AdventureWorks Sales & Product Analysis
A full SQL-to-Python workflow examining product trends, salesperson performance, and incentive effectiveness using the AdventureWorks database.

Steps & Insights:

1. **Data Validation in SQL** - Began by testing if higher product review ratings correlated with sales, but insufficient review data led to a pivot toward transactional analysis.
2. **Sales Performance Analysis** - Aggregated product quantities, list prices, and subcategories to identify high-performing segments.
3. **Top Salespeople Ranking** - Calculated 2014 sales from raw order data to validate reported figures and ensure accuracy.
4. **Commission Impact Study in SQL** - Assessed the relationship between sales volume and commission percentage.
5. **Currency Impact** - Adjusted sales data for multi-currency transactions to fairly compare performance across regions.
6. **Python Correlation Analysis**
    - Exported sales and commission data from SQL into Python (pandas, scipy.stats).
    - Calculated **Pearson** (linear) and **Spearman** (non-linear) correlation coefficients with p-values.
    - Created a **correlation heatmap** and **non-linear trend scatterplot** using seaborn to visualize relationships.
    - Found the strength and direction of the relationship between commission percentage and total sales, supporting data-driven incentive decisions.

Skills & Tools Used:

- SQL (CTEs, JOINs, aggregation, filtering, CASE/COALESCE)
- Python (Pandas, Matplotlib, Seaborn, SciPy)
- Statistical analysis (Pearson & Spearman correlation)
- Data visualization (heatmaps, scatterplots with trend lines)
- Data cleaning, validation, and reconciliation

Outcome:
Delivered insights on product and category performance, validated salesperson rankings, measured commission effectiveness, and built a cross-tool workflow from SQL to Python for advanced statistical analysis and visualization.