finxter   The Ultimate Python Cheat Sheet

Keywords

Keyword	Description	Code Examples
False, True	Boolean data type	```False == (1 > 2)``` ```True == (2 > 1)``` 👎 👍

and, or, not	Logical operators
	→ Both are true
	→ Either is true
	→ Flips Boolean
		```True and True # True```
		```True or False # True```
		```not False # True```

break	Ends loop prematurely	```while True:``` ``` break # finite loop```

continue	Finishes current loop iteration	```while True:```
		``` continue```
		``` print("42") # dead code```

class	Defines new class	```class Coffee:``` ``` # Define your class```
def	Defines a new function or class method.	```def say_hi():``` ``` print('hi')```

if, elif, else	Conditional execution:
	- "if" condition == True?
	- "elif" condition == True?
	- Fallback: else branch
		```x = int(input("ur val:"))```
		```if x > 3: print("Big")```
		```elif x == 3: print("3")```
		```else: print("Small")```

for, while	# For loop
	for i in [0,1,2]:
	    print(i)
		# While loop does same
		j = 0
		while j < 3:
		    print(j); j = j + 1

in	Sequence membership	```42 in [2, 39, 42] # True```

is	Same object memory location	```y = x = 3```
		```x is y # True```
		```[3] is [3] # False```

None	Empty value constant	```print() is None # True```
lambda	Anonymous function	```(lambda x: x+3)(3) # 6```

return	Terminates function. Optional return value defines function result.	```def increment(x):```
		``` return x + 1```
		```increment(4) # returns 5```

Basic Data Structures

Type	Description	Code Examples

Boolean	The Boolean data type is either True or False. Boolean operators are ordered by priority:
	not → and → or
	{ } → 👎
	{1, 2, 3} → 👍
		```## Evaluates to True:```
		```1<2 and 0<=1 and 3>2 and 2>=2 and 1==1```
		```and 1!=0```
		
		```## Evaluates to False:```
		```bool(None or 0 or 0.0 or '' or [] or```
		```{} or set())```
		
		Rule: *None, 0, 0.0, empty strings, or empty container types evaluate to False*

Integer, Float	An **integer** is a positive or negative number without decimal point such as 3.
	
	A **float** is a positive or negative number with floating point precision such as 3.1415926.
	
	Integer division rounds toward the smaller integer (example: 3//2==1).
		```## Arithmetic Operations```
		```x, y = 3, 2```
		```print(x + y) # = 5```
		```print(x - y) # = 1```
		```print(x * y) # = 6```
		```print(x / y) # = 1.5```
		```print(x // y) # = 1```
		```print(x % y) # = 1```
		```print(-x) # = -3```
		```print(abs(-x)) # = 3```
		```print(int(3.9)) # = 3```
		```print(float(3)) # = 3.0```
		```print(x ** y) # = 9```

String	Python Strings are sequences of characters.
	
	String Creation Methods:
	1. Single quotes
	>>> 'Yes'
	2. Double quotes
	>>> "Yes"
	3. Triple quotes (multi-line)
	>>> """Yes
	    We Can"""
	4. String method
	>>> str(5) == '5'
	True
	5. Concatenation
	>>> "Ma" + "hatma"
	'Mahatma'
	
	Whitespace chars:
	Newline \n,
	Space \s,
	Tab \t
		```## Indexing and Slicing```
		```s = "The youngest pope was 11 years"```
		```s[0] # 'T'```
		```s[1:3] # 'he'```
		```s[-3:-1] # 'ar'```
		```s[-3:] # 'ars'```
		Slice [::2]
		`1  2  3  4`
		`0  1  2  3`
		```x = s.split()```
		```x[-2] + " " + x[2] + "s" # '11 popes'```
		
		```## String Methods```
		```y = " Hello world\t\n "```
		```y.strip() # Remove Whitespace```
		```"HI".lower() # Lowercase: 'hi'```
		```"hi".upper() # Uppercase: 'HI'```
		```"hello".startswith("he") # True```
		```"hello".endswith("lo") # True```
		```"hello".find("ll") # Match at 2```
		```"cheat".replace("ch", "m") # 'meat'```
		```''.join(["F", "B", "I"]) # 'FBI'```
		```len("hello world") # Length: 15```
		```"ear" in "earth" # True```

Complex Data Structures

Type	Description	Example
List	Stores a sequence of elements. Unlike strings, you can modify list objects (they're *mutable*).	```l = [1, 2, 2]``` ```print(len(l)) # 3```

Adding elements	Add elements to a list with (i) append, (ii) insert, or (iii) list concatenation.	```[1, 2].append(4) # [1, 2, 4]```
		```[1, 4].insert(1,9) # [1, 9, 4]```
		```[1, 2] + [4] # [1, 2, 4]```

Removal	Slow for lists	```[1, 2, 2, 4].remove(1) # [2, 2, 4]```
Reversing	Reverses list order	```[1, 2, 3].reverse() # [3, 2, 1]```
Sorting	Sorts list using fast Timsort	```[2, 4, 2].sort() # [2, 2, 4]```

Indexing	Finds the first occurrence of an element & returns index. Slow worst case for whole list traversal.	```[2, 2, 4].index(2)```
		```# index of item 2 is 0```
		```[2, 2, 4].index(2,1)```
		```# index of item 2 after pos 1 is 1```

Stack	Use Python lists via the list operations append() and pop()	```stack = [3]```
		```stack.append(42) # [3, 42]```
		```stack.pop() # 42 (stack: [3])```
		```stack.pop() # 3 (stack: [])```

Set	An unordered collection of unique elements (*at-most-once*) → fast membership *O(1)*	```basket = {'apple', 'eggs',```
		``` 'banana', 'orange'}```
		```same = set(['apple', 'eggs',```
		``` 'banana', 'orange'])```

Type	Description	Example
Dictionary	Useful data structure for storing (key, value) pairs	```cal = {'apple' : 52, 'banana' : 89,``` ``` 'choco' : 546} # calories```

Reading and writing elements	Read and write elements by specifying the key within the brackets. Use the **keys()** and **values()** functions to access all keys and values of the dictionary	```print(cal['apple'] < cal['choco'])```
		```# True```
		```cal['cappu'] = 74```
		```print(cal['banana'] < cal['cappu'])```
		```# False```
		```print('apple' in cal.keys()) # True```
		```print(52 in cal.values()) # True```

Dictionary Iteration	You can access the (key, value) pairs of a dictionary with the **items()** method.	```for k, v in cal.items():```
		``` print(k) if v > 500 else ''```
		```# 'choco'```

Membership operator	Check with the **in** keyword if set, list, or dictionary contains an element. Set membership is faster than list membership.	```basket = {'apple', 'eggs',```
		``` 'banana', 'orange'}```
		```print('eggs' in basket) # True```
		```print('mushroom' in basket) # False```

List & set comprehension	List comprehension is the concise Python way to create lists. Use brackets plus an expression, followed by a for clause. Close with zero or more for or if clauses. Set comprehension works similar to list comprehension.	```l = ['hi ' + x for x in ['Alice',```
		```'Bob', 'Pete']```
		```# ['Hi Alice', 'Hi Bob', 'Hi Pete']```
		
		```l2 = [x * y for x in range(3) for y```
		```in range(3) if x>y] # [0, 0, 2]```
		
		```squares = { x**2 for x in [0,2,4]```
		```if x < 4 } # {0, 4}```

Python Cheat Sheet: Basic Data Types

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	Description	Example

Boolean	The Boolean data type is a truth value, either `True` or `False`.
	
	The Boolean operators ordered by priority:
	`not x` ➜ "if x is False, then x, else y"
	`x and y` ➜ "if x is False, then x, else y"
	`x or y` ➜ "if x is False, then y, else x"
	
	These comparison operators evaluate to `True`:
	`1 < 2 and 0 <= 1 and 3 > 2 and 2 >=2 and 1 == 1 and 1 != 0 # True`
		```## 1. Boolean Operations```
		```x, y = True, False```
		```print(x and not y) # True```
		```print(not x and y or x) # True```
		
		```## 2. If condition evaluates to False```
		```if None or 0 or 0.0 or '' or [] or {} or set():```
		``` # None, 0, 0.0, empty strings, or empty```
		``` # container types are evaluated to False```
		``` print("Dead code") # Not reached```

Integer, Float	An integer is a positive or negative number without floating point (e.g. `3`). A float is a positive or negative number with floating point precision (e.g. `3.14159265359`).
	
	The '`//`' operator performs integer division. The result is an integer value that is rounded toward the smaller integer number (e.g. `3 // 2 == 1`).
		```## 3. Arithmetic Operations```
		```x, y = 3, 2```
		```print(x + y) # = 5```
		```print(x - y) # = 1```
		```print(x * y) # = 6```
		```print(x / y) # = 1.5```
		```print(x // y) # = 1```
		```print(x % y) # = 1s```
		```print(-x) # = -3```
		```print(abs(-x)) # = 3```
		```print(int(3.9)) # = 3```
		```print(float(3)) # = 3.0```
		```print(x ** y) # = 9```

String	Python Strings are sequences of characters.
	
	The four main ways to create strings are the following.
	
	1. Single quotes
	`'Yes'`
	2. Double quotes
	`"Yes"`
	3. Triple quotes (multi-line)
	`"""Yes`
	`We Can"""`
	4. String method
	`str(5) == '5' # True`
	5. Concatenation
	`"Ma" + "hatma" # 'Mahatma'`
	
	These are whitespace characters in strings.
	● Newline `\n`
	● Space `\s`
	● Tab `\t`
		```## 4. Indexing and Slicing```
		```s = "The youngest pope was 11 years old"```
		```print(s[0]) # 'T'```
		```print(s[1:3]) # 'he'```
		```print(s[-3:-1]) # 'ol'```
		```print(s[-3:]) # 'old'```
		```x = s.split() # creates string array of words```
		```print(x[-3] + " " + x[-1] + " " + x[2] + "s")```
		``` # '11 old popes'```
		
		```## 5. Most Important String Methods```
		```y = " This is lazy\t\n "```
		```print(y.strip()) # Remove Whitespace: 'This is lazy'```
		```print("DrDre".lower()) # Lowercase: 'drdre'```
		```print("attention".upper()) # Uppercase: 'ATTENTION'```
		```print("smartphone".startswith("smart")) # True```
		```print("smartphone".endswith("phone")) # True```
		```print("another".find("other")) # Match index: 2```
		```print("cheat".replace("ch", "m")) # 'meat'```
		```print(','.join(["F", "B", "I"])) # 'F,B,I'```
		```print(len("Rumpelstiltskin")) # String length: 15```
		```print("ear" in "earth") # Contains: True```

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Python Cheat Sheet: Complex Data Types

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	Description	Example
List	A container data type that stores a sequence of elements. Unlike strings, lists are mutable: modification possible.	```l = [1, 2, 2]``` ```print(len(l)) # 3```

Adding elements	Add elements to a list with (i) append, (ii) insert, or (iii) list concatenation.
	The append operation is very fast.
		```[1, 2, 2].append(4) # [1, 2, 2, 4]```
		```[1, 2, 4].insert(2,2) # [1, 2, 2, 4]```
		```[1, 2, 2] + [4] # [1, 2, 2, 4]```

Removal	Removing an element can be slower.	```[1, 2, 2, 4].remove(1) # [2, 2, 4]```
Reversing	This reverses the order of list elements.	```[1, 2, 3].reverse() # [3, 2, 1]```
Sorting	Sorts a list. The computational complexity of sorting is linear in the no. list elements.	```[2, 4, 2].sort() # [2, 2, 4]```
Indexing	Finds the first occurence of an element in the list & returns its index. Can be slow as the whole list is traversed.	```[2, 2, 4].index(2) # index of element 4 is "0"``` ```[2, 2, 4].index(2,1) # index of element 2 after pos 1 is "1"```

Stack	Python lists can be used intuitively as stacks via the two list operations append() and pop().	```stack = [3]```
		```stack.append(42) # [3, 42]```
		```stack.pop() # 42 (stack: [3])```
		```stack.pop() # 3 (stack: [])```

Set	A set is an unordered collection of unique elements ("at-most-once").	```basket = {'apple', 'eggs', 'banana', 'orange'}``` ```same = set(['apple', 'eggs', 'banana', 'orange'])```
Dictionary	The dictionary is a useful data structure for storing (key, value) pairs.	```calories = {'apple' : 52, 'banana' : 89, 'choco' : 546}```

Reading and writing elements	Read and write elements by specifying the key within the brackets. Use the keys() and values() functions to access all keys and values of the dictionary.	```print(calories['apple'] < calories['choco']) # True```
		```calories['cappu'] = 74```
		```print(calories['banana'] < calories['cappu']) # False```
		```print('apple' in calories.keys()) # True```
		```print(52 in calories.values()) # True```

Dictionary Looping	You can access the (key, value) pairs of a dictionary with the `items()` method.	```for k, v in calories.items():``` ``` print(k) if v > 500 else None # 'chocolate'```

Membership operator	Check with the 'in' keyword whether the set, list, or dictionary contains an element. Set containment is faster than list containment.	```basket = {'apple', 'eggs', 'banana', 'orange'}```
		```print('eggs' in basket) # True```
		```print('mushroom' in basket) # False```

List and Set Comprehension	List comprehension is the concise Python way to create lists. Use brackets plus an expression, followed by a for clause. Close with zero or more for or if clauses.
	
	Set comprehension is similar to list comprehension.
		```# List comprehension```
		```l = [('Hi ' + x) for x in ['Alice', 'Bob', 'Pete']]```
		```print(l) # ['Hi Alice', 'Hi Bob', 'Hi Pete']```
		```l2 = [x * y for x in range(3) for y in range(3) if x>y]```
		```print(l2) # [0, 0, 2]```
		```# Set comprehension```
		```squares = { x**2 for x in [0,2,4] if x < 4 } # {0, 4}```

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Python Cheat Sheet: Keywords

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Keyword	Description	Code example
`False`, `True`	Data values from the data type Boolean	`False == (1 > 2)`, `True == (2 > 1)`

`and`, `or`, `not`	Logical operators:
	`(x and y)` ➜ both x and y must be True
	`(x or y)` ➜ either x or y must be True
	`(not x)` ➜ x must be false
		`x, y = True, False`
		`(x or y) == True        # True`
		`(x and y) == False      # True`
		`(not y) == True         # True`

`break`	Ends loop prematurely	`while(True):`
		`    break # no infinite loop`
		`print("hello world")`

`continue`	Finishes current loop iteration	`while(True):`
		`    continue`
		`    print("43") # dead code`

`class`
 	
`def`
	Defines a new class ➜ a real-world concept (object oriented programming)
	
	Defines a new function or class method. For latter, first parameter ("self") points to the class object. When calling class method, first parameter is implicit.
		`class Beer:`
		`    def __init__(self):`
		`        self.content = 1.0`
		`    def drink(self):`
		`        self.content = 0.0`
		
		`becks = Beer() # constructor - create class`
		`becks.drink() # beer empty: b.content == 0`

`if`, `elif`, `else`	Conditional program execution: program starts with "if" branch, tries the "elif" branches, and finishes with "else" branch (until one branch evaluates to True).	`x = int(input("your value: "))`
		`if x > 3: print("Big")`
		`elif x == 3: print("Medium")`
		`else: print("Small")`

`for`, `while`	`# For loop declaration`
	`for i in [0,1,2]:`
	`    print(i)`
		`# While loop - same semantics`
		`j = 0`
		`while j < 3:`
		`    print(j)`
		`    j = j + 1`

`in`	Checks whether element is in sequence	`42 in [2, 39, 42] # True`

`is`	Checks whether both elements point to the same object	`y = x = 3`
		`x is y # True`
		`[3] is [3] # False`

`None`	Empty value constant	`def f():`
		`    x = 2`
		`f() is None # True`

`lambda`	Function with no name (anonymous function)	`(lambda x: x + 3)(3) # returns 6`

`return`	Terminates execution of the function and passes the flow of execution to the caller. An optional value after the return keyword specifies the function result.	`def incrementor(x):`
		`    return x + 1`
		`incrementor(4) # returns 5`

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Python Cheat Sheet: Functions and Tricks

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		Description	Example	Result
A D V A N C E D F U N C T I O N S	`map(func, iter)`	Executes the function on all elements of the iterable	`list(map(lambda x: x[0], ['red', 'green', 'blue']))`	`['r', 'g', 'b']`
	`map(func, i1, ..., ik)`	Executes the function on all k elements of the k iterables	`list(map(lambda x, y: str(x) + ' ' + y + 's' , [0, 2, 2], ['apple', 'orange', 'banana']))`	`['0 apples', '2 oranges', '2 bananas']`
	`string.join(iter)`	Concatenates iterable elements separated by **string**	`' marries '.join(list(['Alice', 'Bob']))`	`'Alice marries Bob'`
	`filter(func, iterable)`	Filters out elements in iterable for which function returns **False** (or 0)	`list(filter(lambda x: True if x>17 else False, [1, 15, 17, 18]))`	`[18]`
	`string.strip()`	Removes leading and trailing whitespaces of string	`print("\n  \t  42  \t ".strip())`	`42`
	`sorted(iter)`	Sorts iterable in ascending order	`sorted([8, 3, 2, 42, 5])`	`[2, 3, 5, 8, 42]`
	`sorted(iter, key=key)`	Sorts according to the key function in ascending order	`sorted([8, 3, 2, 42, 5], key=lambda x: 0 if x==42 else x)`	`[42, 2, 3, 5, 8]`
	`help(func)`	Returns documentation of **func**	`help(str.upper())`	`'... to uppercase.'`
	`zip(i1, i2, ...)`	Groups the i-th elements of iterators i1, i2, ... together	`list(zip(['Alice', 'Anna'], ['Bob', 'Jon', 'Frank']))`	`[('Alice', 'Bob'), ('Anna', 'Jon')]`
	Unzip	Equal to: 1) unpack the zipped list, 2) zip the result	`list(zip(*[('Alice', 'Bob'), ('Anna', 'Jon')]))`	`[('Alice', 'Anna'), ('Bob', 'Jon')]`
	`enumerate(iter)`	Assigns a counter value to each element of the iterable	`list(enumerate(['Alice', 'Bob', 'Jon']))`	`[(0, 'Alice'), (1, 'Bob'), (2, 'Jon')]`
T R I C K S	python -m http.server <P>	Want to share files between PC and phone? Run this command in PC's shell. <P> is any port number 0–65535. Type <IP address of PC>:<P> in the phone's browser. You can now browse the files in the PC directory.		
	Read comic	`import antigravity`	Open the comic series xkcd in your web browser	
	Zen of Python	`import this`	`'...Beautiful is better than ugly. Explicit is ...'`	
	Swapping numbers	Swapping variables is a breeze in Python. No offense, Java!	`a, b = 'Jane', 'Alice'` `a, b = b, a`	`a = 'Alice'` `b = 'Jane'`

	Unpacking arguments	Use a sequence as function arguments via asterisk operator *. Use a dictionary (key, value) via double asterisk operator **	`def f(x, y, z): return x + y * z`
			`f(*[1, 3, 4])`
			`f(**{'z' : 4, 'x' : 1, 'y' : 3})`
				`13`
				`13`

	Extended Unpacking	Use unpacking for multiple assignment feature in Python	`a, *b = [1, 2, 3, 4, 5]`	`a = 1` `b = [2, 3, 4, 5]`

	Merge two dictionaries	Use unpacking to merge two dictionaries into a single one	`x={'Alice' : 18}`
			`y={'Bob' : 27, 'Ann' : 22}`
			`z = {**x,**y}`
				`z = {'Alice': 18, 'Bob': 27, 'Ann': 22}`

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Python Cheat Sheet: 14 Interview Questions

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Question	Code	Question	Code
| **Check if list contains integer x** | ```python
l = [3, 3, 4, 5, 2, 111, 5]
print(111 in l) # True
``` | **Get missing number in [1...100]** | ```python
def get_missing_number(lst):
    return set(range(lst[len(lst)-1])[1:]) - set(l)
l = list(range(1,100))
l.remove(50)
print(get_missing_number(l)) # 50
``` |
| **Find duplicate number in integer list** | ```python
def find_duplicates(elements):
    duplicates, seen = set(), set()
    for element in elements:
        if element in seen:
            duplicates.add(element)
        seen.add(element)
    return list(duplicates)
``` | **Compute the intersection of two lists** | ```python
def intersect(lst1, lst2):
    res, lst2_copy = [], lst2[:]
    for el in lst1:
        if el in lst2_copy:
            res.append(el)
            lst2_copy.remove(el)
    return res
``` |
| **Check if two strings are anagrams** | ```python
def is_anagram(s1, s2):
    return set(s1) == set(s2)
print(is_anagram("elvis", "lives")) # True
``` | **Find max and min in unsorted list** | ```python
l = [4, 3, 6, 3, 4, 888, 1, -11, 22, 3]
print(max(l)) # 888
print(min(l)) # -11
``` |
| **Remove all duplicates from list** | ```python
lst = list(range(10)) + list(range(10))
lst = list(set(lst))
print(lst)
# [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
``` | **Reverse string using recursion** | ```python
def reverse(string):
    if len(string)<=1: return string
    return reverse(string[1:])+string[0]
print(reverse("hello")) # olleh
``` |
| **Find pairs of integers in list so that their sum is equal to integer x** | ```python
def find_pairs(l, x):
    pairs = []
    for (i, el_1) in enumerate(l):
        for (j, el_2) in enumerate(l[i+1:]):
            if el_1 + el_2 == x:
                pairs.append((el_1, el_2))
    return pairs
``` | **Compute the first n Fibonacci numbers** | ```python
a, b = 0, 1
n = 10
for i in range(n):
    print(b)
    a, b = b, a+b
# 1, 1, 2, 3, 5, 8, ...
``` |
| **Check if a string is a palindrome** | ```python
def is_palindrome(phrase):
    return phrase == phrase[::-1]
print(is_palindrome("anna")) # True
``` | **Sort list with Quicksort algorithm** | ```python
def qsort(L):
    if L == []: return []
    return qsort([x for x in L[1:] if x< L[0]]) + L[0:1] +
qsort([x for x in L[1:] if x>=L[0]])
lst = [44, 33, 22, 5, 77, 55, 999]
print(qsort(lst))
# [5, 22, 33, 44, 55, 77, 999]
``` |
| **Use list as stack, array, and queue** | ```python
# as a list ...
l = [3, 4]
l += [5, 6] # l = [3, 4, 5, 6]

# ... as a stack ...
l.append(10) # l = [4, 5, 6, 10]
l.pop() # l = [4, 5, 6]

# ... and as a queue
l.insert(0, 5) # l = [5, 4, 5, 6]
l.pop() # l = [5, 4, 5]
``` | **Find all permutations of string** | ```python
def get_permutations(w):
    if len(w)<=1:
        return set(w)
    smaller = get_permutations(w[1:])
    perms = set()
    for x in smaller:
        for pos in range(0,len(x)+1):
            perm = x[:pos] + w[0] + x[pos:]
            perms.add(perm)
    return perms
print(get_permutations("nan"))
# {'nna', 'ann', 'nan'}
``` |

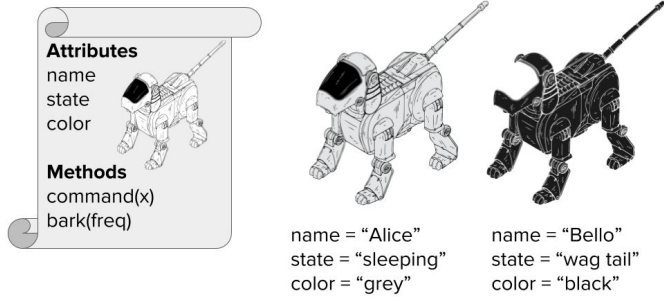**finxter**

Python Cheat Sheet: Functions and Tricks

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		Description	Example	Result
A D V A N C E D F U N C T I O N S	`map(func, iter)`	Executes the function on all elements of the iterable	`list(map(lambda x: x[0], ['red', 'green', 'blue']))`	`['r', 'g', 'b']`
	`map(func, i1, ..., ik)`	Executes the function on all k elements of the k iterables	`list(map(lambda x, y: str(x) + ' ' + y + 's' , [0, 2, 2], ['apple', 'orange', 'banana']))`	`['0 apples', '2 oranges', '2 bananas']`
	`string.join(iter)`	Concatenates iterable elements separated by **string**	`' marries '.join(list(['Alice', 'Bob']))`	`'Alice marries Bob'`
	`filter(func, iterable)`	Filters out elements in iterable for which function returns **False** (or 0)	`list(filter(lambda x: True if x>17 else False, [1, 15, 17, 18]))`	`[18]`
	`string.strip()`	Removes leading and trailing whitespaces of string	`print("\n  \t  42 \t ".strip())`	`42`
	`sorted(iter)`	Sorts iterable in ascending order	`sorted([8, 3, 2, 42, 5])`	`[2, 3, 5, 8, 42]`
	`sorted(iter, key=key)`	Sorts according to the key function in ascending order	`sorted([8, 3, 2, 42, 5], key=lambda x: 0 if x==42 else x)`	`[42, 2, 3, 5, 8]`
	`help(func)`	Returns documentation of **func**	`help(str.upper())`	`'... to uppercase.'`
	`zip(i1, i2, ...)`	Groups the i-th elements of iterators i1, i2, ... together	`list(zip(['Alice', 'Anna'], ['Bob', 'Jon', 'Frank']))`	`[('Alice', 'Bob'), ('Anna', 'Jon')]`
	Unzip	Equal to: 1) unpack the zipped list, 2) zip the result	`list(zip(*[('Alice', 'Bob'), ('Anna', 'Jon')]))`	`[('Alice', 'Anna'), ('Bob', 'Jon')]`
	`enumerate(iter)`	Assigns a counter value to each element of the iterable	`list(enumerate(['Alice', 'Bob', 'Jon']))`	`[(0, 'Alice'), (1, 'Bob'), (2, 'Jon')]`
T R I C K S	python -m http.server <P>	Want to share files between PC and phone? Run this command in PC's shell. <P> is any port number 0–65535. Type <IP address of PC>:<P> in the phone's browser. You can now browse the files in the PC directory.		
	Read comic	`import antigravity`	Open the comic series xkcd in your web browser	
	Zen of Python	`import this`	`'...Beautiful is better than ugly. Explicit is ...'`	
	Swapping numbers	Swapping variables is a breeze in Python. No offense, Java!	`a, b = 'Jane', 'Alice'` `a, b = b, a`	`a = 'Alice'` `b = 'Jane'`

	Unpacking arguments	Use a sequence as function arguments via asterisk operator *. Use a dictionary (key, value) via double asterisk operator **	`def f(x, y, z): return x + y * z`
			`f(*[1, 3, 4])`
			`f(**{'z' : 4, 'x' : 1, 'y' : 3})`
				`13`
				`13`

	Extended Unpacking	Use unpacking for multiple assignment feature in Python	`a, *b = [1, 2, 3, 4, 5]`	`a = 1` `b = [2, 3, 4, 5]`

	Merge two dictionaries	Use unpacking to merge two dictionaries into a single one	`x={'Alice' : 18}`
			`y={'Bob' : 27, 'Ann' : 22}`
			`z = {**x,**y}`
				`z = {'Alice': 18, 'Bob': 27, 'Ann': 22}`

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Python Cheat Sheet: Classes

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	Description	Example
Classes	A class encapsulates data and functionality: data as attributes, and functionality as methods. It is a blueprint for creating concrete instances in memory. **Class** **Instances** Attributes: name, state, color. Methods: command(x), bark(freq). name = "Alice" / state = "sleeping" / color = "grey". name = "Bello" / state = "wag tail" / color = "black".	```python\nclass Dog:\n """ Blueprint of a dog """\n\n # class variable shared by all instances\n species = ["canis lupus"]\n\n def __init__(self, name, color):\n self.name = name\n self.state = "sleeping"\n self.color = color\n\n def command(self, x):\n if x == self.name:\n self.bark(2)\n elif x == "sit":\n self.state = "sit"\n else:\n self.state = "wag tail"\n\n def bark(self, freq):\n for i in range(freq):\n print("[" + self.name\n + "]: Woof!")\n```
Instance	You are an instance of the class human. An instance is a concrete implementation of a class: all attributes of an instance have a fixed value. Your hair is blond, brown, or black--but never unspecified. Each instance has its own attributes independent of other instances. Yet, class variables are different. These are data values associated with the class, not the instances. Hence, all instance share the same class variable `species` in the example.	```python\nbello = Dog("bello", "black")\nalice = Dog("alice", "white")\n\nprint(bello.color) # black\nprint(alice.color) # white\n\nbello.bark(1) # [bello]: Woof!\n\nalice.command("sit")\nprint("[alice]: " + alice.state)\n# [alice]: sit\n```
Self	The first argument when defining any method is always the `self` argument. This argument specifies the instance on which you call the method. `self` gives the Python interpreter the information about the concrete instance. To *define* a method, you use `self` to modify the instance attributes. But to *call* an instance method, you do not need to specify `self`.	```python\nbello.command("no")\nprint("[bello]: " + bello.state)\n# [bello]: wag tail\n\nalice.command("alice")\n# [alice]: Woof!\n# [alice]: Woof!\n```
Creation	You can create classes "on the fly" and use them as logical units to store complex data types. ```python\nclass Employee():\n pass\nemployee = Employee()\nemployee.salary = 122000\nemployee.firstname = "alice"\nemployee.lastname = "wonderland"\n\nprint(employee.firstname + " "\n + employee.lastname + " "\n + str(employee.salary) + "$")\n# alice wonderland 122000$\n```	```python\nbello.species += ["wulf"]\nprint(len(bello.species)\n == len(alice.species)) # True (!)\n```

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Python Cheat Sheet: NumPy

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Name	Description	Example
`a.shape`	The shape attribute of NumPy array a keeps a tuple of integers. Each integer describes the number of elements of the axis.	`a = np.array([[1,2],[1,1],[0,0]])` `print(np.shape(a))` `# (3, 2)`
`a.ndim`	The ndim attribute is equal to the length of the shape tuple.	`print(np.ndim(a))` `# 2`

`*`	The asterisk (star) operator performs the Hadamard product, i.e., multiplies two matrices with equal shape element-wise.	`a = np.array([[2, 0], [0, 2]])`
		`b = np.array([[1, 1], [1, 1]])`
		`print(a*b)` `# [[2 0] [0 2]]`

`np.matmul(a,b), a@b`	The standard matrix multiplication operator. Equivalent to the @ operator.	`print(np.matmul(a,b))` `# [[2 2] [2 2]]`
`np.arange([start, ]stop, [step, ])`	Creates a new 1D numpy array with evenly spaced values	`print(np.arange(0,10,2))` `# [0 2 4 6 8]`
`np.linspace(start, stop, num=50)`	Creates a new 1D numpy array with evenly spread elements within the given interval	`print(np.linspace(0,10,3))` `# [ 0.  5. 10.]`
`np.average(a)`	Averages over all the values in the numpy array	`a = np.array([[2, 0], [0, 2]])` `print(np.average(a))` `# 1.0`

`<slice> = <val>`	Replace the <slice> as selected by the slicing operator with the value <val>.	`a = np.array([0, 1, 0, 0, 0])`
		`a[::2] = 2`
		`print(a)` `# [2 1 2 0 2]`

`np.var(a)`	Calculates the variance of a numpy array.	`a = np.array([2, 6])` `print(np.var(a))` `# 4.0`
`np.std(a)`	Calculates the standard deviation of a numpy array	`print(np.std(a))` `# 2.0`

`np.diff(a)`	Calculates the difference between subsequent values in NumPy array a	`fibs = np.array([0, 1, 1, 2, 3, 5])`
		`print(np.diff(fibs, n=1))`
		`# [1 0 1 1 2]`

`np.cumsum(a)`	Calculates the cumulative sum of the elements in NumPy array a.	`print(np.cumsum(np.arange(5)))` `# [ 0  1  3  6 10]`

`np.sort(a)`	Creates a new NumPy array with the values from a (ascending).	`a = np.array([10,3,7,1,0])`
		`print(np.sort(a))`
		`# [ 0  1  3  7 10]`

`np.argsort(a)`	Returns the indices of a NumPy array so that the indexed values would be sorted.	`a = np.array([10,3,7,1,0])`
		`print(np.argsort(a))`
		`# [4 3 1 2 0]`

`np.max(a)`	Returns the maximal value of NumPy array a.	`a = np.array([10,3,7,1,0])` `print(np.max(a))` `# 10`
`np.argmax(a)`	Returns the index of the element with maximal value in the NumPy array a.	`a = np.array([10,3,7,1,0])` `print(np.argmax(a))` `# 0`
`np.nonzero(a)`	Returns the indices of the nonzero elements in NumPy array a.	`a = np.array([10,3,7,1,0])` `print(np.nonzero(a))` `# [0 1 2 3]`

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Python Cheat Sheet: 14 Interview Questions

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Question	Code	Question	Code

Check if list contains integer x	```l = [3, 3, 4, 5, 2, 111, 5]```
	```print(111 in l) # True```
		Get missing number in [1...100]	```def get_missing_number(lst):```
			``` return set(range(lst[len(lst)-1])[1:]) - set(l)```
			```l = list(range(1,100))```
			```l.remove(50)```
			```print(get_missing_number(l)) # 50```

Find duplicate number in integer list	```def find_duplicates(elements):```
	``` duplicates, seen = set(), set()```
	``` for element in elements:```
	``` if element in seen:```
	``` duplicates.add(element)```
	``` seen.add(element)```
	``` return list(duplicates)```
		Compute the intersection of two lists	```def intersect(lst1, lst2):```
			``` res, lst2_copy = [], lst2[:]```
			``` for el in lst1:```
			``` if el in lst2_copy:```
			``` res.append(el)```
			``` lst2_copy.remove(el)```
			``` return res```

Check if two strings are anagrams	```def is_anagram(s1, s2):```
	``` return set(s1) == set(s2)```
	```print(is_anagram("elvis", "lives")) # True```
		Find max and min in unsorted list	```l = [4, 3, 6, 3, 4, 888, 1, -11, 22, 3]```
			```print(max(l)) # 888```
			```print(min(l)) # -11```

Remove all duplicates from list	```lst = list(range(10)) + list(range(10))```
	```lst = list(set(lst))```
	```print(lst)```
	```# [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]```
		Reverse string using recursion	```def reverse(string):```
			``` if len(string)<=1: return string```
			``` return reverse(string[1:])+string[0]```
			```print(reverse("hello")) # olleh```

Find pairs of integers in list so that their sum is equal to integer x	```def find_pairs(l, x):```
	``` pairs = []```
	``` for (i, el_1) in enumerate(l):```
	``` for (j, el_2) in enumerate(l[i+1:]):```
	``` if el_1 + el_2 == x:```
	``` pairs.append((el_1, el_2))```
	``` return pairs```
		Compute the first n Fibonacci numbers	```a, b = 0, 1```
			```n = 10```
			```for i in range(n):```
			``` print(b)```
			``` a, b = b, a+b```
			```# 1, 1, 2, 3, 5, 8, ...```

Check if a string is a palindrome	```def is_palindrome(phrase):```
	``` return phrase == phrase[::-1]```
	```print(is_palindrome("anna")) # True```
		Sort list with Quicksort algorithm	```def qsort(L):```
			``` if L == []: return []```
			``` return qsort([x for x in L[1:] if x< L[0]]) + L[0:1] + qsort([x for x in L[1:] if x>=L[0]])```
			```lst = [44, 33, 22, 5, 77, 55, 999]```
			```print(qsort(lst))```
			```# [5, 22, 33, 44, 55, 77, 999]```

Use list as stack, array, and queue	```# as a list ...```
	```l = [3, 4]```
	```l += [5, 6] # l = [3, 4, 5, 6]```
	```# ... as a stack ...```
	```l.append(10) # l = [4, 5, 6, 10]```
	```l.pop() # l = [4, 5, 6]```
	```# ... and as a queue```
	```l.insert(0, 5) # l = [5, 4, 5, 6]```
	```l.pop() # l = [5, 4, 5]```
		Find all permutations of string	```def get_permutations(w):```
			``` if len(w)<=1:```
			``` return set(w)```
			``` smaller = get_permutations(w[1:])```
			``` perms = set()```
			``` for x in smaller:```
			``` for pos in range(0,len(x)+1):```
			``` perm = x[:pos] + w[0] + x[pos:]```
			``` perms.add(perm)```
			``` return perms```
			```print(get_permutations("nan"))```
			```# {'nna', 'ann', 'nan'}```

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