**Database Design Lab: Logical and Physical Design**

**Objective:**

The goal of this lab is to guide you through the process of creating both a logical and a physical database design based on a provided business case. You will practice normalizing data, creating Entity-Relationship Diagrams (ERD), and converting these into physical SQL table definitions.

**Requirements:**

* A tool for drawing Entity-Relationship Diagrams (ERD)
  + Draw.io (now diagrams.net) is a good option
* Basic understanding of SQL syntax and databases

**Business Case: Online Retail Store**

You are tasked with designing a database for an online retail store. The store sells various types of products including electronics, clothing, and books. Customers can place orders for products, and these orders can contain multiple types of products. The store maintains an inventory for each product. Furthermore, customers can leave reviews and ratings for products they have purchased.

**Entities to Consider:**

* Customers
* Products
* Orders
* Inventory
* Reviews

**Lab Tasks:**

**Exercise 1: Logical Database Design**

1. Identify the entities and their attributes based on the business case.
2. Normalize the data to remove any redundancies or anomalies.
3. Create an Entity-Relationship Diagram (ERD) capturing the entities, attributes, relationships, and constraints.

**Exercise 2: Physical Database Design**

1. Convert the logical model into a physical model by defining SQL tables.
2. Create SQL queries for creating these tables, including primary keys, foreign keys, and any constraints that are necessary.
3. Populate the tables with sample data to simulate a real-world scenario.

**Exercise 3: Validation**

1. Write SQL queries to validate the data integrity of your physical model. For instance:
   * A query to check if all orders are associated with existing customers.
   * A query to find products that have not been reviewed.
2. Create SQL views that might be useful for the business. For instance:
   * A view to show all products and their average ratings.
   * A view to show customer details along with their total spending.

**Deliverables:**

* Entity-Relationship Diagram (ERD)
* SQL script containing table creation queries
* SQL script for populating tables with sample data
* SQL queries for validation and views
* Documentation explaining the design decisions and any assumptions made

**Submission:**

Submit all the deliverables as a zip file named YourName\_OnlineRetailStoreDBDesign\_Lab.zip through the course portal.