Cheat sheet for Python data structures

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Lists

Mutable, ordered series, traditionally of the same type of object

To create a list, use square brackets:

```
mylist = [ ]
mylist = [1,2,3]
mylist = ['a', 'b', 'c', [1,2,3] ]     # 4 elements
```

Retrieving one element, given an index

```
x = mylist[3]
```

Checking membership

```
3 in mylist            # True or False
```

From another type: Given an iterable, the “list” function returns a list:

```
list('abc')            # ['a', 'b', 'c']
list((1,2,3))          # [1,2,3]
list({1,2,3})          # [1,2,3]
```

Replacing an existing element

```
mylist = ['a', 'b', 'c']
mylist[1] = 'z'
mylist                 # ['a', 'z', 'c']
```

Replacing multiple existing elements

```
mylist = ['a', 'b', 'c', 'd', 'e', 'f']
mylist[1:3] = 'xyz'    # replace indexes 1 and 2 with x, y, z
mylist                 #  ['a', 'x', 'y', 'z', 'd', 'e', 'f']
```

Adding an element to the end

```
mylist = ['a', 'b', 'c']
mylist.append('d')
mylist                 # ['a', 'b', 'c', 'd']
mylist.append([1,2,3])
mylist                 # ['a', 'b', 'c', 'd', [1,2,3]]
```

Adding multiple elements to the end

```
mylist = ['a', 'b', 'c']
mylist.extend([1,2,3])
mylist                 # ['a', 'b', 'c', 'd', 1, 2, 3]
```

Removing an element from the end

```
mylist = ['a', 'b', 'c']
mylist.pop()           # returns 'c'
mylist                 # ['a', 'b']
```

Removing an element from any index

```
mylist = ['a', 'b', 'c']
mylist.pop(0)          # returns 'a'
mylist                 # ['b', 'c']
```

Removing an element based on its value (rather than its position)

```
mylist = ['a', 'b', 'c', 'a', 'a', 'b']
mylist.remove('a')     # Remove the first 'a'
mylist                 # ['b', 'c', 'a', 'a', 'b']
```

Sorting

```
mylist = ['d', 'a', 'c', 'b']
mylist.sort()          # Returns None
mylist                 # ['a', 'b', 'c', 'd']
```

Reversing

```
mylist = ['a', 'b', 'c']
mylist.reverse()       # returns None
mylist                 # ['c', 'b', 'a']
```

Joining

```
mylist = ['a', 'b', 'c']
'*'.join(mylist)      # 'a*b*c'
'...'.join(mylist)    # 'a...b...c'
```

Iterating over the elements

```
mylist = ['a', 'b', 'c']
for item in mylist:
    print(item)
```

Iterating over the sorted elements

```
mylist = ['d', 'a', 'c', 'b']
for item in sorted(mylist):
    print(item)
```

Tuples

Immutable, ordered series traditionally containing different objects

Creating

```
t = ('a', 1, [1,2,3])      # () and comma indicate tuple
t = ('a',)                 # single-element tuple requires ,!
```

From another type

```
tuple([1,2,3])             # (1,2,3)
```

Iterating over the elements

```
t = ('a', 'b', 'c')
```

```
for item in t:
     print(item)
```

Iterating over the sorted elements

```
t = ('d', 'a', 'c', 'b')
for item in sorted(t):
     print(item)
```

Dictionaries

Mutable, unordered pairs (keys and values) of objects. Keys must be hashable.

Creating

```
{'a':1, 'b':2, 'c':3}            # {'a': 1, 'b': 2, 'c': 3}
```

Creating from other data

```
dict(['a',1], ['b',2], ['c',3])  # {'a': 1, 'b': 2, 'c': 3}
dict(('a',1), ('b',2), ('c',3))  # {'a': 1, 'b': 2, 'c': 3}
```

Retrieving from a key

```
d = {'a':1, 'b':2, 'c':3}
d['a']  # 1
d['z']  # raises KeyError
```

Add a key-value pair

```
d = {'a':1, 'b':2, 'c':3}
d['d'] = 100
d                        # {'a': 100, 'b': 2, 'c': 3, 'd': 3}
```

Replacing an existing value

```
d = {'a':1, 'b':2, 'c':3}
d['a'] = 100
d                        # {'a': 100, 'b': 2, 'c': 3}
```

Replacing multiple existing values

```
d = {'a':1, 'b':2 }
x = {'a':555, 'z':987}
d.update(x, y=10)       # Returns None
d                       # {'a': 555, 'b': 2, 'y': 10, 'z': 987}
```

Removing an element

```
d = {'a':1, 'b':2, 'c':3}
del(d['a'])
d                       # {'c': 3, 'b': 2}
```

Getting the keys

```
d = {'a':1, 'b':2, 'c':3}
d.keys()                # ['a', 'c', 'b']  (Python 2)
d.keys()                # dict_keys(['a', 'b', 'c'])  (Python 3)
```

Getting the values

```
d = {'a':1, 'b':2, 'c':3}
d.values()             # [1, 2, 3]  (Python 2)
d.values()             # dict_values([1, 2, 3])  (Python 3)
```

Iterating over the keys

```
d = {'a':1, 'b':2, 'c':3}
for k in d:
    print("{0}: {1}".format(k, d[k]))
```

Iterating over the pairs

```
d = {'a':1, 'b':2, 'c':3}
for k, v in d.items()
    print("{0}: {1}".format(k, v)
```

Iterating over the sorted keys

```
d = {'a':1, 'b':2, 'c':3}
for k in sorted(d):
    print("{0}: {1}".format(k, d[k]))
```

Sets

Mutable, unordered, unique objects. Elements must be hashable.

Creating

```
s = {1,2,3}            # Python 2.7, 3.x
```

Creating from another type

```
s = set([1,2,3])       # From list
s = set((1,2,3))       # From tuple
s = set('abc')         # From string
```

Adding a value

```
s = {1,2,3}
s.add(4)
s                      # {1,2,3,4}
s.add(4)
s                      # {1,2,3,4} – duplicates are ignored
```

Adding multiple values

```
s = {1,2,3}
s.update([3,4,5])      # Any iterable will do
s                      # {1,2,3,4,5} – duplicates ignored
```

Removing an element

```
s = {1,2,3}
s.remove(1)
s                      # {2,3}
```