BITS, PILANI – K. K. BIRLA GOA CAMPUS

Database Systems

(IS F243)

by

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TRANSACTION MANAGEMENT

Concepts

- Database system Examples
- Definition
- Properties of a Transaction

Examples

- Banking system
- Reservation system
- Library management system

Definition

- Transaction is a unit of program that access and updates various data items in data base.

ATM System

Transaction: Withdraw some amount

Steps:

START the transaction

1. Prompt: Enter the amount to be withdrawn

2.Checking enough balance

3. if yes then withdraw

(balance=balance – amount)and

Give the money

3. if no display the message

4. print the receipt

END the transaction

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TRANSACTION FAILS

4. Give the money

END the transaction

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TRANSACTION FAILS

4. print the receipt

END the transaction

Definition

- Unit of program that accesses and updates various data items
- Set of instructions
- Sequential order

Banking system

AccNo.	Customer Name	Balance amt
A1	Manish	1000/-
A2	Suman	2000/-

Transaction: Transfer Rs 500/- from account A1 to account A2

Steps:

BEGIN

1. Read (A1, A1balance)
2 A1balance = A1balance - 500
3. Read (A2, A2balance)
4. A2balance = A2balance + 500
5. Write (A1, A1balance)
6. Write (A2, A2balance)

END

ATOMICITY

AccNo.	Customer Name	Balance amt
A1	Manish	1000/-
A2	Suman	2000/-

Transaction: Transfer Rs 500/- from account A1 to account A2

Steps:

START

1. Read (A1, A1balance)
2. A1balance = A1balance - 500

TRANSACTION FAILS

3. Read(A2, A2balance)
4. A2balance = A2balance + 500
5. Write (A1, A1balance)
6. Write(A2,A2balance)

END

SOLUTION:

(UNDO : A1balance=A1balance+500)

ALL OR NONE

CONSISTENCY

AccNo.	Customer Name	Balance amt
A1	Manish	1000/-
A2	Suman	2000/-

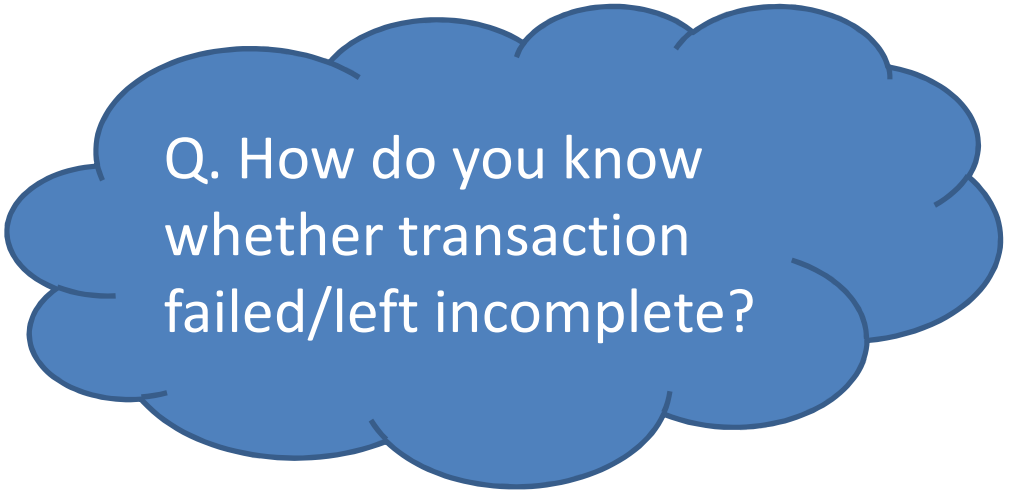
Transaction: Transfer Rs 500/- from account A1 to account A2

Steps:

BEGIN

1. Read (A1, A1balance)
2. A1balance=A1balance-500
3. Read(A2, A2balance)
4. A2balance=A2balance+500
5. Write (A1, A1balance)
6. Write(A2,A2balance)

END



SOLUTION: check the sum of A1balance and A2balance before starting the transaction. It is Rs. 3000.

check the sum of A1balance and A2balance after completing the transaction It is also Rs. 3000 .(same as before means data is consistent)

ISOLATION

Transaction: both C1 and C2 are accessing joint account

Transaction1: C1 is withdrawing money.

Transaction 2: C2is checking balance and withdrawing money

T1 T2

balance = 500

Withdraw 500

trying to withdraw but cannot

He/she is the only one doing the transaction.

DURABILITY

- What happens if the database server crashes before the changed data is written onto a stable storage?

- After a transaction completes successfully, the changes it has made to the database persist, even if there are system failures.

  Solution: client to server, transaction logs, backup etc.

ACID Properties of a transaction

- Atomicity
- Consistency
- Isolation
- Durability

Definition of Transcation

- Unit of program that accesses and updates various data items
- Set of instructions
- Sequential order
- ACID properties