

### **Question 1.1: Research**

**Web Applications and SQL:** SQL (Structured Query Language) is fundamental in managing data for web applications. In a dynamic website like an online store, SQL is used to store and retrieve information about products, user accounts, and order details. This allows for seamless updates to product inventories, user profiles, and transaction records. By efficiently managing large amounts of data, SQL helps ensure that users can access real-time information quickly and accurately.

### **Question 1.2: Role of SQL in Web Applications**

SQL plays a critical role in web applications by enabling the storage, retrieval, and manipulation of data. It allows developers to create, read, update, and delete data in a structured and efficient manner. SQL also supports complex queries and transactions, ensuring data integrity and consistency across the application.

### **Question 1.3: Benefits of Using SQL for Web Applications**

1. **Efficiency:** SQL allows for efficient querying and manipulation of data, enabling fast access and updates to large datasets.
2. **Data Organization:** SQL helps organize data in a structured format using tables, making it easier to manage and retrieve information.
3. **Data Retrieval Capabilities:** SQL provides powerful querying capabilities that allow for complex data retrieval operations, enabling detailed analysis and reporting.

### **Question 1.4: Explanation of Benefits**

1. **Efficiency:** SQL queries can quickly retrieve and update data, which is essential for maintaining the performance of dynamic web applications.
2. **Data Organization:** SQL's structured format ensures that data is stored in a logical and orderly manner, making it easy to navigate and manage.
3. **Data Retrieval Capabilities:** The ability to perform complex queries allows developers to extract specific information and generate insights from the data.

### **Question 1.5: Database Management Systems**

1. MySQL
2. PostgreSQL
3. SQLite

### **Part 2: Database Fundamentals (45 minutes)**

### Question 2.1: Tables

A database table is a collection of related data organized in rows and columns. Each row represents a unique record, while each column represents a specific attribute of the data. This structure is similar to a spreadsheet, where data is arranged in a grid format for easy access and management.

### Question 2.2: Columns

Columns in a database table represent the attributes or fields of the data stored. Each column has a specific data type and stores a particular type of information. For example, a column named "Date" might store date values like '2023-07-01', ensuring consistency in the data format.

### Question 2.3: Data Types

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

1. **Text:** Used to store alphanumeric characters (e.g., names, descriptions).
2. **Number:** Used to store numeric values (e.g., integers, decimals).
3. **Date:** Used to store date and time information (e.g., timestamps).

## Part 3: Expense Tracker Database Design (45 minutes)

### Question 3.1: Planning

To build an Expense Tracker application, we need to track the following data points:


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

### Question 3.2: Tables

**Table name:** Expenses

Attributes	Data Types
expense_id	int
amount	decimal

date	date
category	char
description	char
payment_method	char

<div> Expense</div>	
<b>PK</b>	<b><u>id</u> int</b>
	expense_id(Int) amount(Decimal) date(Date) category(VARCHAR) Description(VARCHAR) payment_method(VARCHAR)