# INTRODUCTION TO FOUNDATIONAL SKILLS.

## PART 1: Understanding SQL.

**Question 1: Research.**

1. How SQL plays a role in managing data:

SQL plays a crucial role in managing data by providing a structured framework for storing, querying and manipulating data.

Product information, user accounts and order details are all stored in a database table where each product is represented as a row and columns for different attributes. When a user now interacts with the online store, the application uses SQL queries to access and update the relevant data in real-time.

SQL’s relational nature enables seamless integration and retrieval of interconnected data, ensuring the smooth functioning of essential operations in the online store movement.

1. Role of SQL in web application:

SQL plays a very crucial role in web application by providing a standardized way to manage and interact with relational databases. It allows developers to create, alter and query data in the database which is essential for storing and retrieving information required by web applications. SQL ensures that web applicants can quickly and securely handle large volume of data, facilitating dynamic content delivery, user authentication and transaction processing.

1. Benefits of using SQL:

Structured Data Management

Efficient querying

Scalability and reliability

1. Explanation based on efficiency, data organization and retrieval capabilities:

**Structured Data Management:** SQL enforces a structured approach to data organization, storing information in well-defined tables with relationships between them. This structure simplifies data retrieval and manipulation, making it easier to manage complex datasets within web applications.

**Efficient Querying:** SQL provides a powerful and versatile query language for accessing specific data from the database. Developers can use SQL queries to filter, sort, and aggregate data efficiently, enabling web applications to respond to user requests quickly and accurately.

**Scalability and Reliability:** SQL databases are well-suited for web applications that need to handle large amounts of data and concurrent user traffic. They offer robust security features and proven reliability, ensuring the web application's data integrity and smooth operation even as it grows.

1. Database Management Systems examples:

Oracle

MySQL

Microsoft SQL Server

## PART 2: Database Fundamentals.

**Question 2.1: Tables.**

A database table is a collection of related data organized into rows and columns where each row represents a single record and each column represents a specific attribute or field. This is similar to spreadsheets since data is also arranged in a grid or rows and columns allowing easy sorting, filtering and analysis of information.

**Question 2.2: Columns.**

A column is vertical section within a table in a database that stores specific types of data. Example you could have a table storing employee information, a name column which would contain the names of the employees.

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.

Types of data types:

**Text:** Used when storing alphanumeric characters such as names and addresses and descriptions.

**Number:** Used when storing numerical values for calculations and mathematical operations.

**Date:** Used to store dates and times, allowing for chronological and time-based analysis and manipulation of data.

**Question 2.3: Data Types.**

Data types define the type of data to be stored in a particular column or variable and provide the underlying structure of data processing. By enforcing data types, input data can be validated, prevent or corrupt data from being stored and also optimize storage.

Common data types:

1. Integer: Represents whole numbers without fractional or decimal component. Integer data types ensure that data is stored in a consistent and predictable format, preventing errors and ensuring data integrity.
2. String: Represents sequence of characters such as; words and sentences. String data types allow for flexible storage of varying length of text, enabling efficient storage and retrieval of character-based data.
3. Boolean: Can only hold of two values (True or False). Boolean data types provide a simple and efficient way to store binary data, making it easy to handle logical operations and evaluate conditions.

## PART 3: Expense Tracker Database Design.

1. Expense amount: The monetary value of each expense.

Date: The date when the expense was incurred.

Category: the classification of the expense.

Description: A brief note of the expense for better understanding.

Payment method: Method used to pay for the expense.

1. Table name: Expenses.

|  |  |  |
| --- | --- | --- |
| Column Name | Data Type | Description |
| expense\_id | int | A unique identifier for each expense. (Primary Key) |
| amount | number | The amount of the expense. |
| date | date | The date when the expense occurred. |
| category | text | The category of the expense. (e.g., food, Transportation) |
| description | text | A description of the expenses. |
| payment\_method | text | The method of payment used. (e.g., Cash, Credit Card) |