# BUG HUNTERS

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## Abstract

This project presents a full end-to-end quality assurance cycle conducted by the Bug Hunters team to evaluate and ensure the stability, performance, and reliability of an e-commerce application modeled after Swag Labs. The testing process covered the entire lifecycle of a modern QA project—beginning with requirement analysis, test planning, and test design, followed by structured manual testing, exploratory sessions, defect management, and coverage validation.

The project advanced into automation using Selenium WebDriver and TestNG, applying the Page Object Model to create a scalable and maintainable test framework capable of executing regression and critical-path scenarios. Additionally, API testing was introduced through DummyJSON to simulate real backend interactions, enabling verification of authentication, product data, and CRUD flows.

Through a combination of test artifacts—test cases, bug reports, traceability matrices, automation scripts, and summary documentation—the team successfully demonstrated the full testing workflow required to validate an e-commerce platform end-to-end. The results highlight improved coverage, efficient defect detection, and strong alignment with QA best practices, showcasing a complete, professional, and industry-aligned testing project.

# 1 Introduction

E-commerce applications rely on accuracy, speed, and reliability—every button, every price calculation, and every checkout step must operate flawlessly to ensure user trust. With this in mind, the Bug Hunters team set out to test an e-commerce system inspired by Swag Labs, applying industry-standard QA methodologies to simulate real-world user journeys and uncover potential weaknesses in the platform.

The project began with a structured analysis of requirements and user stories, forming the basis of a comprehensive Test Plan that defined scope, risk, strategy, environment, and deliverables. From this foundation, the team designed detailed test cases, scenarios, and data sets that guided an organized manual testing effort covering authentication, product browsing, cart behavior, checkout flow, UI correctness, and error handling.

As the project evolved, automated testing was introduced to enhance reliability and reduce regression effort. Using Java, Selenium WebDriver, TestNG, and the Page Object Model, we built a scalable automation framework capable of executing scenarios across login, products, cart, checkout, and full user journeys. Parallel to this, API testing was implemented using DummyJSON, allowing the team to simulate real backend behavior and validate essential endpoints such as login and product retrieval.

All testing activities were supported by structured defect reporting, evidence tracking, coverage evaluation, and traceability mapping to ensure that every requirement was accounted for. Together, these phases form a complete, end-to-end QA project that reflects a real software testing cycle—from planning to execution to documentation.

# 2 TestWare

The TestWare for this project includes all testing artifacts created throughout the testing lifecycle. These assets were used to plan, design, execute, track, and report testing activities. The following components make up the TestWare package:

1. **Test Plan** – Defines the overall testing strategy, scope, objectives, roles, and schedule.
2. **Test Cases** – A structured set of step-by-step test executions documented in the *Test_Cases* sheet.
3. **Test Scenarios** – High-level functional workflows derived from requirements and user stories.
4. **Bug Reports** – All identified defects recorded in Jira and summarized in the *Bug_Report* sheet.
5. **Traceability Matrix** – Ensures full coverage by linking requirements → test cases → defects, available in the *Traceability* sheet.
6. **Test Data** – User accounts, input values, and environment-specific data required to execute test cases.
7. **Test Environment Details** – Browsers, OS, URLs, tools, and configurations used for testing.
8. **Test Execution Results** – Status of each test case, execution cycles, and notes.
9. **Summary Report** – Final evaluation of testing outcomes, referencing the *Summary_Report* sheet.
10. **SIQs (Supplementary Information Questions)** – Additional clarifications and constraints documented in the *SIQs* sheet.
11. **Supporting Test Assets** – Screenshots, evidence, and attachments stored in the *TC_Assets* sheet.
    Together, this TestWare provides complete visibility into the project's testing workflow and supports quality assurance throughout the development lifecycle.

## 2.1 Test Plan

### 2.1.1 Purpose

The purpose of this Test Plan is to define the overall testing strategy, scope, resources, tools, and schedule for validating the SwagLabs e-commerce application. This plan ensures that all functionalities—including login, product sorting, cart operations, and checkout—are systematically tested to verify quality and stability.

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### 2.1.2 Test Objectives

The key objectives of the manual testing process are:

- Validate that all user-facing features operate according to the requirements.
- Identify defects and inconsistencies in UI, functionality, performance, and usability.
- Ensure sorting, filtering, cart management, and checkout flows work end-to-end.
- Verify the system meets acceptance and quality standards before delivery.

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### 2.1.3 Scope

**In-Scope**

- User Login (positive & negative scenarios)
- Product Page Display
- Sorting & Filtering Functions
- Shopping Cart (add, remove, badge update)
- Checkout Process
- Error Messages & UI Behavior
- Regression Testing for fixed bugs

**Out-of-Scope**

- API testing for Swag Labs (because the application does not provide real APIs)
- Performance / Load testing
- Backend Testing
- Automation testing details are covered in a separate section

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### 2.1.4 Test Approach / Strategy

The testing approach consists of the following:

**Manual Functional Testing**

- Based on requirements, user stories, and the Test_Cases sheet.
- Each module tested using detailed written test cases.

**UI & Usability Testing**

- Visual layout checks
- Button alignment
- Dropdown responsiveness
- Error message clarity

**Regression Testing**

- Performed after any fixes or updates.
- Ensures previously working features remain stable.

**Exploratory Testing**

- Conducted to uncover unexpected behaviors outside predefined test cases.

**Automation Testing**

Automation will be performed using **Selenium WebDriver** to validate repetitive and critical flows such as login, cart operations, sorting, and checkout.

Automation scripts help reduce manual workload and improve regression coverage.

**API Testing**

Since **Swag Labs does not offer public APIs**, we used **DummyJSON** to simulate API responses for users, authentication, and products.

DummyJSON acted as a mock e-commerce backend to demonstrate:

- User login via API
- Product retrieval
- CRUD interactions

  This allowed us to perform realistic API testing similar to modern online shopping APIs.

**Tools Used**

- **Jira** – Bug tracking and workflow management
- **Excel Sheets** – Project_Info, Requirements, User_Stories, Test_Cases, Traceability, Bug_Report

- **Browsers** – Chrome, Firefox
- **Selenium WebDriver** – Automation testing
- **DummyJSON API** – Mock API environment

### 2.1.5 Test Deliverables

The following deliverables will be produced:

- Test Cases Document
- Bug Reports (Jira + Bug_Report sheet)
- Test Execution Log
- Test Summary Report
- Traceability Matrix
- Automation Test Scripts (Selenium WebDriver)
- API Test Collection (DummyJSON-based)

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### 2.1.6 Test Environment

- **URL:** https://www.saucedemo.com
- **Browsers:** Chrome (latest), Firefox, Edge
- **Platforms:** Windows / Linux
- **Hardware:** Standard QA machines
- **Test Accounts:** Standard User, Problem User, Accepted Credentials

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### 2.1.7 Acceptance Criteria

- No **Critical** or **High** severity bugs open
- All major flows operate end-to-end
- Minimum **95%** test case execution completed
- Stable build delivered
- Automation scripts for core flows passing consistently

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### 2.1.8 Roles and Responsibilities

| **Role** | **Responsibilities** |
|---|---|
| **QA Lead** | Planning, reviewing test cases, ensuring coverage |
| **Testers** | Designing & executing test cases, reporting bugs |
| **Developers** | -No Developers for demo- |
| **Scrum Master** | Monitoring progress |

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### 2.1.9 Risks & Mitigation

#### *2.1.9.1 Risk: Team College Responsibilities*

**Impact:**
Reduced availability for testing cycles, possible delays in case execution.
**Mitigation:**

- Align schedules early
- Distribute workload based on availability
- Prioritize critical functionality first

##### *2.1.9.2 Risk: Swag Labs Demo Instability*

**Impact:**
The demo often switches between two builds, sometimes resulting in downtime or inconsistent behavior.
**Mitigation:**

- Re-test inconsistent failures
- Document demo outages separately
- Attach screenshots for verification
- Perform testing during known stable hours when possible

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##### *2.1.9.3 Risk: Changing Requirements*

**Impact:** Medium
**Mitigation:** Maintain traceability and conduct frequent communication syncs.

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##### *2.1.9.4 Risk: Delayed Developer Fixes*

**Impact:** High
**Mitigation:** Prioritize critical defects early and ensure timely follow-up.

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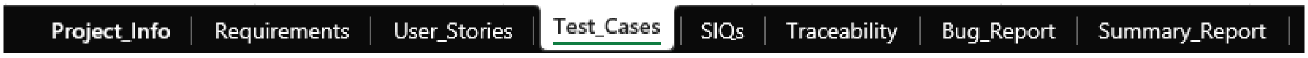
### 2.1.10 Exit Criteria

Testing will be considered complete when:

- All planned test cases are executed
- All critical bugs are fixed and verified
- Test summary report is delivered
- No blocker defects remain

# 3 Manual Testing

Our Manual Testing process was structured and executed using the full **Bug Hunters Testing Workbook**, which contains the following datasets used throughout the testing lifecycle:



These sheets served as the foundation for planning, designing, executing, and reporting our manual tests.

## 3.1 Test Cases

### How We Divided the Manual Testing

To ensure complete feature coverage, the manual testing effort was divided based on **functional modules of the system**, each derived from the *Requirements* and *User Stories* sheets. The division was as follows:

1. **Authentication Module**
   - Based on login-related requirements and negative login scenarios.
   - Ensures user access control and flow correctness.
2. **Product & Inventory Module**
   - Covers sorting, filtering, and product visibility.
   - Uses Test_Cases sheet entries for verifying UI interactions.
3. **Shopping Cart Module**
   - Focuses on add/remove item behavior, cart badge updates, and cart persistence.
4. **Checkout Module**
   - Includes information validation, order overview, and final order completion.
5. **Error Handling & UI Behavior**
   - Ensures proper feedback messages, state resets, and layout consistency.

This modular approach allowed testers to work in parallel, improve traceability, and ensure full requirement coverage.

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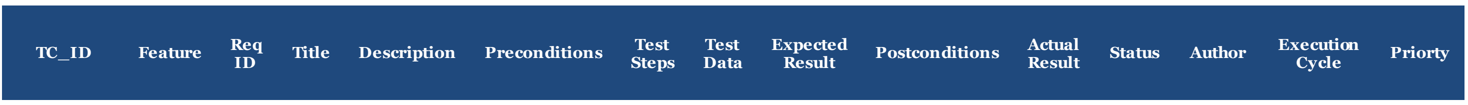
### Test Case Template Used

All test cases followed a **standardized template**, documented inside the **Test_Cases** sheet, ensuring consistency, clarity, and traceability.
The template included:



| TC_ID | Feature | Req ID | Title | Description | Preconditions | Test Steps | Test Data | Expected Result | Postconditions | Actual Result | Status | Author | Execution Cycle | Priorty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

- **TC_ID** – Unique identifier
- **Feature** – The functional area under test
- **Req ID** – Direct reference to the mapped requirement
- **Title** – A short description of the test
- **Description** – Step-by-step actions to perform
- **Preconditions** – Required initial state (login, page, etc.)
- **Expected Result** – The correct system behavior
- **Actual Result** – Outcome after execution
- **Status** – Pass / Fail
- **Author & Execution Cycle** – Ownership and test iteration
- **Priority** – Criticality of the test

This template ensured each test case was **traceable**, **repeatable**, and **aligned with requirements**, enabling seamless mapping in the **Traceability sheet**.

## 3.2 Bug Reports

| Module / Feature | Title / Summary | Reported By | Detected In / Test Cycle | Severity | Priority | Environment | TC_ID | Req_ID/US_ID | Description | Steps to Reproduce | Expected Result | Actual Result | Attachments / Evidence | Status | Assigned To | Detected By | Date Logged | Comments / Root Cause |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

All defects discovered during manual execution were documented in the **Bug_Report** sheet. Each bug entry captured:

- Bug ID
- Related Test Case ID
- Severity & Priority
- Steps to Reproduce
- Actual vs. Expected Behavior
- Screenshot reference (linked from TC_Assets)
- Status and Developer Feedback

This structured bug reporting helped maintain a clear workflow from identification to resolution.

## 3.3 Test Coverage

Test coverage was validated using the **Traceability** sheet, which ensures that:

- Every Requirement has at least one Test Case.
- Every Test Case traces back to a specific Requirement or User Story.
- Identified bugs link directly to failed test cases for accurate tracking.

This matrix confirmed strong coverage across all functional areas.

## 3.4 Bug Tracking Tool

During manual testing, all identified defects were logged and tracked using **Jira**, which served as the primary bug-tracking and workflow-management platform for this project.

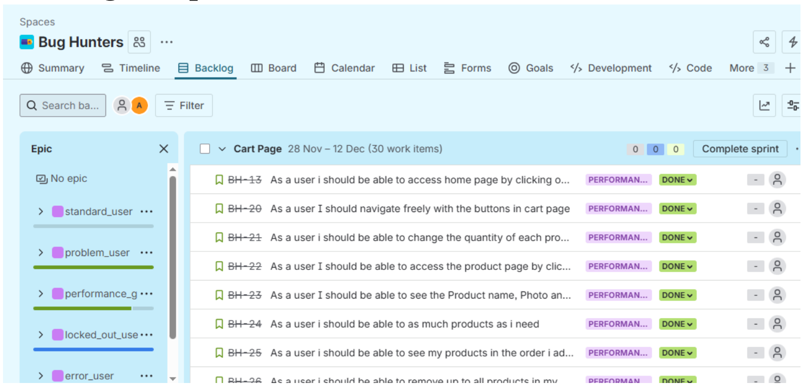
Jira allowed the team to:

- Create detailed bug tickets linked to specific **Test Case IDs** from the *Test_Cases* sheet.
- Assign issues directly to developers or QA retesters.
- Categorize bugs by **severity**, **priority**, **status**, and **component**.
- Attach screenshots taken from the *TC_Assets* sheet for improved visibility and debugging.
- Track the lifecycle of each defect from **Open** → **In Progress** → **Resolved** → **Closed**.
- Maintain full traceability by linking Jira tickets back to requirements and user stories.

The **Bug_Report** sheet in the workbook was used as a local repository for initial documentation, while

Jira acted as the official centralized system for triage, collaboration, and follow-up.

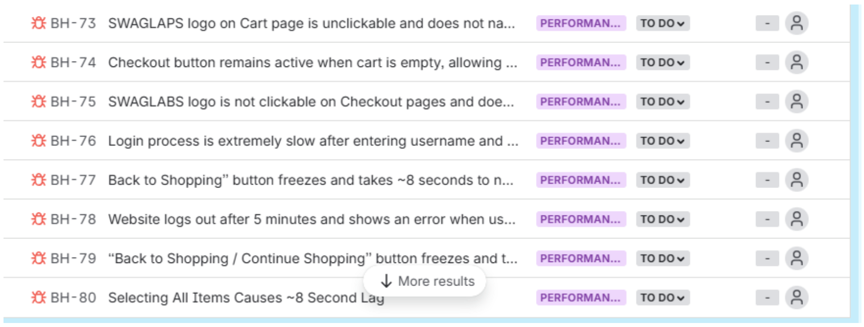
BackLog Sample :



Cart Page 28 Nov – 12 Dec (30 work items) 0 0 0

| | | | |
|---|---|---|---|
| ~~BH-13~~ | As a user i should be able to access home page by clicking o... | PERFORMAN... | DONE |
| ~~BH-20~~ | As a user I should navigate freely with the buttons in cart page | PERFORMAN... | DONE |
| ~~BH-21~~ | As a user i should be able to change the quantity of each pro... | PERFORMAN... | DONE |
| ~~BH-22~~ | As a user I should be able to access the product page by clic... | PERFORMAN... | DONE |
| ~~BH-23~~ | As a user I should be able to see the Product name, Photo an... | PERFORMAN... | DONE |
| ~~BH-24~~ | As a user i should be able to as much products as i need | PERFORMAN... | DONE |
| ~~BH-25~~ | As a user i should be able to see my products in the order i ad... | PERFORMAN... | DONE |
| ~~BH-26~~ | As a user i should be able to remove up to all products in my | PERFORMAN | DONE |

Linked Bugs Sample :



| | | | |
|---|---|---|---|
| BH-73 | SWAGLAPS logo on Cart page is unclickable and does not na... | PERFORMAN... | TO DO |
| BH-74 | Checkout button remains active when cart is empty, allowing ... | PERFORMAN... | TO DO |
| BH-75 | SWAGLABS logo is not clickable on Checkout pages and doe... | PERFORMAN... | TO DO |
| BH-76 | Login process is extremely slow after entering username and ... | PERFORMAN... | TO DO |
| BH-77 | Back to Shopping" button freezes and takes ~8 seconds to n... | PERFORMAN... | TO DO |
| BH-78 | Website logs out after 5 minutes and shows an error when us... | PERFORMAN... | TO DO |
| BH-79 | "Back to Shopping / Continue Shopping" button freezes and t... | PERFORMAN... | TO DO |
| BH-80 | Selecting All Items Causes ~8 Second Lag | PERFORMAN... | TO DO |

## 4 Automation Testing

Automation testing was implemented to validate critical user flows, ensure consistent regression coverage, and reduce manual testing effort. The framework was developed using **Java, Selenium WebDriver, TestNG, and the Page Object Model (POM)** to provide a scalable, maintainable, and industry-aligned automation solution.

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### 4.1 Tools

| **Tool** | **Purpose** | **Description** |
|---|---|---|
| **Java** | Programming Language | Robust, object-oriented language with excellent Selenium support. |
| **Selenium WebDriver** | Browser Automation | Provides cross-browser automation and full control over UI interactions. |
| **TestNG** | Test Orchestration & Reporting | Supports grouping, annotations, parallel execution, and XML-based suite control. |
| **IntelliJ IDEA / Eclipse** | IDE | Offers debugging, intelligent suggestions, Maven integration, and version control support. |
| **Maven** | Build & Dependency Management | Manages Selenium, TestNG, and WebDriverManager libraries through pom.xml. |
| **WebDriverManager** | Driver Management | Automates driver downloads and resolves browser-driver compatibility issues. |
| **Locator Strategies** | Element Interaction | Uses ID, CSS, and XPath to ensure accurate DOM element identification. |

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### 4.2 Automation Framework Architecture

The automation framework follows the **Page Object Model (POM)** architecture, which provides:

- **Separation of Concerns:** UI interactions isolated from test logic
- **Ease of Maintenance:** UI updates require changes only within page classes
- **Reusability:** Page classes support multiple test scenarios
- **Readability:** Test scripts closely match real user journeys

**Project Structure**

```
/src
 └── main
     └── java
         ├── base
         │    ├── BaseTest.java
         │    └── DriverFactory.java
         │
         ├── pages
         │    ├── LoginPage.java
         │    ├── ProductsPage.java
         │    ├── CartPage.java
         │    ├── CheckoutPage.java
         │    ├── OrderPage.java
         │    └── LogoutPage.java
         │
         └── utils
             ├── WaitUtils.java
             └── CartState.java

 └── test
     └── java
         ├── LoginTest.java
         ├── ProductsTest.java
         ├── CartTest.java
         ├── CheckoutTest.java
         ├── OrderTest.java
         ├── LogoutTest.java
         └── FullJourneyTest.java

testng.xml
pom.xml
```

### 4.3 BaseTest.java

BaseTest.java serves as the foundation for all test classes and ensures consistent execution across the framework.

**Core Responsibilities**

- **Driver Initialization** using WebDriverManager
- **Browser Configuration** (window maximization, waits, session setup)
- **Navigation** to the application URL before each test
- **Resetting Shared States** including global cart state
- **Cleanup** and browser session termination after each test
- **Reusable Helper Methods** available for login and shared behaviors

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### 4.4 Test Suite (testng.xml)

The TestNG suite file organizes the execution of all automation tests. It supports grouping, parallel execution, and modular execution of the following test categories:

- Login
- Products and sorting
- Cart operations
- Checkout workflow
- Order confirmation
- Full end-to-end user journeys

This ensures structured regression cycles and efficient execution control.

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### 4.5 Automated Test Classes

The automation suite includes multiple test classes covering all major functional flows of the application.

**LoginTest.java**

Validates:

- All user types
- Successful login
- Error messages for invalid or missing credentials

**ProductsTest.java**

Validates:

- Adding single or multiple items

- Sorting by price and name
- Navigating to product details

**CartTest.java**

Validates:

- Opening the cart page
- Removing items
- Cart badge accuracy
- Badge disappearance when empty
- Item persistence after navigation
- Continue shopping and navigation to checkout

**CheckoutTest.java**

Validates:

- Required field errors
- Partial form submissions
- Successful navigation through Step One and Step Two
- Price and tax calculations
- Cancel flows at each step

**OrderTest.java**

Validates:

- Completion of order
- Confirmation message and layout
- Back home navigation

**FullJourneyTest.java**

A comprehensive scenario covering:

- Login
- Adding items
- Validating cart
- Completing checkout steps
- Finishing order
- Returning to inventory

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### 4.6 Page Object Classes

**LoginPage.java**

Handles user authentication, field interactions, and login error validation.

**ProductsPage.java**

Handles product listing actions including sorting, adding items, and opening product details.

**CartPage.java**

Handles viewing items, removing items, badge validation, and navigation between cart and store.

**CheckoutPage.java**

Handles validation of customer information, navigating through checkout steps, and verifying totals.

**OrderPage.java**

Validates successful order placement and manages navigation back to the inventory.

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### 4.7 Utility Classes

**WaitUtils.java**

Centralized utility for explicit waits, improving script stability and synchronization.

**CartState.java**

Maintains a consistent cart item count across pages and resets state before each test.

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### 4.8 Test Data

**User Credentials**

| **Username** | **Password** | **Expected Behavior** |
|---|---|---|
| standard_user | secret_sauce | Normal functionality |
| locked_out_user | secret_sauce | Displays locked-out message |
| problem_user | secret_sauce | UI / functional anomalies |
| performance_glitch_user | secret_sauce | Slow performance behavior |
| error_user | secret_sauce | Error scenarios |
| visual_user | secret_sauce | UI visual issues |

## 5 API Testing

API testing was introduced into the project to extend our validation beyond the user interface and simulate how the e-commerce system would behave with a real backend. Since the Swag Labs demo application does not provide official APIs, the team utilized **DummyJSON**, a mock REST API service commonly used for prototyping and backend simulation. DummyJSON enabled us to test backend-like flows that mirror real e-commerce operations such as authentication, product management, cart updates, and checkout interactions.

The purpose of integrating API testing was to validate data integrity, ensure endpoint responsiveness, verify logical operations, and demonstrate how backend layers contribute to the overall quality of an online shopping system. This approach allowed the team to perform a complete QA cycle: UI testing, automation testing, and backend simulation.

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### 5.0 Why DummyJSON?

DummyJSON was selected as the backend simulation tool for our API testing because it provides a structured set of REST endpoints that closely resemble the functionalities of a real e-commerce system. Since the Swag Labs demo does not include backend APIs, DummyJSON served as an effective and realistic alternative that allowed us to test essential server-side operations without building an actual backend.

DummyJSON supports core modules—Users, Products, Cart, and Checkout-like operations—which align directly with the workflows of modern online shopping platforms. Its readiness, predictable behavior, and JSON-based responses made it ideal for demonstrating how API testing is performed in real projects while maintaining a lightweight and easily configurable environment.

### 5.1 Tools Used

The following tools and technologies supported the API testing phase:

- **Postman** – Used to create structured API collections, organize test suites, and execute requests.
- **DummyJSON** – Served as the mock backend providing realistic endpoints for products, users, carts, and checkout.
- **JavaScript-Based Postman Test Scripts** – Used to automate validations inside responses (status, fields, data types).
- **Environment Variables** – Utilized extensively to manage tokens, dynamic IDs, URLs, and shared request data across all API modules.

These tools allowed us to maintain clear organization, reduce redundancy, and ensure consistent testing across all endpoint groups.

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### 5.2 How DummyJSON Represents an E-Commerce Backend

Although Swag Labs itself does not supply backend services, DummyJSON offers a rich set of endpoints that closely resemble the backend of a real e-commerce platform. This made it an ideal substitute for demonstrating backend testing within our project.

DummyJSON allowed us to simulate:

- **User Management**: registration, login, authentication tokens, profile retrieval
- **Product Catalog**: listing, searching, filtering, updating, and deleting product entries
- **Cart Operations**: adding items, modifying quantities, deleting items, retrieving cart summaries
- **Checkout-Like Flow**: submitting cart data and validating totals and calculations

These functionalities align with typical e-commerce workflows, making DummyJSON suitable for replicating backend behavior similar to what Swag Labs would have in a real implementation.

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### 5.3 DummyJSON Functionalities Utilized in Our Testing (What We Did)

**To simulate real e-commerce backend behavior, we worked with several key modules from DummyJSON. Below is a concise overview of what we tested and validated in each one.**

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**User Module**

**We used this module to validate basic user-related backend flows such as:**

- **Retrieving a list of users**
- **Logging in and receiving a token**
- **Accessing user details with authentication**
- **Updating and deleting a user**
- **Searching and filtering users**
- **Sorting and paginating user data**

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**Product Module**

**This module helped us test different catalog-related operations, including:**

- **Viewing all products**
- **Viewing a single product**
- **Searching for products**
- **Adding or updating product data**
- **Deleting a product**

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**Cart Module**

**We used the cart endpoints to simulate shopping-cart behaviors such as:**

- **Viewing an existing cart**
- **Adding items to a cart**
- **Removing or adjusting products**
- **Validating totals and quantities**

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**Checkout Simulation**

**To represent the checkout flow, we:**

- **Retrieved a full cart summary**
- **Submitted a cart as a completed checkout**
- **Validated pricing, totals, and returned order structures**

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### 5.4 Environment Variables Utilization

Environment variables played an important role in maintaining consistency and reducing duplicate configuration. They were used to:

- Store and reuse **authentication tokens** after login
- Save **user IDs** or generated data for use in subsequent requests
- Centralize the **Base URL** and other endpoint paths
- Dynamically generate values such as search terms or payload fields

This approach is aligned with real-world API testing practices, where reusable environments support cleaner collections and faster test execution.

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### 5.5 Role of API Testing in Our Overall QA Workflow

Integrating API testing allowed the team to extend validation beyond what is visible on the interface. It also demonstrated how core business logic would be verified in a real application, covering:

- Data flow accuracy
- Server-side validation behavior
- Logical interactions between user, product, and cart systems
- Authentication and authorization handling
- Backend-like workflows that UI testing alone cannot guarantee

As a result, the API testing component strengthened the completeness of the project, ensuring that both front-end behavior and backend simulation were validated using structured, industry-standard QA methods.

# 6. Vision

The vision of the Bug Hunters project is to build a complete, industry-aligned QA ecosystem capable of evaluating modern e-commerce platforms with the same depth, structure, and reliability used in real software companies. Our goal is not only to detect defects, but to showcase a professional, end-to-end testing lifecycle that demonstrates how quality assurance contributes to business success, user trust, and product stability.
This project reflects a future where QA teams are equipped with strong testing strategies, automation frameworks, and backend validation practices—not just as supporting roles, but as essential pillars in delivering high-performing software. By combining manual testing, automation, and API simulations, the project models how real digital commerce systems are validated in the market.

## 6.1 Market Benefit & Industry Impact

In today's competitive e-commerce market, speed, stability, and reliability determine whether users stay or leave. Our work demonstrates how a well-structured QA process directly enhances these outcomes:

- **Building User Trust:**
  Detecting issues early and validating critical flows (login, search, cart, checkout) ensures an experience that users can rely on.
- **Reducing Business Risk:**
  Comprehensive testing minimizes failures that could result in lost revenue, abandoned carts, or damaged brand reputation.
- **Supporting Scalable Development:**
  Our automation framework provides reusable, maintainable test suites that reduce regression time and support continuous delivery.
- **Validating Backend Logic Through APIs:**
  By integrating DummyJSON as a mock backend, we simulate real-world server interactions, preparing teams for actual production APIs and strengthening backend reliability.
- **Showcasing Professional QA Practice:**
  Through documentation, traceability, defect management, and environment-driven API testing, our project serves as a reference for QA best practices in any e-commerce environment.

Ultimately, the vision behind this project is to demonstrate how a modern QA team can elevate product quality, accelerate development cycles, and provide meaningful business value—transforming testing from a routine task into a strategic asset for market success.