Intelligence Academy

Center for Research and Development

Chapter 1: Python Foundations – Your First Step into Code: Part 01

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Chapter 1: Python Foundations – Your First Step into Code

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1. **1.1 Introduction to Python** Learn what Python is, its history, and why it's widely used today.
2. **1.2 Installing Python and Setting Up the Environment** Step-by-step guide on installing Python, setting up VS Code or Jupyter Notebook, and verifying your setup.
3. **1.3 Writing Your First Python Program** A simple 'Hello, World¡ program and executing scripts from terminal or IDE.
4. **1.4 Understanding Python Syntax and Structure** Learn about indentation, code blocks, statements, and line continuation.
5. **1.5 Variables and Data Types** Explore Python's core data types: integers, floats, strings, booleans, and dynamic typing.

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6. **1.6 Basic Input and Output** Using ‘input()‘ and ‘print()‘ for interactive programs.
7. **1.7 Comments and Code Readability** How to write single-line and multi-line comments, and best practices for clean code.
8. **1.8 Exercises and Practice Problems** Practice questions covering all topics in Chapter 1.
9. **1.9 Summary and What’s Next** Recap of key points and a teaser of the next chapter (e.g., control flow or functions).

1.1 Introduction to Python

What is Python?

Python is a high-level, interpreted, general-purpose programming language known for its simplicity and readability. It emphasizes code readability with its clean syntax and allows programmers to express concepts in fewer lines of code than many other languages.

Key Characteristics:

- Interpreted: No compilation step needed; code is executed line-by-line.
- Dynamically typed: No need to declare variable types explicitly.
- High-level: Abstracts many low-level programming tasks.
- Multi-paradigm: Supports procedural, object-oriented, and functional

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programming.

- Extensive standard library and third-party ecosystem (via PyPI).

A Brief History:

- Developed by **Guido van Rossum** in the late 1980s at Centrum Wiskunde & Informatica (CWI) in the Netherlands.
- First released in 1991 as `Python 0.9.0`.
- Named after the British comedy group *"Monty Python"*, not the snake.
- Gained massive popularity due to its simplicity and versatility.
- Python 2.x was succeeded by Python 3.x in 2008 to fix legacy design flaws.

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Why is Python So Popular?

- Beginner-friendly and easy to learn.
- Widely used in many domains: web development, data science, AI/ML, automation, finance, cybersecurity, and more.
- Strong community support and a huge number of open-source libraries.
- Cross-platform (Windows, macOS, Linux).
- Trusted by top companies: Google, NASA, Netflix, Spotify, Meta, Dropbox, and more.

Fun Fact: Python consistently ranks in the top 3 of the TIOBE and Stack Overflow Developer Surveys as one of the most-loved and most-used languages worldwide.

1.2 Installing Python and Setting Up the Environment

Step 1: Download and Install Python

- Visit the official website: https://www.python.org/downloads
- Download the latest Python 3.x installer for your operating system.
- On Windows: **Check "Add Python to PATH"** before clicking "Install Now".

Step 2: Verify Python Installation

- Open terminal (Command Prompt or PowerShell on Windows, Terminal on macOS/Linux).
- Type the following:

```
1 python --version
```

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- You should see something like: `Python 3.11.2`

Step 3: Set Up VS Code (Recommended Editor)

- Download from: https://code.visualstudio.com
- Install the “Python” extension by Microsoft.
- Optional: Install “Jupyter” extension for running notebooks.

Step 4: Install Jupyter Notebook

- Open terminal and run:

```
pip install notebook
```

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- Launch Jupyter:

```
jupyter notebook
```

- It will open in your web browser at `http://localhost:8888`

Step 5: Write and Run Your First Python Program

- Open VS Code and create a new file called `hello.py`
- Write the following code:

```
print("Hello, Python World!")
```

- Run it using:

```
python hello.py
```

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- Expected output: `Hello, Python World!`

Optional Tools:

- `Anaconda`: Pre-packaged Python environment for data science.
- `PyCharm`: Professional IDE for Python by JetBrains.

Success! You've completed your Python setup and are ready to code.

1.3 Writing Your First Python Program

Objective: Learn how to write and run your very first Python script using both terminal and an IDE.

Step 1: Create a New Python File

- Open your text editor or IDE (e.g., VS Code, Sublime Text, or PyCharm).
- Create a new file and name it `hello.py`

Step 2: Write Your First Python Code

```
1  print("Hello, World!")
```

- This line tells Python to print the message `Hello, World!` to the screen.
- `print()` is a built-in Python function used to display output.

1.3 Writing Your First Python Program

Step 3: Run Your Python Script from Terminal

- Open the terminal and navigate to the folder containing `hello.py`
- Use the following command:

```
python hello.py
```

- You should see: `Hello, World!`

Step 4: Run the Script Inside VS Code

- Open `hello.py` in VS Code.
- Right-click anywhere in the editor and choose “Run Python File in Terminal.”

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- Or click the green play button at the top-right if Python extension is installed.

Tips for Beginners:

- Every Python file must end with `.py`
- Python is case-sensitive: `Print` is different from `print`
- Strings must be enclosed in quotes: `"Hello"` or `'Hello'`

Congratulations! You've successfully written and executed your first Python program.