

## Capstone Project Details

Project URL: <https://www.saucedemo.com/>

### Objective:

The objective of this capstone project is to develop a robust, end-to-end automated testing and continuous integration workflow for a web application. The project involves designing an automated testing framework using Selenium WebDriver and TestNG to validate key functionalities and ensure application stability.

The framework will be integrated into a CI/CD pipeline using Jenkins, enabling automatic execution of test cases on each code commit. Git will be used for version control and collaboration, ensuring efficient source code management.

Additionally, the project will incorporate JIRA for tracking requirements, test cases, bugs, and task management throughout the software development lifecycle.

### Project Team:

*The 4 projects mentioned above will be equally divided among the learners.*

### Tools and Technology Stack:

Technology	Purpose
Java	Programming language
Selenium WebDriver	Browser automation
TestNG	Testing framework
Maven	Dependency & build management
Jira	Test management & defect tracking
Extent Reports	Custom HTML reports
GitHub	Version control & collaboration
Jenkins	CI/CD pipeline automation

## Key Goals

1. Automate functional testing using Selenium WebDriver and TestNG.
2. Utilize Git/GitHub for version control and collaborative development.
3. Incorporate JIRA for requirement management, test case tracking, and bug reporting.
4. Implement Cucumber for Behavior-Driven Development (BDD) scenarios.
5. Generate detailed test execution reports with screenshots on failure using ExtentReports.
6. Integrate the framework with Jenkins for automated test execution on code commits.

## Project Structure

### Automation/

```
|— src/main/java
|   |— pages/      # Page Object classes
|   |— utils/      # Utilities (Driver, Excel, Config, Waits)
|— src/test/java
|   |— testcases/  # Test scripts
|   |— runners/    # TestNG/Cucumber runners
|       |— stepDefinitions/ # Using BDD Framework
|— testdata/       # Excel sheets, properties
|— reports/        # Extent reports, logs, screenshots
|— pom.xml         # Maven dependencies
|— testng.xml      # TestNG suite configuration
```

## Project Flow:

1. **Project Setup:**
  - Create a GitHub repository.
  - Clone the repository locally and set up the project structure.
2. **Selenium Automation:**
  - Develop Selenium scripts to automate the critical functionalities
  - Commit and push the scripts to GitHub.
3. **Jira Integration:**
  - Create user stories for each module.
  - Link test cases to JIRA tasks and report bugs with screenshots.
4. **Continuous Integration and Continuous Deployment:**
  - Configure Jenkins pipeline to pull code from GitHub.
  - Run TestNG and Cucumber tests automatically.
  - Publish ExtentReports after each build.

## 5. Reporting and Analysis:

- Produce and evaluate test execution reports.
- Refine and update test cases and scripts according to test outcomes.

### Framework Approach:

- **Page Object Model (POM):** Separate class files for each page to ensure maintainability.
- **TestNG Integration:** XML-driven test suite execution with groups, priorities, and parallel testing.
- **Cucumber BDD:** Feature files written in Gherkin for readability and stakeholder collaboration.
- **Data Driven Testing:** Using Apache POI (Excel) or Properties file for test data input.
- **Reusable Utilities:** For WebDriver initialization, waits, logging, reporting, and screenshot capture.
- **Cross-Browser Execution:** Chrome, Firefox.
- **Coding Standards:** Consistent naming conventions, comments, and exception handling.
- **Screenshots:** Captured on every test pass/fail step and attached in reports.
- **Extent Reports:** Integrated with TestNG for graphical HTML reports.

### Deliverables

- **Manual Test Cases:** Positive, negative, edge cases (Excel/Jira).
- **Automation Scripts:** Implemented with Selenium + TestNG + POM + Cucumber.
- **Execution Reports:** Extent Reports (with screenshots).
- **Cross-Browser Results:** Evidence of execution on Chrome & Firefox.
- **Snapshots:** Screenshots of executed test steps, logs, and reports.
- **Final Submission Package:** Complete project folder in zip format

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