The Python Programming Language

Python is a high-level, general-purpose programming language known for its readability, simplicity, and versatility. Key characteristics:

1. **Readability:**
   - Python emphasizes clean, readable code with a simple and straightforward syntax, reducing the cost of program maintenance and development.

2. **Interpreted and Interactive:**
   - Python is an interpreted language. Code can be executed line by line, making it suitable for prototyping and testing.

3. **High-Level Language:**
   - Python abstracts low-level details, providing a high-level programming environment. This allows developers to focus on solving problems without dealing with memory management or other low-level complexities.

4. **Extensive Standard Library:**
   - Python comes with a rich set of libraries and modules, known as the Standard Library, covering areas such as file I/O, networking, web development, databases, and more.

5. **Object-Oriented Programming (OOP):**
   - Python supports object-oriented programming principles, allowing developers to structure code using classes and objects. Encapsulation, inheritance, and polymorphism are integral to Python's OOP paradigm.

6. **Web Development:**
   - Python is widely used for web development, with frameworks like Django and Flask providing efficient tools for building scalable web applications.

7. **Data Science and Machine Learning:**
   - Python is a popular choice for data science and machine learning projects. Libraries like NumPy, pandas, scikit-learn, and TensorFlow make it a powerful tool for data analysis, modeling, and deep learning.

Overall, Python's simplicity, readability, extensive library support, and diverse applications make it a popular choice for beginners and experienced developers.

Download "Python" for your OS from https://www.python.org/downloads/

Integrated Development Environment (IDE)

An Integrated Development Environment (IDE) for Python is a software application that provides comprehensive tools and features to facilitate the development, debugging, and deployment of Python applications. The primary functions of a Python IDE include:

1. **Code Editor:**
   - **Syntax Highlighting:** Highlights different elements of the code with different colours, making it easier to read and understand.

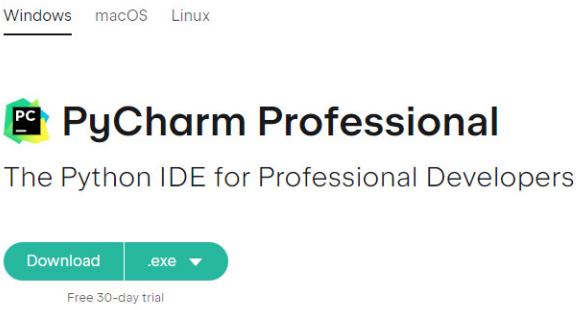
2. **Code Execution:**
   - **Run and Debugging:** Allows you to execute and debug Python code directly from the IDE, providing features like breakpoints, step-through execution, and variable inspection.

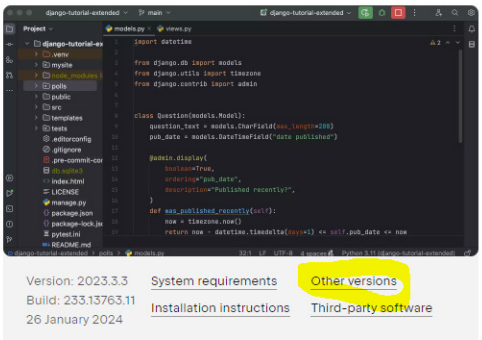
3. **Interactive Console:**
   - **Python Shell:** Offers an interactive Python shell within the IDE, enabling you to experiment with code snippets and test ideas.

4. **Error Checking:**
   - **Real-time Error Highlighting:** Identifies syntax errors and other issues in your code as you type, helping you catch mistakes early.

Popular Python IDEs include PyCharm, Visual Studio Code (VS Code), Jupyter Notebooks, Spyder, PyScripter, PyDev, Atom and IDLE. Each IDE has its strengths and is suitable for different types of projects and workflows.

We will be using the free **Community Edition of PyCharm** which can be obtained at https://jetbrains.com/pycharm → Click the “Download” button → Other Versions





Download “PyCharm Community Edition” for your OS (Windows, macOS or Linux).

Exercise:

What is the difference between an interpreted language and a compiled language?

Does Python require a compiler or an interpreter to run?

Are the following languages compiled or interpreted?

HTML PHP C++ Java JavaScript C# SQL