Python Installation and Basics

Installing Python (Windows)

- Go to python.org → Downloads → download Windows installer.
- Run installer and check 'Add Python to PATH' (very important).
- Choose 'Install Now' or Customize if you want a specific folder.
- Open Command Prompt (type cmd in Start) and check: python --version

Installing Python (macOS)

- Install from python.org OR use Homebrew: brew install python
- Check version: python3 --version

Installing Python (Linux - Ubuntu/Debian)

- sudo apt update
- sudo apt install python3 python3-venv python3-pip
- Check version: python3 --version

Troubleshooting Installation

- If python command doesn’t work, try python3.
- On Windows, if python not found but installed, PATH was not set — reinstall or add to PATH.

pip — Python Package Installer

- pip = Python Package Installer.

- When you install Python (latest versions), pip is automatically installed with it.
- pip is used to install and manage external Python libraries from PyPI (Python Package Index).
- Think of pip as an 'App Store for Python'.

How to check if pip is installed

- Open Command Prompt (Windows) or Terminal (macOS/Linux).
- Type: pip --version
- If pip is installed → shows version (e.g., pip 23.2).
- If error → pip not installed properly.

How to use pip

- pip is not a separate program to open, it is a command line tool.
- You run pip commands inside Command Prompt/Terminal.
- Example: pip install requests

Common pip Commands

- Install a package: pip install numpy
- Upgrade a package: pip install --upgrade pandas
- Uninstall a package: pip uninstall matplotlib
- List installed packages: pip list
- Show package info: pip show requests
- Save environment packages: pip freeze > requirements.txt
- Install from file: pip install -r requirements.txt

Troubleshooting pip

- If pip not found, use: python -m pip install --upgrade pip
- On Windows, if pip is not recognized, reinstall Python and check 'Add to PATH'.
- On macOS/Linux, sometimes use pip3 instead of pip.

VS Code — Install & Usage

- Download from code.visualstudio.com and install.
- Open VS Code → Extensions → search 'Python (Microsoft)' → Install.
- Press Ctrl+Shift+P → Python: Select Interpreter.
- Run code: open main.py → press green run button OR python main.py in terminal.

Tokens in Python

- Keywords: reserved words (if, for, def, class).
- Identifiers: names for variables, functions, etc.
- Literals: fixed values (10, 3.14, 'hello').
- Operators: + - * / % == != >= etc.
- Delimiters: () , : [] {} used to structure code.

Expression Execution

- Python evaluates expressions step by step with operator precedence.
- Example: a=5, b=3, c=a*(b+2) → result = 25.

Comments in Python

- Single-line: starts with #
- Multi-line (docstrings): triple quotes ''' or """
- Best practice: comments explain WHY, not WHAT.

Modules in Python

- Module = Python file (.py) that can be imported and reused.
- Built-in Modules: math, os, sys, etc.
- External Modules: installed with pip (numpy, pandas).
- Custom Modules: created by you (mymodule.py).
- Benefits: reuse, organize, save time.

Extensions in Python

- Python file → .py
- Text file → .txt
- Word file → .docx
- Difference: Module = reusable code, Extension = file type.

Escape Characters

- \n → new line
- \t → tab space
- \\ → backslash
- Example: print('Hello\nWorld')

First Python Code

- Create file main.py
- Write: print('Hello Ayesha!')
- Run: python main.py
- Output: Hello Ayesha!