Homework 02

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June, 2025

Contents

1 AI-Powered Software Testing Tools

1.1 Tool Descriptions

1.1.1 BrowserStack Test Management

Provider: BrowserStack

BrowserStack offers a cloud-based test management suite with an integrated AI-powered test case generator. It was selected for this evaluation due to its robust NLP capabilities, CI/CD integration, and enterprise-grade test analytics.

Main features:

- **Natural language processing (NLP)**: Translates plain-English feature descriptions into comprehensive test cases.
- **Cross-browser testing**: Enables tests across 3000+ devices and browsers.
- **Testoptimization**: Suggests critical path coverage and reduces redundant tests.
- **Analytics**: Provides AI-based reports and test insights.

AI capabilities:

- Automatically detects gaps in coverage.
- Suggests relevant test scenarios based on product requirements.

1.1.2 TestingTools.AI

Provider: Independent platform

This lightweight tool converts user stories into detailed test cases and is ideal for Agile teams that prioritize manual testing. It was chosen for its simplicity, export versatility, and prompt-style input.

Main features:

- **Plain english input**: Converts user stories or requirements into test cases.
- **Export options**: CSV, Excel, Markdown, PDF.
- **Templates**: Offers functional, edge case, and regression templates.
- **Immediate output**: No login or setup required.

AI capabilities:

- AI parses user input and outputs full test cases (steps + expected result).
- Edge case suggestions based on common QA scenarios.

1.1.3 AITestCaseGenerator (Jira Plugin)

Provider: Embedded within Jira ecosystem

Integrated with Jira, this tool enables seamless AI-driven test case generation for existing issues. Selected for its native workflow support and traceability.

Main features:

- **Jira native**: Works inside Jira tickets (Stories, Tasks, Bugs).
- **OpenAI-Powered**: Utilizes GPT to generate precise test cases.
- **Editable outputs**: Allows QA to refine results before saving.
- **Traceability matrix**: Maps test cases back to their requirements.

AI capabilities:

- Context-aware suggestions inside Jira.
- Prompt-less generation based on Jira issue context.

1.2 Test case generation process

Note: BrowserStack uses a **prompt-based** approach while TestingTools.AI and AITestCaseGenerator require structured **title + description** inputs.

1.2.1 Feature 1: User Sign In (Role: User)

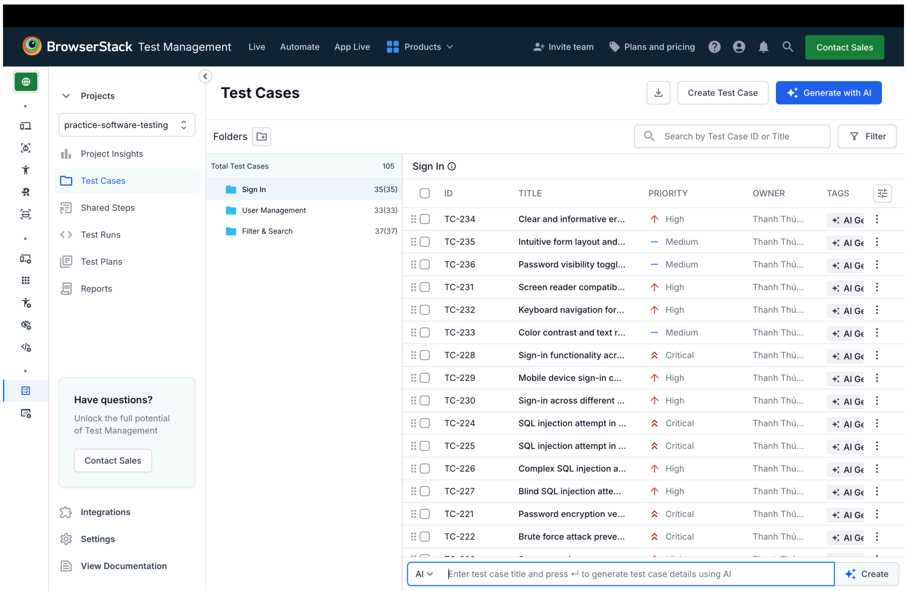
User Story: *As a user, I want to sign in with my email and password so I can access my personal dashboard.*

Prompt Used (for BrowserStack): “Generate a detailed test suite for the ‘User Sign In’ feature of a web application. Include positive and negative test cases. Cover valid login, invalid credentials, empty fields, SQL injection, and edge cases.”

1. BrowserStack

- Pasted prompt into feature description.
- AI generated **35 test cases**.

- **Coverage:** Valid login, input validation, SQL injection, load testing, and cross-platform compatibility.

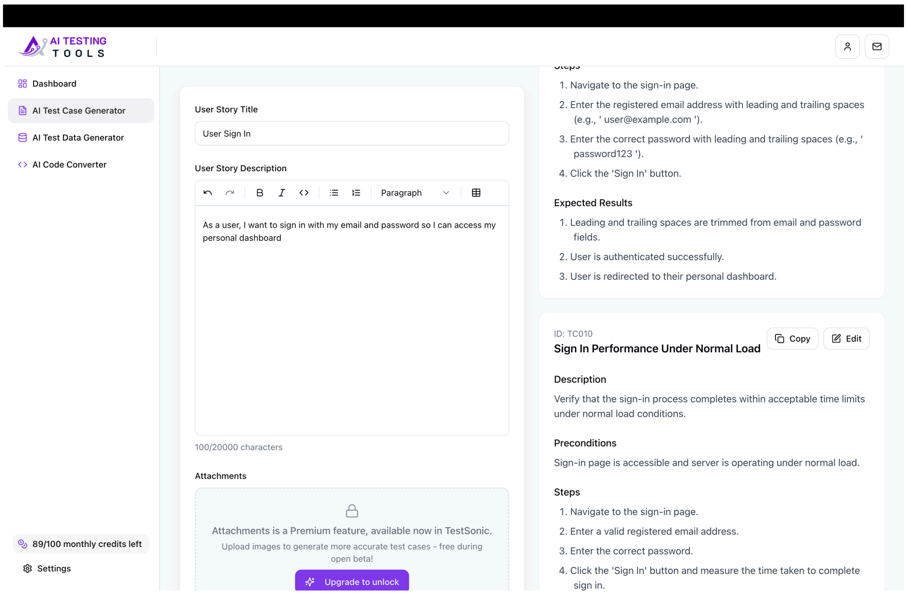


ID	TITLE	PRIORITY	OWNER	TAGS
TC-234	Clear and informative er...	High	Thanh Thú...	AI Ge
TC-235	Intuitive form layout and...	Medium	Thanh Thú...	AI Ge
TC-236	Password visibility toggl...	Medium	Thanh Thú...	AI Ge
TC-231	Screen reader compatib...	High	Thanh Thú...	AI Ge
TC-232	Keyboard navigation for...	High	Thanh Thú...	AI Ge
TC-233	Color contrast and text r...	Medium	Thanh Thú...	AI Ge
TC-228	Sign-in functionality acr...	Critical	Thanh Thú...	AI Ge
TC-229	Mobile device sign-in c...	High	Thanh Thú...	AI Ge
TC-230	Sign-in across different ...	High	Thanh Thú...	AI Ge
TC-224	SQL injection attempt in ...	Critical	Thanh Thú...	AI Ge
TC-225	SQL injection attempt in ...	Critical	Thanh Thú...	AI Ge
TC-226	Complex SQL injection a...	High	Thanh Thú...	AI Ge
TC-227	Blind SQL injection atte...	High	Thanh Thú...	AI Ge
TC-221	Password encryption ve...	Critical	Thanh Thú...	AI Ge
TC-222	Brute force attack preve...	Critical	Thanh Thú...	AI Ge

Figure 1: Exported from BrowserStack

2. TestingTools.AI

- Title: “User Sign In”
- Description: Full user story + constraints (e.g., min 6-char password, email format)
- Generated **10 test cases**.
- **Coverage:** Valid login, invalid credentials, empty fields, and email format. However, it’s missing non-functional tests like SQL injection, performance, and usability, which were covered by BrowserStack’s AI.



User Story Title

User Sign In

User Story Description

As a user, I want to sign in with my email and password so I can access my personal dashboard

100/20000 characters

Attachments

Attachments is a Premium feature, available now in TestSonic.
Upload images to generate more accurate test cases - free during open beta!

Steps

1. Navigate to the sign-in page.
2. Enter the registered email address with leading and trailing spaces (e.g., ' user@example.com ').
3. Enter the correct password with leading and trailing spaces (e.g., ' password123 ').
4. Click the 'Sign In' button.

Expected Results

1. Leading and trailing spaces are trimmed from email and password fields.
2. User is authenticated successfully.
3. User is redirected to their personal dashboard.

ID: TC010

Sign In Performance Under Normal Load

Description

Verify that the sign-in process completes within acceptable time limits under normal load conditions.

Preconditions

Sign-in page is accessible and server is operating under normal load.

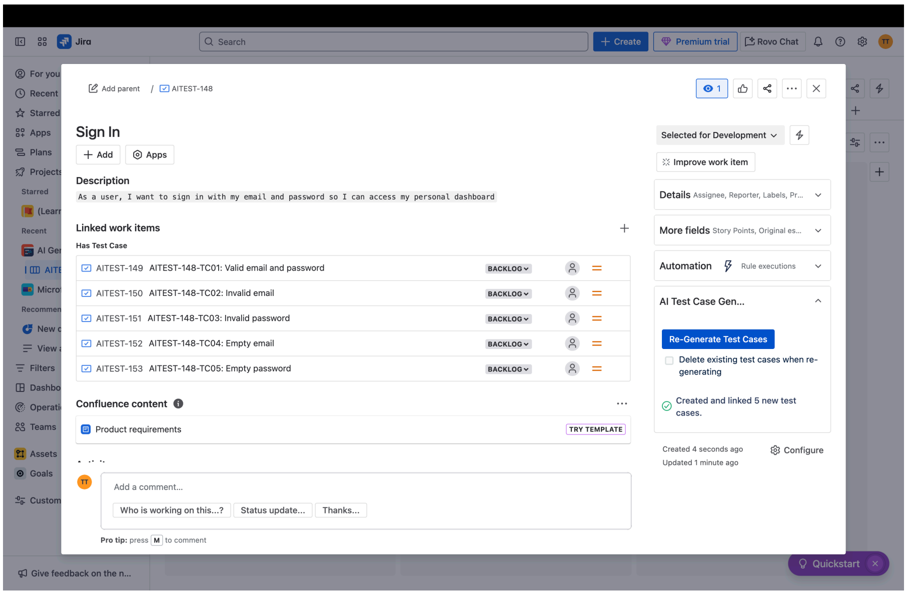
Steps

1. Navigate to the sign-in page.
2. Enter a valid registered email address.
3. Enter the correct password.
4. Click the 'Sign In' button and measure the time taken to complete sign in.

Figure 2: Exported from TestingTools.AI

3. AITestCaseGenerator

- Jira issue created → clicked "Generate Test Cases"
- **5 test cases** generated.
- Cover basic login flows: valid, invalid, and empty fields. Missing coverage for security, performance, and edge cases like SQL injection.



Sign In

Description

As a user, I want to sign in with my email and password so I can access my personal dashboard

Linked work items

Has Test Case

AITEST-149	AITEST-148-TC01: Valid email and password	BACKLOG
AITEST-150	AITEST-148-TC02: Invalid email	BACKLOG
AITEST-151	AITEST-148-TC03: Invalid password	BACKLOG
AITEST-152	AITEST-148-TC04: Empty email	BACKLOG
AITEST-153	AITEST-148-TC05: Empty password	BACKLOG

Confluence content

Product requirements

Add a comment...

□ Delete existing test cases when re-generating

✓ Created and linked 5 new test cases.

Created 4 seconds ago
Updated 1 minute ago

Figure 3: Exported from AITestCaseGenerator

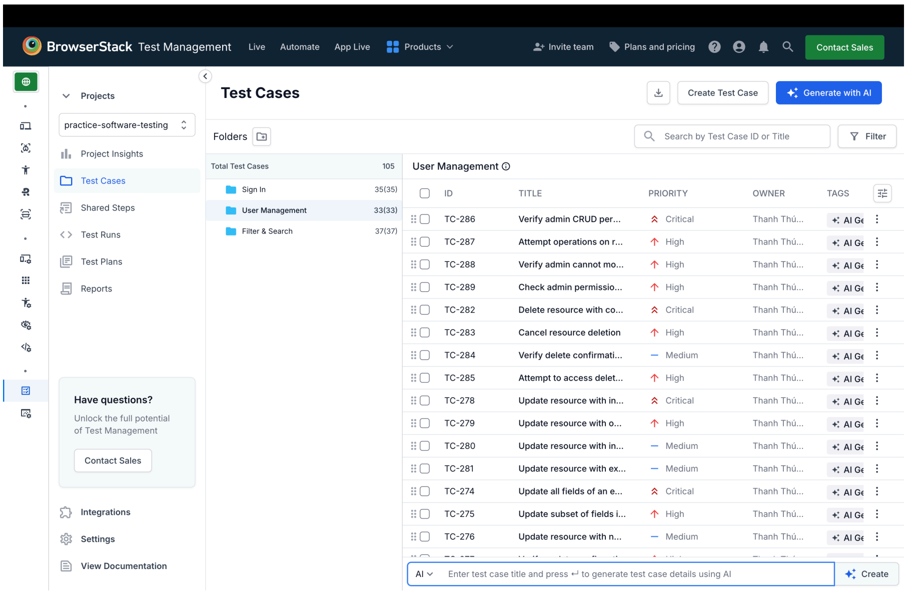
1.2.2 Feature 2: User Management (Role: Admin)

User Story: *As an admin, I want to create, view, update, and delete users to manage access control.*

Prompt Used (BrowserStack): "Generate CRUD test cases for admin role. Include valid inputs, invalid inputs, duplication handling, role restrictions, and delete confirmations."

1. BrowserStack:

- Resulted in **33 test cases** across 8 scenarios.
- **Coverage:** Coverage includes create, read, update, delete (CRUD) flows with both valid and invalid inputs, duplicate handling, deletion confirmation, and role-based permission boundaries — offering strong validation, security, and access control testing.



Total Test Cases	105
Sign In	35(35)
User Management	33(33)
Filter & Search	37(37)

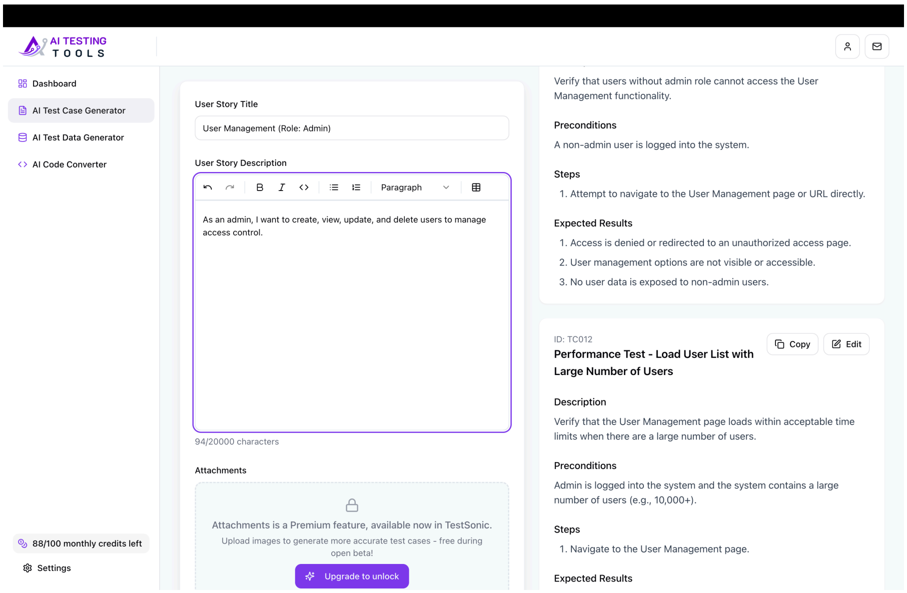
User Management

ID	TITLE	PRIORITY	OWNER	TAGS
TC-286	Verify admin CRUD per...	Critical	Thanh Thú...	AI Ge
TC-287	Attempt operations on r...	High	Thanh Thú...	AI Ge
TC-288	Verify admin cannot mo...	High	Thanh Thú...	AI Ge
TC-289	Check admin permissio...	High	Thanh Thú...	AI Ge
TC-282	Delete resource with co...	Critical	Thanh Thú...	AI Ge
TC-283	Cancel resource deletion	High	Thanh Thú...	AI Ge
TC-284	Verify delete confirmati...	Medium	Thanh Thú...	AI Ge
TC-285	Attempt to access delet...	High	Thanh Thú...	AI Ge
TC-278	Update resource with in...	Critical	Thanh Thú...	AI Ge
TC-279	Update resource with o...	High	Thanh Thú...	AI Ge
TC-280	Update resource with in...	Medium	Thanh Thú...	AI Ge
TC-281	Update resource with ex...	Medium	Thanh Thú...	AI Ge
TC-274	Update all fields of an e...	Critical	Thanh Thú...	AI Ge
TC-275	Update subset of fields i...	High	Thanh Thú...	AI Ge
TC-276	Update resource with n...	Medium	Thanh Thú...	AI Ge

Figure 4: Exported from BrowserStack

2. TestingTools.AI:

- Title: "User Management (Admin)"
- Description: Detailed CRUD description + validation rules.
- **12 test cases** exported.
- Included user creation well, including valid/invalid inputs and duplicate checks. However, it lacks update, delete, role permission, and audit log test cases.


[redacted]

User Story Title

User Management (Role: Admin)

User Story Description

As an admin, I want to create, view, update, and delete users to manage access control.

94/20000 characters

Attachments

Attachments is a Premium feature, available now in TestSonic.

Upload images to generate more accurate test cases - free during open beta!

Verify that users without admin role cannot access the User Management functionality.

Preconditions

A non-admin user is logged into the system.

Steps

1. Attempt to navigate to the User Management page or URL directly.

Expected Results

1. Access is denied or redirected to an unauthorized access page.
2. User management options are not visible or accessible.
3. No user data is exposed to non-admin users.

ID: TC012

Performance Test - Load User List with Large Number of Users

Description

Verify that the User Management page loads within acceptable time limits when there are a large number of users.

Preconditions

Admin is logged into the system and the system contains a large number of users (e.g., 10,000+).

Steps

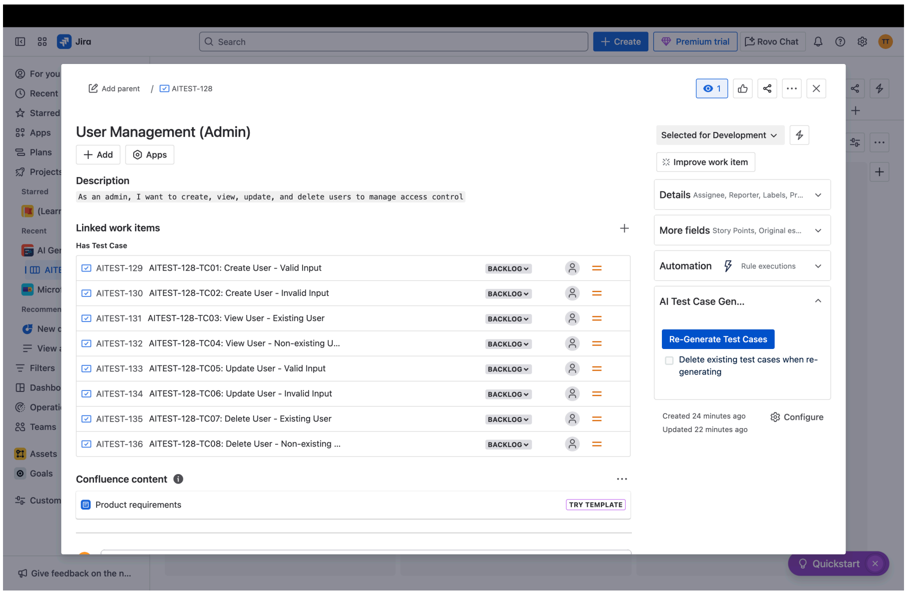
1. Navigate to the User Management page.

Expected Results

Figure 5: Exported from TestingTools.AI

3. AITestCaseGenerator:

- Jira ticket with CRUD admin story.
- AI returned **8 test cases** cover core CRUD flows with valid/invalid inputs and existing/non-existing users. Missing role-based access control and audit logging.


[redacted]

User Management (Admin)

Description

```
As an admin, I want to create, view, update, and delete users to manage access control
```

Linked work items

Has Test Case

AITEST-129	AITEST-128-TC01: Create User - Valid Input	BACKLOG
AITEST-130	AITEST-128-TC02: Create User - Invalid Input	BACKLOG
AITEST-131	AITEST-128-TC03: View User - Existing User	BACKLOG
AITEST-132	AITEST-128-TC04: View User - Non-existing U...	BACKLOG
AITEST-133	AITEST-128-TC05: Update User - Valid Input	BACKLOG
AITEST-134	AITEST-128-TC06: Update User - Invalid Input	BACKLOG
AITEST-135	AITEST-128-TC07: Delete User - Existing User	BACKLOG
AITEST-136	AITEST-128-TC08: Delete User - Non-existing ...	BACKLOG

Confluence content

Product requirements

☐ Delete existing test cases when re-generating

Created 24 minutes ago
Updated 22 minutes ago

Figure 6: Exported from AITestCaseGenerator

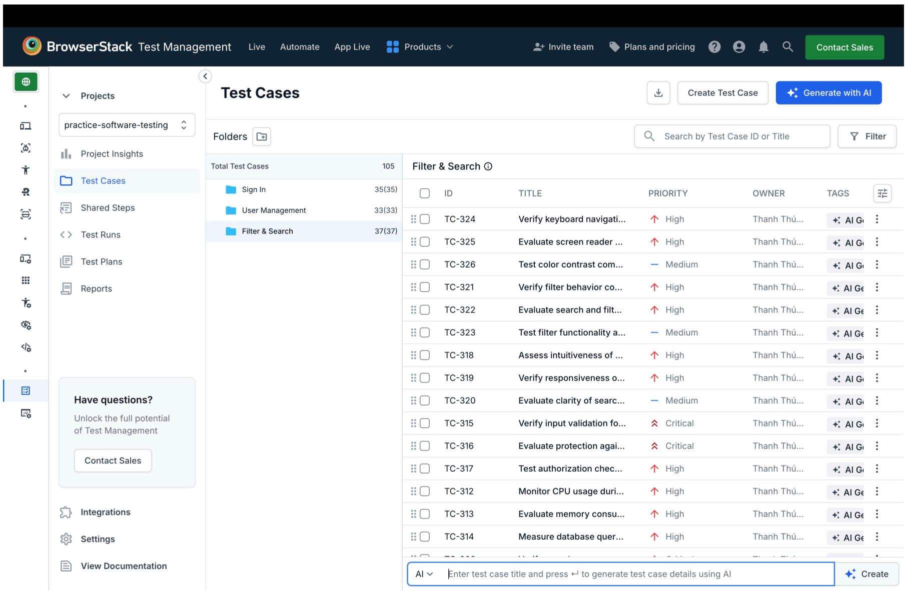
1.2.3 Feature 3: Filter and Search (Role: Guest)

User Story: As a guest (unauthenticated) user, I should be able to: - Use a search bar to input keywords related to item names or descriptions. - Apply filter options such as category, price range, rating, and availability. - Combine multiple filters to narrow down results. - See real-time updates of the search results without full page reload. - Receive feedback if no results match the criteria. - Perform these actions on both desktop and mobile interfaces.

Prompt (BrowserStack): "Test cases for filtering and searching items: include keyword search, category filter, empty results, and combination of filters."

1. BrowserStack:

- **37 test cases** generated.
- The test coverage is comprehensive, including keyword and category filters, combined filter logic, empty results handling, performance under load, resource usage, security validation, usability, accessibility, and cross-platform consistency.



Total Test Cases	105
Sign In	35(35)
User Management	33(33)
Filter & Search	37(37)

Filter & Search

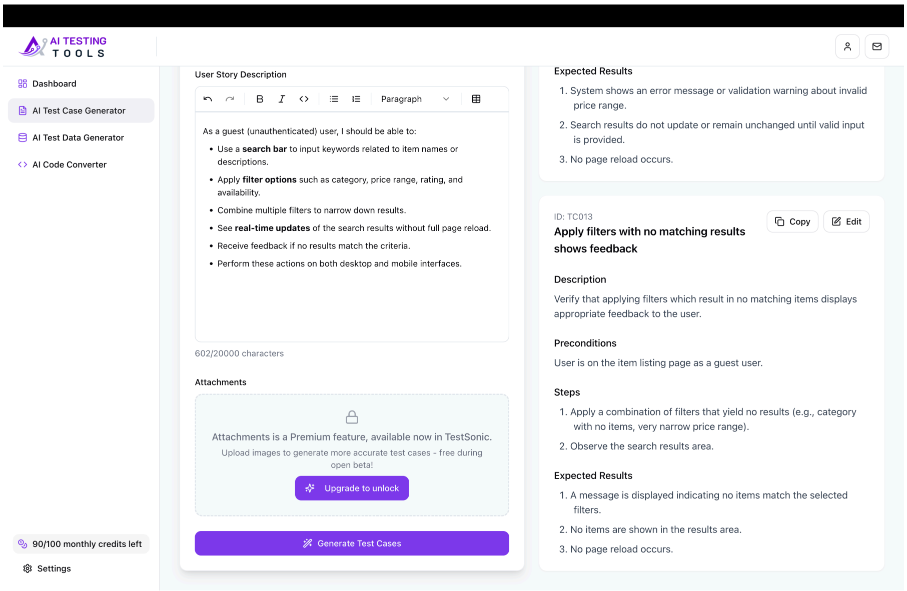
ID	TITLE	PRIORITY	OWNER	TAGS
TC-324	Verify keyboard navigati...	High	Thanh Thú...	AI G
TC-325	Evaluate screen reader ...	High	Thanh Thú...	AI G
TC-326	Test color contrast com...	Medium	Thanh Thú...	AI G
TC-321	Verify filter behavior co...	High	Thanh Thú...	AI Ge
TC-322	Evaluate search and filt...	High	Thanh Thú...	AI Ge
TC-323	Test filter functionality a...	Medium	Thanh Thú...	AI Ge
TC-318	Assess intuitiveness of ...	High	Thanh Thú...	AI G
TC-319	Verify responsiveness o...	High	Thanh Thú...	AI G
TC-320	Evaluate clarity of searc...	Medium	Thanh Thú...	AI G
TC-315	Verify input validation fo...	Critical	Thanh Thú...	AI G
TC-316	Evaluate protection agai...	Critical	Thanh Thú...	AI G
TC-317	Test authorization chec...	High	Thanh Thú...	AI G
TC-312	Monitor CPU usage duri...	High	Thanh Thú...	AI Ge
TC-313	Evaluate memory consu...	High	Thanh Thú...	AI Ge
TC-314	Measure database quer...	High	Thanh Thú...	AI Ge

Figure 7: Exported from BrowserStack

2. TestingTools.AI:

- Title: "Filter & Search"
- Description: Included search by name/category, no login required.
- **13 test cases**, covers basic search and single-filter use cases well for guests. How-

ever, it lacks tests for combined filters, mobile responsiveness, and edge cases like special characters.



[redacted]

User Story Description

As a guest (unauthenticated) user, I should be able to:

- Use a **search bar** to input keywords related to item names or descriptions.
- Apply **filter options** such as category, price range, rating, and availability.
- Combine multiple filters to narrow down results.
- See **real-time updates** of the search results without full page reload.
- Receive feedback if no results match the criteria.
- Perform these actions on both desktop and mobile interfaces.

602/20000 characters

Attachments

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Upload images to generate more accurate test cases - free during open beta!

Expected Results

1. System shows an error message or validation warning about invalid price range.
2. Search results do not update or remain unchanged until valid input is provided.
3. No page reload occurs.

ID: TC013

Apply filters with no matching results shows feedback

Description

Verify that applying filters which result in no matching items displays appropriate feedback to the user.

Preconditions

User is on the item listing page as a guest user.

Steps

1. Apply a combination of filters that yield no results (e.g., category with no items, very narrow price range).
2. Observe the search results area.

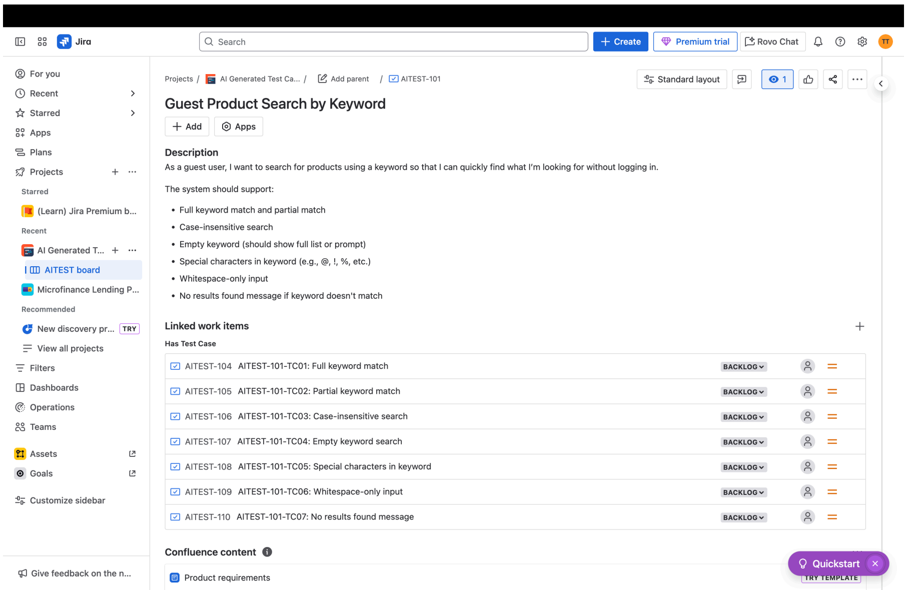
Expected Results

1. A message is displayed indicating no items match the selected filters.
2. No items are shown in the results area.
3. No page reload occurs.

Figure 8: Exported from TestingTools.AI

3. AITestCaseGenerator:

- **10 test cases** generated covering full filter & search flow, including keyword, all filter types, combined filters, responsiveness, and platform behavior.



[redacted]

Guest Product Search by Keyword

Description

As a guest user, I want to search for products using a keyword so that I can quickly find what I'm looking for without logging in.

The system should support:

- Full keyword match and partial match
- Case-insensitive search
- Empty keyword (should show full list or prompt)
- Special characters in keyword (e.g., @, !, %, etc.)
- Whitespace-only input
- No results found message if keyword doesn't match

Linked work items

Has Test Case

AITEST-104	AITEST-101-TC01: Full keyword match	BACKLOG
AITEST-105	AITEST-101-TC02: Partial keyword match	BACKLOG
AITEST-106	AITEST-101-TC03: Case-insensitive search	BACKLOG
AITEST-107	AITEST-101-TC04: Empty keyword search	BACKLOG
AITEST-108	AITEST-101-TC05: Special characters in keyword	BACKLOG
AITEST-109	AITEST-101-TC06: Whitespace-only input	BACKLOG
AITEST-110	AITEST-101-TC07: No results found message	BACKLOG

Confluence content

Product requirements

Figure 9: Exported from AITestCaseGenerator

1.3 Coverage summary

Feature	Tool	TC	Coverage Summary
User Sign In	**BrowserStack**	35	Excellent coverage: valid/invalid input, empty fields, SQL injection, performance, cross-platform
	TestingTools.AI	10	Covers functional flows (valid/invalid login, empty fields), lacks security & performance
	AITestCaseGen	5	Covers basic login flows; missing advanced and non-functional tests
User Management	**BrowserStack**	33	Strong CRUD coverage including duplicates, validation, delete confirm, role boundaries
	TestingTools.AI	15	Focused on user creation; lacks update/delete, role permissions, and audit log
	AITestCaseGen	8	Covers CRUD basics; lacks access control and logging scenarios
Filter & Search	**BrowserStack**	37	Comprehensive: filters, combined filters, performance, UX, accessibility
	TestingTools.AI	13	Good for single-filter search; missing combined filters and mobile UX
	AITestCaseGen	10	Well-balanced coverage: keyword, all filters, UI responsiveness

1.4 Conclusion and analysis

Each tool demonstrates distinct strengths suited to different QA needs:

- **BrowserStack** offers the most comprehensive coverage across all three features. Its prompt-based AI is capable of generating functional, non-functional, and UI-focused test cases with minimal setup. Ideal for teams looking for depth and automation readiness.

- **TestingTools.AI** is best for fast, manual test generation. It provides detailed, exportable test cases from structured user stories, but lacks advanced scenarios like performance or security testing.
- **AITestCaseGenerator** integrates seamlessly with Jira workflows. While it produces fewer test cases, its strength lies in traceability and ease of collaboration within existing Agile pipelines.

1.5 Issues encountered

1.5.1 BrowserStack

- Steps and expected results were not viewable until test cases were saved to the repository.
- Occasionally slow when generating large test suites (35+ cases).
- No direct export to CSV without saving and navigating to the repository.

1.5.2 TestingTools.AI

- No login required, but interface lacks customization for test ID formatting or grouping.
- Edge cases (e.g., mobile responsiveness, special characters) not always suggested unless explicitly stated in the description.
- Limited support for non-functional test categories (e.g., performance, security).

1.5.3 AITestCaseGenerator (Jira Plugin)

- Generated fewer test cases (around 10) unless description was very detailed.
- Lacked depth in advanced scenarios like audit logs or cross-platform testing.
- Requires a Jira environment with plugin access – not ideal for standalone use.