**Part 1: Understanding SQL in Web Applications**

**1.1 Summary of Findings:** SQL (Structured Query Language) is used to manage and work with data in databases. It is essential for web applications because it allows for storing, updating, and retrieving data like user details, product information, and orders. SQL ensures that data is organized and easily accessible for the website to function properly.

**1.2 Role of SQL in Web Applications:** In web applications, SQL is used to handle the database where all the important information is kept. It helps the application add new data, update existing data, fetch needed information, and remove data that is no longer needed. This makes sure the website can show up-to-date information and operate smoothly.

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

1. Speed
2. Organization
3. Easy Data Access

**1.4 Explanation of Each Benefit:**

* **Speed:** SQL helps quickly get and manage large amounts of data, so the website runs fast.
* **Organization:** SQL databases store data in a neat and structured way, making it easy to keep everything in order.
* **Easy Data Access:** SQL lets you quickly find and use the exact data you need, making the web application work better.

**1.5 Database Management Systems:**

1. MySQL
2. PostgreSQL
3. Microsoft SQL Server

**Part 2: Database Fundamentals**

**2.1 Tables:** A database table is a way to organize data into rows and columns, similar to a spreadsheet. Each row represents a single record, and each column represents a specific type of data. For example, a table for storing customer information might have columns for customer names, email addresses, and phone numbers, and each row would contain the details for a different customer.

**2.2 Columns:** Columns in a database table define the type of data stored in each part of a record. For instance, in a table of customer information, you might have columns for "Name" (text), "Age" (number), and "Sign-Up Date" (date). Columns help organize data by type, making it easier to find and manage.

**2.3 Data Types:** Data types are important because they ensure the data is stored correctly and efficiently. They help maintain data integrity by making sure only the right type of data is entered in each column. Here are three common data types:

* **Text:** Used for storing letters, words, and sentences. For example, a "Name" column can use the text data type to store names like "John Doe".
* **Number:** Used for storing numerical values. For example, an "Age" column can use the number data type to store ages like 25 or 30.
* **Date:** Used for storing dates. For example, a "Sign-Up Date" column can use the date data type to store dates like "2024-07-07".

**Part 3: Expense Tracker Database Design**

**3.1 Planning:** For an Expense Tracker application, we will need to track the following data points:

1. Expense Amount
2. Expense Date
3. Expense Category
4. Description
5. Payment Method

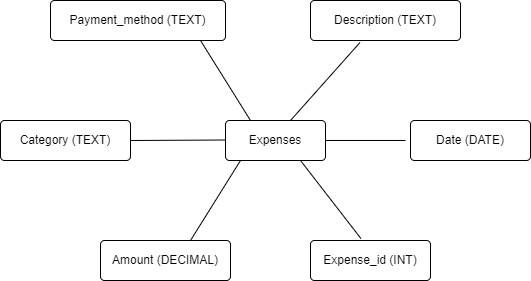
**3.2 Tables:** We will create a main table called "Expenses" to store our expense data. Here is the table structure:

**Table Name:** Expenses

| **Column Name** | **Data Type** | **Description** |
| --- | --- | --- |
| expense\_id | INT | Unique identifier for each expense |
| amount | DECIMAL | Amount of the expense |
| date | DATE | Date when the expense was made |
| category | TEXT | Category of the expense (e.g., food, travel) |
| description | TEXT | Additional details about the expense |
| payment\_method | TEXT | Method used for payment (e.g., cash, card) |

* **expense\_id (INT):** This column will store a unique identifier for each expense, which helps in uniquely identifying each record.
* **amount (DECIMAL):** This column will store the amount spent on each expense. The DECIMAL data type is used to handle precise monetary values.
* **date (DATE):** This column will store the date when the expense was made.
* **category (TEXT):** This column will store the category of each expense, such as food, travel, or utilities.
* **description (TEXT):** This column will store any additional details or notes about the expense.
* **payment\_method (TEXT):** This column will store the method used for payment, such as cash, credit card, or debit card.

**Bonus Question: Expense Tracker database Entity-Relationship Database(ERD)**

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