Data Analytics and Visualization WITH PYTHON:

1. Introduction to Python Programming

Python Overview

Python is a high-level, interpreted programming language known for its simplicity and readability. Invented by Guido van Rossum in the late 1980s, Python was chosen as a name partly because of Van Rossum's affection for Monty Python's Flying Circus.

Python 2 vs. 3

- **Python 2**: Released in 2000, now in "maintenance mode" with no new features.
- **Python 3**: Released in 2008, offers a more readable syntax. For example:
    - range() in Python 3 replaces xrange() in Python 2, improving performance.
    - Integer division in Python 3 results in a float, while in Python 2, decimals are truncated.
    - Python 3 is not backward compatible with Python 2, while Python 2 maintains compatibility with earlier versions.

Most Popular Python IDEs

1. **Thonny**: Great for beginners.
2. **IDLE**: The default editor that comes with Python.
3. **PyCharm**: Ideal for professional developers and large projects.
4. **Visual Studio Code**: Open-source and versatile, created by Microsoft.
5. **Spyder**: Popular for scientific computing.
6. **Jupyter**: Widely used in data science for interactive notebooks.

Key Features

- **High-Level Language**: User-friendly and abstracts complex computer details.
- **Interpreted Language**: Executes code line-by-line, simplifying debugging and allowing interactive programming.

Advantages

- Intuitive and powerful.
- Free and open-source.
- Easy to understand and use.
- Suitable for rapid development.

Disadvantages

- Limited database access.
- Slower than languages like C/C++.
- Not suitable for mobile development.
- Higher memory consumption.
- Simple syntax may make it less versatile for some programmers.

Python's Applications

- **Data Analysis**: Libraries like Pandas, NumPy, and Matplotlib.
- **Web Development**: Frameworks such as Django and Flask.
- **Automation**: Scripts for tasks like file handling and web scraping.
- **Others**: Game development, AI, machine learning, scientific computing.

Installing Python and Setting Up the Environment

Anaconda Distribution

1. Download and install Anaconda from Anaconda's website.
2. Includes Python, Jupyter Notebook, and many scientific libraries.

Jupyter Notebook

1. Launch Jupyter Notebook from Anaconda Navigator with jupyter notebook.
2. Create and manage interactive notebooks.