Strategy Note: Sauce Demo UI Automation

1. **Objective & Scope**

The objective of this project is to ensure that the core user flows of the SauceDemo e-commerce application are functionally robust, regression-safe, and behave as expected across critical user types and scenarios. Automated UI tests deliver fast feedback for new builds, catch regressions, and increase trust in the application's reliability.

In scope:

- End-to-end flows: login, cart management, checkout, order confirmation.
- Negative flows: invalid credentials, business validation, user-specific quirks.
- Cross-user data handling and session isolation.

2. **Approach**

a. **Test Design**

- **Page Object Model (POM):**
  Each app page (Login, ProductCatalog, Cart, Checkout, Overview, Complete) is represented by a separate class encapsulating elements and actions.
- **Scenario-based Test Classes:**
  - *PlaceOrderTest*: Positive/happy path for a successful order.
  - *NegativeLoginTest*: Authentication boundary/negative flows.
  - *RemoveItemFromCartTest*: Cart editing and validation.
- **Data-driven Opportunities:**
  Credentials, product names, and user data are parameterized wherever possible for flexible expansion.

b. **Automation Standards**

- **Explicit waits** used for robust synchronization—no hardcoded sleeps.
- **Assertions after each critical step**; progression gated by outcome.
- **Failure handling:**
  Screenshot and detailed logging on every test failure via TestNG listeners.

3. **Test Coverage**

- **Login:** Standard, locked, and problematic users.
- **Cart:** Add/remove, persistence, edge removal, cart state verification.
- **Checkout:**
  - Info validation (missing data)
  - End-to-end happy path with confirmation.
- **Negative flows:** Invalid/locked login, empty-cart checkout, visual bugs.
- **Cross-user/cart & session handling:** Cart data isolation, logout/login edge cases.

4. **Execution Tools & Environment**

- **Automation Technology:**
  - Java, Selenium WebDriver, TestNG, ExtentReports
- **Browser/Platform:**
  - Chrome (v138+), Windows 11 (1920x1080)

    - [Optional] BrowserStack or local device grid for cross-browser
- **Dependencies:**
    - Maven for dependency management and reproducible builds
- **Structure:**
    - Source: src/main/java (page objects, utilities), src/test/java (test cases)
    - Test data and environment info separated for reusability.

5. **Reporting & CI Integration**

- **Reporting:**
  Extent Reports HTML output per run, with detailed step logs and screenshots on failure.
- **Logs include:**
  Test scenario, executed steps, pass/fail points, error messages, captured screenshots for all failed assertions.
- **Integration:**
  Tests can be run standalone (IDE/TestNG) or as part of CI (Maven + TestNG suite XML).
- **Defect Reporting:**
  All reproducible, externally-observable issues are tracked with full repro steps, test data, screenshots, and environment details.

6. **Defect Handling & Known Limitations**

All encountered bugs (cart persistence across users, checkout with empty cart, product image or cart add/remove issues for certain users) are:

- Logged, prioritized, and included in separate defect reports as required by the assessment brief.
- Automation scripts are designed to **assert and report these bugs** clearly, but they are NOT worked-around in the test logic, ensuring accurate regression detection in future runs.

7. **Maintenance**

- **Test cases** are modular to support rapid changes when requirements or locators change.
- **Base classes and utilities** ensure DRY (don't-repeat-yourself) maintenance.
- **Page object abstraction** supports rapid scaling to cover new pages or features.
- **Reports and logs** are kept per run for traceability.

8. **Conclusion**

The designed automation suite provides scalable, robust, and maintainable coverage for the highest-value and risk-critical flows in SauceDemo. It provides fast feedback, clear troubleshooting, and supports future CI/CD integration and coverage expansion to API, performance, and advanced UI/UX validations.

Prepared by:
Madan Kumar AS
QA Automation Engineer
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