Toppic: Documentation and commenting

1. Commenting in Python

Definition:

- **Comments** are notes written inside code that are ignored by the Python interpreter.

- Purpose → improve readability, explain logic, remind future developers (or yourself).

Types of Comments:

Single-line comment → starts with #

```
 # This is a single-line comment
x = 5  # Assigning value to x
```

    1.

Multi-line comment (block) → written using multiple # lines or triple quotes ''' ... ''' (not technically comments, but often used as block notes).

```
 '''
This is a multi-line note
Often used for long explanations
'''
```

    2.

Best Practices:

- Keep comments short and meaningful.

- Don't state the obvious (bad example: `x = x + 1 # add one to x`).

- Update comments when code changes.

2. Documentation in Python

Definition:

- Documentation explains the **purpose, usage, and behavior** of code (modules, classes, functions).

- Done using **docstrings** (triple quotes `"""` ... `"""`).

Example: Function Documentation

```python
def add_numbers(a: int, b: int) -> int:
    """
    Add two numbers and return the result.

    Parameters:
        a (int): The first number
        b (int): The second number

    Returns:
        int: Sum of a and b
    """
    return a + b
```

Example: Class Documentation

```python
class Calculator:
    """
    A simple calculator class to perform basic arithmetic.
    """
    def multiply(self, x, y):
        """
        Multiply two numbers.

        Args:
            x (float): First number
            y (float): Second number

        Returns:
            float: Product of x and y
        """
        return x * y
```

3. Why It Matters

- **Comments** = quick clarifications for code logic.

- **Documentation** = structured explanation of how code should be used.

    Together, they:

- Improve **readability** and **maintainability**.

- Help **teams collaborate** better.

- Make code **self-explanatory** for future use.

4. Tools & Standards

- **PEP 8** → style guide for Python code (commenting rules).

- **PEP 257** → conventions for docstrings.

- Tools like **Sphinx** or **pdoc** can auto-generate documentation from docstrings