Database Assignment 1

1.1 Storage: Product details such as name, description, price, and inventory are stored in a database table. Each product is represented as a row in the table, with columns for different attributes.

Access: SQL queries are used to retrieve product information based on various criteria such as category, price range, or availability. For example, a query might retrieve all products in the "electronics" category with a price less than $100.

User Accounts:

Storage: User accounts, including details like username, email, password (usually hashed for security), and shipping address, are stored in a dedicated table in the database.

Access: SQL queries are used to manage user accounts, including creating new accounts, authenticating users during login, and updating user details. For example, a query might verify a user's credentials during login by comparing the hashed password with the stored value.

Order Details:

Storage: When a user places an order, the order details such as the products purchased, quantities, total price, and shipping information are stored in the database. This typically involves multiple tables, including an orders table and an order items table to handle the relationship between orders and products.

Access: SQL queries are used to retrieve order details, update order status, and calculate sales metrics. For example, a query might retrieve all orders placed in the last month or calculate the total revenue for a specific time period.

In summary, SQL is essential for managing the data behind the scenes of an online store, enabling efficient storage and retrieval of product information, user accounts, and order details.

1.2. Data Integrity: SQL ensures data integrity by enforcing constraints and rules, preventing the insertion of invalid or inconsistent data into the database.

Scalability: SQL databases can handle large amounts of data and are scalable to accommodate the growth of web applications.

Security: SQL provides robust security features such as user authentication, access control, and encryption, safeguarding the web application's data from unauthorized access or manipulation.

1.3 a) Easy data retrieval and manipulation. One of the main Advantages of SQL Databases is its feature of easy data retrieval. ...

b) Data security. ...

c) Scalability

1.4 SQL Database Efficiency

SQL databases are efficient in managing large volumes of data due to their ability to handle complex queries and transactions. They optimize storage by eliminating data redundancy through normalization, reducing storage requirements and improving performance. Additionally, SQL databases provide indexing capabilities, which enhance query performance by allowing for faster data retrieval.

Data Organization

SQL databases offer a structured way to organize data through tables, ensuring data integrity and consistency. This organization facilitates easy data management, retrieval, and maintenance. By defining relationships between tables using foreign keys, SQL databases enable efficient data organization and retrieval through joins and other relational operations.

Data Retrieval Capabilities

SQL databases provide powerful data retrieval capabilities using structured query language (SQL). This allows users to retrieve specific data based on various criteria, perform complex aggregations, and generate reports efficiently. Additionally, SQL databases support the use of indexes and views, further enhancing data retrieval capabilities.

1.5 a) Mongo Database

b) Microsoft SQL Server

c) MySQOL

Question 2

1. A database table is a collection of related data organized into rows and columns, similar to a spreadsheet. Each row represents a unique record, while each column represents a different attribute or field. Both database tables and spreadsheets use a tabular format to store and organize data, making them easy to read and manipulate.

* Text: This data type is used to store alphanumeric characters, such as names, addresses, and descriptions.
* Number: This data type is used to store numerical values, including integers and decimals, for calculations and quantitative analysis.
* Date: This data type is used to store date and time values, allowing for chronological organization and date-based operations.

3. Data types are crucial for ensuring data integrity and efficient storage in programming. They define the type of data that can be stored in a variable, ensuring that the data is used appropriately and preventing errors. Additionally, data types help in optimizing memory usage by allocating the right amount of memory to store different types of data.

Integer

Integers are used to store whole numbers without any decimal points. They are commonly used for counting and indexing in programming. In terms of storage, integers typically require a fixed amount of memory, making them efficient for storage and processing.

String

Strings are used to represent text data. They are essential for storing and manipulating textual information such as names, addresses, and messages.

Boolean

Booleans are used to represent true or false values. They are fundamental for decision-making and conditional statements in programming.

Question3

3.1. Planning

To track expenses in the Expense Tracker application, you will need to capture the following data points:

* Expense amount
* Date of the expense
* Category of the expense
* Description of the expense
* Payment method used

3.2. Tables

| **Table name** | **Column name** | **Data type** |
| --- | --- | --- |
| Expenses | expense\_id | INT |
|  | amount | DECIMAL |
|  | date | DATE |
|  | category | TEXT |
|  | description | TEXT |
|  | payment\_method | TEXT |