**import** module/file (as mo) *(file no extension)*

from module/file import A (as B)

calling: *module.func or mo.var or A or B*

from module import \* *(call original name)*

**help**(function) function?

shift + tab = floating help in Notebook

**pass** = “no-op” statement

**;** =separate commands on same line

**\** =escape

**\_** = Don’t care variable! *(not shown in %who)*

**for** value in sequence:

***for*** *c* ***in*** *"text":* ***for*** *line* ***in*** *open("file"):*

**while** cond : continue/break

**if** a<b or c>d: **elif** x>3 & x<5: **else**:

**with** open(FileName, "r") **as** file\_input:

**try**:

*expression1*

**except**:

*ErrorName: expression2 (IOError, ValueError…)*

**def** func\_name(x,y): *funcs are objects*

*global z x,y are local copy*

*z=z+x\*2+y*

*return x\*2+y*

**lambda** x,y:x\*2+y *anonymous func*

*func\_name=lambda x,y: x\*2+y*

*name=****lambda*** *x: y+1* ***if*** *x>0 else 7*

for func in func\_array: func\_array=[f1,f2]

*func(value)*

**range**([start,] stop[, step])=ret range object

*a=iter(range(10)🡪 a.\_\_next\_\_()🡪 iter can be used 1x*

*a=list(xrange(10))*

**dir**(a)= all visible attributes of object a

*dir() = ret names in current scope (in cmd,out val,var)*

**hasattr**(a, ‘split’)=does obj a have attr split

**id**(object) = returns object memory address

**len**(object)=length

**type**(a) **isinstance**(a, (int, float))

**str**(a) **bool**(a) **int**(a) **float**(a)

**STRING** **str**(a) **inmutable** char list S[N]=element N

a+b= concatenated string

b=a.**replace**("this", "that")

a.**find**("smth")=lowest index or (-1) if not found

a.**index**("smth")=find with ValueError if not found

a.**capitalize**() a.**lower**() a.**upper**() a.**title**()

a.**count**("aa")=num **nonoverlaping** occurances

a.**isdigit**()=ret bool *'3.45'.isdigit()*

a.**splitlines**()=ret list

a.**split**('^')=ret list def delimiter=" "

'^'.**join**(iterable)=ret concatenated string

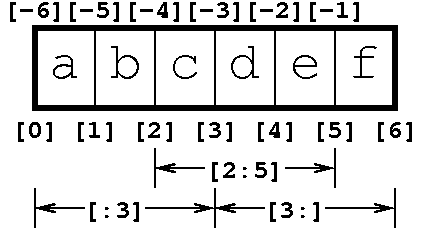
a.**rstrip**(['b'])=strip all b at end *(def=whitespace)*

a.**strip**(['b'])=del leading & trailing b

**print** **('**a is %s**'** **% (**type(a)**))** ('a is ', type(a))

**template**="%s is no %s"--> template % (a,b)

**%s**=string **%l**=line **%.2f**=float **%03d**=int

**"""** (or **'''**) = string over various lines

Negative indices = slice relative to the end

Negative step = reverse direction of moving

*N[-1]=last element N[::-1]=reversed*

**FILE** f=**open**('path' [,'rwa']) (a=append)

*lines=[ ]; for line in f: lines.append(line)*

f.**readlines**()=ret list of lines

f.**writelines**(sequence)=write sequence of strings

f.**read**() = read one line

f.**next**()=next value, or raise StopIteration

f.**write**(str)= Write string to file.

f.**close**() Close the handle

f.**flush**() Flush the internal I/O buffer to disk

f.**seek**(pos)= Move to indicated file position

f.**tell**() =Ret current file position

f.**closed**()=True if the file is closed.

**LIST** L=**list**(a) **L=[ ]=empty** **L[N]**=1 element

*L\_copy=L[:]=L*

L.**append**(S) =add 1 element S at the end

L.**extend**([ ]) =append multiple elements

*L=L****+****[ ]= more expensive (new L created)*

L.**insert**(N,S) =insert element S at position N

L.**remove**(S) =removes first occurrence of S

L.**pop**(N) =del & ret elem N *(default= last elem)*

L.**difference**(L2)=ret elements of L not in L2

S **in** L= ret Bool*; Is element S in list L?*

L.**reverse**() =reverses objects of list in place

L.**sort**(key=method, reverse=T/F)= in-place sort

*(key=str.lower)*  *(key=lambda x:x.count('x'))*

**TUPLE** T=**tuple**(a) **T=( )=empty** **T[N]**

***inmutable,but*** *content of some elements may change*

*T[1].append('n')🡪T[1]= same list, but list has changed*

T.**index**('algo') = return first index of 'algo'

T.**count**('S') = num of occurrences of S

**T=T+( )** =concatenate *T+=('ex',)🡪ok; T+=(‘ex’) 🡪err*

**T=T\*N**=concatenate N tuples of T

*T=tuple('string') T=tuple(['string'])*

**(a,b)=(b,a)** 🡪 **swap** variable names

T=4,(5,6) **unpack** a,(b,c)=T a,bc=T

*seq=[(1,2,3), (4,5,6)]; for a,b,c, in seq: print a,b,c*

**DICT** **D={key:value} D={}=empty**🡪 **D[k]=val**

*KeyValuePair; associative array; K any hashable type*

**D=dict**([(k1,v1), (k2,v2)])=**dict**(**zip**(keys,val))

D.**keys**() = lists keys

D.**values**() = lists values

D.**clear**() = remove all items from dict

**del** D{'key'} = delete from dict

D.**pop**{ k[,d]}=del & return value, [KeyError or d]

D.**popitem**()=del&ret **some** (key, val) KeyErr if {}

D.**items**()=ret list of (key, value) tuples

D.**iteritems**() = iterator over (key, value) items

*iterator=D.iteritems() 🡪 iterator.next()*

D.**get**(k, V) =return value of k (V if k not found)

D.**update**(D2)=**merge** D2 to D;**overwrite** if key exists

**SET** **S=set(seq) S=set()=empty**

***unordered*** *set of* ***unique*** *elements;(dict* ***keys only****)*

'k' **in** S= ret Bool, is key in set S

S.**add**(k)=add new element to S

S.**discard**(k)= del k; if not found do nothing.

S.**remove**(k)=del k, if not found KeyError.

S.**update**(seq/S2)= Update as union with seq/S2

S.**issubset**(seq/S2)=is S found in set seq/S2

S.**issuperset**(S2)=is S2 part of S

S.**union**(b)= **S | b**=or

S.**intersection**(b) = **S & b**=and

S.**difference**(b) = **S - b**=

S.**symmetric\_difference**(b)= **S ^ b**=nor

**list\_comp=[expr for val in collection if condition]**

*res=[x.upper() for x in strings if len(x)>2]*

*res=[]; for x in strings:if len(x)>2:res.append(x.upper())*

**d\_comp={k-expr : v-expr for value in coll if cond}**

*key\_loc={val:indx for indx, value in enumerate(strings)}*

**s\_comp = {expr for value in coll if cond}**

*uniq\_length={len(x) for x in strings}*

**Nested comprehensions** *(“[x for…“ ="return x for…")*

*list\_of\_tuples=[(1,2,3),(4,5,6),(7,8,9)]*

*flatten=[x for tup in list\_of\_tuples for x in tup]*

*for tup in list of tuples: for x in tup: return x*

**reversed**(sequence)

**sorted**(sequence[, key=method, reverse=T/F])

**enumerate**(seq[, start])=ret(index, value) of seq

**zip**(sq1 [, sq2 [,..]]) 🡪"pairs" elements to list of tuples

*[(sq1[0], sq2[0] ...), (sq1[1],sq2[1]…),…]*

zip(\*zipped\_seq) =seq1, seq2 …=**unzip**

x **\*\*** y = x to the power y = **pow**(x,y)

x**//**y = floor division

x**%**y = reminder of division

**round**(x[, n])= x rounded to n digits, def n=0

math.**floor**(x)= greatest integer as a float <= x

math.**ceil**(x)= least integer as a float >= x

**map**(funct, seq)=apply f to all el of seq🡪 list

**reduce**(funct,seq[, initial]) =apply f to first 2, then to result & next el till end🡪scalar

*def mireduce(func, lista):*

*if len(lista) == 0: return None*

*elif len(lista) == 1: return lista[0]*

*else:return func(lista[0], mireduce(func, lista[1:]))*

**filter**(func or None, seq)= filter by boolean function over seq 🡪 list,tuple or string

!= **Shell** commands 🡪 **Slist** = Special list type

**s= ! ( shell exp**  **{py\_var}** or **$py\_var )**

! echo {list(df.columns)} > cols.txt

s**.l** (or **.list**)=as **list** of strings

s**.n** (or **.nlstr**)=as **one** string with newline-sep

s**.s** (or **.spstr**)=as **one** string with space-sep

s.**fields**()=white-space sep fields from string list

s.**grep**("pattern")=return str marching pattern

s.**sort**(N,num=True)=sort on field N numericaly

s.**reverse**()=in place reverse

**%**=**Magic** **cmd** %lsmagic %automagic

%cd %quickref %xdel vs del %reset

%who %whos %who\_ls

%time list('abcde') vs %%time

%config TerminalInteractiveShell.editor='kwrite'

echo “export EDITOR=kwrite” >>~/.zshrc

%matplotlib inline ->set to work interactively

%precision N= for pretty printing.

%dhist, \_dh

%history -n *(num)* -l 100 *(last)* -g *(global)* -f FILE

%edit -x *(do not execute)* %save FILE cells

%rerun -l 10 *(last 10 without this one)*

%macro name 34-36 23/1-5, ~2/3-4 *(~=session ago)*

*(sudo) pip install package (sudo) pip list*

*conda install package conda list*

*sudo pip install -U virtualenv*

*virtualenv dir\_name*

*source dir\_name /bin/****activate****……****deactivate***

*pip install name(s) 🡪 goes in dir\_name*

*dir\_name/bin/jupyter notebook*

*pandas jupyter keras tensorflow matplotlib seaborn sklearn plotly pydotplus*