# **Python Programming – Lesson 1.1 & 1.2**

## **Chapter 1: Learning Python**

### **Key Terms to Remember**

* Python: A high-level, interpreted, interactive, and object-oriented scripting language designed for readability and ease of understanding.
* Guido Van Rossum: Creator of Python; published first version (0.9.0) in February 1991.
* TIOBE: Monthly index tracking programming language popularity via search engine results (e.g., "<language> programming").</language>
* PYPL: Popularity of Programming Language Index.
* IDE: Integrated Development Environment (tools like PyCharm, Spyder, etc.).
* PyCharm: Popular Python IDE (focus of this course).
* Spyder: Scientific Python IDE.
* PyDev: Eclipse plugin for Python.
* IDLE: Basic Python IDE included with Python installation.
* Wing: Advanced Python IDE with strong debugging.

### **What is Python?**

* High-level, interpreted, interactive, object-oriented scripting language.
* Designed for readability and simplicity.
* Great for beginners, students, and professionals aiming to become software engineers or developers.

Advantages of Python:

* Interpreted
* Interactive
* Object-Oriented
* Beginner-friendly

### **Important Features of Python**

* Open-source and free.
* Simple and easy to learn.
* Scalable and portable.
* High-level programming language.
* Built-in high-level data types.
* Strong control structures.
* Multiple organizational structures.
* Compiles on the fly to bytecode.
* Object-oriented with reliable object usage.

### **Development of Python**

* 1991 – Guido Van Rossum released the first version (0.9.0).
* Goals of Python:
  + Easy, intuitive, yet powerful.
  + Open-source (community contributions).
  + Readable like English.
  + Useful for everyday tasks with short development time.

Indexes:

* TIOBE Index: Ranks programming languages by search engine popularity.
* PYPL Index: Tracks programming language usage trends.

### **Python Versions**

| Version | Year | Key Features |
| --- | --- | --- |
| Python 1.0 – 1.6 | 1994 – 2000 | Functional tools: filter(), map(), reduce(), lambda |
| Python 2.0 – 2.7.18 | 2000 – 2020 | Garbage collector, list comprehensions, Unicode support |
| Python 3.0 – 3.9.0 | 2008 – 2020 | Fixed Python 2 issues, simpler syntax, Unicode strings by default |

Key Differences (Python 2 vs 3):

* Strings:
  + Py3 → Unicode by default
  + Py2 → Must define Unicode using "u"
* Variables:
  + Py3 → Values stay constant in loops
  + Py2 → Global variable may change in loops
* Exceptions:
  + Py3 → Enclosed in parentheses
  + Py2 → Enclosed in notations
* Comparisons:
  + Py3 → Simplified rules
  + Py2 → Complex rules
* Iteration:
  + Py3 → range()
  + Py2 → xrange()

### **Python IDEs**

1. PyCharm
   * Free community version available.
   * Intelligent code editor, debugging, testing, profiling.
   * Supports web development (JS, HTML, CSS, etc.).
   * Advantages: auto-completion, cross-platform, customizable interface.
2. Spyder
   * Built for scientists and engineers.
   * Uses PyQt, supports variable exploration.
   * Integration with IPython Console.
   * Advantages: performance debugging, plugin support, object/document viewing.
3. PyDev
   * Eclipse plugin for Python.
   * Supports Django, code completion, type hinting, refactoring, debugging.
   * Integrates with PyLint, Unittest, Mypy.
   * Advantages: strong syntax highlighting, Jython/IronPython support, multi-language.
4. IDLE
   * Simple IDE written in Python.
   * Beginner-friendly.
   * Features: syntax highlighting, multi-window text editor, debugger, Tkinter GUI.
5. Wing
   * Powerful IDE with smart editor and strong debugger.
   * Features: unit testing, remote development, refactoring tools.
   * Advantages: exception handling tab, source browser, productivity tools.

### **Assignment**

Research the following categories of programming languages (at least 5 examples each):

1. High-Level Languages
2. Low-Level Languages
3. Web Programming Languages

## **Chapter 1: Lesson 1.2 – Python 3.9 and PyCharm**

### **Installing Python 3.9**

1. Go to [python.org/downloads](https://www.python.org/downloads/windows/).
2. Download the latest version (or compatible with your OS).
3. Locate the .exe in Downloads and double-click to install.

### **Installing PyCharm (Community Edition)**

1. Go to [JetBrains PyCharm](https://www.jetbrains.com/pycharm/download/).
2. Download the community version.
3. Double-click pycharm.exe.
4. Follow installation steps (default settings recommended).
5. Launch PyCharm → New Project.
6. Assign base interpreter → select Python.exe.

### **Python Environment (Inside PyCharm)**

* Menu Bar – main commands.
* Toolbar – quick access to functions.
* Editor / Code Editor – where code is written.
* Project Window – project structure.
* Tool Window – debugging, console, etc.
* Output Window – program output.
* Status Bar – project/environment details.

Creating a New File:

1. Right-click project name → New → File.
2. Name it helloworld.py → Press Enter.

### **Python Console**

* Accessible via Tools menu.
* Used to run/test Python code interactively inside PyCharm.