Overview  
  
SQL (Structured Query Language) is the programming language used to interact with relational databases. It allows users to define, query, modify, and manipulate data stored in a structured format. SQL is essential for working with databases, and it plays a fundamental role in databases like MySQL, Oracle, PostgreSQL, and Microsoft SQL Server. Another key feature of SQL is its ability to handle transactions. A transaction is a logical unit of work that consists of one or more SQL statements. SQL provides transaction control statements like COMMIT and ROLLBACK to ensure the consistency and integrity of data. Transactions allow users to perform multiple database operations as a single unit, ensuring that all changes are applied atomically or all are rolled back if an error occurs.

Defining

Defining data using SQL involves several important steps. First, you create a database to store your data. Then, you create tables that represent entities, specifying their columns, data types, and constraints. You establish relationships between tables using foreign keys to maintain data integrity. Constraints ensure that data meets specific rules. Indexes can be added to improve query performance.

Querying

SQL follows a declarative programming paradigm, where users specify what they want to achieve rather than how to achieve it. Users can write SQL queries to retrieve specific data from one or more tables using SELECT statements. These queries can involve various conditions, sorting orders, aggregations, and joins to combine data from multiple tables. SQL's versatility allows it to handle complex data retrieval tasks efficiently.

Modify

“Insert” statements allow users to add new records, “Update” statements allow them to modify existing records, and “Delete” statements allow them to remove unwanted data from the database. SQL also supports data definition language (DDL) statements such as CREATE, ALTER, and DROP, which are used to define and modify the structure of the database.

Manipulate

SQL offers various ways to manipulate retrieved data from a query. Firstly, data can be sorted using the ORDER BY clause, allowing results to be arranged in ascending or descending order based on specified columns. Aggregations, such as SUM, COUNT, AVG, and MAX, can provide summarized information about the retrieved data. The GROUP BY clause enables grouping of data based on specific columns. Joins combine data from multiple tables into a single result set. Conditional expressions, such as CASE statements, allow for conditional transformations of data.