

Python Foundations: Logic & Control Flow

Mastering the building blocks of programming

Halder Sir

Why Python Foundations Matter

Strings

Every prompt and API payload is a string.

Control Logic

Determines how AI outputs drive real-world actions.

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Understanding Python Strings

How Python stores and views text data

String

A string is a sequence of characters. Python uses indexing to track the position of every character in that sequence.

Positive Indexing

Starts at 0 from the left.

Negative Indexing

Starts at -1 from the right.

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Slicing and Dicing Text



Slicing

Slicing allows you to pull out sub-sections of a string. Remember: the start is inclusive, but the stop is exclusive.



msg[0:2]

msg[0:2] extracts the first two characters.



msg[::-1]

msg[::-1] is a quick trick to reverse the entire string.

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Essential String Methods

Cleaning and transforming data for processing

Methods

Methods are built-in tools that perform transformations on your strings.

.strip()

Removes leading and trailing whitespace.

.lower() / .upper()

Changes text case.

.split()

Breaks a string into a list of tokens.

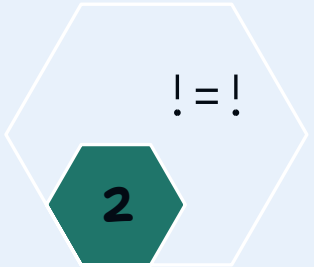
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The Logic Matrix

Comparison operators

Check if assertions are True or False to make decisions.



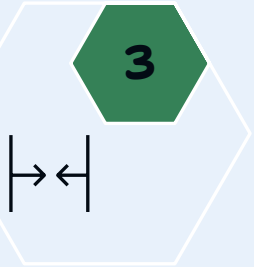


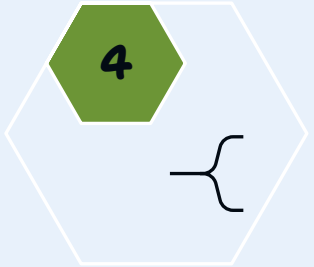
Equality operators

Use == for Equal and != for Not Equal comparisons.

Numerical bounds

Use > and < for numerical bounds and confidence scores.



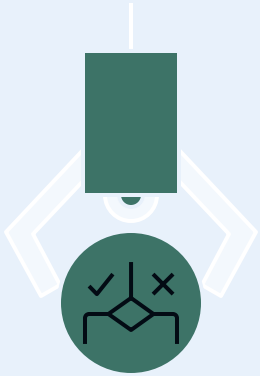


Logical operators

Use and, or, not for composite conditions.

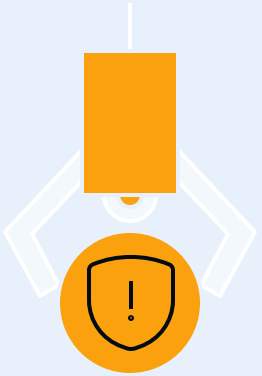
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Control Flow



Simple if Statement

The simplest form of control flow where code inside the block runs only if the condition is True.



Security Alert Example

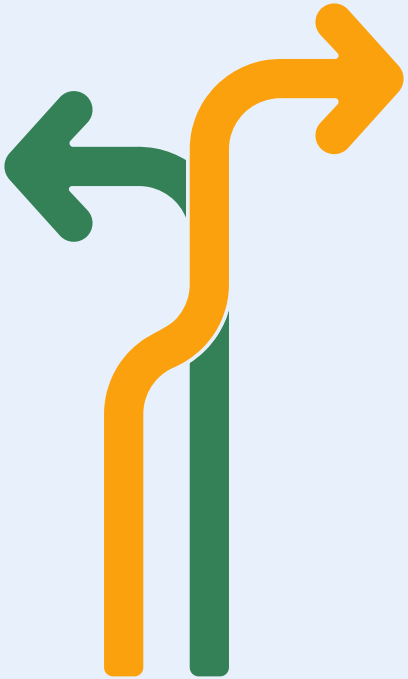
If a risk score is too high, trigger a security alert and freeze the account.

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Which path handles the condition?

First condition

grant access if
authenticated



Alternative path

reject the request
otherwise

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The Multi-Tier Ladder: elif

Membership tier example

Platinum, Gold, or Standard

First True block

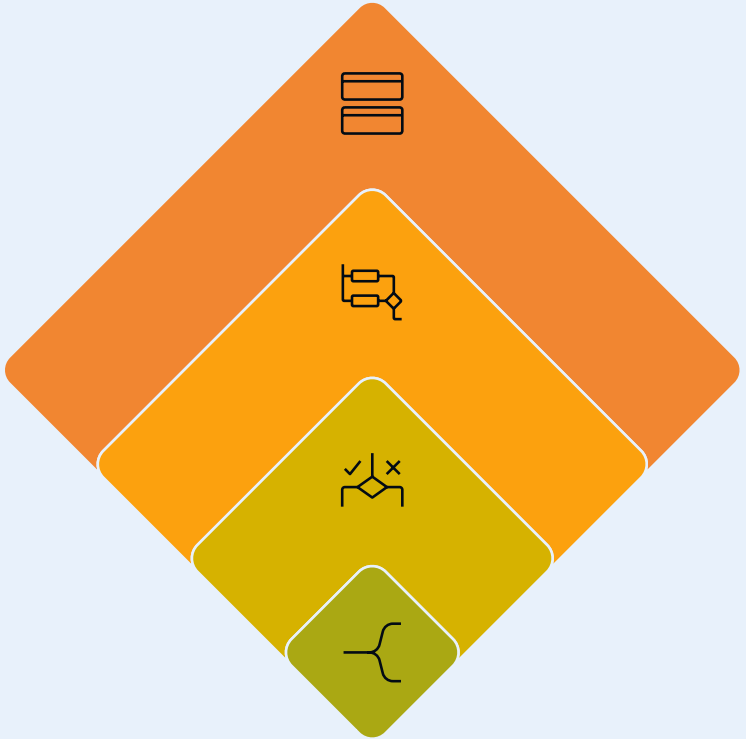
Only the first True block executes

Sequential conditions

check multiple specific cases in order

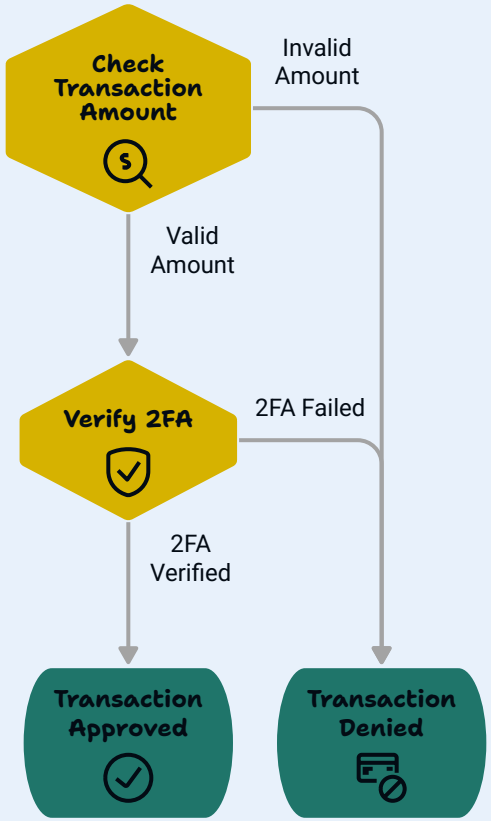
elif

Use elif (else if)



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Nested Logic Control Flow



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Introduction to Loops

Automating repetitive tasks with ease

Loops

Loops allow you to run the same block of code multiple times. This is the key to processing large datasets or lists of strings.

For Loops

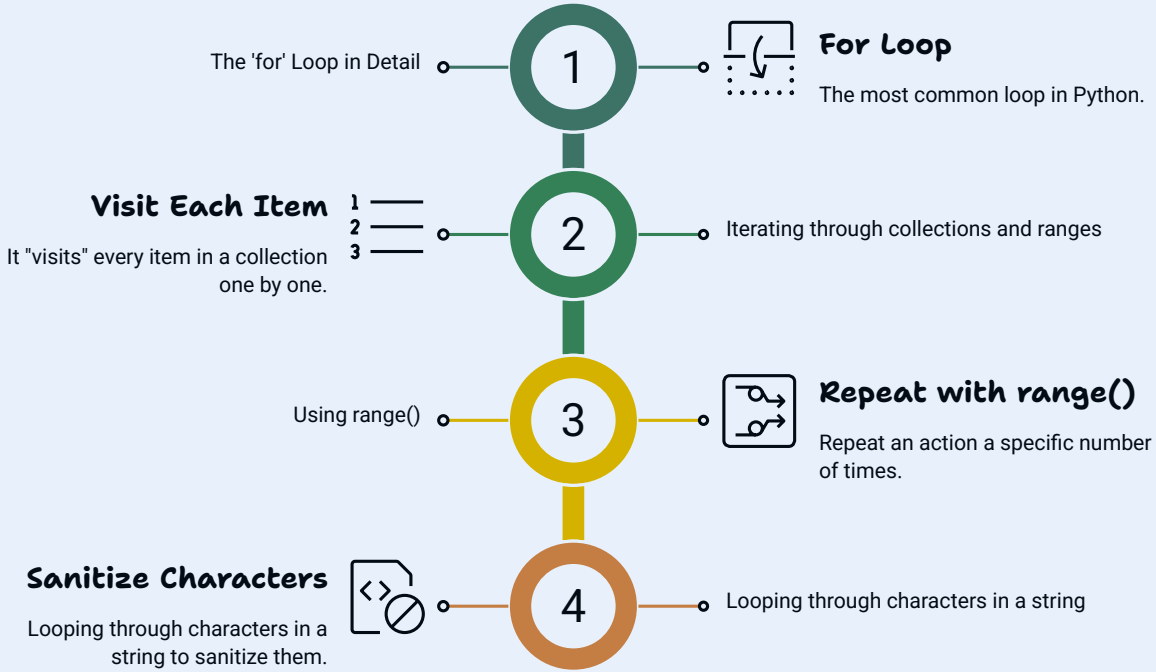
Iterate over a sequence (like a list or string).

While Loops

Run as long as a condition remains True.

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The 'for' Loop in Detail

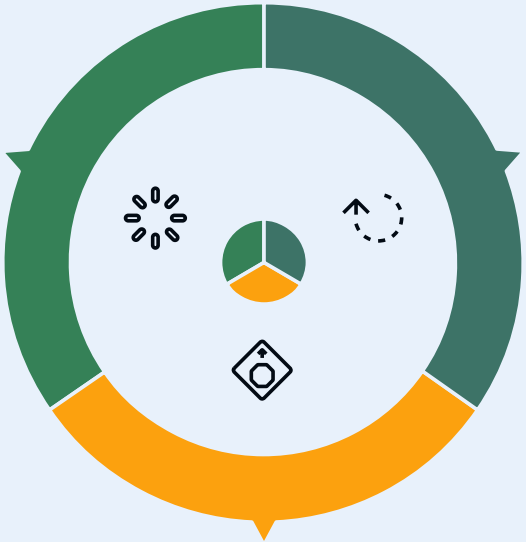


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While Loop Concepts

Common use cases

Waiting for a specific user input or a system status change.



Conditional repetition

A loop that runs as long as a specific condition remains true.

Stop condition

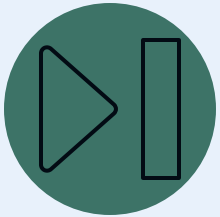
A requirement to prevent the loop from running forever.

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What should the loop do?







break

Stops the loop entirely.

continue

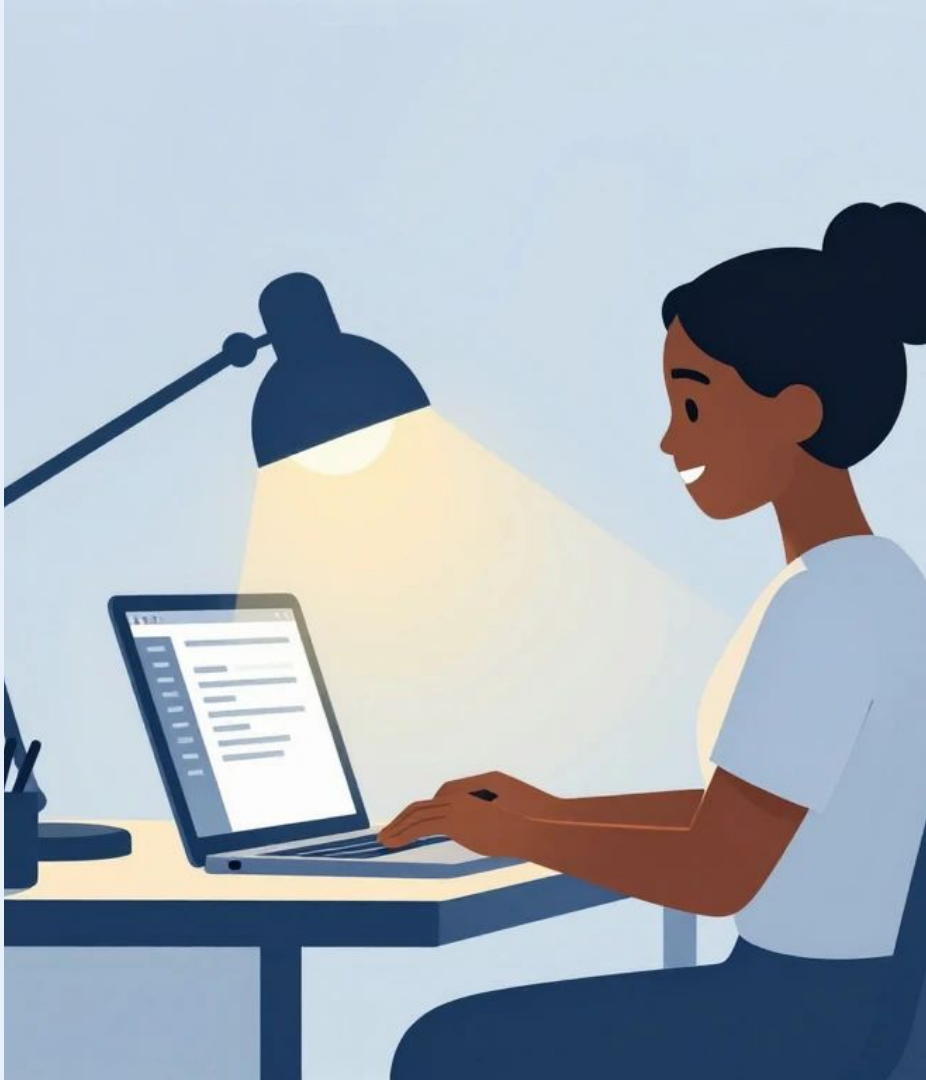
Skips the rest of the current block and moves to the next item.

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Putting It All Together

From strings to complex decision engines

You now have the tools to build structured, logical programs. By combining string processing, conditional logic, and loops, you can automate complex workflows and interface with AI systems.



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