**Preparation (Before the Event)**

1. **Setup the Content**:
   * Prepare Jupyter Notebooks for Day 1 and Day 2 with commented code blocks.
   * Add headings and placeholders for live coding demonstrations.
   * Include real-world datasets (host them on GitHub or share links).
2. **Organize Datasets**:
   * Example:
     + sales\_data.csv (for Pandas and NumPy).
     + visualization\_data.csv (for Matplotlib and Seaborn).
   * Ensure datasets are clean and small enough for real-time usage.
3. **Slides Preparation**:
   * Create PPT decks for:
     + **Day 1**: Python basics, Pandas, NumPy (with screenshots of key operations).
     + **Day 2**: Visualization theory, plot types, customization options (with examples).
4. **Tech Setup**:
   * Test tools (Jupyter Notebook, VS Code, Google Colab).
   * Share necessary installations (pip install pandas numpy matplotlib seaborn).

**Day 1: Python for Data Science (Action Plan)**

**Session Overview:**

| **Time** | **Topic** | **Activity** |
| --- | --- | --- |
| 0:00 - 0:10 | Introduction to Python for Data Science | Slide Presentation and Demo |
| 0:10 - 0:25 | Pandas Basics | Hands-on Coding |
| 0:25 - 0:40 | Data Cleaning and Transformation | Hands-on Coding |
| 0:40 - 1:00 | Grouping and Aggregating Data | Hands-on Coding |
| 1:00 - 1:30 | NumPy Basics and Vectorized Operations | Hands-on Coding |
| 1:30 - 2:00 | Real-World Workflow with GitHub | Live Demo and Hands-On Activity |

**Step-by-Step Flow for Day 1**

1. **Introduction (0:00 - 0:10)**
   * Talk about Python's industry relevance for Data Science (slides).
   * Highlight popular Python libraries for data manipulation, analysis, and visualization.
2. **Hands-On: Pandas Basics (0:10 - 0:25)**
   * Load the dataset (sales\_data.csv) into a Pandas DataFrame.
   * Show basic operations (head, describe, info).
   * Ask students to identify patterns or missing values.
3. **Hands-On: Data Cleaning and Transformation (0:25 - 0:40)**
   * Explain and handle missing data.
   * Rename, drop, and filter columns.
   * Introduce creating new calculated fields.
4. **Hands-On: Grouping and Aggregating Data (0:40 - 1:00)**
   * Use groupby() for revenue and sales by category.
   * Show merging multiple datasets.
5. **Hands-On: NumPy Basics (1:00 - 1:30)**
   * Create arrays for numerical computations (simple lists).
   * Perform basic arithmetic operations, slicing, and broadcasting.
6. **Real-World Workflow with GitHub (1:30 - 2:00)**
   * Demonstrate creating, uploading, and pulling a dataset.
   * Guide students on pushing changes to GitHub.
   * Integrate this workflow with Python for loading data directly from GitHub.

**Day 2: Data Visualization (Action Plan)**

**Session Overview:**

| **Time** | **Topic** | **Activity** |
| --- | --- | --- |
| 0:00 - 0:10 | Recap of Day 1 | Summary and Q&A |
| 0:10 - 0:30 | Introduction to Matplotlib | Slide Presentation + Hands-On |
| 0:30 - 0:50 | Plot Types and Customization | Hands-On Coding |
| 0:50 - 1:20 | Advanced Visualizations with Seaborn | Hands-On + Mini Challenge |
| 1:20 - 1:50 | Real-World Visualization Example | Practical Application Demo |
| 1:50 - 2:00 | Wrap-Up and Feedback | Discussion and Closing |

**Step-by-Step Flow for Day 2**

1. **Recap (0:00 - 0:10)**
   * Quickly summarize Day 1: Pandas, NumPy, and GitHub workflow.
   * Answer lingering questions and address confusion.
2. **Introduction to Matplotlib (0:10 - 0:30)**
   * Explain why data visualization is critical for decision-making.
   * Show basic Matplotlib plots (line, scatter, bar).

**Example Code**:

import matplotlib.pyplot as plt

# Simple line chart

x = [1, 2, 3, 4]

y = [10, 20, 30, 40]

plt.plot(x, y)

plt.title('Line Chart Example')

plt.xlabel('X-axis')

plt.ylabel('Y-axis')

plt.show()

1. **Plot Customization (0:30 - 0:50)**
   * Modify titles, colors, markers, and legends.
   * Hands-on task: Customize a plot as per student preference.
2. **Advanced Visualizations with Seaborn (0:50 - 1:20)**
   * Introduce statistical plots (e.g., histograms, pair plots, heatmaps).
   * Challenge students: Visualize specific insights using visualization\_data.csv.

**Example Code**:

import seaborn as sns

# Heatmap example

corr = df.corr()

sns.heatmap(corr, annot=True, cmap="coolwarm")

plt.title("Correlation Heatmap")

plt.show()

1. **Real-World Application (1:20 - 1:50)**
   * Use sales data to show sales trends, customer distribution, or seasonal insights.
   * Combine line and bar plots to present findings professionally.
2. **Wrap-Up (1:50 - 2:00)**
   * Answer final questions.
   * Share resources for further learning (links to GitHub, tutorials).
   * Collect student feedback.

**Final Deliverables**

1. **Code Files**: Python notebooks with pre-written and completed examples.
2. **Slides**: Downloadable PDF/PowerPoint presentation.
3. **Datasets**: Shared via GitHub repo or Google Drive.
4. **Reference Materials**: Links to Pandas, NumPy, Matplotlib, Seaborn documentation.

Would you like me to help with specific example slides, additional datasets, or complete notebooks for these sessions?