

TRANSACTION CONTROL LANGUAGE(TCL):(14-11-2024)

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Transaction :

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- a transaction is nothing but to perform some task over database tables.
- by default all DDL,DML operations auto-commit(permanent by system) operations in SQLSERVER.
- to control these transactions(DML) under user control then we use TCL commands are,

i) BEGIN TRANSACTION

ii) COMMIT

iii) ROLLBACK

iv) SAVEPOINT

i) BEGIN TRANSACTION:

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- this command is used to start a transaction.

syntax:

=====

begin transaction

< statements>;

ii) COMMIT:

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- this command is used to make a transaction is permanent.

syntax:

=====

begin transaction

< statements>;

commit;

EX:

CREATE TABLE BRANCH(BCODE INT,BNAME VARCHAR(10),LOC VARCHAR(10));

TESTING:

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BEGIN TRANSACTION

INSERT INTO BRANCH VALUES(1021,'SBI','HYD')----USER COMMITTED

COMMIT

BEGIN TRANSACTION

UPDATE BRANCH SET LOC='PUNE' WHERE BCODE=1021;----USER COMMITTED

COMMIT

```
BEGIN TRANSACTION
DELETE FROM BRANCH WHERE BCODE=1021----USER COMMITTED
COMMIT
```

To commit all DML operations at a time:

```
=====
BEGIN TRANSACTION
INSERT INTO BRANCH VALUES(1021,'SBI','HYD')
UPDATE BRANCH SET LOC='PUNE' WHERE BCODE=1021;
DELETE FROM BRANCH WHERE BCODE=1021;
COMMIT
```

15-11-2024:

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iii) ROLLBACK:

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- to cancel a transaction.once a transaction was committed then we cannot rollback.

syntax:

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begin transaction

rollback

Ex:

```
BEGIN TRANSACTION
INSERT INTO BRANCH VALUES(1021,'SBI','HYD')
```

```
BEGIN TRANSACTION
ROLLBACK
```

```
BEGIN TRANSACTION
UPDATE BRANCH SET LOC='PUNE' WHERE BCODE=1021;
```

```
BEGIN TRANSACTION
ROLLBACK
```

```
BEGIN TRANSACTION
DELETE FROM BRANCH WHERE BCODE=1021
```

```
BEGIN TRANSACTION
ROLLBACK
```

To rollback all DML operations at a time:

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```
BEGIN TRANSACTION
INSERT INTO BRANCH VALUES(1021,'SBI','HYD')
UPDATE BRANCH SET LOC='PUNE' WHERE BCODE=1021;
DELETE FROM BRANCH WHERE BCODE=1021;
```

```
BEGIN TRANSACTION
ROLLBACK
```

SAVEPOINT:

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- when we created a savepoint internally system is allocating some special memory under instance for storing the required row / rows which we want to rollback(i.e cancel) in the future.

syntax to create a savepointer:

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```
begin transaction
save transaction <pointer name>
<statements>;
```

syntax to rollback a savepoint:

=====

```
begin transaction
rollback transaction <pointer name>
```

EX:

```
BEGIN TRANSACTION
DELETE FROM BRANCH WHERE BCODE=1021
DELETE FROM BRANCH WHERE BCODE=1025
SAVE TRANSACTION S1
DELETE FROM BRANCH WHERE BCODE=1023
```

TESTING:

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CASE-1:

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```
BEGIN TRANSACTION
ROLLBACK TRANSACTION S1 -----> ( we rollback 1023 record only)
```

CASE-2:

=====

```
BEGIN TRANSACTION
```

ROLLBACK -----> (we rollback remaining 1021,1025 records)

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NOTE:

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- Generally all databases are having ACID properties by default.
- By using ACID properties database server will maintain data / information with accurate and consistency manner.

A - Atomicity

C - Consistency

I - Isolation

D - Durability

A - Atomicity:

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- Atomic means that single.
- this property will make all operations as a single transaction and which will execute successfully (or) cancelled.

Ex:

withdraw transaction:

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ATM

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- step1 : insert ATM card
- step2 : select language
- step3 : select banking option
- step4 : click on withdraw option
- step5 : enter amount : 4500
- step6 : select save / current account
- step7 : enter pin no : xxxx
- step8 : click on YES / NO

C - Consistency:

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- to maintain consistency data before or after a transaction.

Ex:

X-customer

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main bal : 10000 (before transaction)

Y-customer

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main bal : 3000 (before transaction)

transfer : -5000 (debit)		: +5000 (credit)
=====		=====
balance : 5000 (after transaction)		balance : 8000 (after transaction)
+5000 (debit)		-5000 (credit)
=====		=====
is equals to main bal : 10000	is equals to main bal :	3000
=====		=====

I - Isolation:

=====

- every transaction will treat as an independent transaction.

Ex:

Withdraw transaction:

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- > withdraw transaction-1 : Trn ID : xxxxxxxxx1021
- > withdraw transaction-2 : Trn ID : xxxxxxxxx1022
- > withdraw transaction-3 : Trn ID : xxxxxxxxx1023

D - Durability:

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- once a transaction is committed then we cannot rollback at any level.

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