CO558 Database Design   Exam Revision Guide

Use the following to help you to revise for the exam.

1. **Revise how to draw ERDs**

2. **Revise Writing SQL SELECT statements, and understand the clauses and options.**

3. **Chapter Six (Introduction to SQL) Exercises – SQL Worksheet on Cloud.**

4. **Chapter Eleven (Transactions – especially concurrency issues and control)**

5. **Work through some normalisation exercises.**

6. **If you have time, work through/revise some of the other Worksheets on Cloud.**

19) In an SQL statement, which of the following parts states the conditions for row selection?
A) Select
B) From
C) Where
D) Group By

20) What does the following SQL statement do?

Select * From Customer Where Cust_Type = "Best"

A) Selects all the fields from the Customer table for each row with a customer labeled "Best"
B) Selects the "*" field from the Customer table for each row with a customer labeled "Best"
C) Selects fields with a "*" in them from the Customer table
D) Selects all the fields from the Customer table for each row with a customer labeled "*"

21) What result will the following SQL statement produce?

Select Avg(standard_price) as average from Product_V;

A) The average of all products in Product_V
B) The average Standard_Price of all products in Product_V
C) The average price of all products
D) None of the above

22) Which of the following questions is answered by the SQL statement?

Select Count (Product_Description) from Product_T;

A) How many products are in the table Product_T?
B) How many products have product descriptions in the Product Table?
C) How many characters are in the field name "Product_Description"?
D) How many different columns named "Product_Description" are there in table Product_T?

23) What results will be produced by the following SQL query?

Select sum(standard_price) as Total_Price
    from Product_V
    where Product_Type = 'WOOD';

A) The total price of all products that are of type wood
B) The total price of all products
C) The Standard_Price of the first wood product in the table
D) The Standard_Price of any wood product in the table

24) Which of the following counts ONLY rows that contain a value?
A) Count
B) Count(*)
C) Tally(*)

D) Checknum

25) Which of the following will produce the minimum of all standard prices?
A) Select standard_price from Product_V where Standard_Price = min;
B) Select min(standard_price) from Product_V;
C) Select Standard_Price from min(Product_V);
D) Select min(Standard_Price) from Product_V where Standard_Price = min(Standard_Price);

26) What will result from the following SQL Select statement?

Select min(Product_Description)
    from Product_V;

A) The minimum value of Product_Description will be displayed.
B) An error message will be generated.
C) The first product description alphabetically in Product_V will be shown.
D) None of the above.

27) Which of the following is the wildcard operator in SQL statements?
A) < >
B) *
C) =
D) &

28) What result set will the following query return?

Select Item_No
    from Order_V
    where quantity > 10;

A) The Item_No of all orders that had more than 10 items
B) The Order_Id of all orders that had more than one item
C) The Order_Id of all orders that had more than 10 items
D) The Item_No of all orders that had 10 or more items

29) What result set will the following query return?

Select Item_No, description
    from item
    where weight > 100 and weight < 200;

A) The Item_No and description for all items weighing less than 100
B) The Item_No for all items weighing between 101 and 199
C) The Item_No and description for all items weighing between 101 and 199
D) The Item_No for all items weighing more than 200

30) To eliminate duplicate rows in a query, the _____ qualifier is used in the SQL Select command.
A) alter
B) distinct
C) check
D) specific

31) What result set is returned from the following query?

Select Customer_Name, telephone
    from customers
    where city in ('Boston','New York','Denver');

A) The Customer_Name and telephone of all customers
B) The Customer_Name and telephone of all customers living in either Boston, New York or Denver
C) The Customer_Name and telephone of all customers living in Boston and New York and Denver
D) The Customer_Name of all customers living in Boston, New York or Denver

32) To get all the customers from Hawaii sorted together, which of the following would be used?
A) ORDER BY
B) GROUP BY
C) HAVING
D) SORT

33) A single value returned from an SQL query that includes an aggregate function is called a(n):
A) agate.
B) scalar aggregate.
C) vector aggregate.
D) summation.

34) Multiple values returned from an SQL query that includes an aggregate function are called:
A) vector aggregates.
B) scalar aggregates.
C) agates.
D) summations.

35) Which of the following can produce scalar and vector aggregates?
A) ORDER BY
B) GROUP BY
C) HAVING
D) SORT

36) What will be returned when the following SQL statement is executed?

Select driver_no,count($*$) as num_deliveries
    from deliveries
    group by driver_no;

A) A listing of all drivers, sorted by driver number
B) A listing of each driver as well as the number of deliveries that he or she has made
C) A count of all of the deliveries made by all drivers
D) None of the above

37) What will be returned when the following SQL statement is executed?

Select driver_no, count($*$) as num_deliveries
    from deliveries
    where state = 'MA'
    group by driver_no;

A) A listing of all drivers who made deliveries to state = 'MA', sorted by driver number
B) A listing of each driver who made deliveries to state = 'MA' as well as the number of deliveries that each driver has made to that state
C) A count of all of the deliveries made to state = 'MA' by all drivers
D) None of the above

7. Chapter Seven (Advanced SQL) Exercises as follows

1) A join operation:
A) brings together data from two different fields.
B) causes two tables with a common domain to be combined into a single table or view.
C) causes two disparate tables to be combined into a single table or view.
D) is used to combine indexing operations.

2) A join in which the joining condition is based on equality between values in the common columns is called a(n):
A) equi-join.
B) unilateral join.
C) natural join.
D) both A and C.

3) A join that is based upon equality between values in two common columns with the same name and where one duplicate column has been removed is called a(n):
A) equi-join.
B) natural join.
C) multivariate join.
D) inner join.

4) The most commonly used form of join operation is the:
A) outer join.
B) union join.
C) equi-join.
D) natural join.

5) A join in which rows that do not have matching values in common columns are still included in the result table is called a(n):
A) natural join.
B) equi-join.
C) outer join.
D) union join.

8. **Chapter 11 Database Administration and Transaction Management**

Understand Database Audits, Transactions, Concurrency Control, Lost Update Problem

IT Operations

- Policies and procedures for day-to-day management of infrastructure, applications, and databases in an organization

- For databases:

  o Backup & recovery

  o Availability

Database Recovery

- Mechanism for restoring a database quickly and accurately after loss or damage

- Recovery facilities:

  - Backup Facilities

  - Journalizing Facilities

  - Checkpoint Facility

  - Recovery Manager

Backup Facilities

- DBMS copy utility that produces backup copy of the entire database or subset

- Periodic backup (e.g. nightly, weekly)

- Cold backup–database is shut down during backup

- Hot backup–selected portion is shut down and backed up at a given time

- Backups stored in secure, off-site location

Journalizing Facilities

- Audit trail of transactions and database updates

- Transaction log–record of essential data for each transaction processed against the database

- Database change log–images of updated data

o   Before-image–copy before modification

o   After-image–copy after modification

Produces an *audit trail*

Database Audit Trail
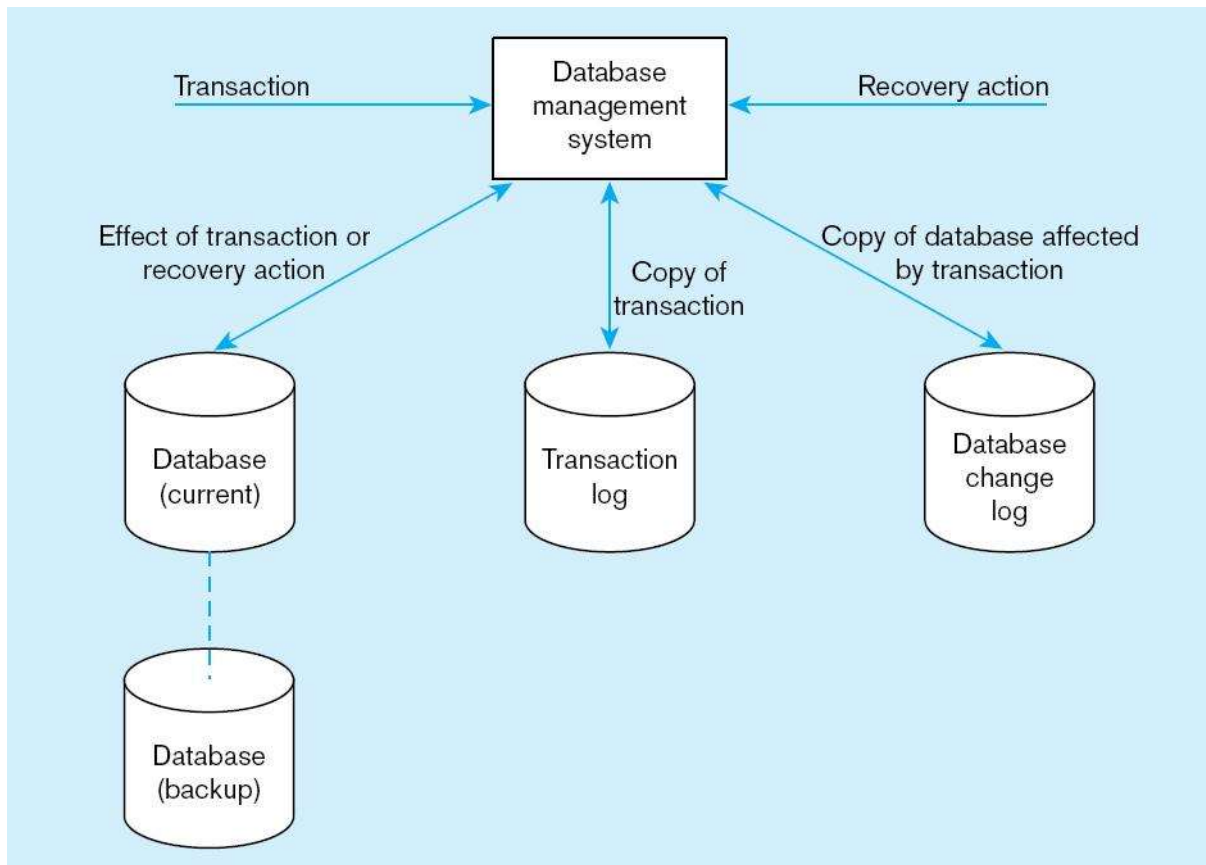
Transaction ACID Properties

- Atomic

  o   Transaction cannot be subdivided

- Consistent

  o   Constraints don't change from before transaction to after transaction

- Isolated

 o   Database changes not revealed to users until after transaction has completed

- Durable

  o Database changes are permanent

Control Concurrent Access

- *Problem*–in a multi-user environment, simultaneous access to data can result in interference and data loss (lost update problem)

- *Solution*–**Concurrency Control**

  o The process of managing simultaneous operations against a database so that data integrity is maintained and the operations do not interfere with each other in a multi-user environment

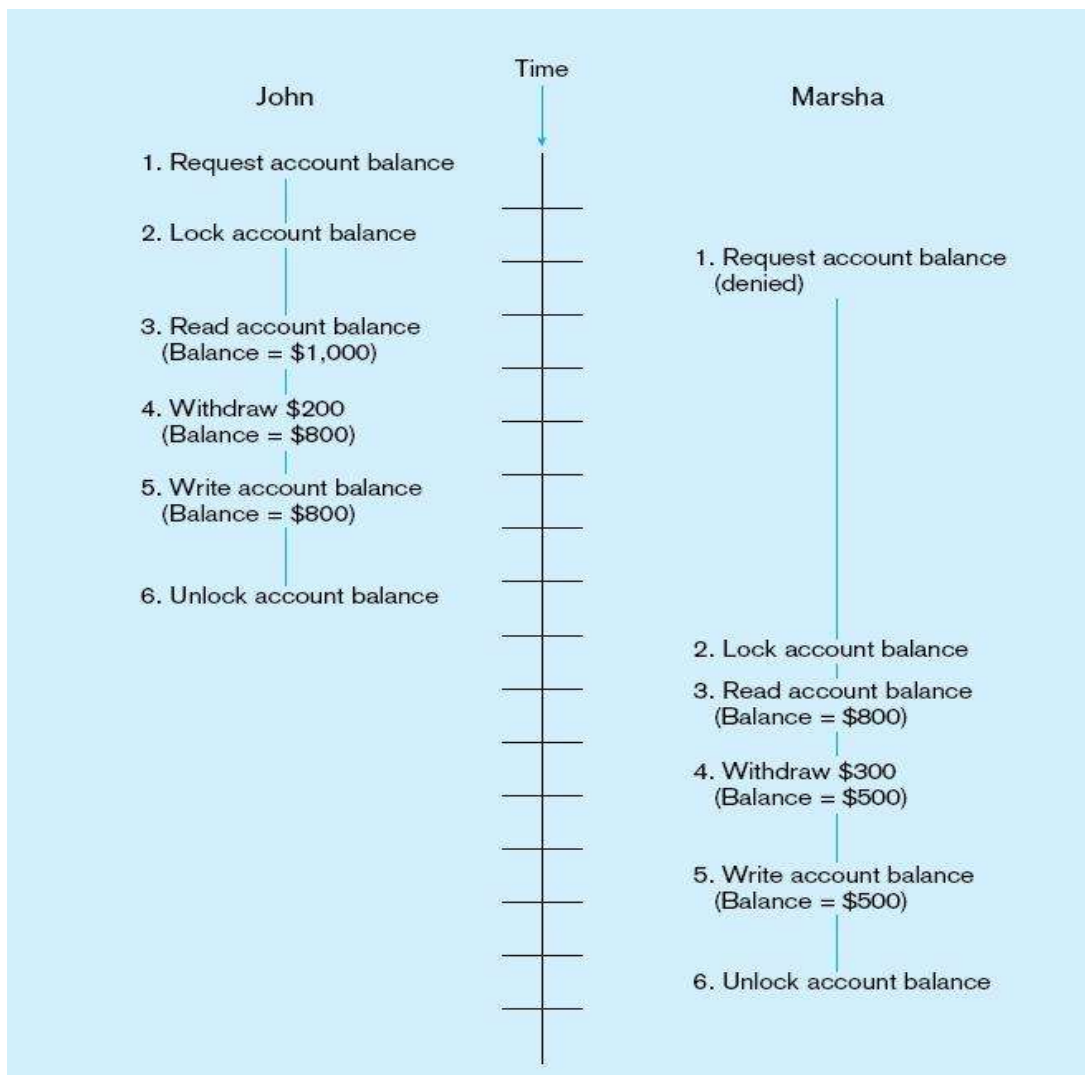**Lost Update Problem**
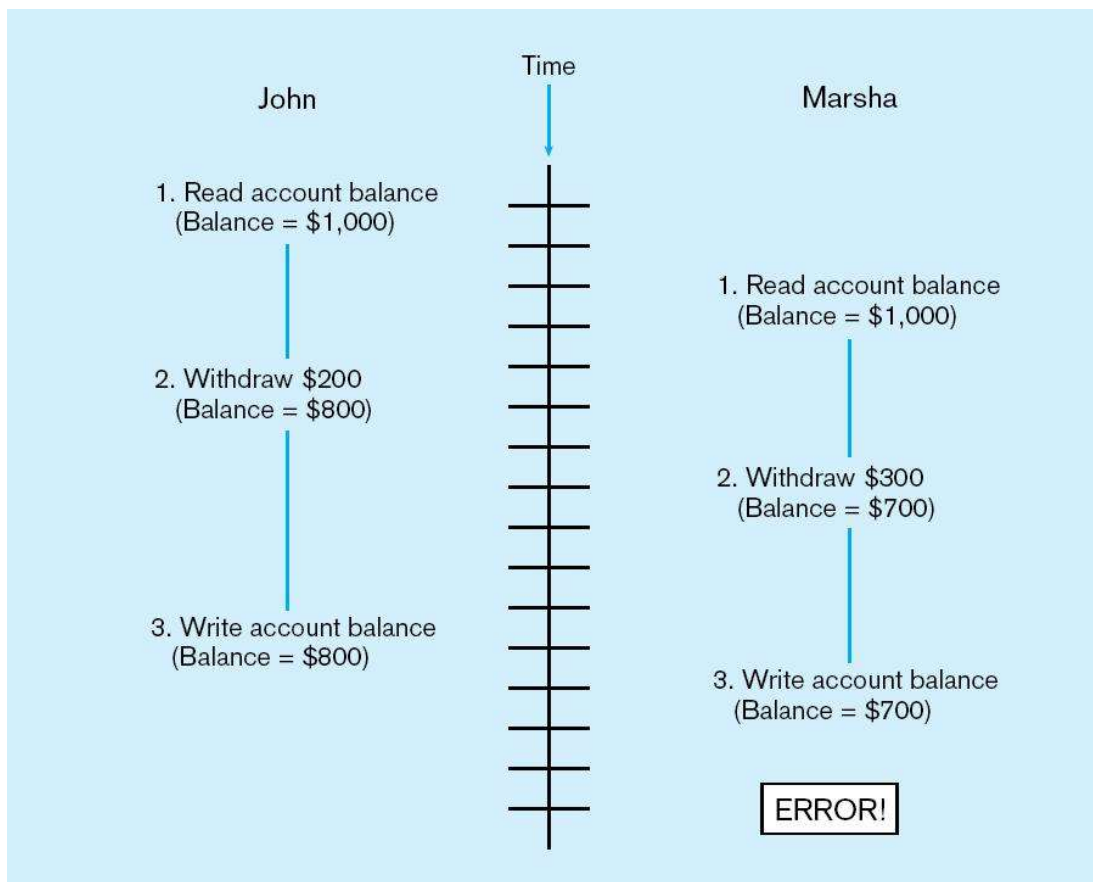
Simultaneous access causes updates to cancel each other.

Concurrency Control Techniques

- Serializability

    o   Finish one transaction before starting another

- Locking Mechanisms

    o   The most common way of achieving serialization

    o   Data that is retrieved for the purpose of updating is locked for the updater

    o   No other user can perform update until unlocked

Updates with locking (concurrency control)

This prevents the lost update problem

Locking Mechanisms

- Locking level:
  - Database–used during database updates
  - Table–used for bulk updates
  - Block or page–very commonly used
  - Record–only requested row; fairly commonly used
  - Field–requires significant overhead; impractical
- Types of locks:
  - Shared lock–Read but no update permitted. Used when just reading to prevent another user from placing an exclusive lock on the record
  - Exclusive lock–No access permitted. Used when preparing to update