



Computer Science 204 - Assignment 1: Creating & Manipulating a Database

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About this Assignment

In this assignment, you will complete real-world tasks to demonstrate your database programming knowledge and skills, including foundational database design principles and implementation using SQL. You will act as a developer for a fictional electronics retail company. Your tasks will include designing a database, creating an ER diagram, applying normalization rules, and implementing the structure using DDL and DML commands in SQL.

Course Learning Outcomes

The following course learning outcomes are assessed in this assignment:

- Describe the characteristics and roles of SQL, ER diagrams, primary keys, foreign keys, and database management systems.
- Analyze the differences between normalized and denormalized databases.
- Apply data manipulation language (DML) and data definition language (DDL) to manage databases.

Related Lessons

- How to Design a Database Schema
- SQL Normalization: Example & Rules
- DDL, DML & DCL in MySQL - Definition & History

Prompt

You have been hired as a database developer for a growing electronics retail company. The company needs a system to manage its product inventory, suppliers, and customer orders.

Your goal is to design and implement the core database infrastructure to support this business.

Part 1: Database Design

1. Entity Identification: Identify and describe database entities. Include at least the following entities.

- Suppliers (Supplier ID, Supplier Name, Phone, Email)
- Products (Product ID, Product Name, Category ID, Supplier ID, Unit Price, QOH)
- Categories (Category ID, Category Name)
- Orders (Order ID, Customer ID, Product ID, Quantity, Order Amount, Order Date, Order Time)

2. Entity Relationship Diagram (ERD): Create an ERD that includes all entities, attributes, primary keys (PKs), foreign keys (FKs), cardinality relationships, and appropriate data types for each field.

Tool Recommendation for ERD Creation: We recommend using dbdiagram.io. Alternatives: Draw.io, Lucidchart, SQLDBM.

3. Normalization vs. Denormalization: Explain how your design satisfies 1NF, 2NF, 3NF and discuss denormalization. Your explanation must be at least 300 words.

Part 2: SQL Implementation

1. Create Tables using DDL: Write SQL Data Definition Language (DDL) statements to create tables based on the Entity Relationship Diagram (ERD) you designed. Your DDL statements should include appropriate data types, primary keys (PKs), foreign keys (FKs), and constraints to enforce data integrity.

2. Populate Tables using DML: Write SQL Data Manipulation Language (DML) statements to populate tables. Include at least five INSERT statements per table, along with one UPDATE and one DELETE statement to modify and remove data.

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Grading Rubric

Your output will be graded based on the following rubric:

Criteria	Excellent (5)	Good (4)	Needs Improvement (2-3)	Unacceptable (1)	Total Possible Points
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Entity Identification & ERD (x3)	All necessary entities are included, with appropriate relationships illustrated, including correct primary keys (PKs), foreign keys (FKs), and cardinality.	All necessary entities are included, though minor issues (e.g., field name, data type, length) remain in the relationships among them.	Not all necessary entities are included, or at least one major issue (e.g., PKs, FKS) remains in their relationships, or there is inconsistency between the identified entities and the ERD.	Not all necessary entities are included, and at least one major issue (e.g., PKs, FKS) remains in their relationships. Additionally, there is inconsistency between the identified entities and the ERD.	15
Explanation of normalization and denormalization (x3)	Clearly and correctly explains how the design satisfies 1NF, 2NF, and 3NF, along with a discussion on denormalization using appropriate examples. The explanation is at least 300 words long.	Correctly explains how the design satisfies 1NF, 2NF, and 3NF, along with a discussion on denormalization. However, either appropriate examples were missing, or the explanation was between 200 and 299 words long.	Partially explains how the design satisfies 1NF, 2NF, and 3NF, or of denormalization, or the explanation contained fewer than 200 words.	Did not provide an explanation of how the design satisfies 1NF, 2NF, and 3NF, or provided an incorrect explanation of denormalization.	15
DDL statements with correct data types and constraints (x3)	DDL statements have no issues and use appropriate data types and constraints.	DDL statements have minor issues, such as inaccurate data types, improper field lengths, and misplaced constraints.	DDL statements have one major issue such as a syntax error or the illegal use of reserved keywords.	DDL statements contain multiple major issues, such as syntax errors or the illegal use of reserved keywords.	15
DML: INSERT, UPDATE, DELETE examples (x3)	All DML statements execute successfully without errors, correctly inserting, updating, and deleting data as intended. Additionally, each table includes at least five INSERT statements.	Minor syntax errors or execution issues exist but do not significantly impact functionality. Most statements work correctly, and each table includes at least five INSERT statements.	Several syntax errors or execution failures are present, affecting the ability to manipulate data correctly, or fewer than five INSERT statements are included per table.	Several syntax errors or execution failures are present, affecting the ability to manipulate data correctly, AND fewer than five INSERT statements have been included per table.	15

Total					60
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Before You Submit

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How to Submit Your Assignment

When you are ready to submit your assignment, **please complete the following submission form by attaching your assignment as a Microsoft Word or Text document file**. After turning in your assignment, you may take the proctored final exam. You do not need to wait for your written response to be graded. You should receive your assignment grade within one week.

If you are not satisfied with the score you receive on your assignment, you may revise or rewrite it and resubmit them for grading using the same submission form above. Keep in mind that the grade you receive on your assignment is only a portion of your overall grade for the course. If this course has an exam, you are also free to retake the final exam as well if you choose. Please see the course syllabus for a more detailed breakdown of the grading policy.



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