Dictionaries

Restrictions on Dictionaries

Dictionaries are unordered collections of key-value pairs.

Dictionary keys do have two restrictions:

• A key of a dictionary cannot be an object of a mutable built-in type.

• Two keys cannot be equal. There can be at most one value for a given key.

This first restriction is tied to Python’s underlying implementation of dictionaries.

The second restriction is an intentional consequence of the dictionary abstraction.

Sharing and Identity

What Would Python Print?

The print function returns None. It also displays its arguments (separated by spaces) when it is called.

If you’re not sure what will happen, draw environment diagrams.

from operator import add, mul
print(add(3, 4), print(5))
def square(x):
    return mul(x, x)
def pirate(arggg):
    print("matey")
def plunder(arggg):
    return arggg
print(delay(print)())

What Would Python Print?

The print function returns None. It also displays its arguments (separated by spaces) when it is called.

If you’re not sure what will happen, draw environment diagrams.

from operator import add, mul
add(pirate(3)(square)(4), 1)
def square(x):
    return mul(x, x)
def pirate(arggg):
    print("matey")
def plunder(arggg):
    return arggg
print(delay(print)())
**Inverse Functions**

If \( g \) is the inverse of invertible \( f \), then \( x = f(g(x)) \)

**Key equation:** \( g(x) \) is the value \( y \), such that \( f(y) = x \)

Rearrange to use Newton’s method: \( f(y) - x = 0 \)

```python
def invert(f):
    def g(x):
        return find_root(lambda y: f(y) - x)
    return g
```

For variable \( y \) and constant \( x \), \( f(y) - x = 0 \)