Python Beginner to Advanced Cheat Sheet

by Muhammad Usman Asghar (musmankkh) via cheatography.com/214866/cs/4678

Basic Syntax

Comments

Single line: Use `#` symbol

Multi-line: Use triple quotes `" " "` or `'''`

Inline comments: Add `#` at end of line

Print Function

Basic output: `print()` function displays text

Multiple values: Separate with commas

String formatting: Use `f-strings, format(), or %` formatting.

Indentation

Critical in Python - Defines code blocks

Use 4 spaces - Standard convention

Consistent indentation - All lines in same block must have same indentation

Data Types

int	Whole numbers
float	Decimal Numbers
complex	Real + imaginary
str	Character strings
Immutable	Can't change chars
Unicode	International support
bool	True/False Values
list	Ordered, mutable
tuple	Ordered, immutable
dict	Key-value pairs
set	Unique elements only

Data types include numeric, text, boolean, and collections.

Naming Rules

Start	Letter or underscore
Characters	alphanumeric + underscore
No reserved words	if, for, class
Convention	snake_case

Variable Declaration

No keyword needed	Just assign
Dynamic typing	Auto-determined
Case sensitive	myvar ≠ MyVar
Multiple assignment	One line

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Cheatography

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Formatting

f-strings	`f"Hello {name} "`
format()	`" Hello {}".f or mat (name)`
% style	`" Hello %s" % name`

String Methods

Case	upper(), lower(), title()
Search	find(), index(), count()
Check	startswith(), endswith()
Modify	replace(), strip(), split()

String Operations

Concatenation	+ operator
Repetition	* operator
Length	`en() function
Indexing	[0] zero-based
Slicing	[start:end:step]

Strings (Creation Methods)

Single quotes	'Hello'
Double quotes	"Hello"
Triple quotes	Multi Line
Raw strings	r 'literal'

Conditionals

if	Basic condition check
elif	Additional conditions
else	Default
Operators	==, !=, <, >
Logic	and, or, not

Loops

For	Iterate sequences
While	Condition-based
range()	Number Sequence
enumerate()	Index + Value
zip()	Multiple sequence

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Loop Control

break	Exit loop
continue	Skip iteration
else	Normal completion
pass	Empty placeholder

Functions

Definition

- def keyword: Define function
- Parameters: Input values
- Return: Output value
- Docstrings: Documentation

Arguments

- Positional: Order matters
- Keyword: Use parameter names
- Default: Provide default values
- Variable: *args,* *kwargs

Types

- Built-in: print(), len(), type()
- User-defined: Custom functions
- Lambda: Anonymous functions
- Generator: Uses yield

Scope

- Local: Inside function
- Global: Outside functions
- global: Modify global vars
- nonlocal: Enclosing scope

Built-in Functions

Essential

- print(): Output to console
- input(): Get user input
- len(): Sequence length
- type(): Object type
- isinstance(): Check type

Conversion

- int(), float(), str()
- list(), tuple(), set()
- ord(), chr(): Char conversion

Mathematical

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Built-in Functions (cont)

• abs(): Absolute value
• round(): Round numbers
• min(), max(): Extremes
• sum(): Sequence sum
• pow(): Power calculation

Sequence

• range(): Number sequences
• enumerate(): Add indices
• zip(): Combine iterables
• sorted(): Sort sequence
• all(), any(): Boolean ops

File Handling

Operations

• open(): Open file for I/O
• Modes: 'r', 'w', 'a', 'x'
• Text/Binary: 't', 'b' modes
• close(): Close file

Reading

• read(): Entire file
• readline(): Single line
• readlines(): All lines
• Iteration: Loop through lines

Writing

write(): Write string
writelines(): Write list
Context manager: with statement

```
</d iv>
<div style= " flex: 1;">
```

Error Handling

try	Code that may fail
except	Handle exceptions
else	No exception occured
finally	Always excute
rise	Trigger exception

Handling

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Error Handling

SyntaxError	Invalid syntax
NameError	Undefined variable
TypeError	Wrong data type
ValueError	Wrong Value
IndexError	List index error
KeyError	Dict key missing

Exception Types

Object-Oriented Programming

Classes and Objects

• class keyword – Define class
• Object instantiation – Create instances
• Instance variables – Data unique to each object
• Class variables – Data shared by all instances
• self parameter – Reference to current instance

Methods

• Instance methods – Access instance data
• Class methods – Work with class data (@classmethod)
• Static methods – Independent functions (@staticmethod)
• Special methods – init, str, repr, etc.

Inheritance

• Parent class – Base class being inherited
• Child class – A class that inherits
• super() function – Access parent class methods
• Method overriding – Redefine parent methods
• Multiple inheritance – Inherit from multiple classes

Encapsulation

• Private attributes – Prefix with underscore(s)
• Property decorator – Create getter/setter methods
• Name mangling – Double underscore prefix
• Public interface – Methods meant for external use

Polymorphism

• Same interface, different implementations
• Duck typing – "If it looks like a duck..."
• Method overloading – Not directly supported
• Operator overloading – Define behavior for operators

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Data Structures

Lists

• Ordered, mutable, duplicates OK

• Methods: `append(), insert(), remove()`

• Access: indexing [0], slicing [1:3]

• Sort: `sort(), reverse()`

Tuples

• Ordered, immutable, duplicates OK

• Methods: `count(), index()`

• Packing/Unpacking: Multiple assignment

• Faster than lists

Dictionaries

• Key-value pairs, mutable

• Methods: `get(), keys(), values()`

• Access: dict[key] or dict.get(key)

• Update: update(), pop()

Sets

• Unordered, unique elements

• Methods: `add(), remove(), union()`

• Operations: intersection, difference

• Membership: fast in testing

Industry Applications

Web Development

• Backend APIs – RESTful services, GraphQL

• Full-stack frameworks – Django, FastAPI

• Microservices – Flask, FastAPI

• Content management – Django CMS, Wagtail

Data Science & Analytics

• Data analysis – Pandas, NumPy

• Machine learning – Scikit-learn, TensorFlow, PyTorch

• Data visualisation – Matplotlib, Seaborn, Plotly

• Big data – PySpark, Dask

Automation & Scripting

• System administration – Automate server tasks

• Web scraping – BeautifulSoup, Scrapy

• Task automation – Schedule, monitor processes

• DevOps tools – Ansible, Fabric

Scientific Computing

• Research computing - SciPy ecosystem

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Industry Applications (cont)

- Bioinformatics – BioPython
- Astronomy – AstroPy
- Physics simulations – NumPy, SciPy

Game Development

- Pygame – 2D game development
- Panda3D – 3D game engine
- Game scripting – Embed Python in games
- Game tools – Level editors, asset pipelines

Learning Resources

Official Documentation

- python.org – Official Python documentation
- PEP documents – Python Enhancement Proposals
- Library reference – Standard library documentation
- Language reference – Complete language specification

Online Tutorials

- W3Schools
- Python.org tutorial
- Real Python
- Codecademy

Practice Platforms

- LeetCode – Coding interview preparation
- HackerRank – Programming challenges
- Codewars – Coding kata and challenges
- Project Euler – Mathematical programming problems

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