# Mini Project: NumPy and Matplotlib

## NumPy Mini Project: Sales Data Analysis

Objective:

Analyze the monthly sales data of 4 products over 6 months using NumPy.

Tasks:

1. Create Sales Data

- Use np.array() to create a 2D array 'sales' with shape (4, 6).

- Each row represents a product (A, B, C, D).

- Each column represents a month (Jan to Jun).

```
sales = np.array([
    [200, 220, 250, 275, 300, 310],  # Product A
    [150, 160, 170, 180, 190, 200],  # Product B
    [100, 120, 130, 140, 150, 160],  # Product C
    [90, 95, 100, 105, 110, 115]     # Product D
])
```

2. Monthly & Product Analysis

- Calculate total sales per product (row-wise sum).

- Calculate total sales per month (column-wise sum).

- Identify the best-selling product (based on total).

- Identify the month with the highest overall sales.

3. Percentage Growth

- Calculate percentage growth from Jan to Jun for each product:

growth = ((sales[:, 5] - sales[:, 0]) / sales[:, 0]) * 100

4. Output

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Print:

- Total sales per product.

- Total sales per month.

- Best product and best month.

- Percentage growth per product.

Tools: Python, NumPy

## Mini Matplotlib Project: Sales Visualization Dashboard

Objective:

Visualize product sales over 6 months using Matplotlib (with the same data used in the NumPy sales project).

Tasks:

1. Prepare the Data

Use the same NumPy 'sales' array.

products = ['A', 'B', 'C', 'D']

months = ['Jan', 'Feb', 'Mar', 'Apr', 'May', 'Jun']

2. Tasks to Visualize

A. Line Plot

- Plot line graphs for all 4 products.

- Each line represents one products sales over 6 months.

- Use different colors and markers.

- Add legend, title, x/y labels.

B. Bar Chart

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- Plot a grouped bar chart showing each product's sales in June.

C. Pie Chart

- Show the contribution of each product to total sales in June using a pie chart.

Bonus:

- Add grid lines to line plots.

- Annotate the highest point in the line plot for each product.

Tools Required: Python, Matplotlib, NumPy