



## Computer Science 204 - Assignment 3: Advanced SQL Techniques for Retail Systems

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### About this Assignment

In this final assignment, you'll enhance your electronics retail database system by writing SQL queries that use advanced functions, improve performance, and implement database objects like views, transactions, and stored procedures. This task emphasizes real-world database operations such as reporting, business logic automation, and system optimization.

# Course Learning Outcomes

The following course learning outcomes are assessed in this assignment:

- Write SQL statements using aggregate, string, date and time, mathematical, and conversion functions to efficiently retrieve data from tables.
- Design solutions to support query performance, database transactions, concurrent database access, triggers, views, and stored procedures and functions.

## Related Lessons

- SQL Server Subquery: Overview, Rules & Examples
- SQL Views: Definition & Example
- TCL & How to Control Transactions in SQL

## Prompt

Now that your electronics retail database is functional and supports analytical queries, you've been asked to improve performance, automate tasks, and prepare the system for production.

## Part 1: Advanced SQL Functions

1. Write an SQL statement that calculates total sales by product category using an aggregate function.
2. Write an SQL statement that formats product names and supplier contact information using string functions.
3. Write an SQL statement that lists orders by purchase month in descending order using date/time functions.
4. Write an SQL query to calculate the 20% discounted price for the most expensive product

## Part 2: Schema Objects and Business Logic

1. Create a view that returns the top 5 best-selling products.
2. Create a stored procedure that accepts a product ID and returns total quantity sold and revenue. Then, write a command to execute the stored procedure.

3. Create a trigger that logs an entry into an Inventory Audit table every time a product's QOH is updated. Then, add a rule to prevent negative values in the QOH field.
4. Create a transaction block that updates inventory and inserts a sales record, rolling back if any part fails.
5. Create an index on a frequently queried column and explain why you chose it.

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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

SQL Functionality and Logic (x4)	SQL queries use correct aggregate, string, date/time, mathematical, and conversion functions with accurate logic and results; syntax is clean and efficient.	Functions and logic are mostly correct with only minor syntax or logic issues; overall results are accurate.	Frequent logic or function issues; some queries produce incorrect, unclear, or inconsistent results.	Major syntax or logic errors prevent proper query execution or understanding.	20
Database Object Implementation (x4)	Views, stored procedures, triggers, transactions, and indexes are implemented correctly with effective logic, structure, and performance awareness.	Most database objects are implemented well with minor issues that don't hinder overall functionality.	Some objects are missing, flawed, or poorly constructed; logic or purpose may be unclear.	Multiple objects missing or significantly flawed; little understanding of use or purpose is shown.	20
Code Commentary and Explanation (x4)	All code includes clear, meaningful comments explaining logic, purpose, and expected outcomes; reflects thoughtful documentation.	Most code is commented appropriately, though some comments may lack detail or clarity.	Comments are sparse, inconsistent, or vague; important logic may be unexplained.	Few or no comments; lacks explanation of code purpose or logic.	20
Performance and Design Thinking (x4)	Code shows strong optimization, indexing strategy, and real-world design awareness; performance justifications are well supported.	Basic design and performance considerations are present; justifications are provided but may lack depth.	Limited evidence of optimization or design strategy; justifications are weak or missing.	No performance considerations; inefficient or poorly reasoned design choices.	20
Total					80

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# How to Submit Your Assignment

When you are ready to submit your assignment, please fill out the following submission form by attaching your assignment as a **Microsoft Word or Text document file**. After turning in your assignment, you may go ahead and 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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