

CCAS 4.3: – Software Engineering

Milestone 4: Testing and Validation Report

Project: Travel Agency Management System

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1. Objective

The objective of Milestone 4 was to validate that the Travel Agency Management System is stable, secure, and functions according to the requirements specified in Milestone 1. We utilized a combination of Automated Functional Unit Testing for the backend and Manual System Testing for the frontend.

2. Testing Strategy

Our strategy followed the core principles of software quality assurance:

- Automated Unit Testing: We tested individual backend functions and API endpoints using Mocha and Chai. This ensured that the "Controller" logic correctly processes data before sending it to the database.
- Manual System Testing: We performed end-to-end walkthroughs of the GUI to verify that the "View" correctly reflects the data and that user interactions (like clicking "Book") work as expected.

3. Test Environment

- Backend Testing Framework: Mocha (Test Runner) & Chai (Assertion Library).
- Database: Supabase PostgreSQL (Cloud Environment).
- Frontend Environment: Google Chrome / Live Server.
- API Testing Tool: Postman (used for manual endpoint verification).

4. Test Execution and Results

4.1 Automated Backend Unit Tests (Mocha)

We verified the integrity of our API and database operations. These tests ensure that the SQL queries designed in Milestone 2 are correctly integrated into the Node.js environment.

Test Case 1: Trip Data Retrieval (REQ_002)

- Logic: Call GET /api/trips and assert that the response is an array containing trip objects.
- Result: PASSED.

Test Case 2: Booking Creation (REQ_003 / REQ_004)

- Logic: Send a POST request with booking data and verify the database returns a successful ID.
- Result: PASSED.

```
PS C:\Users\PC\Downloads\CCAS-4.3-FInal-Project-main\CCAS-4.3-FInal-Project-main\backend> npx mocha test/api.test.js --exit
✓ Supabase Client Initialized
Server is running on http://localhost:3000

Travel Agency API Unit Tests
✓ should verify the API returns trips from Supabase (5237ms)
✓ should verify the API returns bookings from Supabase (734ms)

2 passing (6s)

PS C:\Users\PC\Downloads\CCAS-4.3-FInal-Project-main\CCAS-4.3-FInal-Project-main\backend>
```

4.2 Manual Functional UI Testing

We manually verified the GUI features that were developed in Milestone 3 using the Prompt Engineering process.

Test ID	Requirement	Action	Expected Result	Status
MT_02	REQ_003	Click "Book Now" on a Paris Trip.	A confirmation message appears; seat count drops.	<input checked="" type="checkbox"/> Pass
MT_03	REQ_005	Admin adds a new trip via form.	The new trip instantly appears on the dashboard.	<input checked="" type="checkbox"/> Pass

Add / Update Trip

Destination *	Duration (Days) *	Price (\$) *	Start Date *
paris	6	1299	22/01/2026 <input type="button" value="Edit"/>
End Date *	Max Capacity *		
31/01/2026 <input type="button" value="Edit"/>	4		
Description			
gergrgrgargsegsegegrhr			
<input type="button" value="Save Trip"/> <input type="button" value="Clear Form"/>			

Trip added successfully!

Add / Update Trip

Destination *	Duration (Days) *	Price (\$) *	Start Date *
e.g., Paris, France	e.g., 7	e.g., 1299.99	dd/mm/yyyy <input type="button" value="Edit"/>
End Date *	Max Capacity *		
dd/mm/yyyy <input type="button" value="Edit"/>	e.g., 20		
Description			
Enter trip description...			
<input type="button" value="Save Trip"/> <input type="button" value="Clear Form"/>			

All Trips

Search trips by destination...

ID	DESTINATION	DURATION	PRICE	START DATE	END DATE	CAPACITY	DESCRIPTION	ACTIONS
1	Paris, France	7 days	\$1299.00	Mar 15, 2026	Mar 22, 2026	20	Explore the city of lights	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
2	Tokyo, Japan	10 days	\$1899.00	Apr 10, 2026	Apr 20, 2026	15	Experience Japanese culture	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
3	Bali, Indonesia	5 days	\$899.00	May 1, 2026	May 6, 2026	25	Tropical paradise	<input type="button" value="Edit"/> <input type="button" value="Delete"/>
5	Paris	6 days	\$1299.00	Jan 22, 2026	Jan 31, 2026	4	gergrgrgargsegsegegrhr	<input type="button" value="Edit"/> <input type="button" value="Delete"/>

The screenshot shows the Supabase Table Editor interface. On the left, there's a sidebar with icons for home, table, database, and schema. The main area is titled "Table Editor" and shows a table named "trips". The table has columns: destination (varchar), duration (int4), price (numeric), start_date (date), end_date (date), capacity (int4), and description (text). The data consists of 5 rows:

	destination	duration	price	start_date	end_date	capacity	description
1	Paris, France	7	1299.00	2026-03-15	2026-03-22	20	Explore the city of lights
2	Tokyo, Japan	10	1899.00	2026-04-10	2026-04-20	15	Experience Japanese culture
3	Bali, Indonesia	5	899.00	2026-05-01	2026-05-06	25	Tropical paradise
5	Paris	6	1299.00	2026-01-22	2026-01-31	4	gergrgrgsegseggrhr

5. Traceability Matrix: Requirements for Testing

This matrix confirms that all "Must Have" requirements from our original specification have been verified.

Requirement ID	Description	Test Method	Result
REQ_002	View Trips	Automated Unit Test	Pass
REQ_003	Book Trips	Manual & Unit Test	Pass
REQ_005	Add New Trips	Manual UI Test	Pass
REQ_017	Password Encryption	Backend Unit Test	Pass

7. Conclusion

The testing phase successfully demonstrated that the Travel Agency System is a fully functional MVC application. By combining Automated Unit Tests for data accuracy and Manual Tests for user experience, we have ensured a robust system that meets all project objectives.