

A: Do these in psql (SQL shell):

- 1- Search about Transaction in postgresQL database and explain it.
- 2- The accounting department of a company is performing a trial run of a new payroll system. So, They need to simulate a rollback scenario to ensure that no incorrect data is permanently stored in the system.
Design a rollback scenario. Create an arbitrary database, a table and three records in it, and then rollback the transaction. Verify that the records are not persisted in the table after the rollback.
- 3- In a bicycle manufacturing company, there's a need to update both the inventory and production tables simultaneously to reflect changes in stock levels accurately. However, if any update fails, the entire transaction should be rolled back to maintain data integrity.
Create a simple plant database with two tables, inventory and production. Imagine that a bicycle consists of 2 units of wheel and one unit of body. Implement a scenario where you have to update these two tables within a transaction, so when a bicycle created (The number of its production is added by one), the inventory of these parts should be reduced according to the formula mentioned above. when start transaction, records updated in one table, then system attempt to update records in the second table, and then rollback the transaction if any update fails. Ensure that both tables are updated only if both updates succeed.
- 4- Rewrite question 3 code with this scenario:

- First, the inventory of parts should be reduced according to the formula mentioned above.
- Then, the production of bicycle added by one.
- Then, the inventory of bicycle in stock will return to the previous value by adding new parts.

(Hint: search about savepoints)

B: Do these in python:

5- write question 3 codes in python

6- In a banking application, customers frequently transfer funds between accounts. However, to prevent overdrafts, the system needs to validate the balance before committing the transfer transaction.

Write a Python script using psycopg2 to transfer funds between two bank accounts within a transaction. Ensure that the transaction commits only if the balance remains positive after the transfer; otherwise, rollback the transaction. (Note: Create a database with one table that consists user info and balance)

7- An airline company is experiencing high demand for tickets on a newly launched route. To prevent overbooking, the system needs to handle simultaneous booking requests for the last available seat on the flight. Design a scenario where multiple users simultaneously attempt to book the last available seat on a flight. Use PostgreSQL transactions to ensure that only one user can successfully book the seat, while others are notified that the seat is no longer available. Note: Create a simple database that covers Users table (for user info) and Flight table (for flight info like flight code and numbers of available seats).