

UNDERSTANDING SQL

1.1 Summary of Findings

Imagine a dynamic website like an online store. SQL plays a crucial role in managing the data behind such a site. It is used to store, retrieve, and manipulate product information, user accounts, and order details. SQL allows the backend of the website to interact with the database, ensuring that all data transactions are efficient, secure, and reliable.

1.2 Role of SQL in Web Applications

SQL (Structured Query Language) is essential in web applications for interacting with databases. It allows developers to perform operations such as creating, reading, updating, and deleting data. This functionality is vital for managing user accounts, product catalogs, and transaction records, enabling the web application to provide dynamic and interactive experiences for users.

1.3 Benefits of Using SQL for Web Applications

1. Efficient Data Retrieval
2. Organized Data Management
3. Enhanced Data Security

1.4 Explanation of Benefits

- **Efficient Data Retrieval:** SQL provides powerful querying capabilities that enable quick and precise data retrieval, which is essential for providing a responsive user experience on web applications.
- **Organized Data Management:** SQL databases use structured schemas that help organize data logically, making it easier to maintain and understand complex datasets.
- **Enhanced Data Security:** SQL databases support robust security features such as user authentication and access control, ensuring that sensitive data is protected from unauthorized access.

1.5 Database Management Systems

1. MySQL
2. PostgreSQL
3. Microsoft SQL Server

Database Fundamentals

2.1 Tables

A database table is a structured set of data organized in rows and columns, where each row represents a unique record and each column represents a specific field of data within the record. It is similar to a spreadsheet in that both use a grid format to display data, making it easy to read, manage, and manipulate information systematically.

2.2 Columns

Columns in a database table define the type of data that each field will hold. Each column has a name and a specific data type, which constrains the kind of data that can be stored in it. For example, a column named "DateOfBirth" could be of the "Date" data type, ensuring that only date values are stored in this column.

2.3 Data Types

Data types are crucial in a database because they define the nature of the data that can be stored in each column, ensuring data integrity and efficient storage.

- **Text:** This data type is used for storing alphanumeric characters. It is important for fields like names, addresses, and descriptions. For example, a "CustomerName" column would use the text data type.
- **Number:** This data type is used for storing numerical values, which are essential for calculations and quantitative analysis. For instance, a "Quantity" column in an inventory table would use the number data type.
- **Date:** This data type is used for storing dates and times. It is crucial for fields that involve dates, such as birth dates, order dates, or timestamps. For example, an "OrderDate" column would use the date data type.

Expense Tracker Database Design

3.1 Planning

For the Expense Tracker application, we need to track the following data points:

1. Expense amount
2. Date of expense
3. Expense category
4. Description of expense
5. Payment method

3.2 Tables

Considering the data points listed, the basic database schema will include one main table named "Expenses". Below is the table structure with the necessary columns and their corresponding data types.

Table Name: Expenses

Column Name	Data Type	Description
expense_id	INT	Unique identifier for each expense (Primary Key)
amount	DECIMAL	The amount of the expense
date	DATE	The date the expense was made
category	TEXT	The category of the expense (e.g., food, transport)
description	TEXT	A brief description of the expense
payment_method	TEXT	The method of payment (e.g., cash, credit card)