**Question 1. Research**

Use online resources like websites or PowerPoint slides.

**1.1.** In a single Word document, summarize your findings in a short paragraph (3-5 sentences). Web Applications:

Imagine a dynamic website like an online store. How do you think SQL plays a role in managing data behind the scenes? Consider how product information, user accounts, and order details might be stored and accessed.

**SOLUTION**

Role of SQL in Managing Data for an Online Store include

It is used to create, retrieve, update, and delete data in the database. Thus involved in managing data for both product information, user accounts, and order details by storing and access of prescribed information.

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

**1.2.** Write a short explanation (3-5 sentences) in your document about the role of SQL in web applications.

**SOLUTION**

SQL is used for data manipulation since it views, manages and access the data thus make it easier for developers to test and manipulate data. It is used to store user information and other application data thus SQL database act as the central repository for all of this data.

It allows end-users to communicate with databases and perform tasks like creating, updating, and deleting databases.

**1.3.** List 3 benefits of using SQL for web applications.

**SOLUTION**

1. Data integrity
2. Data manipulation and retrieval
3. Data security.

**1.4.** Think about efficiency, data organization, and data retrieval capabilities. Briefly explain each benefit in your document (1-2 sentences per benefit).

**SOLUTION**

### 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.

### 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 data efficient

### Data Retrieval Capabilities

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

**1.5.** List any 3 Database Management Systems.

**SOLUTION**

1. MongoDB
2. Microsoft SQL Server
3. Oracle

**Question 2.1: Tables**

Think about how data is organized in rows and columns. In your document, define a database table and explain its similarity to a spreadsheet (2-3 sentences).

**SOLUTION**

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.

**Question 2.2: Columns**

Consider different types of data like text, numbers, and dates. Define "columns" and provide an example with an explanation (2-3 sentences) in your document. Data Types: Why are data types important in a database? Briefly explain 3 common data types (e.g., Text, Number, Date).

**SOLUTION**

Column" refers to a vertical arrangement of data within a table. Each column represents a specific attribute or field, e.g. name, age, or date, and contains data of a particular type.

For example, in a table storing student information “Name" column would contain text data, an "Age" column would contain numerical data, and a “Date" column would contain date data.

Data types are important in a database because they define the kind of data that can be stored in a column, ensuring data integrity, accuracy, and efficient storage and retrieval.

**Question 2.3: Data Types**

Think about how data types ensure data integrity and efficient storage. Explain the importance of data types and provide brief explanations of 3 common types (2-3 sentences each) in your document.

**SOLUTION**

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.

**3.1. Planning:** We'll be building an Expense Tracker application. What kind of data do you think we'll need to track? List at least 5 data points relevant to our project.

* Consider information like expense amount, date, and category.
* List your identified data points in your document.

**SOLUTION**

 ExpenseAmount: The amount of money spent in each transaction.

 Dateof Expense: The date when the expense was incurred.

 Category: The type or category of the expense (e.g., food, transportation, entertainment).

 Description: A brief description or note about the expense for additional context.

 PaymentMethod: The method used to pay for the expense (e.g., cash, credit card, bank transfer).

**3.2. Tables:** Considering the data points you listed, design a basic database schema with one main table (likely named "Expenses").

* Define the columns needed for this table.
* Assign appropriate data types to each column based on the kind of data it will hold. (e.g., amount: number, date: date, category: text)

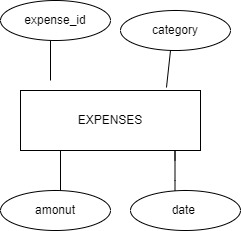
In your document, create a table structure that includes:

* Table name (e.g., Expenses)
* Column names (e.g., expense\_id, amount, date, category)
* Data type for each column (e.g., INT, DECIMAL, DATE, TEXT)

**SOLUTION**

|  |  |
| --- | --- |
| **Column name** | **Data type** |
| **Expense\_id** | **integer** |
| **Amount** | **decimal** |
| **Date** | **Date** |
| **category** | **text** |

In this basic database schema, the "Expenses" table includes columns for expense\_id (to uniquely identify each expense), amount (to store the expense amount), date (to store the date of the expense), and category (to store the category of the expense). The data types assigned to each column are INT for expense\_id, DECIMAL for amount, DATE for date, and TEXT for category.



The figure above represent Entity relationship diagram.