

Python Tool Chest – Core Concepts and Skills

1. Computational Thinking

- Breaking problems into smaller, manageable steps
 - Decomposition, pattern recognition, abstraction, algorithm design
 - Using functions to encapsulate tasks (def)
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2. Variables and Data Types

- Creating and using variables for storing values
 - Primitive types: int, float, str, bool
 - Type conversion: int(), float(), str()
 - Checking types: type()
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3. Operators

- Arithmetic: +, -, *, /, //, %, **
 - Comparison: ==, !=, <, >, <=, >=
 - Boolean logic: and, or, not
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4. Strings

- Creating and manipulating text
 - Methods: .upper(), .lower(), .capitalize(), .split(), .replace(), .strip()
 - Concatenation and f-strings for formatting
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5. Lists

- Creating, indexing, slicing, and modifying lists
 - Adding elements: `.append()`
 - Iterating with loops (`for`)
 - Understanding mutability
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6. Tuples

- Creating immutable sequences
 - Unpacking elements
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7. Dictionaries

- Key-value storage and retrieval
 - Updating values, `.get()` for safe access
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8. Sets

- Optional: storing unique, unordered items
 - Basic operations: `add()`, `remove()`, membership test in
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9. Input and Output

- Reading from users: `input()`
 - Printing output: `print()`
 - Formatting output with f-strings
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10. File I/O

- Writing: `open(filename, "w"), .write()`
 - Reading: `open(filename, "r"), .read()`
 - Using `with` for automatic file handling
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11. Conditional Logic

- `if`, `elif`, `else` statements
 - Using conditions to make decisions
 - Boolean expressions to combine checks
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12. Loops and Control Statements

- `for` loops over ranges and collections
 - `while` loops for repeated actions based on conditions
 - Loop control: `break`, `continue`, `pass`
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13. Functions

- Defining functions: `def`
 - Parameters and arguments
 - Return values: `return`
 - Understanding scope: local vs global
 - Effects of mutability on function arguments
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14. Comments and Code Style

- Single-line: #
 - Multi-line / docstrings: """ """
 - Proper indentation and readability
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15. Modules

- Importing and using standard modules: sys, platform, math, random
 - Accessing functions or attributes within modules
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Functions and Methods Used in Our Tool Chest

Built-in Functions

- print(), input(), type(), int(), float(), str(), len(), sum(), range(), round(), enumerate(), zip()

String Methods

- .upper(), .lower(), .capitalize(), .split(), .replace(), .strip()

List Methods

- .append()

Dictionary Methods

- .get()

File Methods

- .write(), .read()