UNIT 4 TRANSACTIONS

Transaction Concepts –ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlocks – Transaction Recovery – **Save Points – Isolation Levels – SQL Facilities for Concurrency and Recovery**

Recap

- Deadlock Detection

- Deadlock Recovery

- Failure Classification

- Storage Structure

Save Point

- Command in SQL

- Used with the rollback command.

- Transaction Control Language, that is used to mark the transaction in a table.

- very long table, and you want to roll back only to a certain position in a table then; this can be achieved using the savepoint.

```
Create: Savepoint <savepoint_name>;
Rollback: Rollback to <savepoint_name>;
Drop: Release <savepoint_name>;
```

Savepoint Example

• ROLLBACK: Similar to the undo operation.

SQL> select * from customer;

CUSTID	PID	QUANTITY
100	1234	10
101	1235	15
102	1236	15
103	1237	10

SQL> savepoint s1;

Savepoint created.

Savepoint Example

SQL> Delete from customer where custid=103;

```
CUSTID    PID      QUANTITY
--------  --------  --------
   100    1234         10
   101    1235         15
   102    1236         15
```

SQL> rollback to s1;

Rollback complete.

Savepoint Example

SQL> select * from customer;

```
CUSTID    PID      QUANTITY
----------  ----------  ----------
   100     1234        10
   101     1235        15
   102     1236        15
   103     1237        10
```

SQL> commit;

Isolation Level

- Isolation determines how transaction integrity is visible to other users and systems.

- A transaction isolation level is defined by the following phenomena

  - Dirty Read

  - Non Repeatable read

  - Phantom Read

Isolation Level

- **Dirty Reads**: This situation occurs when transactions read data that has not been committed.

- **Nonrepeatable Reads**: This situation occurs when a transaction reads the same query multiple times and results are not the same each time

- **Phantoms**: This situation occurs when a row of data matches the first time but does not match subsequent times

Isolation Level

- The SQL standard defines four isolation levels

  - Read Uncommitted - Lowest Isolation Level

  - Read Committed

  - Repeatable Read - most restrictive isolation level

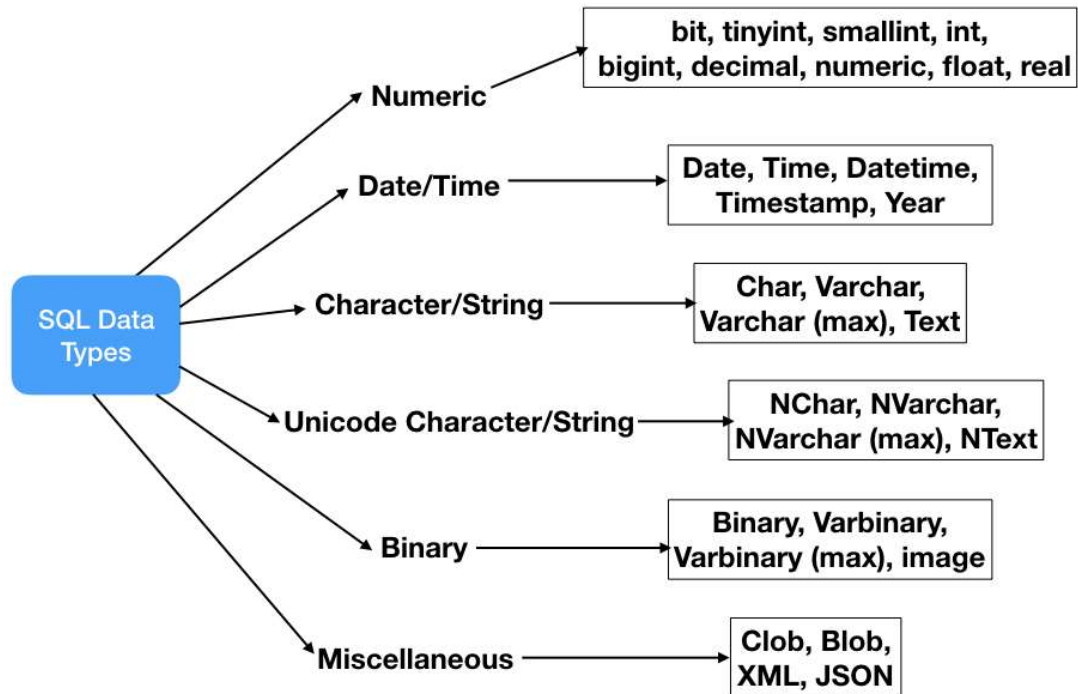 - Serializable – Highest isolation Level

Isolation Level

Isolation Level	Dirty reads	Non-repeatable reads	Phantoms
Read Uncommitted	May occur	May occur	May occur
Read Committed	Don't occur	May occur	May occur
Repeatable Read	Don't occur	Don't occur	May occur
Serializable	Don't occur	Don't occur	Don't occur

SQL Data Types

Assessment

1. Write an SQL query to fetch "FIRST_NAME" from Worker table using the alias name as <WORKER_NAME>.

   Select FIRST_NAME AS WORKER_NAME from Worker;

2. Write an SQL query to fetch "FIRST_NAME" from Worker table in upper case.

   Select upper(FIRST_NAME) from Worker;

3. Write an SQL query to fetch unique values of DEPARTMENT from Worker table.

   Select distinct DEPARTMENT from Worker;