Integration Testing

Course: Software Testing

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Integration Test Case 2: Supplier Delete Constraint Behavior (Parent–Child Relationship)

Test Objective

The objective of this integration test is to verify that the system correctly enforces **referential integrity constraints** between the suppliers (parent table) and products (child table). Specifically, the test checks whether a supplier **cannot be deleted** while products referencing that supplier still exist, and that deletion becomes possible only after dependent products are removed.

Type of Testing

Database Integration Testing

Integration Method

Decomposition-Based Integration Testing (Bottom-Up)

This method was chosen because the test starts from **lower-level database components** (tables and constraints) and verifies correct behavior before higher-level business logic is considered.

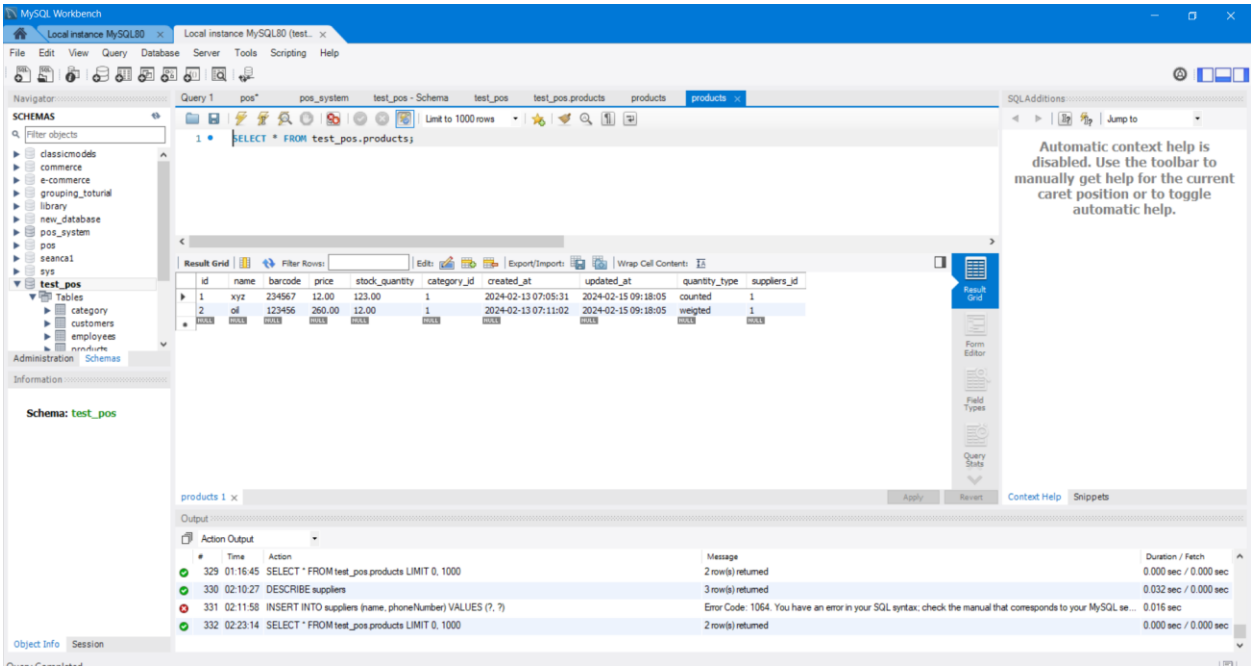
Integrated Components

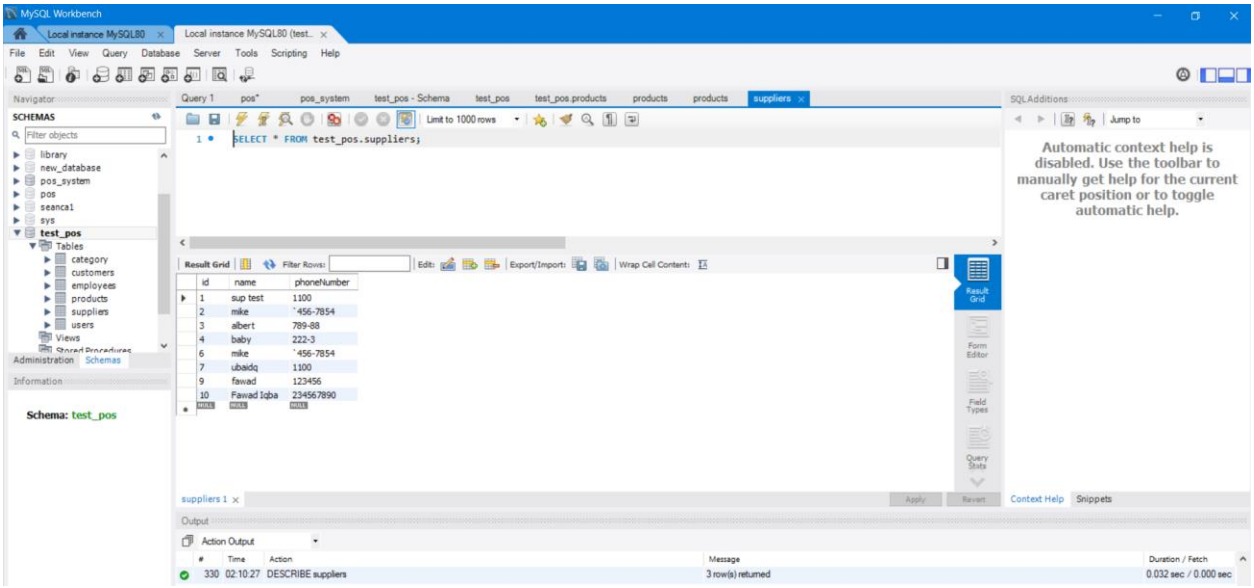
- **Tables:** suppliers, products
- **Database Constraint:** Foreign Key (products.suppliers_id → suppliers.id)
- **Operations Integrated:**

- Insert supplier
- Insert product linked to supplier
- Attempt supplier deletion
- Delete product
- Delete supplier

Test Environment

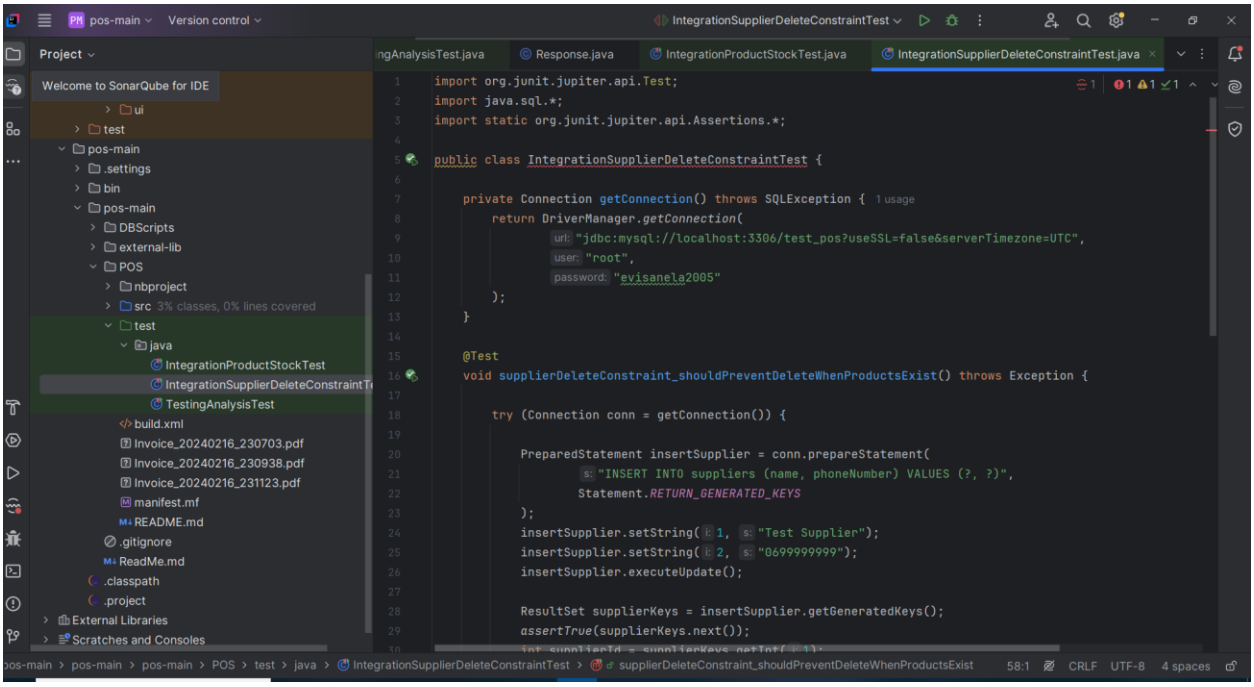
- **Database:** MySQL (Schema: test_pos)
- **Programming Language:** Java
- **Testing Framework:** JUnit 5
- **Database Access:** JDBC (PreparedStatement)
- **IDE:** IntelliJ IDEA

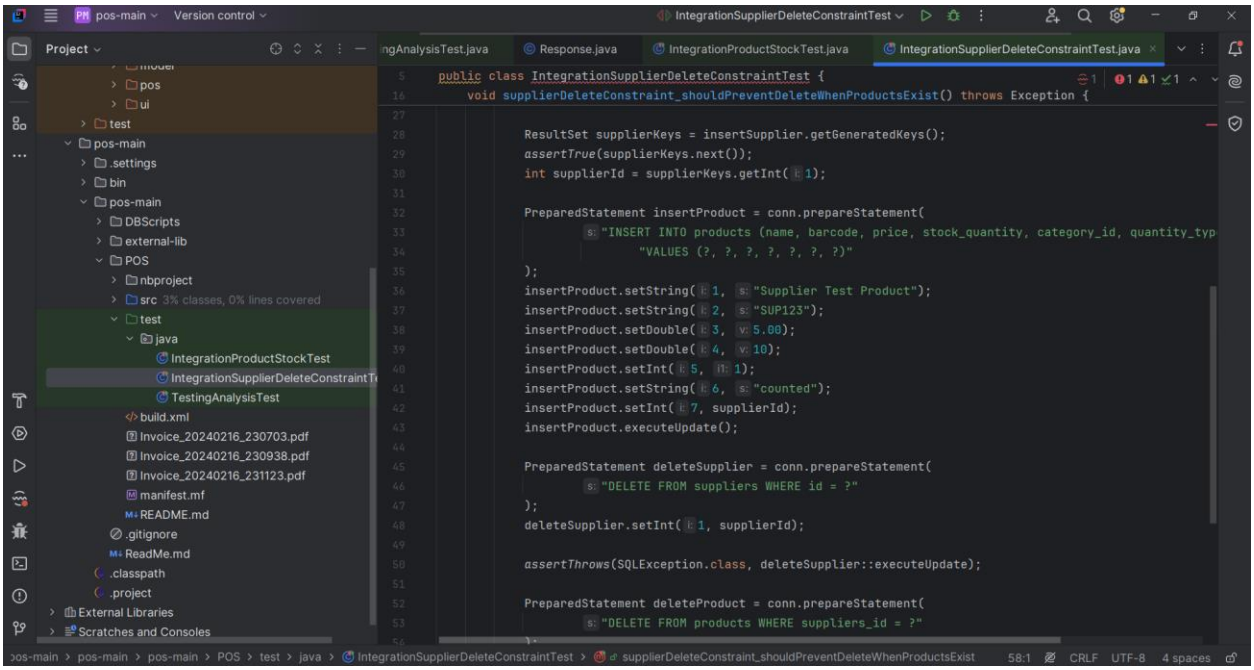


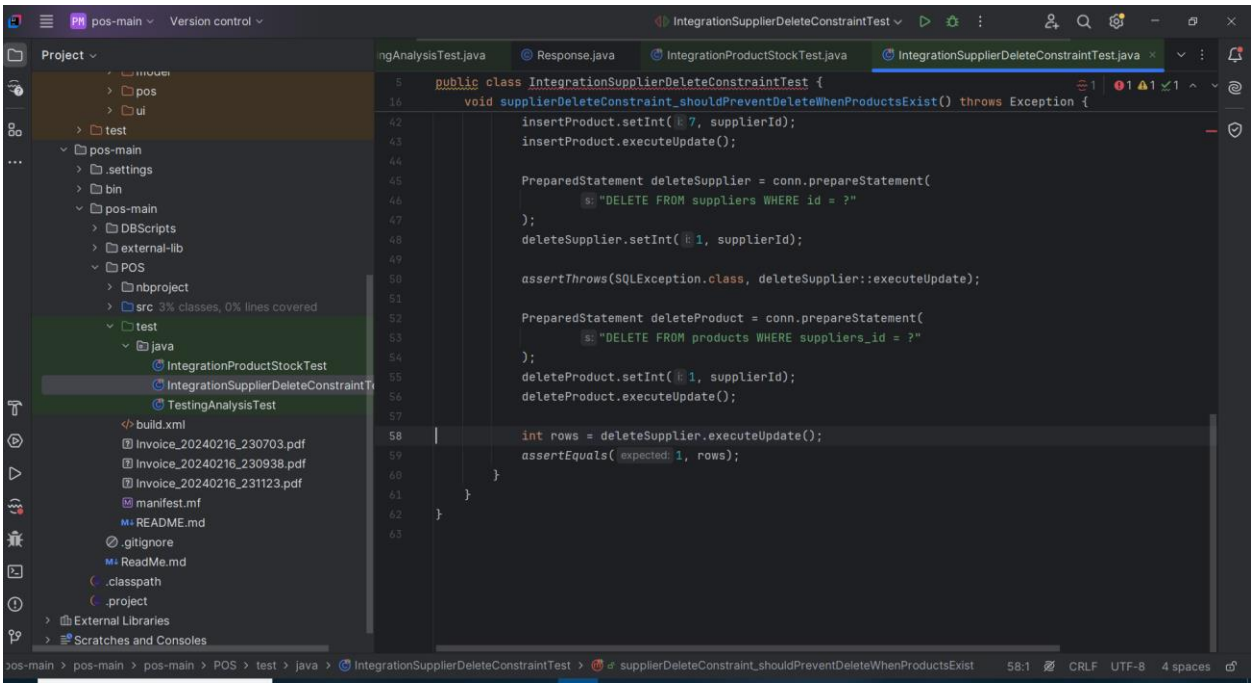


Test Flow

1. Insert a new supplier into the suppliers table.
2. Insert a product linked to that supplier using suppliers_id.
3. Attempt to delete the supplier **while the product still exists**.
4. Verify that deletion is **prevented by the foreign key constraint**.
5. Delete the product referencing the supplier.
6. Delete the supplier successfully after dependency removal.





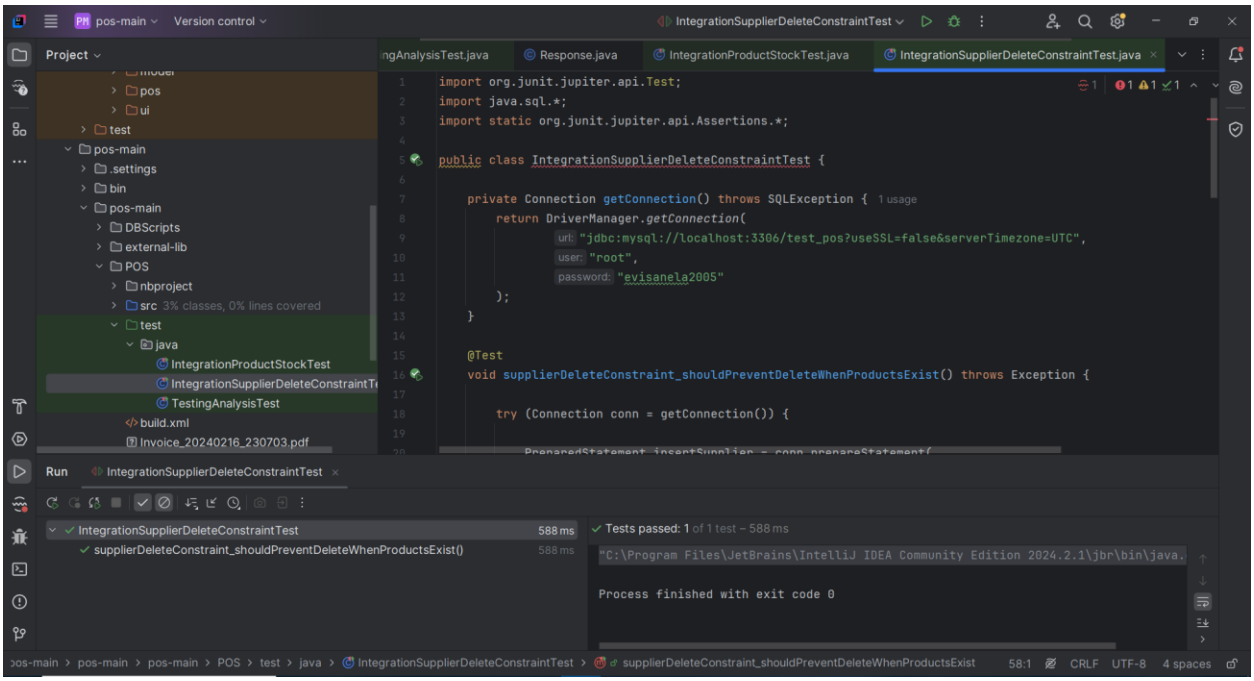


Expected Result

- The system should **prevent deletion** of a supplier if related products exist.
- The database should throw an SQL constraint error or block the operation.
- After deleting the related product, the supplier deletion should succeed.

Actual Result

- When attempting to delete the supplier while a product existed, the database **prevented the deletion**, enforcing referential integrity.
- After deleting the product, the supplier was deleted successfully.
- The behavior confirms that the foreign key constraint is working as expected.



Test Result

PASS

The test successfully validated correct enforcement of parent–child constraints between the suppliers and products tables.

Observations

- The test confirms that **database-level constraints** protect data integrity even without additional application-level validation.
- This behavior prevents orphan records and ensures consistency between related entities.
- Proper test data setup (including mandatory fields such as phoneNumber) is required to avoid insertion errors.

Step	Operation	Expected Outcome	Actual Outcome
1	Insert supplier	Supplier added	Supplier added
2	Insert product with supplier ID	Product added	Product added
3	Delete supplier	Operation blocked	Blocked by FK
4	Delete product	Product removed	Product removed
5	Delete supplier	Supplier removed	Supplier removed

Conclusion

This integration test demonstrates that the system correctly applies **foreign key constraints** to manage parent–child relationships. By using a **Bottom-Up integration strategy**, the test confirms reliable database behavior and ensures that invalid delete operations are safely prevented.