

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.	<pre>l = [1, 2, 2] print(len(l)) # 3</pre>
Adding elements	Add elements to a list with (i) append, (ii) insert, or (iii) list concatenation. The append operation is very fast.	<pre>[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]</pre>
Removal	Removing an element can be slower.	<pre>[1, 2, 2, 4].remove(1) # [2, 2, 4]</pre>
Reversing	This reverses the order of list elements.	<pre>[1, 2, 3].reverse() # [3, 2, 1]</pre>
Sorting	Sorts a list. The computational complexity of sorting is $O(n \log n)$ for n list elements.	<pre>[2, 4, 2].sort() # [2, 2, 4]</pre>
Indexing	Finds the first occurrence of an element in the list & returns its index. Can be slow as the whole list is traversed.	<pre>[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"</pre>
List 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.	<pre>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]</pre>
Stacks	Python lists can be used intuitively as stack via the two list operations <code>append()</code> and <code>pop()</code> .	<pre>stack = [3] stack.append(42) # [3, 42] stack.pop() # 42 (stack: [3]) stack.pop() # 3 (stack: [])</pre>
Set	A set is an unordered collection of elements. Each can exist only once.	<pre>basket = {'apple', 'eggs', 'banana', 'orange'} same = set(['apple', 'eggs', 'banana', 'orange'])</pre>
Contains	Check with the 'in' keyword whether the set contains an element. Set containment is much faster than list containment.	<pre>print('eggs' in basket) # True print('mushroom' in basket) # False</pre>
Comprehension	Create sets using set comprehension like in lists.	<pre>squares = { x**2 for x in [0,2,4] } # {0, 16, 4} squares2 = { x**2 for x in [0,2,4] if x < 4 } # {0, 4}</pre>
Dictionary	The dictionary is a useful data structure for storing (key, value) pairs.	<pre>calories = {'apple' : 52, 'banana' : 89, 'chocolate' : 546}</pre>
Reading and writing elements	Read and write elements by specifying the key within the brackets. Use the <code>keys()</code> and <code>values()</code> functions to access all keys and values of the dictionary.	<pre>print(calories['apple'] < calories['chocolate']) # True calories['cappuccino'] = 74 print(calories['banana'] < calories['cappuccino']) # False print('apple' in calories.keys()) # True print(52 in calories.values()) # True</pre>
Dictionary Looping	You can loop over the (key, value) pairs of a dictionary with the <code>items()</code> method.	<pre>for k, v in calories.items(): print(k) if v > 500 else None # 'chocolate'</pre>