Database Management Systems: 100 Multiple Choice Questions with Answers

Chapter 1: Introduction to Database Systems

What is the primary purpose of a database system?

a) To replace all file systems

b) To provide an environment that is both convenient and efficient for storing and retrieving information

c) To eliminate all data redundancy

d) To make data inaccessible to unauthorized users

Answer: b

Which of the following is NOT a characteristic of the database approach?

a) Self-describing nature

b) Program-data independence

c) Single-user access

d) Multiple views

Answer: c

The traditional file processing system suffers from:

a) Data redundancy and inconsistency

b) Difficulty in accessing data

c) Data isolation

d) All of the above

Answer: d

Who among the following is considered an "actor on the scene" in database systems?

a) Database administrators

b) End users

c) System analysts

d) All of the above

Answer: d

The separation of data descriptions from the application programs that use the data is called:

a) Data independence

b) Data integrity

c) Data redundancy

d) Data security

Answer: a

Chapter 2: Database System Architecture

The three-schema architecture includes all EXCEPT:

a) Internal schema

b) Conceptual schema

c) External schema

d) Logical schema

Answer: d

Which level of data abstraction describes how the data is actually stored?

a) Physical level

b) Logical level

c) View level

d) Conceptual level

Answer: a

Data independence refers to:

a) The ability to change the schema at one level without affecting the schema at another level

b) The ability to store data separately from programs

c) The ability to process data independently of other data

d) The ability to access data without authorization

Answer: a

Which of the following is NOT a type of data model?

a) Relational model

b) Network model

c) Hierarchical model

d) Sequential model

Answer: d

The DML is used to:

a) Define the database structure

b) Manipulate data in the database

c) Control access to the database

d) Create backup copies of the database

Answer: b

Chapter 3: Database Modeling

In an ER diagram, a rectangle represents:

a) Attribute

b) Entity

c) Relationship

d) Constraint

Answer: b

A weak entity is one that:

a) Has no primary key

b) Depends on another entity for its existence

c) Has only single-valued attributes

d) Has no relationships with other entities

Answer: b

Which of the following is NOT a type of attribute in the ER model?

a) Simple attribute

b) Composite attribute

c) Derived attribute

d) Virtual attribute

Answer: d

In relational model terminology, a row is called:

a) Attribute

b) Tuple

c) Field

d) Domain

Answer: b

The degree of a relationship refers to:

a) The number of attributes in the relationship

b) The number of entities participating in the relationship

c) The strength of the relationship

d) The cardinality ratio of the relationship

Answer: b

Chapter 4: Functional Dependency and Normalization

A functional dependency X → Y means that:

a) Y is a subset of X

b) The value of X determines the value of Y

c) The value of Y determines the value of X

d) X and Y are the same attribute

Answer: b

A relation is in 1NF if:

a) It has no repeating groups

b) It has no partial dependencies

c) It has no transitive dependencies

d) All non-key attributes depend on the primary key

Answer: a

A relation is in 2NF if it is in 1NF and:

a) Has no partial dependencies

b) Has no transitive dependencies

c) Has no multivalued dependencies

d) Has no join dependencies

Answer: a

Boyce-Codd Normal Form (BCNF) is stricter than:

a) 1NF

b) 2NF

c) 3NF

d) All of the above

Answer: d

The process of decomposing relations to eliminate redundancy is called:

a) Denormalization

b) Normalization

c) Aggregation

d) Generalization

Answer: b

Chapter 5: Record Storage and Primary File Organization

A heap file organization stores records:

a) In sequential order based on a key field

b) In no particular order

c) Using a hash function

d) In a tree structure

Answer: b

Which file organization is best for equality searches?

a) Sequential

b) Heap

c) Hashed

d) Indexed sequential

Answer: c

A B+ tree differs from a B tree in that:

a) B+ trees have higher fanout

b) B+ trees store data only in leaf nodes

c) B trees are always balanced

d) B trees support range queries better

Answer: b

The main purpose of indexing is to:

a) Reduce storage space

b) Speed up data retrieval

c) Improve data security

d) Simplify query syntax

Answer: b

Which of the following is NOT a type of single-level ordered index?

a) Primary index

b) Clustering index

c) Secondary index

d) Ternary index

Answer: d

Chapter 6: The Relational Algebra and Relational Calculus

Which relational algebra operation combines two relations horizontally?

a) Selection

b) Projection

c) Join

d) Union

Answer: c

The SELECT operation in relational algebra:

a) Chooses vertical subsets of relations

b) Chooses horizontal subsets of relations

c) Combines two relations

d) Renames attributes

Answer: b

The DIVISION operation in relational algebra is used to:

a) Divide numeric attributes

b) Find tuples in one relation that match all tuples in another

c) Split relations into smaller parts

d) Perform arithmetic division on attribute values

Answer: b

Tuple relational calculus differs from domain relational calculus in that:

a) It deals with tuples rather than domains

b) It is procedural rather than declarative

c) It uses different mathematical notation

d) It cannot express all relational algebra operations

Answer: a

Which of these is NOT a relational algebra operation?

a) Join

b) Select

c) Project

d) Where

Answer: d

Chapter 7: The SQL Language

Which SQL command is used to create a table?

a) CREATE TABLE

b) MAKE TABLE

c) DEFINE TABLE

d) NEW TABLE

Answer: a

The WHERE clause in SQL is used to:

a) Specify which columns to display

b) Specify which rows to retrieve

c) Group rows together

d) Sort the result set

Answer: b

Which SQL command is used to remove rows from a table?

a) DELETE

b) REMOVE

c) DROP

d) ERASE

Answer: a

A view in SQL is:

a) A stored query that acts like a virtual table

b) A graphical representation of the database

c) A way to visualize query execution

d) A temporary table

Answer: a

Which of the following is NOT a SQL constraint?

a) PRIMARY KEY

b) FOREIGN KEY

c) CHECK

d) VERIFY

Answer: d

Additional Questions (covering all chapters)

The entity integrity rule states that:

a) No primary key attribute can be null

b) No foreign key attribute can be null

c) All entities must have at least one relationship

d) All entities must be in third normal form

Answer: a

Referential integrity constraints are concerned with:

a) Primary keys

b) Foreign keys

c) Candidate keys

d) Super keys

Answer: b

In a relational database, a candidate key is:

a) A primary key chosen by the candidate

b) A minimal superkey

c) Any attribute that can be a foreign key

d) An attribute that may become a primary key in the future

Answer: b

The process of converting an ER diagram to relational schema is called:

a) Normalization

b) Mapping

c) Transformation

d) Conversion

Answer: b

A transaction in a database system must maintain:

a) Atomicity, Consistency, Isolation, Durability

b) Accuracy, Completeness, Isolation, Durability

c) Atomicity, Completeness, Independence, Durability

d) Accuracy, Consistency, Independence, Durability

Answer: a

Which normal form deals with multivalued dependencies?

a) 2NF

b) 3NF

c) BCNF

d) 4NF

Answer: d

The data dictionary contains:

a) Actual database data

b) Metadata about the database

c) User passwords

d) Backup copies of data

Answer: b

Which of the following is NOT a disadvantage of file processing systems?

a) Data redundancy

b) Data inconsistency

c) Efficient data access

d) Difficulty in representing complex relationships

Answer: c

In a relational database, a foreign key is:

a) A key that doesn't work properly

b) A primary key of another table

c) Any attribute that is unique

d) An attribute that is always null

Answer: b

The PROJECT operation in relational algebra:

a) Selects rows based on a condition

b) Selects columns from a relation

c) Combines two relations

d) Renames attributes

Answer: b

Which SQL clause is used to sort query results?

a) SORT BY

b) ARRANGE BY

c) ORDER BY

d) GROUP BY

Answer: c

The HAVING clause is used with:

a) SELECT statements only

b) GROUP BY clauses

c) ORDER BY clauses

d) All SQL statements

Answer: b

Which of the following is NOT a valid SQL aggregate function?

a) COUNT

b) SUM

c) AVERAGE

d) MAX

Answer: c (Correct function is AVG)

A correlated subquery is one that:

a) Returns multiple rows

b) References columns from the outer query

c) Contains aggregate functions

d) Is nested inside another subquery

Answer: b

Which SQL command is used to change data in a table?

a) ALTER

b) UPDATE

c) MODIFY

d) CHANGE

Answer: b

The purpose of the COMMIT command is to:

a) Save changes permanently

b) Undo changes

c) Create a new transaction

d) Delete records

Answer: a

Which of the following is NOT a valid SQL join?

a) INNER JOIN

b) OUTER JOIN

c) CROSS JOIN

d) DIAGONAL JOIN

Answer: d

The UNION operation in SQL:

a) Combines rows from two queries

b) Combines columns from two tables

c) Joins tables horizontally

d) Creates a Cartesian product

Answer: a

A stored procedure is:

a) A precompiled collection of SQL statements

b) A temporary table

c) A view definition

d) A transaction log

Answer: a

Which SQL command is used to remove a table definition?

a) DELETE TABLE

b) DROP TABLE

c) REMOVE TABLE

d) ERASE TABLE

Answer: b

In a 1:N relationship, the foreign key is placed in:

a) The "one" side table

b) The "many" side table

c) Both tables

d) A separate relationship table

Answer: b

A surrogate key is:

a) A natural key

b) A composite key

c) An artificial primary key

d) A foreign key

Answer: c

Which of the following is NOT a type of SQL constraint?

a) UNIQUE

b) NOT NULL

c) VALID

d) DEFAULT

Answer: c

The purpose of the GRANT command is to:

a) Create database objects

b) Give privileges to users

c) Insert data into tables

d) Start a transaction

Answer: b

A materialized view is:

a) A view that is stored as a physical table

b) A temporary view

c) A view that cannot be updated

d) A view with no underlying tables

Answer: a

In database systems, concurrency control is needed to:

a) Prevent unauthorized access

b) Handle simultaneous transactions

c) Improve query performance

d) Reduce storage requirements

Answer: b

A deadlock occurs when:

a) Two transactions wait indefinitely for each other

b) A transaction takes too long to complete

c) The database crashes

d) A query returns no results

Answer: a

The two-phase locking protocol ensures:

a) Serializability

b) Atomicity

c) Durability

d) All of the above

Answer: a

Which of the following is NOT a recovery technique?

a) Rollback

b) Rollforward

c) Checkpoint

d) Reboot

Answer: d

A database trigger is:

a) A stored procedure that executes automatically in response to events

b) A special type of constraint

c) A backup mechanism

d) A transaction control command

Answer: a

In distributed databases, fragmentation refers to:

a) Dividing a relation into parts stored at different sites

b) Corrupting data

c) Breaking transactions into smaller parts

d) Replicating data across sites

Answer: a

Data warehousing is primarily concerned with:

a) Transaction processing

b) Historical data analysis

c) Real-time data updates

d) Database design

Answer: b

OLAP stands for:

a) Online Analytical Processing

b) Online Application Processing

c) Object Linking and Processing

d) Operational Logical Access Protocol

Answer: a

A star schema consists of:

a) Fact tables and dimension tables

b) Only fact tables

c) Only dimension tables

d) Normalized tables

Answer: a

Data mining is used to:

a) Discover patterns in large datasets

b) Create databases

c) Backup data

d) Design ER diagrams

Answer: a

Which of the following is NOT a NoSQL database type?

a) Document store

b) Key-value store

c) Column-family store

d) Table-store

Answer: d

CAP theorem states that a distributed system can guarantee only two of:

a) Consistency, Availability, Partition tolerance

b) Consistency, Accuracy, Performance

c) Concurrency, Availability, Performance

d) Consistency, Atomicity, Persistence

Answer: a

In database security, DAC stands for:

a) Data Access Control

b) Discretionary Access Control

c) Database Authorization Control

d) Direct Access Control

Answer: b

SQL injection is a type of:

a) Database optimization technique

b) Security vulnerability

c) Backup procedure

d) Data modeling approach

Answer: b

Which of the following is NOT a database privilege?

a) SELECT

b) INSERT

c) UPDATE

d) COMPUTE

Answer: d

Database tuning involves:

a) Improving database performance

b) Changing the database schema

c) Adding more data

d) Reducing security

Answer: a

A query execution plan shows:

a) How the DBMS will execute a query

b) The SQL syntax for a query

c) The tables involved in a query

d) The users who can run a query

Answer: a

Denormalization is sometimes used to:

a) Improve query performance

b) Reduce data redundancy

c) Eliminate anomalies

d) Simplify database design

Answer: a

A clustered index determines:

a) The logical order of table data

b) Additional access paths to data

c) The columns to be indexed

d) The tables to be joined

Answer: a

The main purpose of a database transaction log is to:

a) Enable recovery from failures

b) Improve query performance

c) Reduce storage requirements

d) Simplify backup procedures

Answer: a

In a database, a cursor is used to:

a) Process individual rows in a result set

b) Define relationships between tables

c) Create indexes

d) Specify constraints

Answer: a

A phantom read occurs when:

a) A transaction reads data that has been modified by another transaction

b) A transaction reads committed data

c) A transaction reads the same row twice and gets different values

d) A transaction reads new rows inserted by another transaction

Answer: d

The two-phase commit protocol is used in:

a) Distributed databases

b) Single-user databases

c) Read-only databases

d) Temporary databases

Answer: a

Database replication is used to:

a) Improve availability and performance

b) Reduce storage requirements

c) Simplify database design

d) Eliminate the need for backups

Answer: a

A database checkpoint is:

a) A point at which all dirty buffers are written to disk

b) A type of constraint

c) A backup copy of the database

d) A recovery procedure

Answer: a

In database sharding:

a) Data is partitioned across multiple servers

b) Data is replicated across multiple servers

c) Data is compressed to save space

d) Data is encrypted for security

Answer: a

The main purpose of a database view is to:

a) Provide a security mechanism

b) Simplify complex queries

c) Present data in a different perspective

d) All of the above

Answer: d

Which of the following is NOT a characteristic of a DBMS?

a) Data redundancy

b) Data integrity

c) Data security

d) Data independence

Answer: a

The data definition language (DDL) is used to:

a) Define the database structure

b) Manipulate data in the database

c) Control transactions

d) Manage user privileges

Answer: a

A database schema represents:

a) The logical structure of the database

b) The physical storage of the database

c) The current state of the database

d) The backup copies of the database

Answer: a

The main advantage of a database approach over file processing is:

a) Reduced data redundancy

b) Improved data integrity

c) Better data sharing

d) All of the above

Answer: d

In a database, metadata is:

a) Data about data

b) Primary data

c) Historical data

d) Temporary data

Answer: a

The database administrator (DBA) is responsible for:

a) Designing the database

b) Implementing security controls

c) Managing database performance

d) All of the above

Answer: d

A database management system (DBMS) is:

a) Software that manages databases

b) A collection of related data

c) A type of operating system

d) A programming language

Answer: a

The relational model was introduced by:

a) E.F. Codd

b) Charles Bachman

c) Michael Stonebraker

d) Larry Ellison

Answer: a

In a relational database, a relation is:

a) A table

b) A relationship between tables

c) A foreign key constraint

d) A join operation

Answer: a

The SELECT statement in SQL is used to:

a) Retrieve data from the database

b) Insert data into the database

c) Update data in the database

d) Delete data from the database

Answer: a

The main purpose of the GROUP BY clause is to:

a) Group rows that have the same values

b) Sort the result set

c) Filter rows before grouping

d) Join multiple tables

Answer: a

The HAVING clause is used to:

a) Filter groups after aggregation

b) Filter rows before grouping

c) Sort the result set

d) Join multiple tables

Answer: a

The purpose of the ORDER BY clause is to:

a) Sort the result set

b) Group rows that have the same values

c) Filter rows

d) Join tables

Answer: a