SQL Internship – Task 13 Solution

Transactions & ACID Properties

This document demonstrates SQL transactions, COMMIT, ROLLBACK, and ACID properties. It also explains transaction isolation levels and how transactions ensure data consistency in real-world systems.

SQL Script:

```sql
-- Sample Bank Table
CREATE TABLE bank_accounts (
    acc_id INT PRIMARY KEY,
    acc_name VARCHAR(100),
    balance INT
);

-- Insert sample data
INSERT INTO bank_accounts VALUES (1, 'Aaryan', 5000);
INSERT INTO bank_accounts VALUES (2, 'Rahul', 3000);

-- Start Transaction (Money Transfer Example)
START TRANSACTION;

-- Debit from Aaryan
UPDATE bank_accounts SET balance = balance - 1000 WHERE acc_id = 1;

-- Credit to Rahul
UPDATE bank_accounts SET balance = balance + 1000 WHERE acc_id = 2;

-- Commit changes (if successful)
COMMIT;

-- Rollback Example (Failure Scenario)
START TRANSACTION;
UPDATE bank_accounts SET balance = balance - 2000 WHERE acc_id = 1;
-- Error occurs here
ROLLBACK;

-- Check data
SELECT * FROM bank_accounts;
```

ACID Properties:

- Atomicity: All operations succeed or none are applied.
- Consistency: Database moves from one valid state to another.
- Isolation: Transactions execute independently of each other.
- Durability: Once committed, data is permanently stored.

Transaction Isolation Levels:

- READ UNCOMMITTED – Allows dirty reads.
- READ COMMITTED – Prevents dirty reads.
- REPEATABLE READ – Prevents non-repeatable reads.
- SERIALIZABLE – Highest isolation, fully consistent.

Interview Questions & Answers: 1. What is a transaction? A transaction is a group of SQL statements executed as a single unit. 2. Explain ACID properties? Atomicity, Consistency, Isolation, Durability ensure reliable transactions. 3. What is rollback? ROLLBACK undoes all changes in a transaction. 4. What are isolation levels? They define how transactions interact with each other. 5. Why transactions matter? They prevent data corruption and ensure data consistency in critical

systems like banking.