02.17-functions

February 21, 2020

1

1.1

function

```
In [3]: def add(x, y):
            """Add two numbers"""
            a = x + y
            return a
```

- def -def , def foo(): - -docstring """ -return None

1.2

Python

```
In [4]: print (add(2, 3))
        print (add('foo', 'bar'))
```

```
5
foobar
```

Python

```
In [5]: print (add(2, "foo"))
```

```
        ---------------------------------------------------------------------------

        TypeError                                 Traceback (most recent call last)

        <ipython-input-5-fc607c31368f> in <module>
    ----> 1 print (add(2, "foo"))
```

```
        <ipython-input-3-a0af632d0680> in add(x, y)
          1 def add(x, y):
          2     """Add two numbers"""
    ----> 3     a = x + y
          4     return a

        TypeError: unsupported operand type(s) for +: 'int' and 'str'
```

```
In [6]: print (add(1, 2, 3))
```

```
        ---------------------------------------------------------------------------
        TypeError                                 Traceback (most recent call last)

        <ipython-input-6-199dc382af0f> in <module>
    ----> 1 print (add(1, 2, 3))

        TypeError: add() takes 2 positional arguments but 3 were given
```

```
In [7]: print (add(1))
```

```
        ---------------------------------------------------------------------------
        TypeError                                 Traceback (most recent call last)

        <ipython-input-7-15efd13f3023> in <module>
    ----> 1 print (add(1))

        TypeError: add() missing 1 required positional argument: 'y'
```

Python

```
In [8]: print (add(x=2, y=3))
        print (add(y="foo", x="bar"))
```

```
5
barfoo
```

```
In [9]: print (add(2, y=3))
```

```
5
```

1.3

```
In [10]: def quad(x, a=1, b=0, c=0):
             return a*x**2 + b*x + c
```

```
In [11]: print (quad(2.0))
```

```
4.0
```

```
In [12]: print (quad(2.0, b=3))
```

```
10.0
```

```
In [13]: print (quad(2.0, 2, c=4))
```

```
12.0
```

$2\,a$

```
In [14]: print (quad(2.0, 2, a=2))
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)

<ipython-input-14-396c5b01c664> in <module>
----> 1 print (quad(2.0, 2, a=2))

TypeError: quad() got multiple values for argument 'a'
```

1.4

```
In [15]: def add(x, *args):
             total = x
             for arg in args:
                 total += arg
             return total
```

*args

```
In [16]: print (add(1, 2, 3, 4))
         print (add(1, 2))
```

```
10
3
```

```
In [17]: def add(x, **kwargs):
             total = x
             for arg, value in kwargs.items():
                 print ("adding ", arg)
                 total += value
             return total
```

**kwargs

```
In [18]: print (add(10, y=11, z=12, w=13))
```

```
adding  y
adding  z
adding  w
46
```

```
In [19]: def foo(*args, **kwargs):
             print (args, kwargs)

         foo(2, 3, x='bar', z=10)
```

```
(2, 3) {'x': 'bar', 'z': 10}
```

args kwargs

1.5

```
In [20]: from math import atan2

         def to_polar(x, y):
             r = (x**2 + y**2) ** 0.5
             theta = atan2(y, x)
             return r, theta

         r, theta = to_polar(3, 4)
         print (r, theta)
```

```
5.0 0.9272952180016122
```

Python

```
In [21]: print (to_polar(3, 4))
```

```
(5.0, 0.9272952180016122)
```

```
r, theta = to_polar(3, 4)
```

```
In [22]: a, b, c = [1, 2, 3]
         print (a, b, c)
```

```
1 2 3
```

```
In [23]: def add(x, y):
             """Add two numbers"""
             a = x + y
             return a

         z = (2, 3)
         print (add(*z))
```

```
5
```

*

```
In [24]: def add(x, y):
             """Add two numbers"""
             a = x + y
             return a

         w = {'x': 2, 'y': 3}
         print (add(**w))
```

```
5
```