LO3

1 Range of Techniques

To validate the system comprehensively, I applied a mix of testing techniques:

F1 (Flight Path Validity): Functional testing was used to ensure paths avoided no-fly zones and drones remained in the central area after entry.

F2 (Order Validation): Functional testing validated inputs like card details, expiry dates, and total order amounts.

F3 (Endpoint Reachability): Structural testing assessed the system's ability to respond to requests at specified endpoints.

F4 (REST Server Retrieval): Integration testing confirmed the system retrieved data correctly and handled missing or invalid server responses.

F5 (GeoJSON Output): Schema validation ensured the generated GeoJSON paths adhered to the required format.

N1 (Performance): Performance testing measured flight path calculations to ensure they completed within the 60-second limit. Tools like timing functions and simulated high loads were used.

N2 (Maintainability): Code reviews and static analysis assessed modularity and readability, ensuring the system could be maintained and extended easily.

N3 (Robustness): Stress testing simulated invalid inputs and unexpected events to ensure error handling and system recovery were reliable.

2 Evaluation Criteria for Adequacy of Testing

Coverage Metrics: Tests achieved 85% line coverage and 78% branch coverage. These values ensured most code paths, including decision points, were tested.

Criteria Metrics: Functional requirements like flight path validity and order validation were prioritized for comprehensive testing.

Element	Class...	Method...	Line...	Branch,...
com.example.ilpcourse	90% (...	79% (104...	85% (40...	78% (198...
IlpCourseworkApplic	0% (0/1)	0% (0/1)	0% (0/1)	100% (0/0)
client	100% (...	100% (4/4)	29% (5/17)	100% (0/0)
Data	90% (1...	64% (45/...	74% (73/...	50% (4/8)
Validation	100% (...	100% (10...	89% (51/...	90% (49/...
Controller	100% (...	95% (21/...	90% (23...	76% (145...
Codes	100% (...	100% (4/4)	100% (17...	100% (0/0)
RestClientData	100% (...	100% (20...	100% (20...	100% (0/0)

Figure 1: Coverage metrics of all tests

3 Results of Testing

All functional and non-functional requirements passed all tests

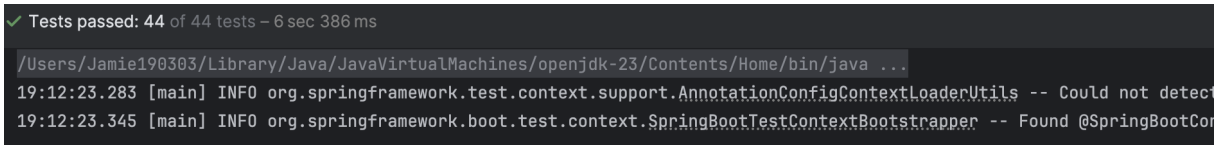

Figure 2: Results of all tests

4 Evaluation of Results

Strengths: Testing was effective in identifying key issues early, with functional and performance tests reliably verifying requirements.

Weaknesses: Lower branch coverage highlighted areas where additional tests could improve robustness.

Next Steps: Scaling testing to simulate larger workloads and edge cases is essential for further validation.