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1.2.2 Quiz Database Basics Answer Key PDF

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What is the primary language used for managing and manipulating relational databases?

A. Python

B. SQL ✓

C. Java

D. HTML

Which of the following are types of databases?

A. Relational databases ✓

B. Document databases ✓

C. Hierarchical databases

D. Key-value stores ✓

Explain the importance of normalization in database design. How does it contribute to data integrity and efficiency?

Normalization contributes to data integrity by eliminating duplicate data and ensuring that data dependencies are properly enforced, which helps maintain accurate and consistent data across the database. Additionally, it improves efficiency by optimizing the structure of the database, making queries faster and reducing the amount of storage required.

What is the primary purpose of creating an index in a database?

A. To increase storage capacity

B. To improve data retrieval speed ✓

C. To enhance data security

D. To simplify data entry

Which of the following operations can be performed using SQL?

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A. SELECT ✓

B. INSERT ✓

C. DELETE ✓

D. COMPILE

Describe the role of a Database Management System (DBMS) and how it interacts with users and applications.

The role of a Database Management System (DBMS) is to provide a systematic way to create, retrieve, update, and manage data in databases. It interacts with users through query languages (like SQL) and with applications via APIs, allowing for efficient data manipulation and ensuring that data is organized and accessible.

Which database management system is known for its open-source nature and wide use in web applications?

A. Oracle

B. MongoDB

C. MySQL ✓

D. Microsoft SQL Server

Which of the following are considered ACID properties in database transactions?

A. Atomicity ✓

B. Consistency ✓

C. Isolation ✓

D. Durability ✓

Discuss the differences between relational and non-relational databases. Provide examples of scenarios where each type would be most appropriate.

Relational databases, such as MySQL and PostgreSQL, organize data into tables with predefined relationships and use SQL for querying. They are best suited for applications requiring complex transactions, like banking systems. Non-relational databases, like MongoDB and Cassandra, store data in various formats (e.g., documents, key-value pairs) and are designed for scalability and flexibility, making them ideal for applications like social media platforms or real-time analytics where data structure may evolve.

Which of the following is a key feature of distributed databases?

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A. Centralized data storage

B. Data redundancy across multiple locations ✓

C. Single-node processing

D. Manual data backup

Which of the following are common types of NoSQL databases?

A. Graph databases ✓

B. Column-family stores ✓

C. Flat-file databases

D. Document databases ✓

Explain the concept of transactions in databases and why the ACID properties are crucial for transaction management.

Transactions in databases are a set of operations that are executed as a single unit, ensuring that either all operations are completed successfully or none at all. The ACID properties are crucial for transaction management as they guarantee that transactions are processed reliably, maintaining data integrity and consistency.

What is the main advantage of using a non-relational database over a relational database?

A. Fixed schema

B. Scalability and flexibility ✓

C. Easier data normalization

D. Enhanced security features

Which of the following are components of a data model in databases?

A. Data structures ✓

B. Relationships ✓

C. Constraints ✓

D. Algorithms

Describe the process of backup and recovery in databases. Why is it essential for maintaining data integrity?

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The backup process involves regularly creating copies of the database data and storing them securely, while recovery is the process of restoring the database from these backups when needed. This ensures that in the event of data loss or corruption, the database can be restored to a previous state, thus maintaining data integrity.

Which SQL operation is used to add new records to a database table?

A. SELECT

B. INSERT ✓

C. UPDATE

D. DELETE

Which of the following are examples of relational database management systems (RDBMS)?

A. PostgreSQL ✓

B. MongoDB

C. Oracle ✓

D. Microsoft SQL Server ✓

Evaluate the challenges and benefits of using distributed databases in large-scale applications.

The benefits of using distributed databases in large-scale applications include improved scalability, fault tolerance, and enhanced performance through data locality. However, challenges arise in maintaining data consistency, managing network latency, and handling the complexity of distributed transactions.

What is the main goal of data modeling in database design?

A. To create a user interface

B. To define data structures and relationships ✓

C. To enhance network security

D. To develop software applications

Which of the following are considered when optimizing a database?

A. Index creation ✓

B. Query optimization ✓

C. Data redundancy

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D. Schema design ✓

Explain the impact of database security measures such as authentication, authorization, and encryption on data protection.

The impact of database security measures like authentication, authorization, and encryption on data protection is significant, as they collectively safeguard against unauthorized access, ensure proper user permissions, and protect data integrity and confidentiality.

Which of the following is a characteristic of a document database?

A. Stores data in tables

B. Uses a fixed schema

C. Stores data in JSON-like documents ✓

D. Requires complex joins

Which of the following are essential for ensuring database security?

A. User authentication ✓

B. Data encryption ✓

C. Manual backups

D. Firewall protection ✓

Discuss how SQL can be used to perform complex queries and data analysis. Provide examples of SQL operations that facilitate this process.

SQL can be used to perform complex queries and data analysis by utilizing operations like SELECT for data retrieval, JOIN to combine data from different tables, GROUP BY for aggregation, and subqueries for nested queries. For example, a query could aggregate sales data by region and product category to analyze performance trends.

What is the main purpose of normalization in database design?

A. To increase data redundancy

B. To minimize data redundancy ✓

C. To enhance data visualization

D. To simplify user interfaces

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Which of the following are benefits of using a DBMS?

A. Data consistency ✓

B. Improved data sharing ✓

C. Increased data redundancy

D. Enhanced data security ✓

Critically analyze the role of indexes in database performance. How do they affect query execution times and storage requirements?

Indexes improve query execution times by providing a faster way to access data, but they require additional storage space and can negatively impact the performance of write operations.