Functions

1. What is Python, and why is it popular?

Python is a **high-level, interpreted programming language** known for its **simple syntax**, which is close to human language.
It's popular because:

- Easy to learn and read.
- Large community and libraries for web, data, AI, automation, etc.
- Cross-platform and versatile.

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2. What is an interpreter in Python?

An **interpreter** reads Python code **line by line** and executes it immediately.
Unlike compilers, it doesn't convert the entire program to machine code at once, making debugging easier.

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3. What are pre-defined keywords in Python?

Pre-defined keywords are **reserved words** that have a fixed meaning in Python and cannot be used for other purposes.
Examples: if, for, while, True, None.

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4. Can keywords be used as variable names?

No. Keywords are **reserved** for Python's own use, so they **cannot** be used as identifiers (variable names).

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5. What is mutability in Python?

Mutability means whether an object's **value can be changed** after creation.

- **Mutable**: Can change values without creating a new object (e.g., list, dict).
- **Immutable**: Cannot change values once created (e.g., tuple, str).

6. Why are lists mutable, but tuples are immutable?

- **Lists** store elements in a way that allows modification, insertion, and deletion.
- **Tuples** are designed for fixed data storage; their contents cannot be changed after creation for safety and performance.

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7. Difference between "==" and "is" operators in Python

- == → Compares **values** of objects.
- is → Checks if two variables **point to the same memory location** (identity).

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8. What are logical operators in Python?

Logical operators combine or invert conditions:

- and → True if both conditions are true.
- or → True if at least one condition is true.
- not → Inverts the result (True → False).

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9. What is type casting in Python?

Type casting is **converting one data type to another**.
Example: int("5") → converts string "5" to integer 5.

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10. Difference between implicit and explicit type casting

- **Implicit casting** → Done automatically by Python (e.g., int + float → float).
- **Explicit casting** → Done manually by the programmer using functions like int(), float(), str().

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11. Purpose of conditional statements in Python

Conditional statements allow the program to **make decisions** and execute code **only if certain conditions are met**.

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12. How does the elif statement work?

elif checks another condition **if previous if is False**.
It allows multiple conditions to be tested in sequence.

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13. Difference between for and while loops

- **for loop** → Runs a fixed number of times (known iterations).
- **while loop** → Runs until a condition becomes False (unknown iterations possible).

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14. Scenario where a while loop is more suitable than a for loop

When you **don't know in advance** how many times the loop will run.
Example: Keep asking the user for a password until it's correct.