

Functions

Python basics

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Functions

- evit repetition
- scope and local function

```
def func():  
    a = []  
    for i in range(5):  
        a.append(i)
```

```
a
```

NameError: name 'a' is not defined

```
# making the function global to fix it  
  
#a = None  
  
def bind_a_variable():  
    global a  
    a = []  
    bind_a_variable()  
  
print(a)
```

None

```
c = []  
def func1():  
    for i in range(5):  
        c.append(i)
```

c

[0, 1, 2, 3, 4]

returning multiple values

```
def f():  
    a = 5  
    b = 6  
    c = 7  
    return a, b, c
```

a, b, c = f()

f()

(5, 6, 7)

f(1, 2, 3) # traceback because 0 positional argument should have been provided

TypeError: f() takes 0 positional arguments but 3 were given

```
def g():  
    a = 5  
    b = 3  
    c = 5  
    return {'a':a, 'b': b, 'c': c}
```

g()

```
{'a': 5, 'b': 3, 'c': 5}
```

```
states = ["  Alabama ", "Georgia!", "Georgia", "georgia", "Fl0rIda", "south  ca
```

```
### data cleaning with functions
```

```
import re
```

```
def clean_strings(strings):  
    result = []  
    for value in strings:  
        value = value.strip()  
        value = re.sub("[!#?]", "", value)  
        value = value.title()  
        result.append(value)  
    return result
```

```
clean_strings(states)
```

```
['Alabama',  
'Georgia',  
'Georgia',  
'Georgia',  
'Florida',  
'South  Carolina',  
'West Virginia']
```

lambda functions

```
def short_function(x):  
    return x * 2
```

```
equiv_anon = lambda x: x * 2
```

```
short_function(3)
```

```
equiv_anan = 2
```

```
def apply_to_list (some_list, f):  
    return [f(x) for x in some_list]
```

```
ints = [4, 0, 1, 4, 6]  
apply_to_list (ints, lambda x: x * 2)
```

```
[8, 0, 2, 8, 12]
```

```
strings = ['foo', 'card', 'bar', 'aaa', 'abab']  
  
strings.sort(key = lambda x : len(set(x)))  
  
strings
```

```
['aaa', 'foo', 'abab', 'bar', 'card']
```

Generators

```
some_dict = {'a': 1, 'b': 2, 'c': 3}  
  
for key in some_dict:  
    print(key)
```

```
a  
b  
c
```

```
dict_iterator = iter(some_dict)  
  
dict_iterator
```

```
<dict_keyiterator at 0x193c70f6040>
```

```
list(dict_iterator)
```

```
['a', 'b', 'c']
```

```
tuple(dict_iterator)
```

```
()
```

```
def squares(n = 10):  
    print(f"Generating squares from 1 to {n **2}")  
    for i in range (1, n + 1):  
        yield i ** 2
```

```
gen = squares()
```

```
gen
```

```
<generator object squares at 0x00000193C6733120>
```

```
# use for loop to see the output from generator  
for x in gen:  
    print(x, end= ' ')
```

```
Generating squares from 1 to 100  
1 4 9 16 25 36 49 64 81 100
```

Generator expressions

```
gen2 = (x ** 2 for x in range(100))
```

```
gen2
```

```
<generator object <genexpr> at 0x00000193C6733D60>
```

```
for x in gen2:
    print(x, end= " ")
```

0 1 4 9 16 25 36 49 64 81 100 121 144 169 196 225 256 289 324 361 400 441 484 529 576 625 676

```
# verbose generator

def _make_gen():
    for x in range(100):
        yield x** 2
```

```
gen = _make_gen()
```

```
# using gen expressions as function arguments
```

```
sum (x ** 2 for x in range(100))
```

328350

```
dict((i, i**2 ) for i in range(5))
```

{0: 0, 1: 1, 2: 4, 3: 9, 4: 16}

itertools module

- contains collection of generators for many data algorithms

```
import itertools
```

```
def first_letter(x):
    return x[0]
```

```
names = ['Alan', 'Adam', 'Wes', 'Will', 'Albert']
```

```
for letter, names in itertools.groupby(names, first_letter):
    print(letter, list(names))
```

```
A ['Alan', 'Adam']
W ['Wes', 'Will']
A ['Albert']
```

Errors and exception handling

```
def attempt_float(x):
    try:
        return float(x)
    except:
        return x
```

1.22

```
attempt_float('flower')
```

'flower'

```
def attempt_float1(x):
    try:
        return float(x)
    except(TypeError, ValueError):
        return x
```

```
attempt_float1('nice')
```

'nice'