DAY 6- DEPLOYMENT PREPARATION AND STAGING ENVIRONMENT SETUP

Before deploying your website, it's crucial to ensure everything is prepared and optimized for production. Here's a checklist to help you:

1. Code and Dependencies

- Remove Unused Code and Dependencies: Clean up any unused code, libraries, or components to reduce bundle size.

- Use .env for Secrets: Store API keys, environment-specific variables, and sensitive data in .env files. Never hardcode sensitive information.

- Check for Warnings/Errors: Ensure there are no errors or warnings in your code during development (npm run dev) or build (npm run build).

2. Environment Configuration

- Set the Correct Environment: Ensure your environment variable NEXT_PUBLIC_NODE_ENV is set to "production".

- API Endpoints: Verify that all API endpoints point to production servers (not staging or local).

- Environment Variables: Ensure all required environment variables are set in the production environment.

3. Static and Dynamic Pages

- Test Static Generation (getStaticProps/getStaticPaths): Ensure all paths and data-fetching logic work correctly during the build process.

- Verify Server-Side Rendering (getServerSideProps): Confirm pages requiring dynamic data load correctly.

- Fallbacks for Dynamic Routes: If using getStaticPaths, ensure fallback is properly configured.

4. Optimization

- Image Optimization: Use Next.js Image Optimization with the <Image /> component for better performance.

- Bundle Analysis: Run next build && next analyze to identify large bundles and optimize them.

- Tree Shaking: Ensure dead code elimination is working, and you are importing only what you need.

5. Security

- HTTPS: Use an SSL certificate to secure your site.

- Helmet or Equivalent: Add headers for security (e.g., Content Security Policy, X-Frame-Options).

- Sanitize User Inputs: Prevent XSS, SQL injection, and other attacks if you're accepting user input.

- Rate Limiting: If you have APIs, implement rate-limiting to prevent abuse.

6. Performance

- Test Load Time: Use tools like Lighthouse, PageSpeed Insights, or WebPageTest to analyze performance.

- Enable Caching: Use Cache-Control headers for static assets and optimize caching for APIs.

- Lazy Loading: Use lazy loading for images and components that aren't above the fold.

7. Accessibility

- Run Accessibility Tests: Use tools like Axe or Lighthouse to ensure the site is accessible to all users.

- Keyboard Navigation: Verify that all interactive elements can be accessed and used via keyboard.

- Alt Text for Images: Ensure all images have descriptive alt text.

8. Error Handling

- Global Error Pages: Create custom error pages for 404 and 500 errors.

- Error Logging: Integrate error reporting tools like Sentry to monitor runtime errors in production.

9. Final Testing

- Cross-Browser Testing: Test your site in multiple browsers (Chrome, Firefox, Safari, Edge).

- Responsive Design: Verify the site looks good on different screen sizes (mobile, tablet, desktop).

- Test Critical Flows: Ensure all user journeys (e.g., login, checkout, search) work seamlessly.

- I use Lighthouse, Cypress tool for checking performance and components.

10. Deployment

- Build and Export: Run npm run build and verify the output in the .next folder.

- Preview Deployment: Deploy to a staging environment before production.

- Use a CDN: Deploy using a CDN (e.g., Vercel, AWS CloudFront) for better performance and distribution.

- Monitor Deployment: Test the live site thoroughly after deployment.

Step 1: Functional Testing

1. Search Bar

- Expected Functionality:

    o Users can search for products by keywords.

    o Suggestions or auto-completion may appear as the user types.

- Features to Test:

    o Search results update dynamically as the user types.

    o Correct products are displayed based on search terms.

    o Handling of no results (e.g., display a "No results found" message).

    o Case-insensitivity in searches.

    o Search performance for large datasets.

    o Special characters or empty input should not crash the application.

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2. Add to Cart

- Expected Functionality:

    o Users can add products to the cart with a single click.

    o Quantity selection is available and updates in the cart.

- Features to Test:

- Item successfully added and reflected in the cart.

- Cart total updates correctly with the addition or removal of items.

- Handle duplicate product addition (increase quantity instead of duplicate rows).

- UI feedback after adding an item (e.g., toast notifications or badge updates).

- Persistence of cart data (local storage/session storage).

- Validation for adding invalid items (e.g., out of stock).

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3. Product Card

- Expected Functionality:

  - Each card displays product details (name, price, description, image).

  - Click actions navigate to the product detail page or perform another action.

- Features to Test:

  - All data displays correctly on the product card.

  - Card responsiveness across various screen sizes.

  - Image loading and fallback if an image is missing.

  - Click actions on "Add to Cart" or "View Details" buttons.

  - Hover effects and accessibility features (e.g., focus state).

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4. Filter

- Expected Functionality:

  - Users can filter products based on categories, price range, ratings, etc.

  - Multiple filters can be applied simultaneously.

- Features to Test:

- o Filter criteria are correctly applied to the product list.

- o Filters are reset when the user clears selections.

- o Combined filtering (e.g., category + price range).

- o Performance with large datasets and multiple filters.

- o Clear messaging when no products match the applied filters.

- o Responsive design for filter options.

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5. Dynamic Cards

- Expected Functionality:

  - o Cards dynamically display data based on user interactions or API responses.

- Features to Test:

  - o Cards update correctly with API data or dynamic changes.

  - o No duplication or missing cards.

  - o Handle errors gracefully when dynamic data fails to load.

  - o Performance for loading large numbers of cards.

  - o UI behavior when the number of cards exceeds the visible area (e.g., infinite scroll or pagination).

Step 2:Error Handling

1. API Connectivity

- Ensure the API endpoints are reachable and return a **200 OK** status.

- Verify secure connections using HTTPS.

- Test the API with **valid** and **invalid** tokens (if authentication is required).

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2. Sanity Integration

- Confirm that Sanity CMS is correctly configured and data is being fetched using GROQ queries or other mechanisms.

- Validate that Sanity's dataset matches the structure your frontend expects.

- Ensure real-time updates from Sanity (if using its real-time listener).

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3. Data Accuracy

- Validate the API data matches the structure and fields required on your website (e.g., titles, descriptions, images, etc.).

- Test data integrity by cross-checking with Sanity Studio.

- Handle cases where data is incomplete or fields are missing gracefully.

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4. Error Handling

- Test for API failures (e.g., 404 Not Found, 500 Internal Server Error) and ensure appropriate error messages are displayed to the user.

- Handle **timeout scenarios** gracefully without breaking the UI.

- Display fallback content or messages when the API fails to fetch data.

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5. Performance

- Measure API response times and ensure they are within acceptable limits.

- Optimize queries in Sanity (e.g., limit the fields fetched to only those required).

- Use caching mechanisms (e.g., stale-while-revalidate or getStaticProps/getServerSideProps in Next.js).

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6. Data Rendering on the Website

- Ensure the data fetched from APIs dynamically populates the components correctly (e.g., product cards, filters, etc.).

- Handle edge cases, such as empty data arrays or unexpected data formats.

- Test dynamic routing or URL-based data rendering (e.g., /product/:id).

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7. Pagination and Lazy Loading

- Test API responses for paginated data (if implemented) and validate next/previous page calls.

- Verify that lazy loading or infinite scroll fetches data correctly without duplication.

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8. API Security

- Validate that sensitive data (e.g., API keys) is not exposed in the frontend code.

- Use environment variables (process.env) to store keys securely in the build.

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9. Cross-Browser Compatibility

- Ensure API-driven data renders consistently across different browsers and devices.

- Test for older browser versions to ensure compatibility.

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10. Real-Time Updates (if applicable)

- If using real-time updates (e.g., WebSockets, Sanity's real-time listener), validate that changes in Sanity reflect instantly on the website.

- Ensure live updates don't cause performance bottlenecks.

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11. Accessibility

- Ensure API data renders in a way that supports accessibility (e.g., readable by screen readers, properly labeled ARIA roles).

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12. Localization (if applicable)

- If the API serves data for multiple languages, validate that the correct language data is displayed based on user settings.

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13. Testing Automation

- Automate the API testing using tools like **Postman**, **Cypress**, or **Jest** to validate responses for expected scenarios.

- Write end-to-end tests in Cypress to simulate user interactions that trigger API calls and validate their behavior.

Step3: Api Testing

Here are some key points you might consider when working with and testing your API:

1. Understanding the API

- **Base URL**: https://fakestoreapi.com/products

- **Purpose**: Provides product data for a mock e-commerce platform.

2. Common API Operations

- **GET**: Fetch all products or a single product by ID.

- **POST**: Add a new product (if supported by the API).

- **PUT/PATCH**: Update existing product data.

- **DELETE**: Remove a product.

3. Testing Points

- **Response Status Codes**: Ensure the API returns appropriate HTTP status codes:

  - 200 OK for successful operations.

  - 404 Not Found for invalid endpoints or missing resources.

- 201 Created for successful POST operations.

- **Response Data**: Verify the structure and content of the response:

  - Are all expected fields (id, title, price, description, category, etc.) present?

  - Validate data types (e.g., price is a number, title is a string).

- **Error Handling**: Test for appropriate error messages and status codes when:

  - Providing invalid IDs.

  - Missing required fields in POST/PUT requests.

- **Performance**: Measure response times using Thunder Client/Postman.

4. Sanity Checks

- Test the API with a minimal set of inputs to confirm it's functional.

- Verify default behaviors for optional parameters.

5. Examples

- **GET All Products**: GET https://fakestoreapi.com/products

- **GET Single Product**: GET https://fakestoreapi.com/products/1

- **POST Example**:

json

CopyEdit

```
{
  "title": "New Product",
  "price": 29.99,
  "description": "A brand-new item",
  "category": "electronics",
  "image": "https://example.com/image.jpg"
}
```
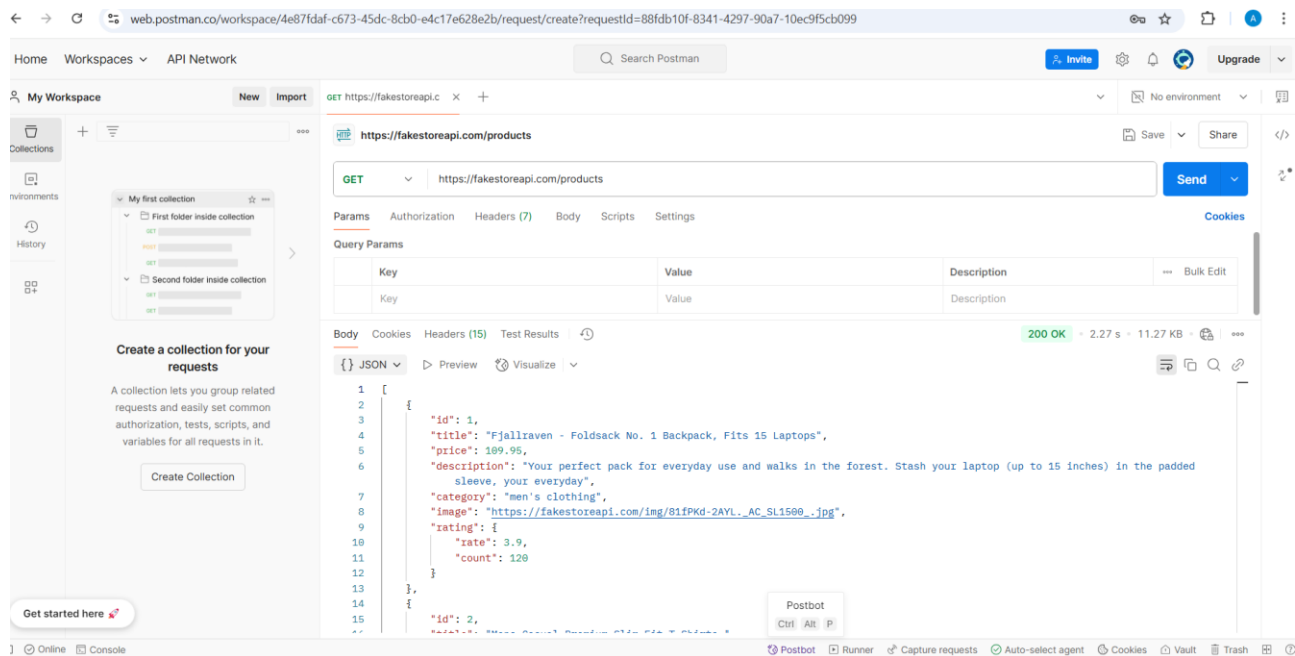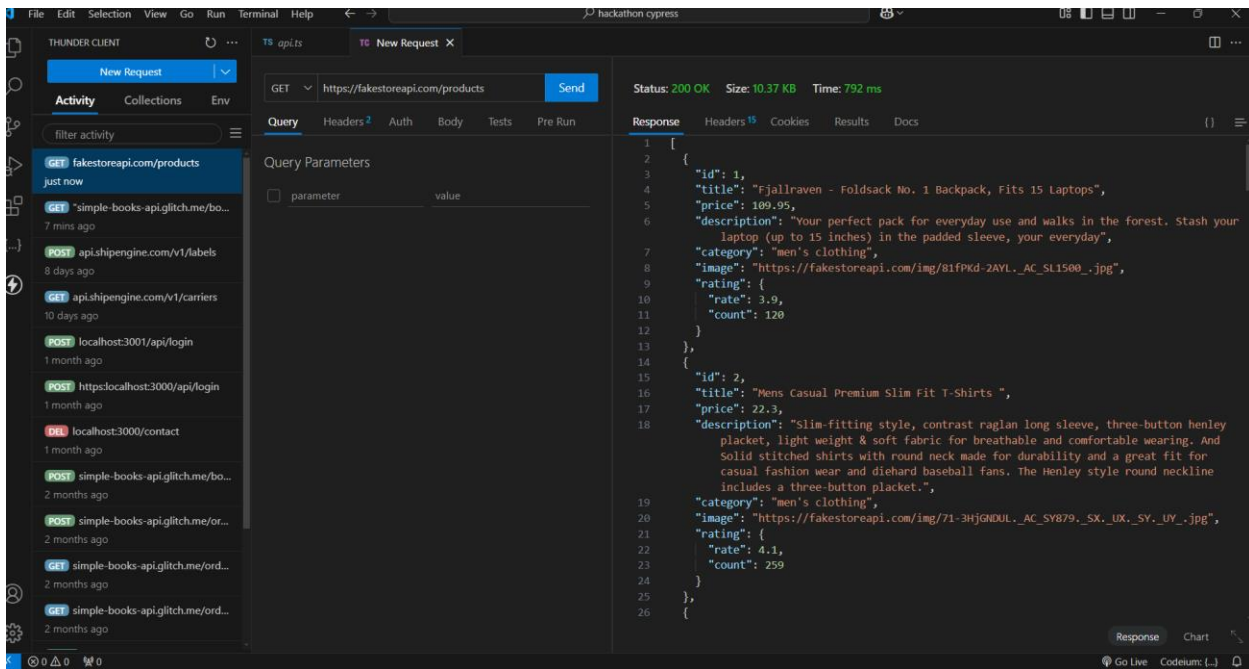
- **PUT Example**:

json

CopyEdit

```
{
  "title": "Updated Product",
  "price": 25.99
}
```

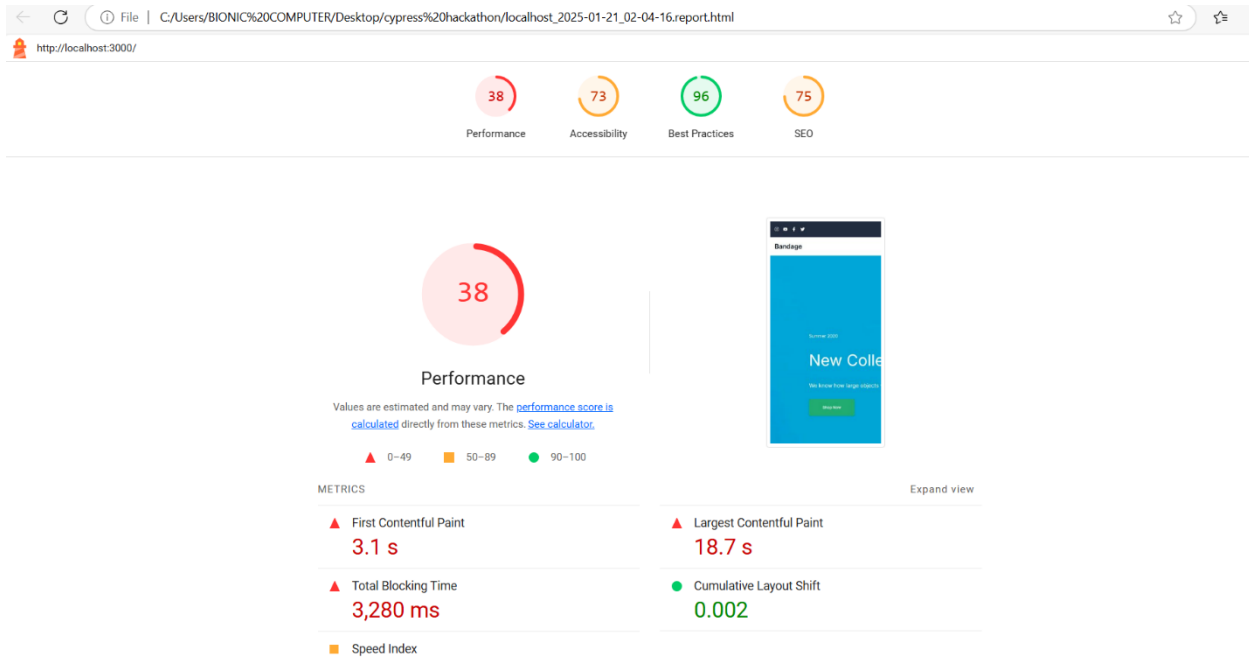## 6. Integration with Your Website (Bandage)

- **Fetch and Display**: Use the GET method to fetch product data and render it dynamically.

- **Form Submissions**: Utilize POST for adding new items to the catalog.

- **CMS (Sanity)**: Integrate with Sanity to manage and store product content effectively.

Postman

Thunder ClientUsing Light House

http://localhost:3000/

(38) (73) (96) (75)

⊞ View Treemap

Show audits relevant to: **All** FCP LCP TBT CLS

DIAGNOSTICS

▲ Minimize main-thread work — 6.5 s ⌄

▲ Reduce JavaScript execution time — 4.5 s ⌄

▲ Largest Contentful Paint element — 18,680 ms ⌄

▲ Eliminate render-blocking resources — Potential savings of 2,010 ms ⌄

▲ Preconnect to required origins — Potential savings of 350 ms ⌄

▲ Reduce unused CSS — Potential savings of 16 KiB ⌄

▲ Reduce the impact of third-party code — Third-party code blocked the main thread for 770 ms ⌄

▲ Page prevented back/forward cache restoration — 4 failure reasons ⌄

■ Minify CSS — Potential savings of 3 KiB ⌄

http://localhost:3000/

(38) (73) (96) (75)

96

Best Practices

GENERAL

▲ Browser errors were logged to the console ⌄

○ Detected JavaScript libraries ⌄

▲ Missing source maps for large first-party JavaScript ⌄

TRUST AND SAFETY

○ Ensure CSP is effective against XSS attacks ⌄

○ Use a strong HSTS policy ⌄

○ Ensure proper origin isolation with COOP ⌄

Test Case ID	Test Case Description	Test Steps	Expected Result	Actual Result	Status	Security Level	Assigned to	Remarks
TC001	Validate product listing	Open product page>verify products	Products displayed correctly	Products displayed correctly	Passed	Low	-	No issue Found
TC002	Test API error Handling	Use postman and thunder client	no error	array of object shown	Passed	Medium	-	Successful
TC003	Check Cart functionality	Add products to cart>check functionality	Cart updated with added product	Card update	Passed	High	-	Successful
TC004	Ensure responsiveness on mobile	Check layout	layout adjust properly to screen	Responsive layout	Passed	Medium	-	Successful

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TC004	Ensure responsiveness on mobile	Check layout	Responsive layout	Passed	Medium	Successful