Biba Integrity Model Test Cases

Test Environment Setup

Users and Their Integrity Levels

User Name	User ID	Integrity Level
Pauline Pugha	3ca7b66-41ea-4183-8585-563e65581ddb	Top Secret
Brandon Lee	6618e6ea-69b3-4daa-9353-975342d6fae6	Secret
Robert Yestur	90ab417b-e85a-48d7-b183-532c4459cb70	Confidential
Valentine Davis	ce0164a1-f097-4582-af21-b92909485af5	Unclassified

Objects and Their Integrity Levels

Object Type	Object ID	Integrity Level
Mission Spec	56c56f2e-fd34-497a-9de5-5ce428542622	Top Secret
Weapon Spec	8e2d1aa9-17e6-4b17-ba87-38c6e6d5562f	Secret
Mission Spec	ebbe1830-1ee4-46ff-9819-14bee69340c5	Confidential
Weapon Spec	a727ad5a-e986-437d-ac1e-e4a0d19bc3da	Unclassified

Test Case 1: Simple Integrity Property (No Read Down)

Biba Rule: To prevent "contamination" from less reliable sources, users cannot read data from a lower integrity level than their own.

Test 1.1: Failed Read - Lower Level ✗

- **User:** Pauline Pugh (Top Secret)
- **Object:** Weapon Spec a727ad5a... (Unclassified)
- **Operation:** READ field "Name"
- **Result:**

```
java.lang.Exception: Access Denied [Simple Integrity Property]:
User 'Pauline Pugh' (Top Secret) cannot read object 'a727ad5a...' (Unclassified).
No Read-Down allowed.
```

Test 1.2: Successful Read - Higher Level ✓

- **User:** Robert Yestur (Confidential)
- **Object:** Mission Spec 56c56f2e... (Top Secret)
- **Operation:** READ field "Title"
- **Result:**

```
Output: Ash
```

Success: Integrity is preserved because a lower-level user reading higher-level data does not corrupt the higher-level data.

Test Case 2: Star (*) Integrity Property (No Write Up)

Biba Rule: To prevent "polluting" high-integrity data, users cannot write to objects at a higher integrity level than their own.

Test 2.1: Failed Write - Higher Level ✗

- **User:** Valentine Davis (Unclassified)
- **Object:** Weapon Spec 8e2d1aa9... (Secret)
- **Operation:** WRITE field "Name" with "newName"
- **Result:**

```
java.lang.Exception: Access Denied [*Integrity-Property]:
User 'Valentine Davis' (Unclassified) cannot write to object '8e2d1aa9...' (Secret).
No Write-Up allowed.
```

Test 2.2: Successful Write - Lower Level ✓

- **User:** Brandon Lee (Secret)
- **Object:** Mission Spec ebbe1830... (Confidential)
- **Operation:** WRITE field "Content" with "This is a test"
- **Result:**

```
Write Successful.
```

Success: A high-integrity user is permitted to write to a lower-integrity object.

Summary of Results

Property	Rule	Result
Simple Integrity	No Read Down	PASSED (Prevents contamination)
Star (*) Integrity	No Write Up	PASSED (Prevents pollution)