DATA ANALYTICS AND VISUVALIZATION

LAB ASSIGNMENT WEEK-4:

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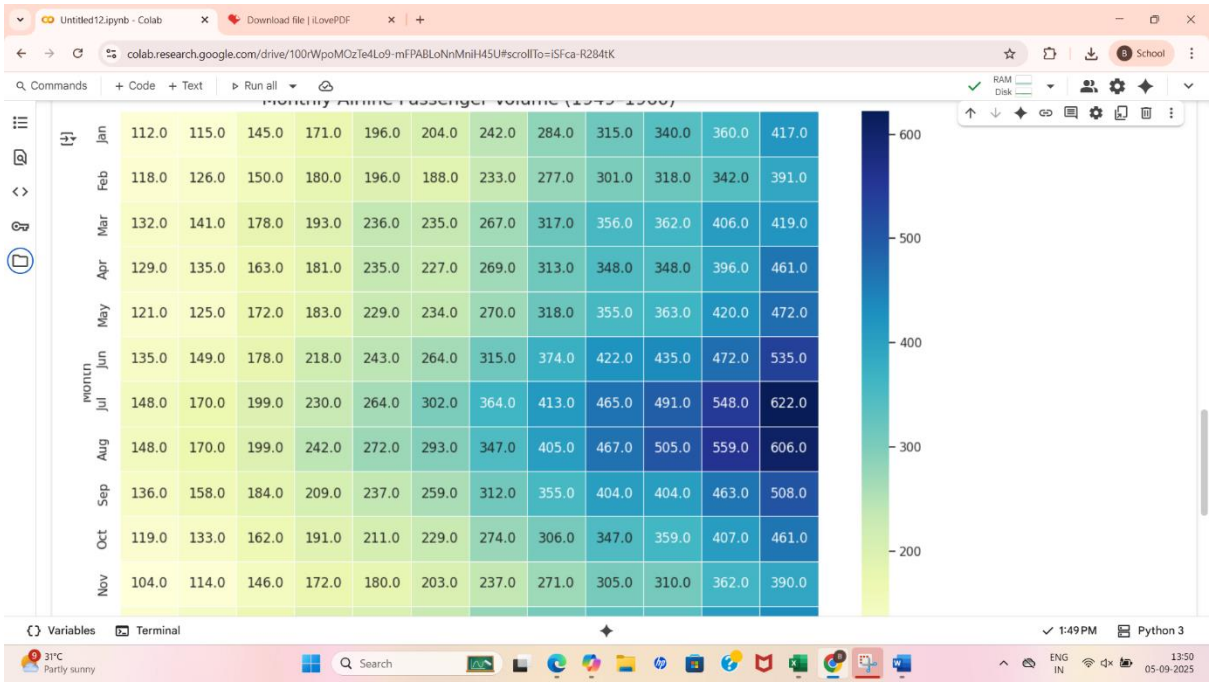
OBJECTIVE: You work for a travel agency that wants to understand seasonal trends in air travel. You're provided with data showing the number of passengers each month from 1949 to 1960.

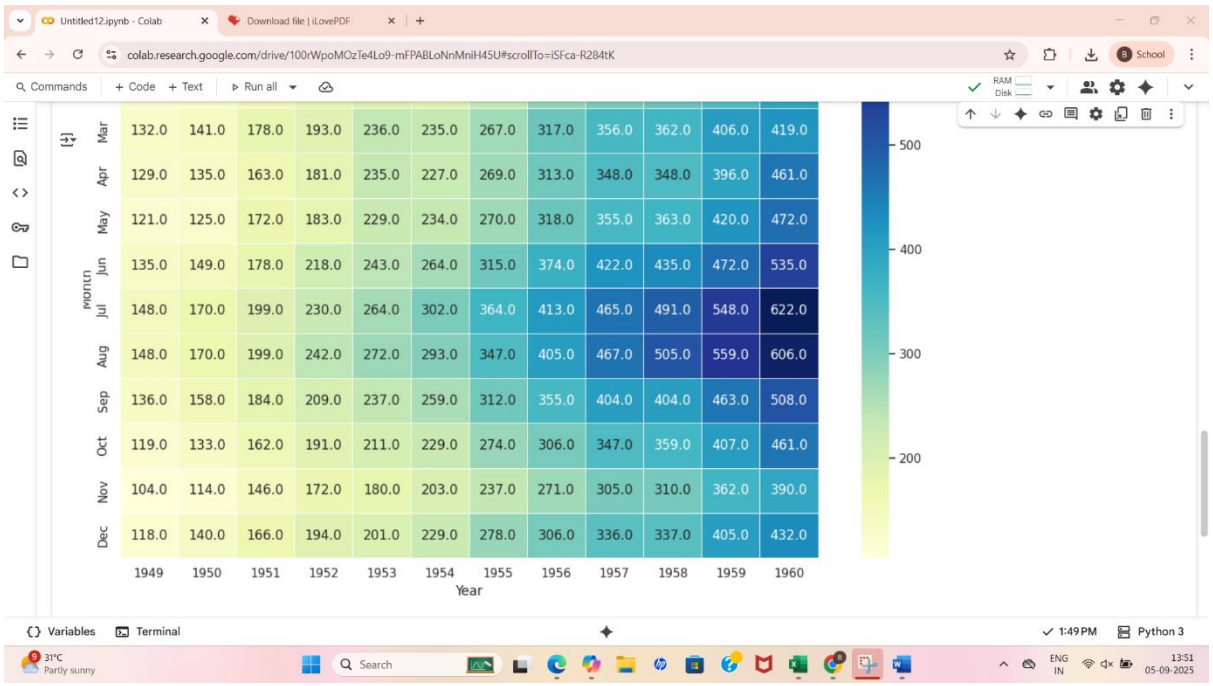
Task:

- Use pivot_table() to structure the data into a matrix of months vs years.
- Use Seaborn's heatmap() to show passenger volume, with color intensity indicating traffic.
- Annotate values on the heatmap and apply color gradients

CODE:

```python
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

# Set Seaborn theme
sns.set_theme(style="white")

# Load the dataset (Seaborn has a built-in flights dataset)
flights = sns.load_dataset("flights")

# Pivot the data: rows = months, columns = years, values = passengers
flights_pivot = flights.pivot_table(index="month", columns="year", values="passengers")

# Optional: reorder months chronologically
month_order = ["Jan", "Feb", "Mar", "Apr", "May", "Jun",
               "Jul", "Aug", "Sep", "Oct", "Nov", "Dec"]
flights_pivot = flights_pivot.reindex(month_order)

# Create the heatmap
plt.figure(figsize=(12, 8))
sns.heatmap(flights_pivot, annot=True, fmt=".1f", cmap="YlGnBu", linewidths=0.5)

# Add labels and title
plt.title("Monthly Airline Passenger Volume (1949–1960)", fontsize=16)
plt.xlabel("Year")
plt.ylabel("Month")

# Show the plot
plt.tight_layout()
plt.show()
```





REFLECTION:

- **Data Reshaping**: Using pivot_table() teaches you how to restructure time-series data into a matrix format, which is ideal for comparing across dimensions (months vs years).
- **Visual Insight**: The heatmap() from Seaborn turns numbers into color gradients, allowing you to spot high and low traffic months at a glance.
- **Annotation & Styling**: Adding annot=True and choosing a color palette (cmap) shows how aesthetics can enhance clarity and impact.