Python Cheat Sheet

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Data types

Strings

```
s = "foo bar"
s = 'foo bar'
s = r'c:\Windows\System32'  # raw == 'c:\\Windows\\System32'
s = """Hello
     world"""
s.join(" foo")
n = len(s)
"One: {} Two: {}".format(1, 2)
"Three dived by four is {:.2f}".format(3/4)
```

Lists

```
L = [1, 2, 3, 4, 5]
L[0]                # single position
L[0:3]               # the first three elements
L[-2:]              # the last two elements
L[1:4] = [7,8]         # substitute
del L[2]             # remove elements
L.append(x)            # x is a value
L.remove(x)
L.extend(L2)           # or: L3 = L + L2
L.pop()              # simple stack (with append)
L.sort()
x in L              # does L contain x?
L.index(x)             # index of the first occurrence
[x*2 for x in L if x>2    # list comprehensions
```

Tuples

```
x = 1,2,3
x = (1,2,3)
x[1]
a,b,c = x
```

Dictionaries

```
D = {'f1': 10, 'f2': 20}        # dict creation
D = dict(f1=10, f2=20)

keys = ('a', 'b', 'c')
D = dict.fromkeys(keys)         # new dict with empty values

for k in D: print(k)            # keys
for v in D.values(): print(v)   # values
for k, v in D.items():          # tuples with keys and values
list(D.keys())                  # list of keys
sorted(D.keys())                # sorted list of keys

D = {}
D[(1,8,5)] = 100                # 3D sparse matrix
D.get((1,8,5))
D.get((1,1,1), -1)
```

Sets

```
S = {1,3,5}
L = [1, 3, 1, 5, 3]
S = set(L)                      # set([1, 3, 5])
if (3 in S):
S1+S2, S1-S2, S1^S2, S1|S2
```

See also https://docs.python.org/3/library/stdtypes.html

Loops

```
for x in range(6):              # 0, 1, 2, 3, 4, 5
for x in range(1,6):            # 1, 2, 3, 4, 5
for x in range(1,6,2):          # 1, 3, 5

for k,v in D.items():
   print("D[{}]={}".format(k,v))  # D[f1]=10  D[f2]=20

L = [1, 3, 5]
for i,v in enumerate(L):        # (index,value)
for x,y in zip(L1,L2):          # returns tuples
for i in sorted(set(L)): print(i)  # sorted set from a list
for x in reversed(L1):
```

Functions

```
def foo(arg1, *args, **dic):
  """Example documentation string.

  This function does not do anything special.
  """
  # arg1 is a positional argument
  # args is a list
  # dic is a dictionary of named arguments

def foo(a,b,c=0):
L = [1, 2, 3]
foo(*L)                    # unpacking a list of arguments
D = {'a': 10, 'b': 20}
foo(**D)                    # unpacking a dictionary of arguments

foo.__doc__                  # the docstring
```

Input/output

Printing

```
str(x)          # human readable representation
repr(x)          # interpretable representation
```

File Access

```
f = open("test.txt", "w")       # r / r+ / rb / rb+ / w / wb
f.write("Hello world.\n")
f.close()

for line in open("test.txt"):
    print(line, end="")

L = open("test.txt").readlines()  # returns a list of lines
```

Exclusive access

```
f = os.fdopen(os.open("test.txt", os.O_WRONLY|os.O_EXCL), "w")
```

Input

```
x = input("Name: ")
for line in sys.stdin:
    print(line)
```

String buffers

```
from StringIO import StringIO
buf = StringIO()
sys.stdout = buf
print("Hello")
x = buf.getvalue()
```

Error stream

```
print("Error!", file=sys.stderr, flush=True)
```

Other file operations

```
os.chmod(file, 0700)
os.remove(path)
os.rename(from, to)
os.stat(file)
```

Special names

`__name__` The name of the file being run not imported

Typical usage:

```
if __name__ == '__main__':
    print("Do something")
```

Exceptions

```
try:
    raise TypeError("arg")
except (RuntimeError, NameError):
    pass                        # empty instruction (NOP)
except:
    info = sys.exc_info()
    print(info[0])
    print(info[1])
    traceback.print_tb(info[2])
    raise
else:
    ...                         # no exception but before finally
finally:                        # on the way out
    ...                         # unhandled exception, release resources
```

Object-oriented programming

```
class Person:
   ID = 0
   def __init__(self, name, age=0):
      self.name = name
      self.age  = age
   def lastName(self):
      return self.name.split()[-1]
   def __str__(self):
      return "{}({},{})".format(self.__class__.__name__,
                        self.name, self.age)

class Worker(Person):
   def __init__(self, name, position, age=0):
      super().__init__(name, age)
      self.position = position
   def __str__(self):
      return "{}({},{},{})".format(self.__class__.__name__,
                         self.name, self.position, self.age)

john = Worker("John Smith", "developer", 29)
print(john)
```

Useful APIs

Queues

```
import collections
Q = collections.deque([10,20,30])
Q.append(40)
Q.popleft()
```

Pickling

```
import pickle
f = open("object.dat", "w")
pickle.dump(x, f)
f = open("object.dat", "r")
x = pickle.load(f)
```

Databases

```
import sqlite3
conn = sqlite3.connect("data.db")
c = conn.cursor()
c.execute("SELECT * FROM employees")
for row in c:
    print(row[0])
conn.commit()
conn.close()

db = shelve.open("file")
db["x"] = y
db.close()
```

CGI

```
import cgi
form = cgi.FieldStorage()
print("Content-type: text/html\n")
print(cgi.escape(form["user"].value))
```

HTTP Server

```
import http.server
server_address = ('', 8000)     # host, port
httpd = http.server.HTTPServer(server_address, http.server.BaseHTTPRequestHandler)
httpd.serve_forever()
```

URLs

```
from urllib.request import urlopen
conn = urlopen("http://www.google.com/")
reply = conn.read()
```

Environment

Encoding

```
#!/usr/bin/python3
# -*- coding: latin-2 -*-
```

Paths

```
PYTHONPATH
export PYTHONSTARTUP=~/.pythonrc.py
```

Module sys

```
sys.argv
sys.path
sys.platform
sys.stderr
sys.stdin
sys.stdout
sys.version
```

Processes (module subprocess)

```
import subprocess
res = subprocess.call(["hostname","-f"], stderr=subprocess.DEVNULL)
res = subprocess.call("ps aux | grep ^root", shell=True)
output = subprocess.check_output(["cmd", "arg"],universal_newlines=True)
```

Module os

```
os.curdir
os.linesep
os.listdir("/usr/local")
os.pardir
os.pathsep
os.popen("ps aux").readlines()
os.sep
```

Module os.path

```
import os
os.path.split("/usr/bin/go.sh")       # ('/usr/bin', 'go.sh')
os.path.join("/usr/bin", "go.sh")     # '/usr/bin/go.sh'
os.path.splitext("/usr/bin/go.sh")    # ('/usr/bin/go', '.sh')
os.path.abspath("../bin/go.sh")       # '/usr/bin/go.sh'
os.path.isfile("go.sh")
```

Module os.environ

```
os.environ.get("HOME")
```

Directories

```
for (dir, subdirs, files) in os.walk("/tmp"):
    for f in files:
        print(f)
```

More Resources

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