

python3语法速查

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2. 数组 list/tuple

python有可变数组和不可变数组

2.1 不可变数组tuple

创建：

```
array = ()
```

2.2 可变数组list

创建：

```
array = []
```

2.2.1 数组添加元素

添加一个元素到数组末尾：

```
array.append(insert_item)
```

添加另外一个数组的所有元素到一个数组：

```
dest_array.extend(insert_array)
```

执行效果：insert_array数组内的元素全部append到dest_array, 最终dest_array的数组元素变多。

```
s[i] = x
```

item `i` of `s` is replaced by `x`

```
s[i:j] = t
```

slice of `s` from `i` to `j` is replaced by the contents of the iterable `t`

```
del s[i:j]
```

same as `s[i:j] = []`

```
s[i:j:k] = t
```

the elements of `s[i:j:k]` are replaced by those of `t`

(1)

```
del s[i:j:k]
```

removes the elements of `s[i:j:k]` from the **list**

```
s.append(x)
```

appends `x` to the end of the sequence (same as `s[len(s):len(s)] = [x]`)

```
s.clear()
```

removes **all** items from `s` (same as `del s[:]`)

(5)

```
s.copy()
```

creates a shallow **copy** of `s` (same as `s[:]`)

(5)

```
s.extend(t) or s += t
```

extends s with the contents of t (for the most part the same as `s[len(s):len(s)] = t`)

```
s *= n
```

updates s with its contents repeated n times

(6)

```
s.insert(i, x)
```

inserts x into s at the index given by i (same as `s[i:i] = [x]`)

```
s.pop([i])
```

retrieves the item at i and also removes it from s

(2)

```
s.remove(x)
```

remove the first item from s where `s[i]` is equal to x

(3)

```
s.reverse()
```

reverses the items of s in place

(4)

2.3 数组length

```
tmp_array = [1, 2]
ret_len = len(tmp_array)
```

3. dict字典

3.1 创建dict

```
#### 方式1
>>> a = dict(one=1, two=2, three=3)
```

```
>>> b = {'one': 1, 'two': 2, 'three': 3}
>>> c = dict(zip(['one', 'two', 'three'], [1, 2, 3]))
>>> d = dict([('two', 2), ('one', 1), ('three', 3)])
>>> e = dict({'three': 3, 'one': 1, 'two': 2})
>>> a == b == c == d == e
```

True

方式2

```
import collections
```

```
dict = collections.OrderedDict()
```

3.2 functions

list(d)

Return a **list** of **all** the keys used **in** the dictionary d.

len(d)

Return the number of items **in** the dictionary d.

d[key]

Return the item of d **with** key key. **Raises** a **KeyError** if key **is not in** the **map**.

d[key] = value

Set d[key] to value.

del d[key]

Remove d[key] **from** d. **Raises** a **KeyError** if key **is not in** the **map**.

key in d

Return **True** if d has a key key, **else False**.

key not in d

Equivalent to **not key in d**.

keys()

Return a **new** view of the dictionary's keys. **See** the documentation of view objects.

3.3 使用举例

```
for item in a_dict.keys():
    print(f'key={item}')
```

4. string

5. 文件操作

5.1 打开文件

```
fh = open('file.txt', 'r')
```

文件打开类型, r - 只读打开 rb - 只读二进制文件打开 w - 只写文件打开 wb - 只写二进制文件打开, a - 追加写

5.1.1 读文件操作

```
fh = open('file.txt', 'r')

for line in fh.readlines():
    line = line.rstrip() # 去除最右侧换行符
    print(f'line: {line}')

fh.close()
```

5.1.2 写文件操作

```
fh = open('file.txt', 'w', encoding='utf-8')

fh.write('haha\n')
fh.write(f'hello\n')

fh.close()
```

5.2 关闭文件

```
fh = open('file.txt', 'r', encoding='utf-8')

fh.close()
```

5.3 其它

5.3.1 os.path

```
import os

os.path.exists(path)
```

```
os.path.isfile(path)
os.path.isdir(path)
os.path.islink(path)

os.path.dirname(path)
os.path.basename(path)

os.path.abspath(path)
os.path.isabs(path)
```

5.3.2 os

```
import os

os.getenv(key, default=None)
os.putenv(key, value)
os.unsetenv(key)

os.chmod(path, mode, *, dir_fd=None, follow_symlinks=True)
os.chown(path, uid, gid, *, dir_fd=None, follow_symlinks=True)

os.link(src, dst, *, src_dir_fd=None, dst_dir_fd=None, follow_symlinks=True)
os.symlink(src, dst, target_is_directory=False, *, dir_fd=None)

os.remove(path, *, dir_fd=None)
os.unlink(path, *, dir_fd=None)
os.rename(src, dst, *, src_dir_fd=None, dst_dir_fd=None)

os.mkdir(path, mode=0o777, *, dir_fd=None)
os.rmdir(path, *, dir_fd=None)

os.listdir(path='.')
os.chdir(path)
os.getcwd()
```

6. base function

6.1 eval()

可以用来支持一些逻辑表达式的计算：

```
1. #!/usr/bin/python3
2.
3. import re
```

```
4.
5.
6. A = '0xaa'
7. B = '0xcc'
8. C = '0xf0'
9.
10.
11. s_prem = 'A&(B|~C)'
12.
13. # re.sub(pattern, repl, string, count=0, flags=0)
14. # flags=re.IGNORECASE
15.
16. s_new_math = s_prem
17. s_new_math = re.sub(r'A', '0xaa', s_new_math)
18. s_new_math = re.sub(r'B', '0xcc', s_new_math)
19. s_new_math = re.sub(r'C', '0xf0', s_new_math)
20.
21. print(f's_new_math = {s_new_math}')
22.
23.
24. try:
25.     ret = eval(s_new_math)
26.     print(f'ret = {hex(ret)}')
27. except SyntaxError as e:
28.     print(e)
```

6.2 getopt()

C-style parser for command line options

短argument

```
>>> import getopt
>>> args = '-a -b -cfoo -d bar a1 a2'.split()
>>> args
['-a', '-b', '-cfoo', '-d', 'bar', 'a1', 'a2']
>>> optlist, args = getopt.getopt(args, 'abc:d:')
>>> optlist
[('-a', ''), ('-b', ''), ('-c', 'foo'), ('-d', 'bar')]
>>> args
['a1', 'a2']
```

长argument

```
>>> s = '--condition=foo --testing --output-file abc.def -x a1 a2'
>>> args = s.split()
>>> args
['--condition=foo', '--testing', '--output-file', 'abc.def', '-x', 'a1', 'a2']
```

```
>>> optlist, args = getopt.getopt(args, 'x', [
    'condition=', 'output-file=', 'testing'])
>>> optlist
[('--condition', 'foo'), ('--testing', ''), ('--output-file', 'abc.def'),
('-x', '')]
>>> args
['a1', 'a2']
```

一个比较接近实用的例子

```
import getopt, sys

def main():
    try:
        opts, args = getopt.getopt(sys.argv[1:], "ho:v", ["help",
"output="])
    except getopt.GetoptError as err:
        # print help information and exit:
        print(err) # will print something like "option -a not recognized"
        usage()
        sys.exit(2)
    output = None
    verbose = False
    for o, a in opts:
        if o == "-v":
            verbose = True
        elif o in ("-h", "--help"):
            usage()
            sys.exit()
        elif o in ("-o", "--output"):
            output = a
        else:
            assert False, "unhandled option"
    # ...

if __name__ == "__main__":
    main()
```

6.3 enumerate()

enumerate(iterable, start=0)

Return an enumerate object. iterable must be a sequence, an iterator, or some other object which supports iteration. The `next()` method of the iterator returned by `enumerate()` returns a tuple containing a count (from start which defaults to 0) and the values obtained from iterating over iterable.

```
seasons = ['Spring', 'Summer', 'Fall', 'Winter']
list(enumerate(seasons))
[(0, 'Spring'), (1, 'Summer'), (2, 'Fall'), (3, 'Winter')]
```

```
list(enumerate(seasons, start=1))
[(1, 'Spring'), (2, 'Summer'), (3, 'Fall'), (4, 'Winter')]
```

7. function

7.1 默认参数

```
def my_sum (a, b=1):
    return a+b

def my_append (new_item, a_list = None):
    if a_list == None:
        a_list = []
    a_list.append(new_item)
    return a_list
```

总结：

- 默认值为不可变值（比如上述例子中b=1为常数不变值）时，使用不会有问题。
- 普通列表项目默认值为可变值，即为对象[]list[]dict等，最好默认值输入为None[] 在使用的時候显示将其初始化为空对象（比如上述使用的a_list = [][]这样在不同位置调用此function函数不会产生相互影响。

8. 条件判断

8.1 if

```
if (a == b) :
    pass
elif (a == c) :
    pass
else:
    pass

if (a == b) or (e == f) :
    pass
elif (a == c) not (i == j) :
    pass
elif (a == c) and (m == n) :
    pass
else:
    pass
```

9. 循环

9.1 for

```
for i in range(10):
    print(i)
    break

for i in range(1,11):
    print(i)
    continue
```

9.2 range用法

```
# range(stop)
# range(start, stop[, step])

>>> list(range(10))
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
>>> list(range(1, 11))
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
>>> list(range(0, 30, 5))
[0, 5, 10, 15, 20, 25]
>>> list(range(0, 10, 3))
[0, 3, 6, 9]
>>> list(range(0, -10, -1))
[0, -1, -2, -3, -4, -5, -6, -7, -8, -9]
>>> list(range(0))
[]
>>> list(range(1, 0))
[]
```

9.3 while

```
>>> a=3
>>> while a > 0:
...     a = a - 1
...     print(a)
...
2
1
0
>>>
```

10. 正则表达式

```
import re

# 用上r' '的方式, 其正则表达式的内容跟perl比较想像

# 可以从中间搜索
if re.search(r'(abc|def)', "abc"):
    print(f' matched!')

# 从头开始匹配搜索
if re.match(r'(abc|def)', "abc"):
    print(f' matched!')

# 不匹配, 结果=None
if re.match(r'a', "dbc") == None:
    print(f' not matched!')
```

10.1 group

```
>>> m = re.match(r"(\w+) (\w+)", "Isaac Newton, physicist")
>>> m.group(0)          # The entire match
'Isaac Newton'
>>> m.group(1)          # The first parenthesized subgroup.
'Isaac'
>>> m.group(2)          # The second parenthesized subgroup.
'Newton'
>>> m.group(1, 2)      # Multiple arguments give us a tuple.
('Isaac', 'Newton')
```

11. python操作json

```
import collections
import json

dict0 = collections.OrderedDict()
dict1 = collections.OrderedDict()
dict0['line0'] = 'hha0'
dict0['line1'] = 'hha1'
dict0['line2'] = 'hha2'
dict0['line3'] = dict1

dict1['a'] = 0
dict1['b'] = 1
dict1['c'] = 2
```

```
#####  
### conver dict to json string  
s_djs = json.dumps(dict0, indent=2)  
print(f's_djs = {s_djs}')
```

```
### conver json string to dict  
tmp_dict = json.loads(s_djs)  
for key in tmp_dict.keys():  
    print(key)
```

```
#####  
### dict dump to json file  
hdl0 = open('w0.json', 'w')  
json.dump(dict0, hdl0, indent=2)  
hdl0.close()
```

```
### load json file to dict  
hdl1 = open('w0.json', 'r')  
tmp_dict = json.load(hdl1)  
hdl1.close()  
print(f'tmp_dict = {tmp_dict}')
```

运行结果：

```
s_djs = {  
  "line0": "hha0",  
  "line1": "hha1",  
  "line2": "hha2",  
  "line3": {  
    "a": 0,  
    "b": 1,  
    "c": 2  
  }  
}  
line0  
line1  
line2  
line3  
tmp_dict = {'line0': 'hha0', 'line1': 'hha1', 'line2': 'hha2', 'line3':  
{'a': 0, 'b': 1, 'c': 2}}
```

12. 格式转换或输出

12.1 String Methods

`str.lower()` -- 转小写

str.upper() -- 转大写

12.2 字符串格式化

12.2.1 占位符%

- <https://python-reference.readthedocs.io/en/latest/docs/str/formatting.html>
- <https://docs.python.org/3/library/stdtypes.html#printf-style-string-formatting>

```
name = "Li hua"
age = 24
print("Hello "+name+", you are " + str(age) + " years old")
```

```
name = "Li hua"
age = 24
print("Hello %s, you are %d years old" % (name, age))
```

```
##### 字符串
'%5s' % 's'      # 左留空, 占5个字符宽度
'%-5s' % 's'     # 右留空, 占5个字符宽度
```

```
##### 数值
'%5d' % 200     # 左留空, 占5个字符宽度
'%-5d' % 200    # 右留空, 占5个字符宽度
```

12.2.2 printf样式

```
##### printf样式[] %s, %03d[]只不过是直接把变量插在%号后面
print('%(language)s has %(number)03d quote types.' %
      {'language': "Python", "number": 2})
Python has 002 quote types.
```

12.2.3 python3.6之后 f"" 方法

在python里面双引号和单引号功能是一样的。

```
print(f'名字是{name}年龄是{age}')
```

12.3 print to string

```
import io
import re
```

```

output = io.StringIO()
output.write('First line.\n')
print('Second line.', file=output)

# Retrieve file contents -- this will be
# 'First line.\nSecond line.\n'
contents = output.getvalue()
contents = re.sub(r'\n', ' ', contents, count=0)

# Close object and discard memory buffer --
# .getvalue() will now raise an exception.
output.close()

print(contents)

```

12.4 str.format()

Accessing arguments by position:

```

>>> '{0}, {1}, {2}'.format('a', 'b', 'c')
'a, b, c'
>>> '{} , {} , {}'.format('a', 'b', 'c') # 3.1+ only
'a, b, c'
>>> '{2}, {1}, {0}'.format('a', 'b', 'c')
'c, b, a'
>>> '{2}, {1}, {0}'.format(*'abc') # unpacking argument sequence
'c, b, a'
>>> '{0}{1}{0}'.format('abra', 'cad') # arguments' indices can be repeated
'abracadabra'

>>> print('{:<8} {:<20} {:<20}'.format(data0, data1, data2))

```

Accessing arguments by name:

```

>>> 'Coordinates: {latitude}, {longitude}'.format(latitude='37.24N',
longitude='-115.81W')
'Coordinates: 37.24N, -115.81W'
>>> coord = {'latitude': '37.24N', 'longitude': '-115.81W'}
>>> 'Coordinates: {latitude}, {longitude}'.format(**coord) # 意思是将dict字典
展开
'Coordinates: 37.24N, -115.81W'

```

Accessing arguments' items:

```

>>> coord = (3, 5)
>>> 'X: {0[0]}; Y: {0[1]}'.format(coord)
'X: 3; Y: 5'

```

Aligning the text and specifying a width:

```
>>> '{:<30}'.format('left aligned')
'left aligned'
>>> '{:>30}'.format('right aligned')
'right aligned'
>>> '{:^30}'.format('centered')
'centered'
>>> '{:*^30}'.format('centered') # use '*' as a fill char
'*****centered*****'
```

Replacing %x and %o and converting the value to different bases:

```
>>> # format also supports binary numbers
>>> "int: {0:d}; hex: {0:x}; oct: {0:o}; bin: {0:b}".format(42)
'int: 42; hex: 2a; oct: 52; bin: 101010'
>>> # with 0x, 0o, or 0b as prefix:
>>> "int: {0:d}; hex: {0:#x}; oct: {0:#o}; bin: {0:#b}".format(42)
'int: 42; hex: 0x2a; oct: 0o52; bin: 0b101010'
```

12.5 format数值格式转换

12.5.1 float保留2位小数

```
>>> i = 503
>>> j = 100
>>> format(i/j, ".2f")
'5.03'
```

12.5.2 转换为二进制数(字符串)

Convert an integer number to a binary string prefixed with "0b".

```
>>> bin(3)
'0b11'

# 如果不想要0b开头, 可以使用format 'b'的方式
>>> format(14, '#b'), format(14, 'b')
('0b1110', '1110')
>>> f'{14:#b}', f'{14:b}'
('0b1110', '1110')
```