

Week 1 assignment one -SHARON OPUDO

question 1: Understanding sql

1.1 SQL-Structured query language is a programming language used for storing and processing information in a relational database. A relational database stores information in form of tables with rows and columns. The columns and rows represents the attributes and various relationship between data values.

1.2 Role of SQL in web applications

Structured Query Language plays a big role in web applications by enabling communications between relational databases. Web applications utilize SQL to store, retrieve and manage data efficiently. SQL queries are used to interact with databases to perform operations such as fetching user information, storing session data and processing transactions ensuring integrity and ensure user contentment. It is also used for data manipulation, aggregation and retrieval powering the back-end functionality of web applications.

1.3 Benefits of using SQL in web applications

- i) Data Integrity; SQL ensures data integrity by enforcing constraints such as primary key, foreign key, and unique constraints ensuring accuracy and consistency of the data stored in the database. This prevents data duplications and ensure data retrieval from storage.
- ii) Scalability and Performance; SQL databases are designed to handle large amounts of data and perform well even as the applications scales up.
- iii) Query Flexibility; SQL provides powerful and flexible querying language that allows developers to retrieve data from databases in various ways ranging from simple data retrieval to complex data manipulation and aggregation.

1.4 Explaining benefits of using SQL

- i) Efficiency; SQL databases are optimized for efficient data storage and retrieval . They use indexing and query optimization techniques to quickly locate and retrieve data.
- ii) Data Organization; SQL databases provides a structured way to organize data tables and predefined schema. This ensures storage of data in a logical manner.
- iii) Data retrieval capabilities; SQL offers robust data retrieval capabilities through its powerful querying language. Developers can use SQL queries to retrieve specific subsets of data and perform complex operations like joins and aggregation.

1.5 List 3 DBMS

MySQL

MongoDB

Oracle database

Question two

2.1 Similarity between spreadsheet and database table

A table is a collection of related data arranged in rows and columns.

A database table is similar to a spreadsheet in that it organizes data in a tabular form with rows and columns. Each row in a database represents a distinct record while each column represents attributes of each record. Both database tables and spreadsheet allow for easy storage, manipulation and retrieval of data providing an effective way to store them.

2.2 Columns and Data Types

A column in a database table refers to the vertical entities that define the attributes or fields of data records stored in the table.

In a database table for a Students database would include columns like; name,age,reg_no,date_of_birth
Data types are essential in databases as they:

i)Ensure data integrity; data types determine the type of data that can be stored in a column enforcing data integrity.

ii)Enable data manipulation; data types determine how data can be manipulated and processed allowing accurate calculations and sorting operations within the database.

Examples of data types used in databases include;

i)Text

ii) Number

iii)Date

2.3 Importance of data types

Data types play a crucial role in ensuring data integrity by defining the kind of data that can be stored in each column of a database table. They also contribute to efficient storage by allocating appropriate amount of memory required for each type of data.

Text; is used to store alphanumeric characters

Numeric; numeric data types like integer and float are used to store numerical values such as quantities.

Date; date data type is designed to store date and time values, providing accuracy in recording temporal information for events and transactions.

3.1 Expense Tracker database design

Expense Amount

Date of Expense

Expense Category

Payment method

Expense description

3.2 Table Structure for Expense Tracker system

TABLE : EXPENSES

expense_id	INT
amount	DECIMAL
date	DATE
category	TEXT
payment_method	TEXT
description	TEXT

Bonus Quiz

Expenses	
PK	<u>expense_id</u> int NOT NULL
FK1	amount int NOT NULL expense_date date NOT NULL category varchar NOT NULL payment_method varchar NOT NULL description varchar NOT NULL