

## Python Cheat Sheet for Java Learners

### ■ **What is Python?**

- High-level, interpreted language
- Dynamically typed (no need to declare variable types)
- Popular in scripting, automation, web dev, AI/ML

### ■■ **How Python Runs Code**

- No compilation step: Code is interpreted line-by-line
- Runs in the Python interpreter (CPython is most common)
- Use .py files or run interactively in REPL (e.g., terminal or IDLE)

Java vs Python Execution:

Step   Java   Python
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Compilation   javac → .class files   No compilation step
Execution   JVM (java)   Python interpreter
Static/Dynamic Typing   Static   Dynamic

### ■ **Basic Syntax Comparison (Python vs Java)**

Hello World:

Python: `print("Hello, World")`  
Java: `System.out.println("Hello, World");`

Variables:

Python: `x = 5, name = "Taha"`  
Java: `int x = 5; String name = "Taha";`

If Statements, Loops, Functions, Classes:

Shows how Python uses indentation, and Java uses braces and semicolons.

### ■ **Python Data Structures (In-Depth)**

1. list:

- Ordered, mutable collection
- Allows duplicates
- `nums = [1, 2, 3]; nums.append(4); nums[0] = 99`

2. dict (dictionary):

- Key-value pairs (like a HashMap)
- `student = {"name": "Taha", "age": 20}; student["grade"] = 95`

3. tuple:

- Ordered, immutable
- `point = (4, 5)`

4. set:

- Unordered, unique elements
- `colors = {"red", "blue"}; colors.add("yellow")`

## ■ **Type Conversion**

`int("5"), float("3.14"), str(100), list("abc")`

## ■■ **Indentation**

- Python requires indentation (standard: 4 spaces)
- No curly braces

## ■ **Other Helpful Tips**

- `input()` always returns a string → convert as needed
- `#` is for comments
- Use `import` to access libraries
- `try/except` for error handling

## ■ **Useful Built-in Functions**

- `len()`, `type()`, `range()`, `sum()`, `max()`, `min()`, `enumerate()`, `zip()`, `sorted()`, `reversed()`

## ■ **Resources to Explore**

- [docs.python.org](https://docs.python.org)
- [w3schools.com/python](https://www.w3schools.com/python)
- [realpython.com](https://realpython.com)

Practice, experiment, and have fun!