

1. Python Basics

- What is Python?
- Scripts vs interactive mode
- Syntax and indentation
- Comments and documentation
- Variables & assignment
- Basic types: int, float, str, bool
- Type conversion

2. Data Structures

- Lists, slicing, mutability
- Tuples and unpacking
- Sets and operations
- Dictionaries and key/value access
- Nested structures

3. Control Flow

- if/elif/else
- for and while loops
- break, continue, pass
- Iteration with range

4. Functions

- def and return values
- Arguments and parameters
- Scope
- Lambda expressions
- map, filter
- Built-ins: len, sum, max, min, abs, sorted, replace, enumerate, zip

5. Strings & Formatting

- Indexing and slicing
- Common string methods
- f-strings and formatting
- Multi-line strings

6. Error Handling

- try, except, else, finally
- Built-in exceptions
- Custom exceptions

7. Recursion

- Base vs recursive case
- Recursion vs iteration

8. File I/O

- Reading/writing files
- with open(...)
- File modes

9. Searching & Sorting

- sorted() and .sort()
- Custom sort keys
- Binary search

10. JSON & Serialization

- json.loads, json.dumps
- Reading/writing JSON files

11. Object-Oriented Programming

- Classes and objects
- `__init__`, `__str__`, `__repr__`, `__add__`
- Methods and attributes
- Inheritance and polymorphism
- `super()`
- Operator overloading

12. Decorators

- First-class functions
- Wrapper functions
- `@decorator` syntax

13. Modules & Imports

- `import` and `from X import Y`
- Standard library modules
- Creating your own modules

14. Computational Thinking

- Pattern recognition
- Abstraction
- Decomposition
- Algorithms (step-by-step design)
- Scaling and efficiency