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IT FDN 130

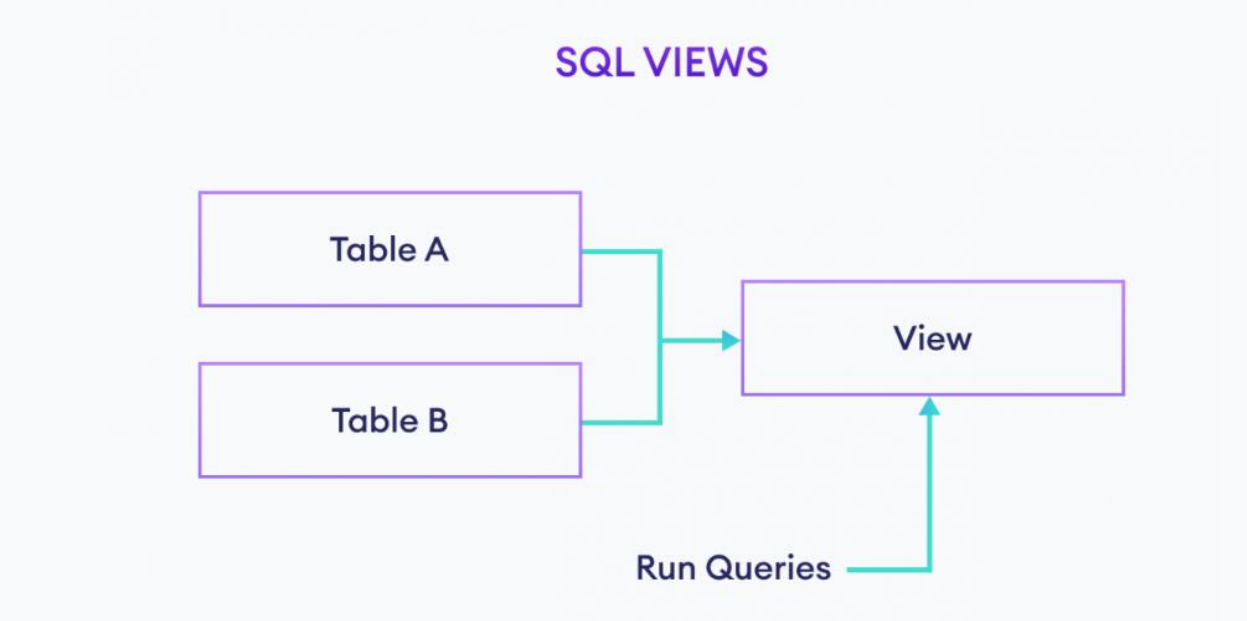
ASSIGNMENT 06

1. ***Explain when you would use a SQL View.***
2. ***Explain are the differences and similarities between a View, Function, and Stored Procedure.***

Introduction

SQL Views contain rows and columns similar to a table, however, views don't hold the actual data. We could think of a view as a virtual table environment that is created from one or more tables so that it is easier to work with data.

Example SQL Views:



Topic 1: **Explain when you would use a SQL View.**

We would use SQL Views for:

1. Data Abstraction and Security: If we have sensitive data in our database that we want to restrict access to, we can create views that expose only the necessary columns to users, hiding the underlying details of the database structure. This enhances security by preventing direct access to the raw data.
2. Complex Queries Simplification: When we have complex queries that involve multiple joins, aggregations, or calculations, we can create a view to encapsulate the complexity. This simplifies the user's interaction with the database by providing a high-level view of the data.
3. Consistency and Centralization: Views allow us to centralize logic and data transformations in one place. If we have certain data transformations that need to be applied consistently across multiple queries or reports, we can define those transformations in a view rather than repeating the same logic in every query.
4. Report Generation: Views can be useful for generating reports. Instead of constructing the same complex query each time a report is needed, we can create a view that encapsulates the necessary data and joins, making report generation more efficient.
5. Compatibility and Migration: In cases where the database schema changes or evolves, using views can provide a level of compatibility between the old and new schema. Applications and queries that rely on views won't be affected as long as the view definition remains consistent, even if the underlying tables change.
6. Performance Optimization: In some cases, using views can help optimize query performance. For instance, we can pre-compute aggregations or calculations in a view, reducing the computational load when the view is queried.
7. Data Partitioning and Segmentation: Views can be used to segment or partition data in a way that's convenient for specific users or applications. For instance, we might create a view that shows only data relevant to a particular department or geographic region.
8. Data Integration: Views can provide a standardized way to expose data to other systems or applications, making it easier to integrate data from different sources.
9. Simplifying Application Development: When building applications, we can use views to abstract away the complexity of the database structure, providing a simpler interface for the application to interact with.

Topic 2: ***Explain are the differences and similarities between a View, Function, and Stored Procedure.***

a. Views:

- **Purpose:** A view is a virtual table that represents the result of a SELECT query. It provides a way to simplify complex queries and abstract the underlying data structure.
- **Data Retrieval:** Views are used to retrieve data from one or more tables or other views.
- **Modifiability:** Depending on the database system, some views can be updatable (allowing you to perform INSERT, UPDATE, DELETE operations on them), while others are read-only.
- **Structure:** Views don't store data themselves; they are based on the data in the underlying tables.
- **Abstraction:** Views abstract the complexity of underlying tables and allow users to interact with a simplified version of the data.
- **Usage:** Views are often used for data security, data abstraction, and simplifying complex queries.

b. Functions:

- **Purpose:** Functions are reusable blocks of code that can accept parameters, perform computations, and return a single value. They are often used to encapsulate logic that needs to be applied to data.
- **Data Manipulation:** Functions can be used to manipulate data and perform calculations, but they don't retrieve entire result sets like views do.
- **Return Value:** Functions return a single value based on the provided parameters and logic.
- **Invocation:** Functions are invoked as part of a SQL statement, and their result can be used in computations or assignments.
- **Usage:** Functions are often used for data transformation, calculations, and encapsulating business logic.

c. Stored Procedures:

- **Purpose:** Stored procedures are precompiled blocks of code that can contain multiple SQL statements, control structures, and even conditional logic. They are used to encapsulate a series of operations.
- **Data Manipulation:** Stored procedures can perform data manipulation, data retrieval, and other actions. They are not limited to returning a single value like functions.
- **Execution:** Stored procedures are explicitly executed using a CALL or EXECUTE statement.
- **Transaction Control:** Stored procedures can include transaction control statements (BEGIN, COMMIT, ROLLBACK) to manage transactions.
- **Usage:** Stored procedures are often used for complex data processing, multi-step operations, and managing transactions.

Similarities:

- **Abstraction:** All three (views, functions, and stored procedures) provide a level of abstraction that helps in encapsulating complexity and presenting a simplified interface to users or applications.
- **Reusability:** Both functions and stored procedures can be reused across different parts of a database application.
- **Encapsulation:** All three help in encapsulating logic, which can lead to better maintainability and code organization.

Summary

A view is a well-known feature in SQL. It allows you to create a virtual table based on an SQL query referring to other tables in the database. A view stores an SQL query that is executed whenever you refer to the view. This is a convenient way to get the data because it is easier to run a query stored in a view than to type a query from scratch. It is essential to be able to apply this feature efficiently. In summary, views are primarily used to simplify complex queries and provide a simplified data presentation, functions are used for calculations and data transformation, and stored procedures are used for encapsulating complex operations and transactions. Each has its own unique role in database management and application development.