**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.