Introductory Modules for ML

Modules we will import initially to start off our code
-> `pandas` for data handling
-> `numpy` for numerical calculations
-> `seaborn` and `matplotlib` for visualization
-> `sklearn` for implementing the linear regression model.

```
import pandas as pd   # For data handling
import numpy as np    # For numerical operations
import seaborn as sns # For visualization
import matplotlib.pyplot as plt # For plotting
```

Pandas and NumPy are two of the most important libraries in the Python data science ecosystem.

NumPy:

- **Purpose:** NumPy provides support for multi-dimensional arrays and high-performance mathematical operations on these arrays.
- **Core Data Structure:** The `ndarray` (n-dimensional array) is the fundamental object in NumPy.
- **Key Features:**
  - Efficient array operations (vectorized operations)
  - Mathematical functions (trigonometry, linear algebra, etc.)
  - Random number generation
  - Broadcasting (performing operations on arrays with different shapes)

Pandas:

- **Purpose:** Pandas builds on top of NumPy to provide easy-to-use data structures and data analysis tools.
- **Core Data Structures:** The `Series` (1-dimensional labeled array) and `DataFrame` (2-dimensional labeled table) are the primary data structures in Pandas.
- **Key Features:**
  - Data manipulation (filtering, sorting, grouping, merging, reshaping)
  - Handling missing data
  - Time series analysis

    - Input/output operations (reading and writing data from various file formats)

Matplotlib:

- **Foundation:** Matplotlib is a low-level plotting library, providing a foundation for creating a wide range of visualizations.
- **Flexibility:** It offers extensive customization options, allowing you to control every aspect of your plots, from axes and labels to colors and markers.
- **Complexity:** Due to its flexibility, Matplotlib can be more verbose, requiring more code to create complex visualizations.
- **Use Cases:** Ideal for creating highly customized plots, scientific visualizations, and when you need precise control over the plot's appearance.

Seaborn:

- **Built on Matplotlib:** Seaborn is a higher-level library built on top of Matplotlib, providing a simpler interface for creating visually appealing statistical graphics.
- **Ease of Use:** Seaborn offers a concise syntax and built-in themes, making it easier to create attractive plots with less code.
- **Statistical Visualizations:** Seaborn excels at creating visualizations for statistical analysis, such as:
    - Distribution plots (histograms, KDE plots)
    - Scatter plots with regression lines
    - Categorical plots (bar plots, box plots, violin plots)
    - Heatmaps and cluster maps

Scikit-Learn