# 1 Python CheatSheet LANGUAGES

- PDF Link: cheatsheet-python-A4.pdf, Category: languages
- Blog URL: `https://cheatsheet.dennyzhang.com/cheatsheet-python-A4`
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## 1.1 Python Compact Coding

| Name | Comment |
|---|---|
| if ... return | if k == 0: return False |
| if... continue | if index == icol: continue |
| return if.. else | `return val if i>0 else 0` |
| multiple assignment | `l, r = 2, 3` |
| assign with check of none | `a = b if b else 1` |
| assignments | `l[1]=l[0]=0` |
| swap values | `left, right = right, left` |
| list Comprehensions | `[x*x for x in range(1, 1001)]` |
| list Comprehensions | `l = [2, 3, 5]; [2*x for x in l if x>2]` |
| use zip | `for a, b in zip(nums, nums[3:])` |
| build a list | `dp = [1] + [0]*3` |
| sum a subarray | `sum(nums[0:k])` |
| sort list in descending order | `sorted(nums, reverse=True)` |
| dictionary with defaults | `m = collections.defaultdict(lambda: 1)` |
| loop with single statement | `while p.left: p = p.left` |
| print multiple values | `print(x, y)` |
| get both index and item | `for i, ch in enumerate(["a", "b", "c"]): print(i, ch)` |
| mod negative | `(-2)%5` |

## 1.2 Python Common Algorithms

| Name | Comment |
|---|---|
| bfs | code/tree-bfs.py |
| trie tree | code/tree-trie.py |

## 1.3 List

| Name | Comment |
|---|---|
| return all but last | `list[:-1]` |
| The second last item | `list[-2]` or `list[~1]` |
| map | `map(lambda x: str(x), [1, 2, 3])` |
| create fixed size array | `l = [None] * 5` |
| insert elements to head | `array.insert(0,var)` |
| delete element by index | `del a[1]` |
| list as stack | `item = l.pop()` |
| sort in descending | l = sorted([8, 2, 5], reverse=True) |
| sort by attribute | l=sorted([('ebb',12),('abc',14)], key=lambda x: x[1]) |
| in-place sort | `l.sort()` |
| generate a-z | `map(chr, range(ord('a'), ord('z')+1))` |
| map/reduce | `functools.reduce((lambda x, y: "%s %s" % (x, y)), l)` |
| replace ith to jth | `list[i:j] = otherlist` |
| combine two list | `list1 + list2` |
| get sum | `sum(list)` |
| unique list | `set(["Blah", "foo", "foo", 1, 1, 2, 3])` |
| Insert to sorted list | `bisect.insort(l, 3)` |
| Reverse a list | `l[::-1]` |

## 1.4 String

| Name | Comment |
|---|---|
| reverse string | ’hello world’[::-1] |
| array to string | ’ ’.join([’a’, ’b’]) |
| split string to array | "hello, python".split(",") |
| string to array | list(’abc’) |
| format to 2 digits | print "%02d" % (13) |
| find location of substring | ’abc’.find(’d’)= (returns -1) |
| find location of substring | ’abc’.index(’d’)= (raise exception) |
| capitalize string | ’hello world’.capitalize() |
| upper/lower string | ’aBc’.upper()=, ’aBc’.lower() |
| count substring | ’2-5g-3-J’.count(’-’) |
| replace string | ’ab cd’.replace(’ ’, ”) |
| padd whitespace to the left | ’a’.ljust(10, ’ ’) |
| padd whitespace to the right | ’a’.rjust(10, ’ ’) |
| pad leading zero | ’101’.zfill(10) |
| string remove tailing ’0’ | ’0023’.rstrip(’0’) |
| string remove leading ’0’ | ’0023’.lstrip(’0’) |
| check if string represent integer | ’123’.isdigit() |
| check if string alphabetic | ’aBc’.isalpha() |
| Check if string alphanumeric | ’a1b’.isalnum() |

## 1.5 Integer

| Name | Comment |
|---|---|
| max, min | sys.maxsize, -sys.maxsize-1 |
| min, max | min(2, 3), max(5, 6, 2) |
| generate range | for num in range(10,20) |
| get ascii | ord(’a’), chr(97) |
| print integer in binary | "{0:b}".format(10) |

## 1.6 Dict & Set

| Name | Comment |
|---|---|
| dict get first element | m[m.keys()[0]] |
| intersection | list(set(l1).intersection(set(l2))) |
| list to set | set(list1) |
| remove from set | s.remove(2) |
| remove the first from set | s.pop() |
| sort dict by values | sorted(dict1, key=dict1.get) |
| deep copy dict | import copy; m2=copy.deepcopy(m1) |

## 1.7 Bit Operator

| Name | Comment |
|---|---|
| mod | x % 2 |
| shift left | x « 1 ; a « 2= |
| shift righ | x » 2 |
| and | x & y |
| complement | ~x |
| xor | x ^ y |
| power | 2 ** 3 |
| bool complement | not x |
| binary format | bin(5) (get 101) |
| count 1 inside binary | bin(5).count(’1’) |

## 1.8 File

| Name | Comment |
|---|---|
| Append file | `open("/tmp/test.txt", "ab").write("\ntest:")` |
| Write file | `open("/tmp/test.txt", "wab").write("\ntest:")` |
| Read files | `f.readlines()` |
| Check file | `os.path.exists("/tmp/test.txt")` |

## 1.9 Math

| Name | Comment |
|---|---|
| sqrt | `import math; math.sqrt(5)` |
| power | `import math; math.pow(2, 3)` |
| random | `random.randint(1, 10)` 1 and 10 included |
| eval string | `eval("2-11*2")` |

## 1.10 Networking

| Name | Comment |
|---|---|
| Start a simple HTTP server | `python -m SimpleHTTPServer <port_number>` |

## 1.11 Queue/heapq

| Name | Comment |
|---|---|
| Initialize min heap | `heapq.heapify(q)` |
| heappush a tuple | q[]; heapq.heappush(q, (5, 'ab'))= |
| pop | `print (heapq.heappop(q))` |
| first item | `q[0]` |
| print heapq | `print list(q)` |
| create a queue | `from collections import deque; queue = deque([1,5,8,9])` |
| append queue | `queue.append(7)` |
| pop queue from head | `element = queue.popleft()` |

Review: Heap Problems
Link: BINARY HEAP AND HEAPQ IN PYTHON

### 1.11.1 minheap & maxheap

```
import heapq

# initializing list
li = [5, 7, 9, 1, 3]

# using heapify to convert list into heap
heapq.heapify(li) # a minheap
heapq._heapify_max(li) # for a maxheap!

# printing created heap
print (list(li))

# using heappush() to push elements into heap
# pushes 4
heapq.heappush(li,4)

# printing modified heap
print (list(li))

# using heappop() to pop smallest element
print (heapq.heappop(li))

print (list(li))
```

## 1.12 Code snippets

- Initialize Linkedlist from array

```
def initListNodeFromArray(self, nums):
    head = ListNode(None)
    prev, p = head, head
    for num in nums:
        pre = p
        p.val = num
        q = ListNode(None)
        p.next = q
        p = p.next
    pre.next = None
    return head
```

- Print linkedlist

```
def printListNode(self, head):
    print("printListnode")
    while head:
        print("%d" % (head.val))
        head = head.next
```

- Print Trie Tree in level order

```
def printTrieTreeLevelOrder(self, node):
    print("printTrieTreeLevelOrder")
    if node.is_word:
        print("Node is a word")
    queue = []
    queue.append(node)
    while len(queue) != 0:
        s = ''
        for i in range(len(queue)):
            node = queue[0]
            del queue[0]
            for child_key in node.children:
                s = '%s %s' % (s, child_key)
                queue.append(node.children[child_key])
        if s != '':
            print 'print level children: %s' % (s)
```

- python sort with customized cmp function: -1 first

```
nums = [3, 2, 6]
def myCompare(v1, v2):
    return -1
sorted_nums = sorted(nums, cmp=myCompare)
print nums # [3, 2, 6]
print sorted_nums # [6, 3, 2]
```

- Initialize m*n matrix

```
col_count, row_count = 3, 2
matrix = [[None for j in range(col_count)] for i in range(row_count)]
print matrix
```

## 1.13 More Resources