Python Object Types / Data Types

🔢 1. Number Types

- **Integers**: `1234`, `0b11` (binary)
- **Floats**: `3.1415`
- **Complex Numbers**: `3 + 4j`
- **Decimal**: `Decimal('0.1')` (from `decimal` module)
- **Fraction**: `Fraction(2, 7)` (from `fractions` module)

🔤 2. String Types

- **Standard Strings**: `'spam'`, `"Bob's"`
- **Byte Strings**: `b'a\x01c'`
- **Unicode Strings**: `u'sp\xc4m'` (Python 2 style, use regular string in Python 3)

📋 3. List

- Example: `[1, [2, 'three'], 4.5]`
- Constructor: `list(range(10))`
- Mutable and ordered.

📎 4. Tuple

- Example: `(1, 'spam', 4, 'U')`
- Constructor: `tuple('spam')`
- Immutable and ordered.
- Extended: `namedtuple` (from `collections`)

📒 5. Dictionary (dict)

- Example: `{'food': 'spam', 'taste': 'yum'}`
- Constructor: `dict(hours=10)`
- Key-value pairs; unordered (insertion-ordered in Python 3.7+)

🔡 6. Set

- Example: `{'a', 'b', 'c'}`
- Constructor: `set('abc')`
- Unordered, no duplicates.

📂 7. File

- Example: `open('eggs.txt')`, `open(r'C:\ham.bin', 'wb')`
- Supports text and binary modes.

⚙️ 8. Boolean

- `True`, `False`
- Internally, `True == 1`, `False == 0`, but `True is not 1`

🚫 9. None Type

- `None`
- Represents absence of value or null

🧩 10. Functions, Modules, Classes

- First-class objects in Python:

- **Functions**: `def`, `lambda`
- **Modules**: `import math`
- **Classes**: `class MyClass:`

🚀 11. Advanced Types

- **Decorators**: Functions that modify other functions
- **Generators**: Yield-based iterators
- **Iterators**: `__iter__()` and `__next__()` interface
- **MetaProgramming**: Code that manipulates code (e.g., metaclasses, `type()`)