2. Programming Style

• Understanding Python's PEP 8 guidelines:

PEP 8 is the official style guide for Python code. It helps developers write clean, readable, and consistent code across projects. Some key areas it covers:

Indentation and spacing

Line length

Imports

Naming conventions

Commenting

Blank lines

Code layout

PEP 8 is not a rigid rulebook, but rather a set of best practices. It's often enforced using tools like flake8, black, or pylint.

• Indentation, comments, and naming conventions in Python.

• Indentation

Python uses indentation to define code blocks (unlike braces in other languages).

- **Use 4 spaces** (not tabs).

- Proper indentation is **crucial in Python** because it defines blocks of code.

• **Comments**

Comments explain the “why” behind the code and improve maintainability.

- **Inline comments**: Use #
- **Docstrings**: ("""...""") for functions, classes, and modules.

```
#this is my first program.
"""this is my first program"""
Print(“hello world”)
```

• **Naming Conventions**

Variable/function : General variables, local scope.

Ex. user_input()

Constant : ALL CAPS WITH UNDERSCORES, Values that shouldn’t change.

Ex. MAX_RETRIES

Classes: Class names (start with uppercase).

Ex. UserProfile

Module/package**:** Use short, lowercase snake_case names.

Ex. math, utils

- **Writing readable and maintainable code.**

  - keep functions small and focused: Each function should perform a single task. If a function is too long or does multiple things, consider breaking it into smaller functions.
  - avoid magic numbers: Use named constants instead of hard-coding numbers in your code. For example, instead of 2 * 3.14159 * radius, use PI = 3.14159 and 2 * PI * radius.
  - use list comprehensions and generators: they provide a concise and efficient way to create lists and iterators, respectively. For example, [x ** 2 for x in range(1, 11)] creates a list of squares.
  - write tests: Implement unit tests to validate your code and encourage modular design. test-driven development can help you write more reliable and maintainable code.