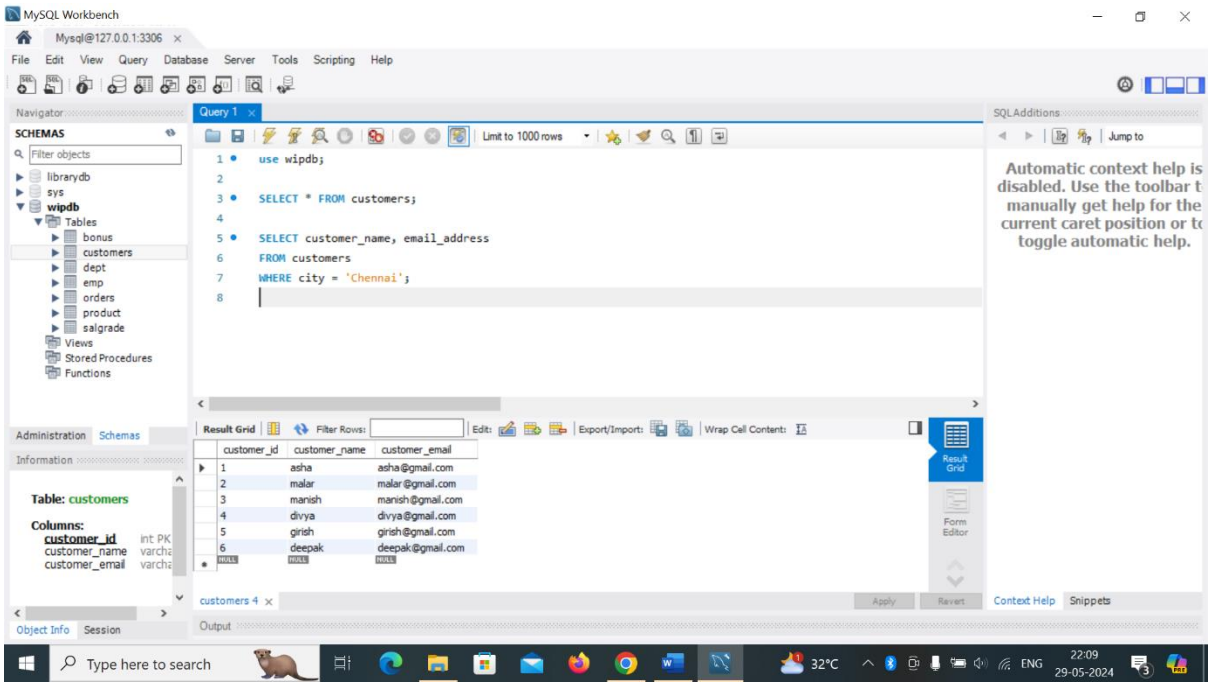
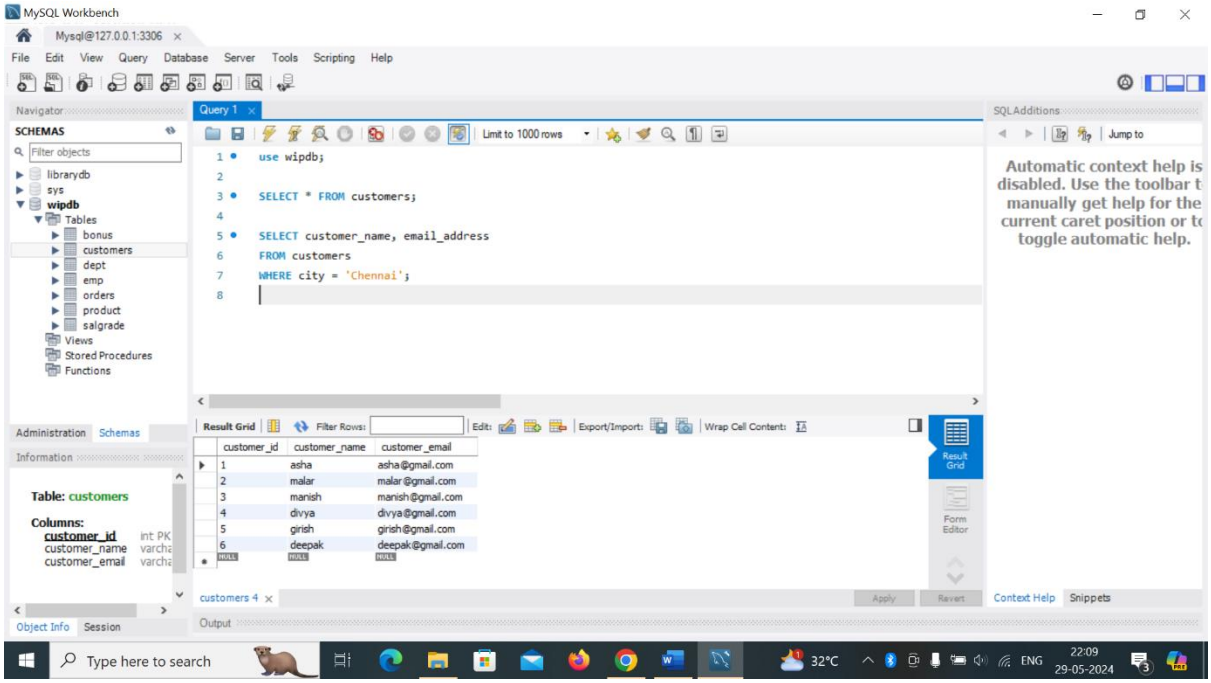
SQL

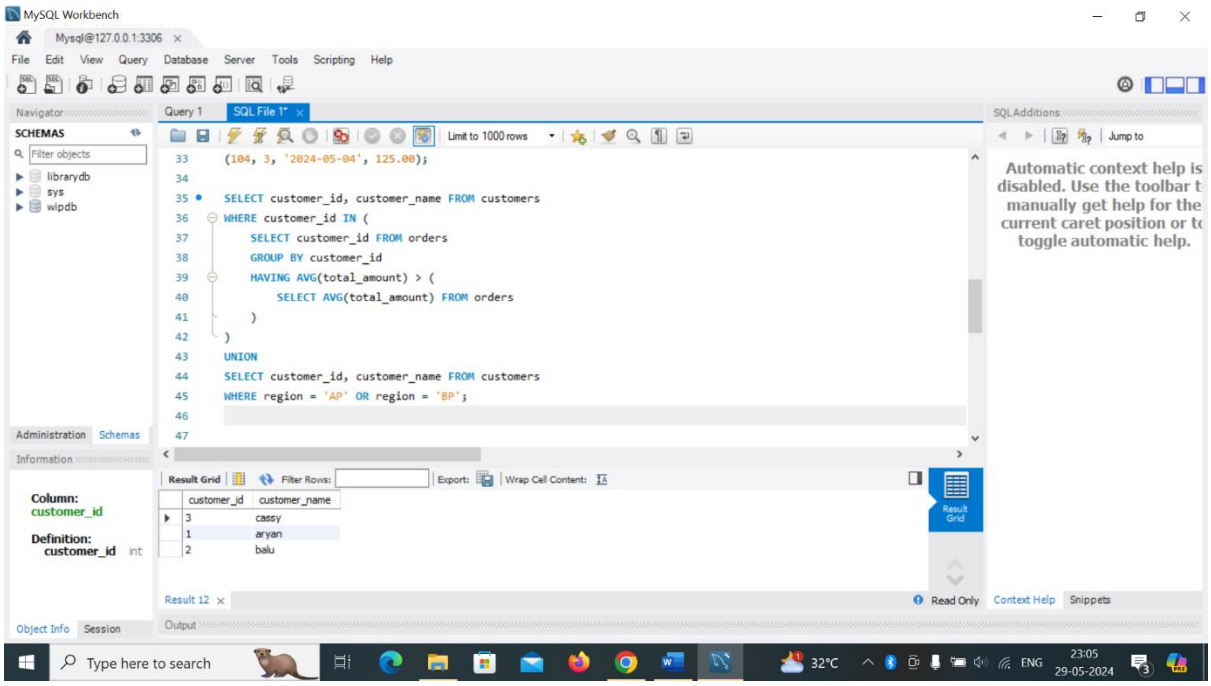
Assignment 1: Write a SELECT query to retrieve all columns from a 'customers' table, and modify it to return only the customer name and email address for customers in a specific city



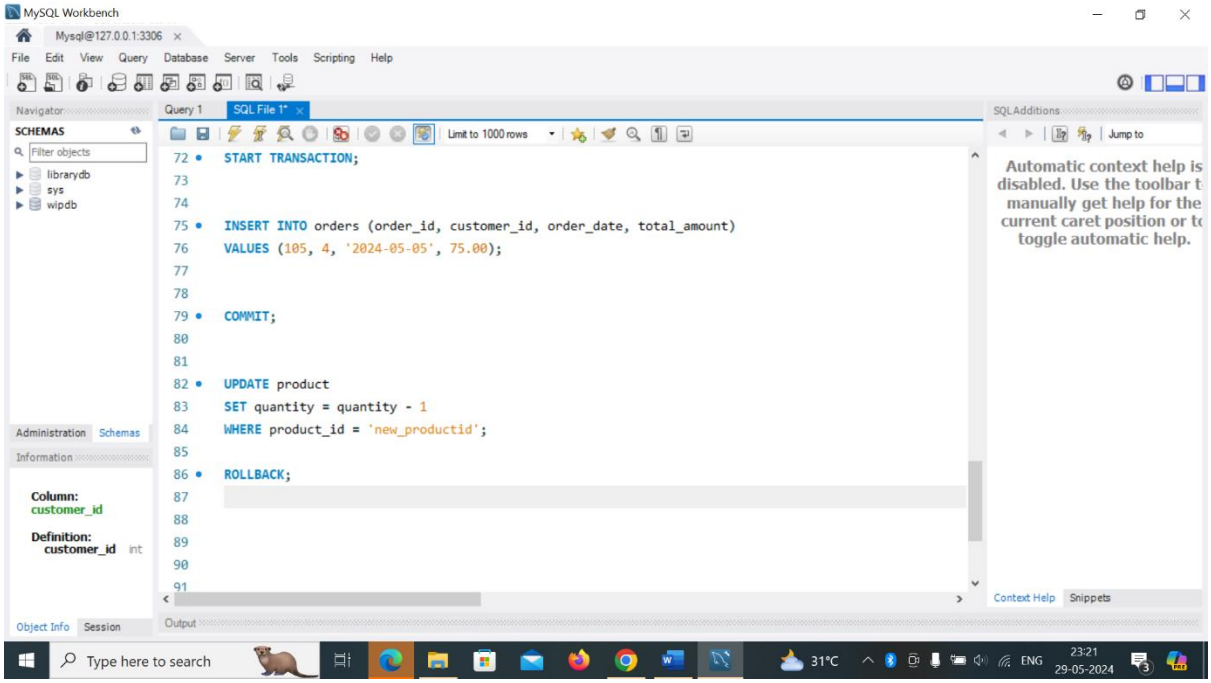
Assignment 2: Craft a query using an INNER JOIN to combine 'orders' and 'customers' tables for customers in a specified region, and a LEFT JOIN to display all customers including those without orders.



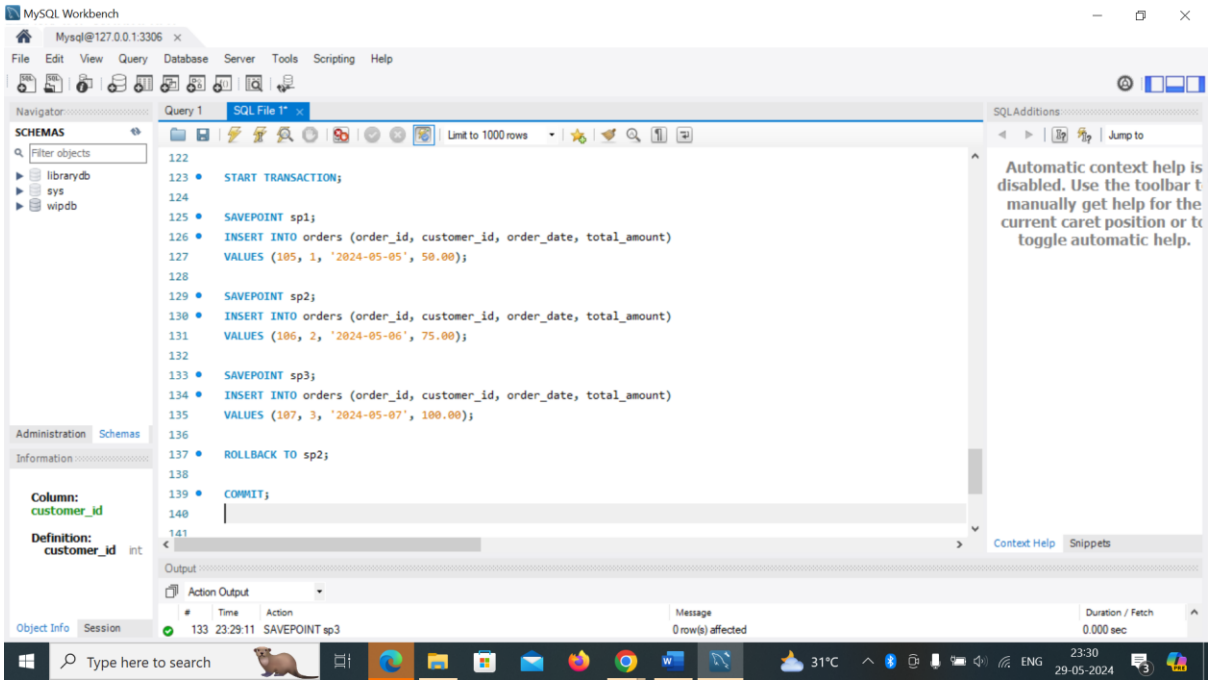
Assignment 3: Utilize a subquery to find customers who have placed orders above the average order value, and write a UNION query to combine two SELECT statements with the same number of columns



Assignment 4: Compose SQL statements to BEGIN a transaction, INSERT a new record into the 'orders' table, COMMIT the transaction, then UPDATE the 'products' table, and ROLLBACK the transaction.



Assignment 5: Begin a transaction, perform a series of INSERTs into 'orders', setting a SAVEPOINT after each, rollback to the second SAVEPOINT, and COMMIT the overall transaction



Assignment 6: Draft a brief report on the use of transaction logs for data recovery and create a hypothetical scenario where a transaction log is instrumental in data recovery after an unexpected shutdown

Report on the Use of Transaction Logs for Data Recovery

Introduction:

Transaction logs are vital components of modern database management systems (DBMS). They act as detailed records of every change made to a database, ensuring data consistency and integrity, especially in the face of unexpected system shutdowns or failures.

Functionality of Transaction Logs:

Transaction logs serve a crucial function by recording all database modifications during transactions, including inserts, updates, and deletes. They store both the original and modified data, enabling the DBMS to roll back or replay transactions as needed for data recovery.

Use Cases for Data Recovery:

Incomplete Transaction Rollback: If a system crash interrupts a transaction, the DBMS can use transaction logs to roll back the incomplete operation, restoring the database to a consistent state.

Point-in-Time Recovery: Transaction logs allow for recovery to a specific moment in time by replaying logged transactions up to the desired timestamp, ensuring data consistency.

Error Correction: In cases of erroneous data modifications, transaction logs facilitate the rollback of affected transactions, preserving data accuracy and integrity.

Recovery from Disk Failures: Transaction logs aid in reconstructing lost or damaged data due to disk failures by replaying logged transactions onto a new storage medium.

Hypothetical Scenario:

A financial institution's database experiences an unexpected shutdown during critical transactions, such as payroll processing and customer payments. Without transaction logs, this interruption could lead to financial discrepancies and operational disruptions.