This series of five tasks focused on comprehensive SQL database management, covering database design, functional analysis, ERD creation, administration, and data warehousing. Each task was designed to build practical skills in database construction, data normalization, and administration, using industry-standard tools like Microsoft Access, Visio, and SQL Server.

- Task 1: Developed a simple database and report, using Microsoft Access to create tables, establish relationships, and generate a report summarizing key data from the *Orders Schema*.
- Task 2: Focused on analysing functional dependencies within the *CustomerOrder* table, transforming it into 4th Normal Form, and addressing potential data issues.
- Task 3: Created an Entity Relationship Diagram (ERD) using Crow's Foot notation to illustrate the relationships between entities in the *Orders Schema*, showing cardinality and key relationships.
- Task 4: Involved SQL administration, including schema design, user role management, and ODBC setup, ensuring secure access to the *Employee Database* for various departments.
- Task 5: Designed a data mart for analyzing shipping performance, implemented using a star schema, SQL scripts for table creation, and sample data for testing the data warehouse functionality.

Each task progressively built upon the previous one, providing hands-on experience with real-world database management scenarios, strengthening skills in database design, optimization, and maintenance.

Task 1: Simple Database and Report

Overview: In this task, I developed a simple database using Microsoft Access and generated a report to summarize key aspects of the dataset. This task involved working with the *Orders Schema* from the provided narrative to build relationships and enforce referential integrity between tables.

Key Responsibilities:

- **Database Construction:** Created tables for customer orders and related entities, ensuring accurate data relationships.
- **Data Population:** Inserted sample data with five records per table.
- **Report Generation:** Designed a report in Microsoft Access using the *Report Wizard*, displaying primary key values from the *Orders* schema.

Skills Utilized:

- Microsoft Access (Database Development, Reports)
- Data Population and Referential Integrity
- Report Design and Generation

Task 2: Functional Dependencies

Overview: This task focused on analyzing the functional dependencies within the *CustomerOrder* table from the *Orders Database*. The goal was to transform the entity into 4th Normal Form and address potential issues with data structure.

Key Responsibilities:

- **Dependency Analysis:** Identified primary keys, foreign keys, and candidate keys in the *CustomerOrder* table.
- **Data Normalization:** Transformed the table into 4th Normal Form to ensure reduced redundancy and improved data integrity.
- **Consultation Report:** Provided potential questions to clarify database structure and addressed potential issues in the schema.

Skills Utilized:

- Functional Dependency Analysis
- Data Normalization (4NF)
- Professional Communication with Stakeholders

Task 3: Entity Relationship Diagram (ERD)

Overview: In this task, I created an Entity Relationship Diagram (ERD) using Microsoft Visio. The diagram illustrated the relationships between different entities in the *Orders Schema* as per the specified requirements.

Key Responsibilities:

- **ERD Creation:** Developed a detailed ERD using Crow's Foot notation, including all entities and their attributes.
- **Primary & Foreign Keys:** Clearly marked all primary and foreign keys, ensuring accurate representation of relationships.
- **Cardinality:** Represented cardinality (one-to-many, many-to-many) between entities to reflect real-world data connections.

Skills Utilized:

- Microsoft Visio (ERD Creation)
- Crow's Foot Notation
- Data Structure and Relationships

Task 4: Schema Control and Administration

Overview: This task focused on schema creation and user access control for the *Employee Database*. I worked on establishing proper schemas and setting up user roles with specific access permissions to the database.

Key Responsibilities:

- **Schema Design:** Created schemas based on different data classifications (personal data, contact information, etc.) as per the company's security needs.
- **User Account Creation:** Set up dummy user accounts and roles for various departments (HR, Accounting, Developers) with different levels of database access.
- **ODBC Connection Setup:** Configured the ODBC data source and documented the process, ensuring secure access to the database.

Skills Utilized:

- SQL (Schema Creation, User Management)
- Database Security and Access Control
- ODBC Configuration

Task 5: Data Warehouse and ETL

Overview: This task involved designing a data mart to analyze shipping performance, based on the *Orders Database*. I created a star schema, wrote SQL scripts to build the necessary tables, and provided sample data for testing.

Key Responsibilities:

- **Data Mart Design:** Developed a star schema with a fact table and dimensional tables to evaluate shipping performance.
- **SQL Table Scripts:** Created SQL scripts to build tables, ensuring the use of composite keys and setting constraints to protect data integrity.
- **Sample Data Generation:** Provided test data to validate the data mart, ensuring it was ready for analysis.

Skills Utilized:

- Data Warehousing (Star Schema Design)
- SQL Scripting (Table Creation, Constraints)
- ETL (Extract, Transform, Load) Concepts