Technical Assessment - Senior Test Engineer

**Candidate Assessment for Companies House**

**Website Under Test:** [DemoBlaze](https://www.demoblaze.com/index.html)

1. **Test Plan**

### Types of Functional Tests Prioritized

**Critical Path Testing (High Priority)**

* + **User Registration and Authentication Flow**
    - Login/Signup page tests to verify all possible positive and negative tests(ex: valid email and invalid password)
    - Validating messages in alert boxes.
    - Sign up functionality with validation checks
    - Login/logout processes
    - Session management and security isolation
    - Cross-browser session validation
    - Incognito/private browsing mode authentication
  + **E-commerce Core Functionality**
    - Product filtering by categories
    - Add to shopping cart operations with quantity management
    - Shopping cart management (view, remove items)
    - Checkout process with payment validation
    - Session-specific cart data isolation
  + **Order Processing**
    - Order placement workflow
    - Order confirmation and tracking
    - User-specific order history
    - Verify ‘Total order’ values reflects the correct value based on the product in the cart.

**Secondary Functional Testing (Medium Priority)**

* + **Navigation and User Interface**
    - Menu navigation consistency
    - Page responsiveness and layout integrity
  + **Data Validation and Error Handling**
    - Form validation across all user inputs
    - Error message accuracy and user guidance
    - Boundary value testing for numeric inputs

**Supporting Feature Testing (Lower Priority)**

* + **Contact and Support Features**
    - Contact form functionality
    - About Us page content loading
  + **Performance,Usability and Accessibility**
    - Page load times
    - Rapid clicks on ‘Add to cart’ and ‘Purchase’ buttons
    - Cross-browser compatibility
    - Mobile responsiveness
    - Contrast ratio of 4.5:1 for all the elements on the UI
    - Right color contrasts in the UI sections

## Testing Approach Rationale

**Risk-Based Testing Approach:** Prioritizing critical business functions that directly impact revenue and user experience. E-commerce sites depend heavily on seamless user registration, product selection, and payment processing.

**Behavior-Driven Development (BDD):** Using Gherkin syntax to create human-readable test scenarios that align business requirements with technical implementation, ensuring stakeholder understanding and acceptance criteria validation.

**Data-Driven Testing:** Implementing scenario outlines with examples tables to test multiple data combinations efficiently while maintaining readable specifications.

**Progressive Testing Strategy:** Starting with smoke tests for basic functionality, then expanding to detailed functional testing, and finally integration testing.

## Tools and Frameworks for Automation

**Primary Recommendation: Cypress with Cucumber (BDD Framework) Rationale:**

* + **Modern Architecture:** Direct browser control eliminates Selenium's inherent flakiness
  + **BDD Integration:** Cucumber preprocessor enables Gherkin syntax for business-readable tests
  + **Developer Experience:** Built-in waiting, debugging, and time-travel capabilities
  + **Real-time Feedback:** Live reloading and instant visual feedback during test development
  + **Comprehensive Reporting:** Built-in dashboard with video recordings and screenshots

**Framework Structure:**

**A screenshot of a computer

AI-generated content may be incorrect.**

**Supporting Tools:**

* + **@badeball/cypress-cucumber-preprocessor:** Advanced BDD support
  + **cypress-multi-reporters:** Combined Mochawesome and Cucumber reporting
  + **@cypress/xpath:** XPath selector support for complex element identification
  + **cypress-real-events:** Real user interaction simulation

# Automated Test Cases (BDD with Cypress)

### Test Case 1: User Registration and Login Flow

**Technology Choice:** Cypress + Cucumber BDD

**Scenario:** Complete user journey from registration to successful login.

**Automation Rationale:** This critical path requires consistent validation across different user types and scenarios. BDD approach ensures business stakeholders can understand and validate the authentication requirements.

**Feature File : authentication.feature**

## Test Case 2: Shopping Cart Management

**Scenario:** Product selection, cart operations(adding, removing and viewing single/multiple products), and quantity management.

**Automation Rationale:** Cart functionality directly impacts conversion rates. BDD scenarios help stakeholders understand various cart interaction patterns and edge cases.

**Feature File:** **cart.feature**

### Test Case 3: Checkout Process with Payment Validation

**Scenario:** End-to-end checkout with comprehensive payment validation

**Automation Rationale:**

Payment processing is the critical conversion point. BDD scenarios capture both successful and

transactions and various failure modes for stakeholder review.

**Feature File: checkout.feature**

### Test Case 4: Form Validation Comprehensive Testing

**Scenario:** Validation testing across all user input forms

**Automation Rationale:** Based on identified issues, comprehensive form validation ensures data integrity and user experience consistency.

**Feature File:** **form-validation.feature**

### Test Case 5: Navigation and UI Consistency

**Scenario:** Cross-page navigation and interface stability

**Automation Rationale:** Navigation issues directly impact user experience and can lead to lost sales. **BDD** scenarios help identify and prevent UI regression issues.

**Feature File:** **navigation.feature**

## Test Case 6: Critical Security and Session Management Validation

**Scenario:** Cross-browser session isolation and authentication security

**Automation Rationale:** These security vulnerabilities represent critical business risks, potential data breaches, and regulatory compliance failures. Automated testing ensures proper session isolation across browser instances and authentication states.

**Feature File:** **security.feature**

# Issue Reporting

* Use Cypress test failures as a source of reproducible issues.
* Each test scenario produces logs/screenshots/videos for detailed debugging.
* Automated test results can be integrated into CI pipelines with Slack/email alerts for fast reporting.
* Create concise issue tickets referencing failed BDD scenarios with artifacts attached.
* Example Report Entry:  
  Title: Session Isolation Failure Across Browsers  
  Description: User session data persists when accessing site via incognito mode in Chrome.  
  Steps: Defined by failing BDD scenario 'Session Isolation with Incognito' in Cypress tests.  
  Attachments: Test logs, screenshots from Cypress runs.

### Critical Issues Identified

1. **Form Validation Failures (High Severity)**

**Issue:** Multiple forms lack proper validation mechanisms **Specific Examples:**

* + Contact form accepts invalid email formats (e.g., "lakshman$"£%%%")
  + Empty messages can be sent through contact form
  + Credit card year field accepts non-numeric values (e.g., "e20026")

**Impact on Testing Approach:**

* + Implement comprehensive negative testing scenarios
  + Create data-driven tests with boundary value analysis
  + Add custom validation assertion commands in Cypress

1. **Cart Functionality Issues (High Severity)**

**Issue:** Cart management has multiple critical flaws **Specific Problems:**

* + Empty cart orders can be placed
  + Quantity management requires multiple clicks for same product
  + Cart item order changes unpredictably
  + No pagination for large volume of cart products

**Testing Approach Adjustments:**

*II Additional BDD scenario for cart edge cases*

Scenario: Cart edge case handling Given I have an empty cart

When I attempt to place an order

Then the "Place Order" button should be disabled And I should see "Cart is empty" message

1. **Navigation and UI Stability (Medium Severity)**

**Issue:** Navigation elements behave inconsistently

**Specific Problems:**

* + Gallery navigation breaks page layout after repeated clicks
  + Header elements not fixed during scrolling
  + Duplicate navigation elements (About Us)
  + Category filtering doesn't work properly

**Testing Approach Adjustments:**

* + Add visual regression testing capabilities
  + Implement cross-browser consistency checks
  + Create stability tests for repeated user actions

1. **Media Loading Failures (Medium Severity)**

**Issue:** About Us page fails to load media content

**Error:** "The media could not be loaded, either because the server or network failed or because the format is not supported."

**Testing Approach Adjustments:**

Scenario: Media content verification When I navigate to "About us" page

Then all media elements should load without errors And I should not see any broken media placeholders

1. **Mobile Responsiveness and Dialog Management Issues (High Severity)**

**Issue:** Multiple UI/UX problems affecting mobile users and checkout experience

**Specific Problems:**

* + **Mobile Header Misalignment:** Website headers are not properly aligned when accessed on mobile devices, causing navigation difficulties
  + **Dialog Box Background Interaction:** After clicking 'Place Order', the success dialog allows background form scrolling and interaction when it should be modal
  + **Order ID Generation Bug:** After clicking 'Place Order', the success dialog allows access to background form interaction and ‘Purchase’ option still shows up. Each click on 'Purchase' button generates a new Order ID in the confirmation dialog, suggesting multiple order processing(This can be fixed when above Dialog box issue is fixed)

**Detailed UI/UX Concerns:**

1. **Mobile Responsiveness Failure:** Headers and navigation elements lose proper positioning on mobile viewport, impacting user ability to navigate the site effectively
2. **Modal Dialog Security Risk:** Background form remains interactive during order confirmation, potentially allowing users to modify order details after purchase
3. **Duplicate Order Processing:** Multiple Order IDs generated suggest backend is processing multiple orders for single transaction, creating inventory and financial reconciliation issues **Issue:** Severe session management and authentication security flaws

**Specific Problems:**

* + **Incognito Mode Security Breach:** Cart contents accessible in incognito/private browsing modes
  + **Session Token Management:** Authentication state shared globally across browser instances
  + **Multiple rapid clicks** not handled properly
  + **Cross-Browser Session Sharing:** User sessions persist across different browsers without proper authentication

### Testing Strategy

**Enhanced Test Coverage Areas:**

1. **Security Testing Priority:** 40% of test effort should focus on session management and authentication security
2. **Cross-Browser Session Validation:** All authentication tests must verify proper session isolation across Chrome, Firefox, Edge, and Safari
3. **Incognito/Private Mode Testing:** Dedicated test suite for private browsing security validation
4. **Negative Testing Expansion:** 60% of test cases should focus on error conditions and edge cases
5. **Performance Monitoring:** Add response time assertions for all AJAX calls
6. **Visual Regression:** Implement screenshot comparison for layout stability

**Compliance and Security Considerations:**

* + **GDPR Compliance:** User data should not be accessible across unauthorized browser sessions
  + **PCI DSS Requirements:** Payment and user data must be properly session-isolated
  + **Security Audit Trail:** All session access attempts should be properly logged and monitored

**Continuous Integration and Security Considerations:**

module.exports = { e2e: {

retries: { runMode: 2,

openMode: 0

},

video: true, screenshotOnRunFailure: true, viewportWidth: 1280,

viewportHeight: 720,

defaultCommandTimeout: 10000,

requestTimeout: 15000,

responseTimeout: 15000,

chromeWebSecurity: false, *II For cross-origin testing*

env: {

security\_testing: true,

session\_timeout: 30000, cross\_browser\_validation: true

## Risk Mitigation Strategy

**Critical Security Risks Requiring Immediate Attention:**

1. **Session Management Vulnerabilities:** Unauthorized access to user data across browser instances
2. **Authentication Bypass:** Cross-browser and incognito mode security failures
3. **Payment processing validation**
4. **User data privacy and GDPR compliance**
5. **Cart functionality reliability**

**Enhanced Testing Approach Modifications:**

* + **Security-First Testing:** Implement comprehensive security test suite as prerequisite for all releases
  + **Multi-Browser Session Isolation Validation:** Automated tests across Chrome, Firefox, Edge, and Safari to verify proper session boundaries
  + **Privacy Mode Testing:** Dedicated incognito/private browsing test scenarios
  + **Session Timeout and Cleanup Verification:** Automated validation of proper session lifecycle management
  + **Compliance Testing:** GDPR and PCI DSS compliance validation through automated security scenarios

**Security Monitoring and Alerting:**

* + Real-time alerts for session security test failures
  + Automated security regression testing on each code deployment
  + Regular penetration testing validation through automated scenarios
  + Compliance audit trail generation through test reporting

This comprehensive BDD approach with Cypress ensures that both technical teams and business stakeholders can understand, validate, and maintain the test coverage while addressing the identified critical issues systematically.