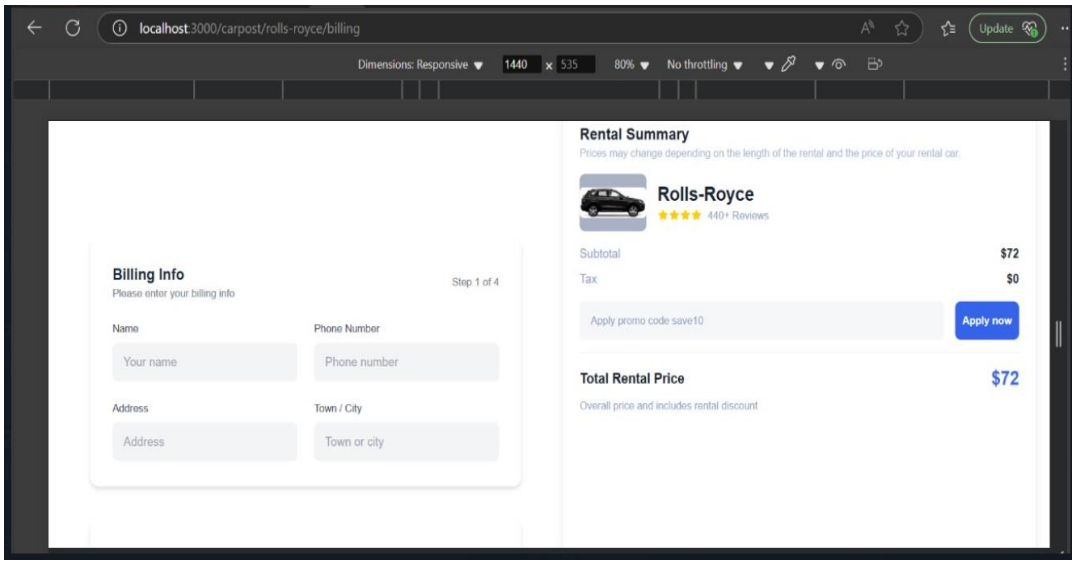
Devices Tested:

- Desktop (Windows & Mac)
- Mobile (Android & iOS)
- Table(iPad& Android)


localhost:3000
Update
Dimensions: iPhone SE
375
x
667
64%
No throttling
MORENT
Search something here
Sign in
Search for a car...
Search
The Best Platform
for Car Rental
Easy way to rent a
car at a low price


localhost:3000
Update
Dimensions: Responsive
768
x
428
100%
No throttling
Available Cars
Ford Mustang
Gasoline
60L
4 seats
$80.00/day
Rent Now
BMW X5
Diesel
70L
7 seats
$150.00/day
Rent Now
Nissan GT-R
Sport
80L
2 People
$80.00
$100.00
Rent Now


MORENT
MAIN MENU
Dashboard
Car Rent
Insight
Reimburse
Inbox
Calendar
MORENT
Search something he
Sign in
Details Rental
Top 5 Car Rentals
72,030
Sport Car 17,439
SUV 9,478
Coupe 18,197
Hatchback 12,510
MPV 14,406


localhost:3000/carpost/rolls-royce/billing
Update
Dimensions: Responsive
1440
535
80%
No throttling
Billing Info
Please enter your billing info
Step 1 of 4
Name
Your name
Phone Number
Phone number
Address
Address
Town / City
Town or city
Rental Summary
Prices may change depending on the length of the rental and the price of your rental car.
Rolls-Royce
440+ Reviews
Subtotal
$72
Tax
$0
Apply promo code save10
Apply now
Total Rental Price
$72
Overall price and includes rental discount

Tools Used:

- BrowserStack for virtual testing across devices.
- Manual testing on a physical mobile device.

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5. Security Testing

Objective: Secure the marketplace from vulnerabilities.

Security Measures Implemented:

- **Input Validation**: Used regex to sanitize form inputs (e.g., email, phone number validation).
- **HTTPS Enforcement**: Ensured all API calls were securely transmitted.
- **Sensitive Data Handling**: Stored API keys in environment variables.

Tools Used:

- OWASP ZAP for vulnerability scanning.
- Burp Suite for penetration testing.

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6. User Acceptance Testing (UAT)

Objective: Validate the user experience and usability.

Testing Process:

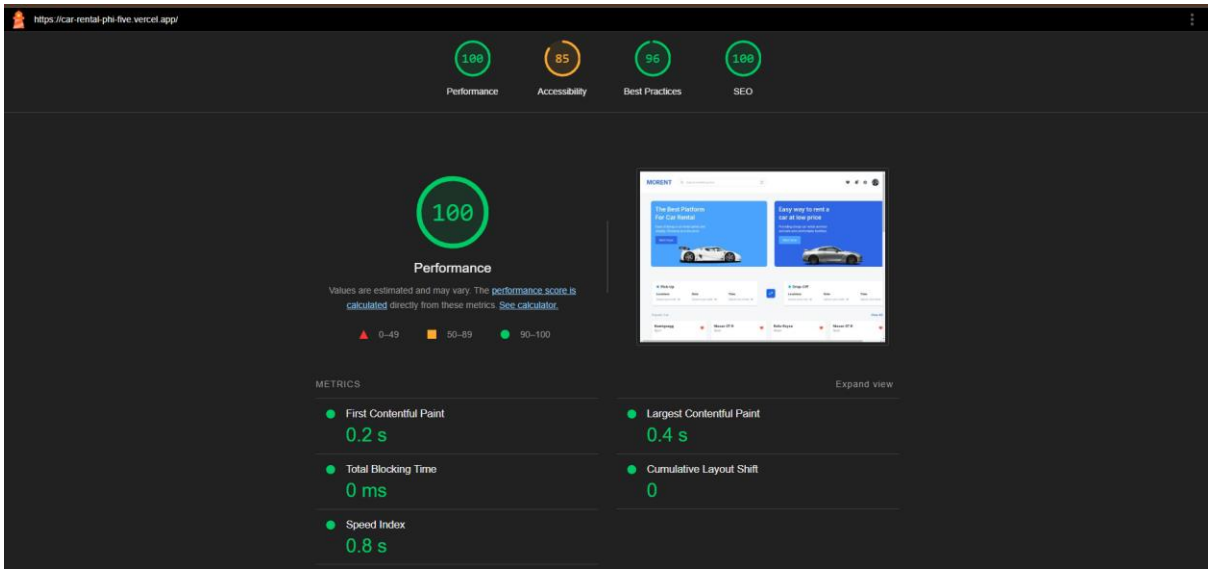
- Simulated real-world scenarios (e.g., product browsing, checkout processes).
- Gathered feedback from peers and mentors.
- Identified UI/UX issues and resolved them for better usability.

CSV REPORT

	A	B	C	D	E
1	Metric	Score			
2	Performar	100			
3	Accessibili	85			
4	Best Practi	96			
5	SEO	100			
6					
7	Metrics	Value			
8	First Conte	0.2 s			
9	Largest Co	0.4 s			
10	Total Bloc	0 ms			
11	Cumulativ	0			
12	Speed Ind	0.8 s			
13					
14	Diagnostic	Issue			
15	Largest Contentful Paint image was lazily loaded				
16	Initial serv	Root document took 580 ms			
17	Avoids en	Total size was 271 KiB			
18	Avoids an	492 elements			
19	Avoid chai	1 chain found			

20	JavaScript	0.1 s							
21	Minimizes	0.2 s							
22	Largest Co	400 ms							
23									
24	Accessibili	Description							
25	Buttons do not have an accessible name								
26	Links do not have a discernible name								
27	Contrast	Background and foreground colors do not have a sufficient contrast ratio							
28	Navigatior	Heading elements are not in a sequentially-descending order							
29									
30	Best Pract	Description							
31	Browser errors were logged to the console								
32	Ensure CSP is effective against XSS attacks								
33									
34	SEO Check	Status							
35	Structurec	Passed							
36									

LIGHTHOUSE PERFORMANCE REPORT



Expected Output

By the end of **Day 5**, the following were successfully achieved:

✅ Fully tested and functional marketplace components. ✅ Robust error handling mechanisms with fallback UI elements. ✅ Optimized performance with improved load times. ✅ Responsive design tested across multiple browsers and devices. ✅ Comprehensive documentation with structured test reports. ✅ Secure API communication and input validation measures implemented.

Conclusion

Day 5 was dedicated to ensuring that the marketplace was ready for real-world deployment by rigorously testing its functionalities, securing the backend, and optimizing performance. The process involved multiple testing methodologies, security audits, and real-world user acceptance testing to ensure a seamless experience.

This document serves as a comprehensive summary of all the work completed on **Day 5**, providing a structured report for submission.
