QA Analysis Summary (Integrated E2E + JUnit)

| Metric	Value	Formula / Source	Notes
Total Test Cases	24	N/A	8 (E2E) + 16 (JUnit)
Executed Tests	24	N/A	All tests executed
Passed Test Cases	13	N/A	Moderate execution success
Failed Test Cases	11	N/A	45.8% fail rate
Total Defects	10	N/A	6 (E2E) + 5 (JUnit)
Pass Rate (%)	54.17%	PassedTestCases/TotalExectuedTestCases	Indicates mid-level reliability
Requirement Coverage (%)	100.00%	CoveredReq/TotalReq	N/A
Defect Density (%)	45.83%	TotalDefects/TotalExectuedTestCases	High defect ratio
High/Critical Defects (%)	90.91%	(High+Critical)/TotalDefects	Prioritize fixes

Metrics
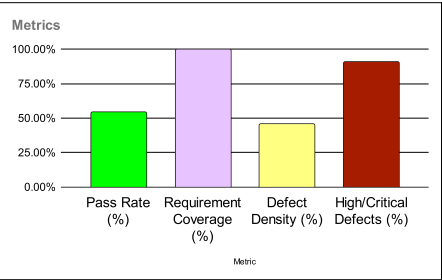
Requirement Traceability Matrix

Requirement ID	Description	Risk Level	Priority	Status	Fail Reason / Defect Summary	Test Cases
REQ-BR-01	Two seat classes (Business & Economy) must be handled distinctly.	Medium	P1	Fail	Seat duplication occurs after consecutive ticket issues; seat state not updated properly (E2E-TC02, JUNIT-TC02).	JUNIT-BUSROW-TC01, JUNIT-SEATDUP-TC02, JUNIT-SEATPLAN-TC03, JUNIT-SEATRES-TC04, JUNIT-SEATRES-TC06, E2E-Y-ISSUE-L1-TC01–TC04
REQ-BR-02	Business class ticket costs $750 (no discount).	Low	P1	Pass	N/A	JUNIT-SELL-TC07, JUNIT-SELL-TC15, E2E-Y-ISSUE-L1-TC01–TC02
REQ-BR-03	Economy class ticket cost $500 base price.	Low	P2	Pass	N/A	JUNIT-SELL-TC13
REQ-BR-04	Passenger type (Frequent Flyer, Employee, Neither) mutually exclusive.	Medium	P1	Pass	N/A	JUNIT-SEATDUP-TC02, JUNIT-FFLY-TC09, E2E-Y-ISSUE-L1-TC01–TC02
REQ-BR-05	Airline employees get 50% discount on Economy.	Medium	P1	Fail	Economy discount not applied (expected $250, actual $500).	JUNIT-SELL-TC08
REQ-BR-06	Employees get no discount on Business class.	Low	P2	Pass	N/A	JUNIT-SELL-TC14
REQ-BR-07	Frequent flyers get no discount but retain privileges.	Low	P3	Pass	N/A	JUNIT-FFLY-TC09, E2E-Y-ISSUE-L1-TC01–TC02
REQ-NO-01	Airplane has 14 seats total.	High	P1	Fail	Ticket issuance continues beyond 14 seats; no overflow validation.	JUNIT-SEATDUP-TC02, JUNIT-SEATPLAN-TC03, JUNIT-SEATRES-TC05, JUNIT-SEATRES-TC12
REQ-NO-02	Row 1 = Business class (1A, 1B).	Medium	P1	Fail	Seat allocation error- Business seats reused after sale.	JUNIT-BUSROW-TC01, JUNIT-SEATDUP-TC02, E2E-Y-ISSUE-L1-TC01–TC04
REQ-NO-03	Rows 2–4 = Economy class (A–D).	Medium	P1	Fail	Economy row count mismanaged; extra seat beyond limit generated.	JUNIT-SEATPLAN-TC03, JUNIT-SEATRES-TC05, JUNIT-SEATRES-TC06, JUNIT-SEATRES-TC12, JUNIT-SELL-TC08
REQ-NO-04	Output printed to console with prompts and loops.	Low	P2	Fail	Input validation loop repeats indefinitely; "Please answer Y/N" not consistently shown.	JUNIT-SELL-TC08, JUNIT-PASS-TC10–TC11, JUNIT-PASS-TC16, E2E-Y-ISSUE-L1-TC01–TC08

Requirement Status Overview

Status	Count	%
Passed Reqs	5	45.45%
Failed Reqs	6	54.55%

Requirement Pass/Fail Status
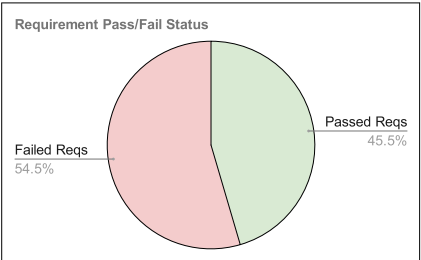
Defect Analysis by Priority & Severity

Phase	Target Area	Key Issues	Required Fix	Related Requirements
1 (Critical)	Seat management & sale logic	Seat duplication, flyer validation	Lock seat map, sync sale record	BR-01, NO-01, NO-02, NO-03
2 (Stability)	Pricing & validation logic	Employee discount not applied correctly (expected $250 →	Fix discount calculation in SellTicket, integrate	BR-05, NO-04
3 (Usability)	Prompt and console response	Message display inconsistency	Unify console outputs	NO-04, NO-08

Key Observations

Category	Key Findings
Seat Synchronization Issues	E2E and JUnit both detect duplication between Business and Economy seats after multiple transactions (BR-01, NO-01, NO-02).
Discount Logic Failure	Employee discount logic malfunctioning under Economy ticket flow (BR-05).
Prompt Validation Instability	Input validation not breaking properly after invalid entry, repeating more than expected (NO-04).
Console Output Inconsistency	"Unavailable" seat tag and flight manifest outputs not consistently formatted (NO-04).

Improvement Roadmap

Next Steps	1. Refactor Seat Reservation Module 2. Correct Employee Discount Logic 3. Centralize Input Validation Handler 4. Standardize Console Output 5. Conduct Regression