

CS522- Final Project and Demo

End-to-End Test Automation for Amazon Use Case

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Date: Dec 14th, 2024

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Introduction

- **Objective:** Automate an end-to-end test case for a real-world web application.
- **Use Case:** Amazon - Search for an item, select it(color), and add it to the cart.

Key Features Implemented

- **Data-Driven Testing:** Using Excel to load test data dynamically.
- **Screenshots:** Capturing critical steps for debugging and reporting.
- **Logging:** Detailed logging of each test step using Log4j.
- **Assertions:** Validating outcomes to ensure correctness.
- **Efficient Waits:** Handling dynamic elements with WebDriverWait.
- **Clean Code Practices:** Modular methods and reusable components.

Automation Workflow

1. **Setup:** Initialize WebDriver, load test data, and navigate to the application.
2. **Search for Item:** Input item details, search, and verify results.
3. **Select Item:** Choose the correct item and handle attributes like color.
4. **Add to Cart:** Add the selected item to the cart and handle any popups.
5. **Teardown:** Close the browser and clean up resources.

Tools and Frameworks Used

- **Selenium WebDriver:** For browser automation.
- **TestNG:** Organizing and executing test cases with annotations.
- **Log4j:** Logging test steps and outcomes.
- **Apache POI:** Reading data from Excel for data-driven testing.
- **Maven:** Build and dependency management.

Test - Case

Test Case Description:

Verify that a user can search for an item, select it, and add it to the cart successfully.

Preconditions:

1. The user is logged in (if required by Amazon).
2. Browser is set up with geckodriver.
3. The item details (name, type, color, price) are present in the `data.xlsx` file.

Test Steps:

1. Launch the browser and open the Amazon homepage.
2. Read test data from the `data.xlsx` file.
3. Enter the item name and type in the search bar.
4. Click the **Search** button.
5. Select the product from the search results.
6. Choose the specified color (if available).
7. Click the **Add to Cart** button.
8. Handle any warranty pop-ups by selecting **No Thanks**.

Expected Result:

The item is successfully added to the cart, and a confirmation message is displayed.

Actual Result:

- **Logs:**
 - **Search for Item:** Searched for item: Hamilton Beach FlexBrew Trio, type: Coffee Maker.
 - **Screenshot:** Saved at `/Users/fevenbelay/Downloads/Selenium_Project4/screenshotssearchItem_2024_12_14_133050.png`.
 - **Selection:** Selected item with type: Coffee Maker, color: Black.
 - **Add to Cart:** Clicked "Add to Cart" button.
 - **Warranty:** Selected 'No Thanks' for warranty.
 - **Screenshots:** Added screenshots at each step of the process.

Code Highlights

Logging with Log4j

```
void setup() throws Exception {  
    logger.info(message:"Setting up the test...");  
    setExcelFile();  
    System.setProperty(key:"webdriver.gecko.driver", driverPath); // Set up Firefox driver  
    driver = new FirefoxDriver(); // Using Firefox  
    driver.get(url);  
    driver.manage().window().maximize();  
    WebDriverWait wait = new WebDriverWait(driver, Duration.ofSeconds(seconds:15));  
    wait.until(ExpectedConditions.titleContains(title:"Amazon.com. Spend less. Smile more."));  
    logger.info(message:"Test setup completed.");  
}
```


Code Highlights

Data-Driven Testing with Excel

```
void setExcelFile() throws Exception {  
    try (FileInputStream file = new FileInputStream(testDataFile);  
        XSSFWorkbook workbook = new XSSFWorkbook(file)) {  
        XSSFSheet sheet = workbook.getSheet(name:"Sheet1");  
        item = sheet.getRow(rownum:1).getCell(cellnum:0).getStringCellValue();  
        type = sheet.getRow(rownum:1).getCell(cellnum:1).getStringCellValue();  
        color = sheet.getRow(rownum:1).getCell(cellnum:2).getStringCellValue();  
        price = sheet.getRow(rownum:1).getCell(cellnum:3).getStringCellValue();  
        logger.info("Loaded test data from Excel: Item=" + item + ", Type=" + type + ", Color=" + color  
                    + ", Price=" + price);  
    } catch (Exception e) {  
        logger.error(message:"Error reading Excel file: ", e);  
        throw e;  
    }  
}
```

A	B	C	D
itemName	type	color	price3
Hamilton Beach FlexBrew Trio	Coffee Maker	Black	"\$119.99"

Code Highlights

Capturing Screenshots at Key Steps

```
void takeSnapshot(WebDriver webdriver, String fileWithPath) throws Exception {  
    TakesScreenshot scrShot = ((TakesScreenshot) webdriver);  
    File srcFile = scrShot.getScreenshotAs(OutputType.FILE);  
    File destFile = new File(fileWithPath);  
    FileUtils.copyFile(srcFile, destFile);  
    logger.info("Screenshot saved at: " + fileWithPath);  
}
```

Code Highlights

Handling Dynamic Elements with WebDriverWait

```
driver.manage().window().maximize();  
WebDriverWait wait = new WebDriverWait(driver, Duration.ofSeconds(seconds:15));  
wait.until(ExpectedConditions.titleContains(title:"Amazon.com. Spend less. Smile more."));  
logger.info(message:"Test setup completed.");
```


Code Highlights

Assertions to Validate Expected Results


```
boolean itemFound = driver.getPageSource().contains(item) || driver.getPageSource().contains(price)  
|| driver.getPageSource().contains(color) || driver.getPageSource().contains(model);  
  
Assert.assertTrue(itemFound, msg);  
logger.info("Search completed successfully for item: " + item);
```



Screenshot

Search Result: Screenshot after searching for the item.

 Delivering to San Jose 95124
[Update location](#)

All



 EN [Hello, sign in](#) [Account & Lists](#) [Returns & Orders](#)  Cart

All Holiday Deals Medical Care Amazon Essentials Best Sellers Prime Amazon Basics Today's Deals New Releases Groceries Music Customer Service Amazon Home Personalized Gifts

1-48 of 118 results for "Hamilton Beach FlexBrew TrioCoffee Maker" Sort by: Featured

Eligible for Free Shipping

☐ Free Shipping by Amazon

Get FREE Shipping on eligible orders shipped by Amazon

Brands

☐ Hamilton Beach

☐ Cuisinart

All Top Brands

☐ Top Brands

Customer Reviews

★★★★☆ & Up

Condition

New

Used

Seller


☐ Amazon.com

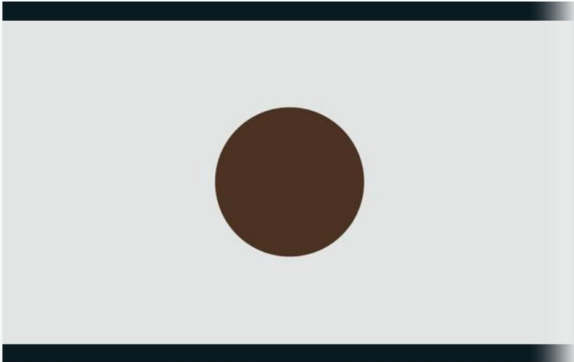
☐ Amazon Resale


[See more](#)


Price


\$21 – \$215+

 Go






Hamilton Beach FlexBrew Trio 2-Way...
4.4 ★★★★★ 11,562
\$119.99 Typical:
~~\$130.64~~




Brew a Single Cup OR a Full Pot







Includes a brew basket, ground coffee, and a holder for single-serve packs


Sponsored

Results

Check each product page for other buying options.



Selected Item: Screenshot of the selected item details.



Delivering to San Jose 95124
[Update location](#)


Home & Kitchen

Search Amazon

EN


Hello, sign in in
Account & Lists

Returns
& Orders

 Cart


[All](#) [Holiday Deals](#) [Medical Care](#) [Amazon Essentials](#) [Best Sellers](#) [Prime](#) [Amazon Basics](#) [Today's Deals](#) [New Releases](#) [Groceries](#) [Music](#) [Customer Service](#) [Amazon Home](#) [Personalized Gifts](#)


[Amazon Home](#) [Shop by Room](#) [Discover](#) [Shop by Style](#) [Home Décor](#) [Furniture](#) [Kitchen & Dining](#) [Bed & Bath](#) [Garden & Outdoor](#) [Home Improvement](#)



Mr. Coffee Perfect Brew, Intelligent Coffee Maker, Cold Brew...
★★★★☆ 41
33% off Limited time deal
\$199.99 [Shop now](#)

Home & Kitchen › Kitchen & Dining › Coffee, Tea & Espresso › Coffee Makers › Single-Serve Brewers





Hamilton Beach FlexBrew Trio 2-Way Coffee Maker, Compatible with K-Cup Pods or Grounds, Single Serve & Full 12c Pot, Permanent Gold-Tone Filter, Black & Silver

[Visit the Hamilton Beach Store](#)
4.4 ★★★★★ 11,562 ratings
300+ bought in past month

-8% \$119⁹⁹
Typical price: \$130.64

[Get a \\$80 Amazon Gift Card instantly upon approval for the Amazon Store Card. No annual fee.](#)

Color: **Permanent Gold-Tone Filter, Black & Silver**

Brand	Hamilton Beach
Color	Permanent Gold-Tone Filter, Black & Silver
Product Dimensions	11.42"D x 13.66"W x 12.24"H
Special Feature	Automatic Shut-Off, Programmable, Timer

\$119⁹⁹

FREE delivery **Wednesday, December 18.** [Details](#)

Arrives before Christmas

Delivering to San Jose 95124 - [Update location](#)

In Stock

Quantity: 1

[Add to Cart](#)

[Buy Now](#)


Ships from **HomeGoods Shop**

Sold by **HomeGoods Shop**








Returns **Returnable until Jan 31, 2025**

[Secure transaction](#)

Add to Cart: Screenshot confirming the item is added to the cart.



Roll over image to zoom in



2 easy-fill reservoirs

6 VIDEOS

Product Dimensions 11.42"D x 13.66"W x 12.24"H

Special Feature Automatic Shut-Off, Programmable, Timer

Coffee Maker Type Drip Coffee Machine

Capacity 60 Fluid Ounces

Item Weight 4.4 Kilograms

Material Glass, Plastic

Wattage 1050 watts

About this item

- **3 WAYS TO BREW.** Brew 12 cups with ground coffee on the carafe side or brew a single serving with a pod or ground coffee on the other. With a pod you can brew up to 10 oz. of coffee and when you use coffee grounds you can fill a 14 oz. travel mug. Filter type: Reusable
- **SINGLE-CUP COFFEE MAKER.** Brew a cup with a K-Cup® pod, another pod brand, or ground coffee. The included pod holder and single-serve grounds basket easily handle both options and the cup rest removes so you can brew into a tall travel mug.
- **BREW A FULL POT OF COFFEE:** This programmable coffee maker has Easy-Touch programming for wake-up ready coffee. After brewing, coffee stays warm for 2 hours and the power automatically shuts off. AutoPause & Pour lets you pour a cup as coffee brews.
- **INCLUDES GOLD-TONE PERMANENT FILTER:** There's no need to buy paper filters again. Simply fill the gold-tone permanent filter with coffee before brewing into the carafe and discard the wet grounds later.
- **CUSTOMIZE YOUR BREW STRENGTH:** Control how strong you want your coffee with Select-a-Brew: regular and bold brewing options.
- *K-Cup is a registered trademark of Keurig Green Mountain, Inc. Use of the K-Cup trademark does not imply any affiliation with or endorsement

Return Policy Returnable until Jan 31, 2025

Payment Secure transaction

Add a Protection Plan:


- ☐ 3-Year Protection Plan for \$21.99
- ☐ 4-Year Protection Plan for \$29.99
- ☐ Asurion Complete Protect: One plan covers all eligible past and future purchases (Renews Monthly Until Cancelled) for \$16.99/month

Add to List

Other sellers on Amazon

New & Used (7) from \$80⁵⁴ & **FREE Shipping.**

Cuisinart



Results and Logs

```
[INFO] T E S T S
[INFO] -----
[INFO] Running TestSuite
SLF4J: Failed to load class "org.slf4j.impl.StaticLoggerBinder".
SLF4J: Defaulting to no-operation (NOP) logger implementation
SLF4J: See http://www.slf4j.org/codes.html#StaticLoggerBinder for further details.
2024-12-14 10:49:08 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Setting up the test...
2024-12-14 10:49:08 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Loaded test data from Excel: Item=Hamilton Beach FlexBrew Trio, Type=Coffee Maker, Color=Black, Price="$119.99"
2024-12-14 10:49:17 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Test setup completed.
2024-12-14 10:49:17 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Starting test case: Search and Add Item to Cart
2024-12-14 10:49:17 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Step 1: Searching for item...
2024-12-14 10:49:19 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Searched for item: Hamilton Beach FlexBrew Trio, type: Coffee Maker
2024-12-14 10:49:19 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Taking screenshot after search...
2024-12-14 10:49:20 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Screenshot saved at: /Users/fevenbelay/Downloads/Selenium_Project 4/screenshotssearchItem_2024_12_14_104908.png
2024-12-14 10:49:21 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Search completed successfully for item: Hamilton Beach FlexBrew Trio
2024-12-14 10:49:21 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Step 2: Selecting the item...
2024-12-14 10:49:21 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Selecting item with type: Coffee Maker, color: Black
2024-12-14 10:49:26 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Clicked on the product: Coffee Maker
2024-12-14 10:49:46 [main] WARN com.qa.nai.ShopJavaSeleniumTest - Color option not found or not clickable: Black
2024-12-14 10:49:46 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Default quantity (1) assumed.
2024-12-14 10:49:46 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Screenshot saved at: /Users/fevenbelay/Downloads/Selenium_Project 4/screenshotsselectItem_2024_12_14_104908.png
2024-12-14 10:49:46 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Step 3: Adding the item to the cart...
2024-12-14 10:49:46 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Adding the item to the cart...
2024-12-14 10:49:47 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Clicked 'Add to Cart' button.
2024-12-14 10:49:47 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Screenshot saved at: /Users/fevenbelay/Downloads/Selenium_Project 4/screenshotsaddToCart_2024_12_14_104908.png
2024-12-14 10:49:49 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Selected 'No Thanks' for warranty.
2024-12-14 10:49:49 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Test case completed successfully.
2024-12-14 10:49:49 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Tearing down the test...
2024-12-14 10:49:50 [main] INFO com.qa.nai.ShopJavaSeleniumTest - Test teardown completed.
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 42.37 s -- in TestSuite
[INFO] Results:
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 43.805 s
[INFO] Finished at: 2024-12-14T10:49:50-08:00
[INFO]
```


Demo Presentation

Challenges and Solutions

- **Challenge:** Handling dynamic elements (e.g., color selection, popups).
 - **Solution:** Used `WebDriverWait` and JavaScript executor.
- **Challenge:** Verifying test results dynamically.
 - **Solution:** Implemented assertions for search and cart validations.

Future Improvements

- Add more test cases for checkout and payment flows.
- Implement cross-browser testing.
- Use DataProvider for running tests with multiple datasets.
- Generate HTML reports for better visualization.

Conclusion

- Successfully automated a critical e-commerce workflow.
- Demonstrated robust logging, data-driven testing, and clean coding practices.
- Framework ready for extension to other test cases.

Thank you!
