Note: Solution for the exercises will be on GitHub.

Day 12: Advanced Pandas

1. Sorting data (values & index)
2. Filtering with multiple conditions
3. Grouping and aggregation
4. Applying functions (apply, lambda)
5. Pivot tables & Crosstab
6. Merging and joining DataFrames

---

1. Import Required Libraries

```
import pandas as pd
```

2. Load the Dataset

We'll use the CSV from Day 11 (time_series_day11.csv) or a new one if you're interested.

```
df = pd.read_csv("time_series_day11.csv")

df["Date"] = pd.to_datetime(df["Date"])
```

---

3. Sorting

```
# Sort by Sales descending

sorted_df = df.sort_values(by="Sales", ascending=False)

print(sorted_df.head())
```

---

4. Filtering with Conditions

```
# Filter rows where Sales > 300 and Date after Jan 2024

filtered = df[(df["Sales"] > 300) & (df["Date"] > "2024-01-01")]

print(filtered)
```

---

5. Grouping and Aggregation

You can group by month, for example:

```
df["Month"] = df["Date"].dt.to_period("M")

monthly_avg = df.groupby("Month")["Sales"].mean()

print(monthly_avg)
```

🔸 6. Apply and Lambda

```
# Add a new column flagging High Sales

df["High_Sales"] = df["Sales"].apply(lambda x: "Yes" if x > 350 else "No")

print(df.head())
```

🔸 7. Pivot Table Example

```
pivot = df.pivot_table(values="Sales", index=df["Date"].dt.month, aggfunc="mean")

print(pivot)
```

🔸 8. Merging Two DataFrames

```
# Sample merge

df1 = pd.DataFrame({

   'ID': [1, 2, 3],

   'Name': ['A', 'B', 'C']

})

df2 = pd.DataFrame({

   'ID': [1, 2, 4],

   'Score': [80, 90, 70]

})

merged = pd.merge(df1, df2, on='ID', how='outer')

print(merged)
```

📝 Mini Task

1. Create a new column categorizing Sales as "Low", "Medium", "High" based on value.
2. Group data by month and get:
   - Average
   - Min
   - Max sales
3. Use pivot_table to show average sales per month.
4. Save your final DataFrame to a new CSV file.