
Part 1: Data Cleaning in Python (10 Questions)

1. **Load all CSV files into pandas and preview the first 5 rows of each.**
   📘 Tutorial: Load CSVs in Pandas

2. **Check and display the number of missing values per column.**
   📘 Tutorial: Handling Missing Data in Pandas

3. **Rename all columns to lowercase and replace spaces with underscores.**

4. **Convert date columns (like `order_date`, `shipped_date`) to datetime objects.**
   📘 Tutorial: Convert Data Types in Pandas

5. **Remove duplicate rows from each dataset.**

6. **Standardize text columns like city or state names (title case, trimmed).**
   📘 Tutorial: String Cleaning in Pandas

7. **Check for outliers in numeric columns such as `list_price` or `quantity`.**

8. **Fill missing phone numbers or emails in the `customers` table with placeholders.**
   📘 Tutorial: Fill Missing Values in Pandas

9. **Combine first and last name columns into a single `full_name` column.**

10. **Export cleaned dataframes back to CSV for upload.**
    📘 Tutorial: Export Pandas DataFrame to CSV

Part 2: Uploading Data to PostgreSQL (10 Questions)

11. **Install and import `psycopg2` or `SQLAlchemy` for database connection.**
    📘 Tutorial: Connect Python to PostgreSQL

12. **Create a PostgreSQL database called `bike_store`.**
    📘 Tutorial: Create Database in PostgreSQL

13. **Write Python code to create all tables in PostgreSQL using SQLAlchemy.**

14. **Upload cleaned CSV data into tables using pandas `.to_sql()`.**

15. **Write Python code to verify the number of rows in each table.**
    📘 Tutorial: Execute SQL Queries in Python

16. **Query and print 5 rows from the `customers` table in Python.**
    📘 Tutorial: Fetch SQL Query Results in Python

17. **Automate the table upload process for all CSV files in one Python script.**
    📘 Tutorial: Automate Data Upload with SQLAlchemy

18. **Add indexes to common query columns using a Python connection.**
    📘 Tutorial: Execute DDL Statements from Python

19. **Handle PostgreSQL connection errors gracefully in Python.**
    📘 Tutorial: Handle DB Connection Errors in Python

20. **Write a Python function to verify all foreign key relationships.**
    📘 Tutorial: Use SQLAlchemy to Inspect DB Relationships

Part 3: CASE Queries in SQL (10 Questions)

(No tutorials — pure SQL practice)

21. Write a CASE query to label orders as `Late`, `On Time`, or `Early`.

22. Categorize customers by state (East, West, Central).

23. Group products as `Budget`, `Standard`, or `Premium` based on `list_price`.

24. Flag staff as `Active` or `Inactive` using a CASE expression.

25. Label customers with `Low`, `Medium`, or `High` order volume.

26. Check whether each product is `In Stock` or `Out of Stock`.

27. Identify if a staff member manages a store.

28. Categorize discounts as `No Discount`, `Low`, or `High`.

29. Add a revenue tier column per store using CASE with SUM.

30. Mark products as `Old` or `New` based on model year.

Part 4: Python + SQL Integration (10 Questions)

31. **Write a Python function that runs a CASE query and returns a DataFrame.**
    📘 Tutorial: Query PostgreSQL into Pandas

32. **Visualize order counts by category using matplotlib in Python.**

33. **Build a Streamlit dashboard showing total revenue by brand.**
    📘 Tutorial: Build Dashboards with Streamlit

34. **Automate running queries and saving results as daily reports.**

35. **Handle SQL exceptions in Python and log them.**
    📘 Tutorial: Python Try/Except for Databases

36. **Write a JOIN query combining orders, customers, and order_items from Python.**
    📘 Tutorial: Run SQL JOIN Queries via Python

37. **Add a CASE column in that query to label order status.**
    📘 Tutorial: Combine Python + SQL Logic

38. **Aggregate and summarize revenue by brand and model year in Python.**
    📘 Tutorial: Run and Aggregate SQL Results in Pandas

39. **Run a parameterized CASE query in Python (e.g., for a specific state).**
    📘 Tutorial: Parameterized Queries in Python

40. **Export final query results to Excel directly from Python.**
    📘 Tutorial: Write Pandas DataFrame to Excel
