COS102

Advanced Text Processing

Slicing, Formatting, & Methods

Mastering String Manipulation in Python

Learning Outcomes

- Master text extraction using **String Slicing** boundaries.
- Implement negative indexing to safely traverse text backwards.
- Dynamically inject values into strings using modern **f-strings**.
- Leverage native string methods to clean, parse, and validate text variables.
- Handle structural data extractions like email and matric numbers.

What is String Slicing?

If indexing lets you look at a single character, **Slicing** lets you cut out an entire substring or segment.

The Bread Analogy

Instead of inspecting just one crumb, you specify where to start cutting and where to stop cutting to pull out a clean slice of text.

Slicing Syntax Matrix

Slicing uses square brackets with colons separating your target limits: string[start:stop]

P	y	t	h	o	n
0	1	2	3	4	5

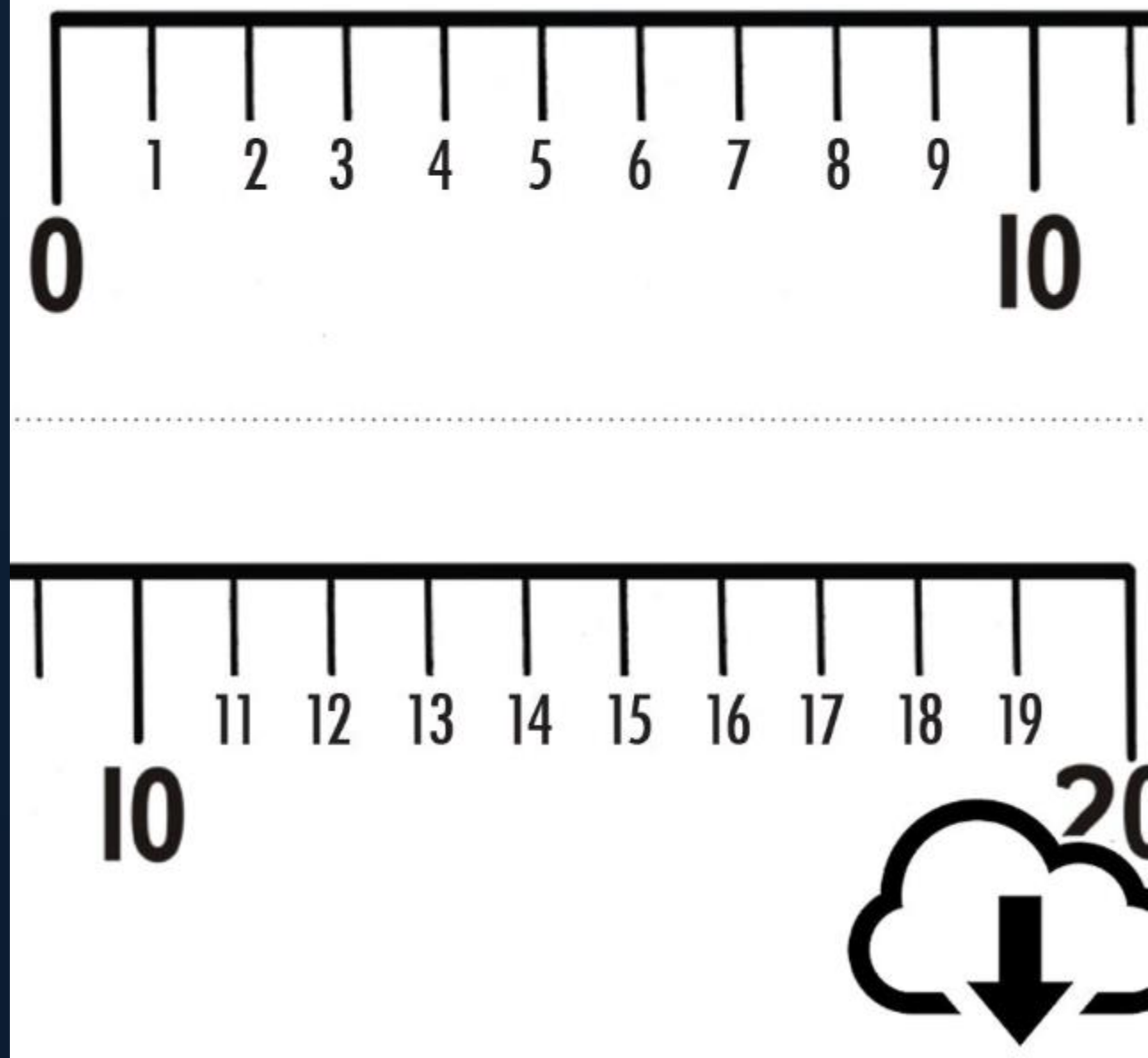
```
word = "Python"
print(word[0:2])  # Output: 'Py'
print(word[2:5])  # Output: 'tho'
```

⚠**The Off-By-One Reminder:** Python includes the start index, but completely excludes the stop index!

Slicing Shortcuts

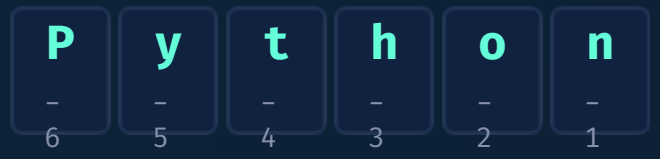
You can leave parameters blank to trigger automatic default values:

- **Omit Start ([:stop]):** Starts from index 0.
  "Python"[:4] → 'Pyth'
- **Omit Stop ([start:]):** Goes all the way to the end.
  "Python"[2:] → 'thon'
- **Omit Both ([:]):** Clones the entire string.



Negative Slicing Limits

What if you want to pull characters from the end of a long text string without counting from zero?




```
filename = "report.txt"
# Extract the extension using negative steps
ext = filename[-4:]
print(ext)  # Output: '.txt'
```

String Formatting (f-Strings)

Combining text variables using old concatenation (+) is clunky and error-prone.

Modern Python uses **f-strings** (Formatted String Literals) to easily embed variables inside strings.

```
name = "Tolani"
score = 85

# Put an 'f' before the quotes, and wrap variables in curly braces {}
msg = f"Hello {name}, your score is {score}."
print(msg)  # Output: Hello Tolani, your score is 85.
```

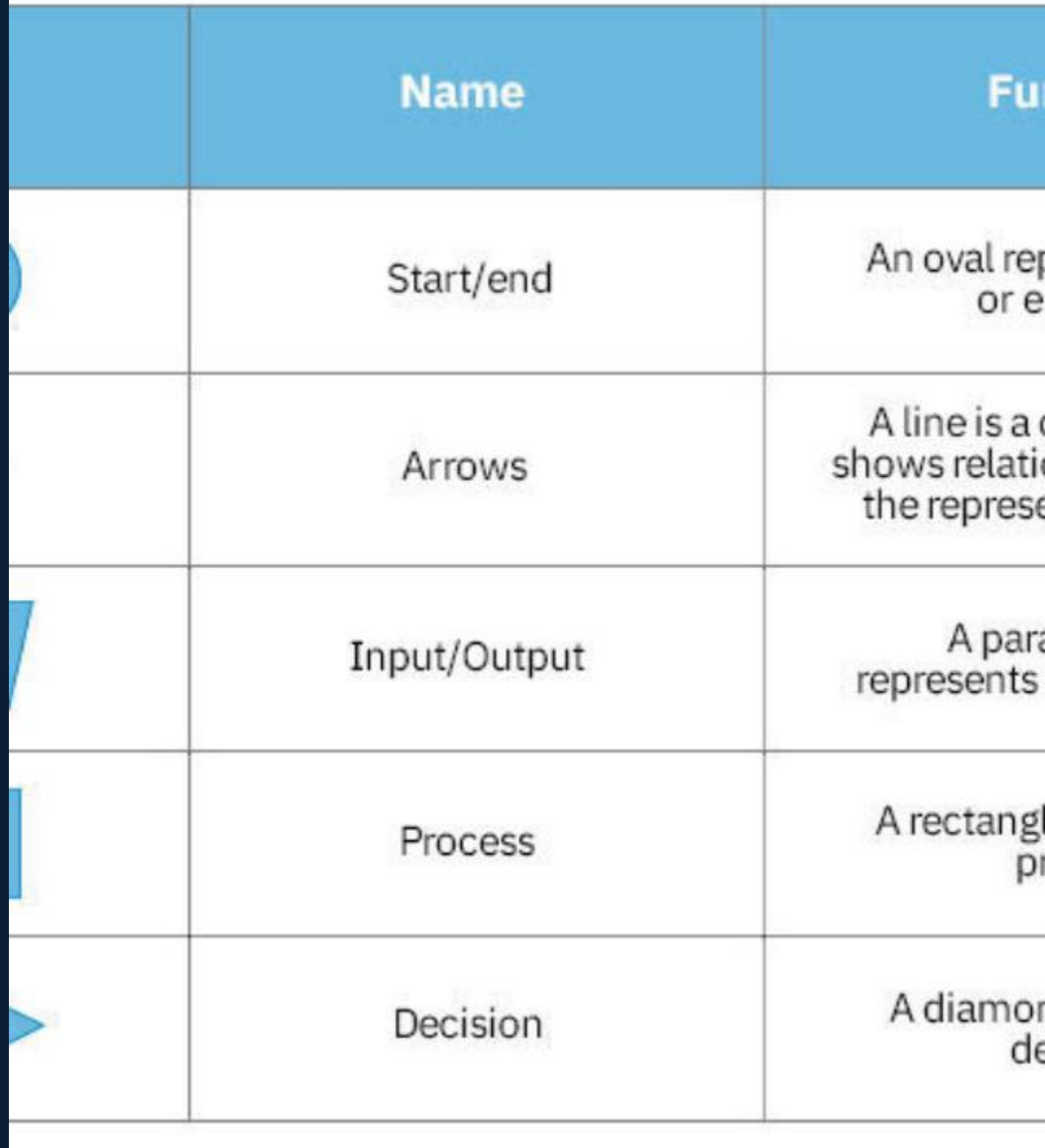
Inline f-String Math

f-strings don't just hold variables—they can evaluate active expressions and format numbers on the fly.

```
price = 2500
discount = 0.10

print(f"Total: #{price * (1 - discount)}")
# Output: Total: #2250.0

val = 22 / 7
print(f"Pi to 2 decimals: {val:.2f}")
# Output: Pi to 2 decimals: 3.14
```



	Name	Fu
	Start/end	An oval rep or e
	Arrows	A line is a shows relati the represe
	Input/Output	A para represents
	Process	A rectangl pr
	Decision	A diamor de

Essential String Methods

String methods are built-in operations you can run on text variables using the dot (.) operator.

Method Syntax	Functional Behavior Action	Code Example Output
.upper() / .lower()	Converts character casing completely.	"Hi".upper() → "HI"
.strip()	Removes leading/trailing whitespaces.	" x ".strip() → "x"
.replace(old, new)	Swaps character sub-segments.	"abc".replace("b", "z") → "azc"
.split(separator)	Breaks text into a list of chunks.	"a,b".split(",") → ["a", "b"]

Strings are Immutable!

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ONLY

Immutable means a string cannot be altered once it's created in memory.

```
name = "Python"
name[0] = "J"  # CRASH! TypeError!
```

String methods don't modify the original text—they return a brand new string value that you have to save into a variable.

Lab: Email Domain Extractor

The Code Challenge:

Write a program that takes a user's input email address, extracts the domain name using string methods, and prints a clean greeting.

```
email = " student@unilag.edu.ng "
# 1. Clean the outer whitespace
# 2. Extract everything after the "@" symbol
# 3. Print a message using an f-string
```

Questions?

Text processing transforms raw data into structured information inputs.

Next Chapter: Error and Exception Handling (Try / Except)

Image Sources

https://static.vecteezy.com/system/resources/previews/046/070/489/non_2x/a-closeup-of-a-students-hand-writing-on-a-notebook-with-a-classic-fountain-pen-while-their-other-hand-types-on-a-keyboard-symbolizing-the-harmony-between-old-and-new-form-photo.jpg

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