

# Python Cheat Sheet

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- [Python Cheat Sheet](#)
- [Data types](#)
  - [Strings](#)
  - [Lists](#)
  - [Tuples](#)
  - [Dictionaries](#)
  - [Sets](#)
- [Loops](#)
- [Functions](#)
- [Input/output](#)
  - [Printing](#)
  - [File Access](#)
  - [Exclusive access](#)
  - [Input](#)
  - [String buffers](#)
  - [Error stream](#)
  - [Other file operations](#)
- [Special names](#)
- [Exceptions](#)
- [Object-oriented programming](#)
- [Useful APIs](#)
  - [Queues](#)
  - [Pickling](#)
  - [Databases](#)
  - [CGI](#)
  - [HTTP Server](#)
  - [URLs](#)
- [Environment](#)
  - [Encoding](#)
  - [Paths](#)
  - [Module sys](#)
  - [Processes \(module subprocess\)](#)
  - [Module os](#)
  - [Module os.path](#)

- [Module os.environ](#)
- [Directories](#)
- [More Resources](#)

## 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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