



Basic Programming

Lesson 10

Collections

Collection Object

An object that contains other objects and allows object retrieval.

Standard Python Collection Types

```
>>> l = [1,2,3,4,144,42]
>>> l[0]
1
>>> l[5]
42
```

list

A mutable, ordered collection of objects retrievable by index

```
>>> d = {'a':3, 'b':7, 'c': 42}
>>> d['a']
3
>>> d['c']
42
```

dict

A mutable, unordered collection of objects retrievable by key

Collection Classification



Sequence Type

list

A mutable collection of
values retrievable by index



Mapping Type

dict

A mutable collection of
values retrievable by a key

Sequence Type

A collection where contained objects are retrievable by their index. The object can report the number of contained objects (i.e. `length`).

Other Sequence Types

tuple

range

bytes

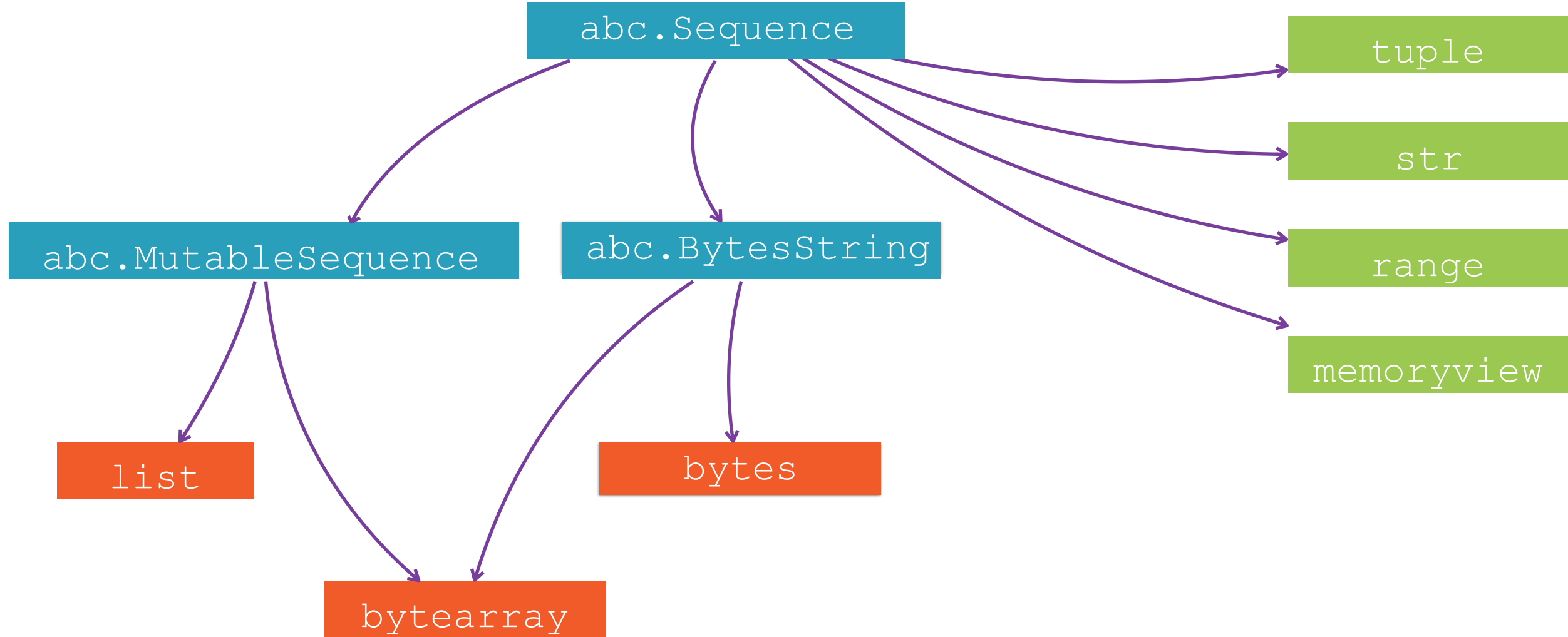
bytearray

memoryview

str

list

Base Classes: collections.abc



deque



`abc.Sequence`



`abc.MutableSequence`



`deque`

“Double-ended Queue”

Can be used as a Queue (Hàng đợi) and/or Stack (Ngăn xếp)

Can add or remove items from both “ends”

Can limit number of items (maxlen)

If set deque discards objects when maxlen is hit

Stack Data structure

Last In First Out
LIFO

object

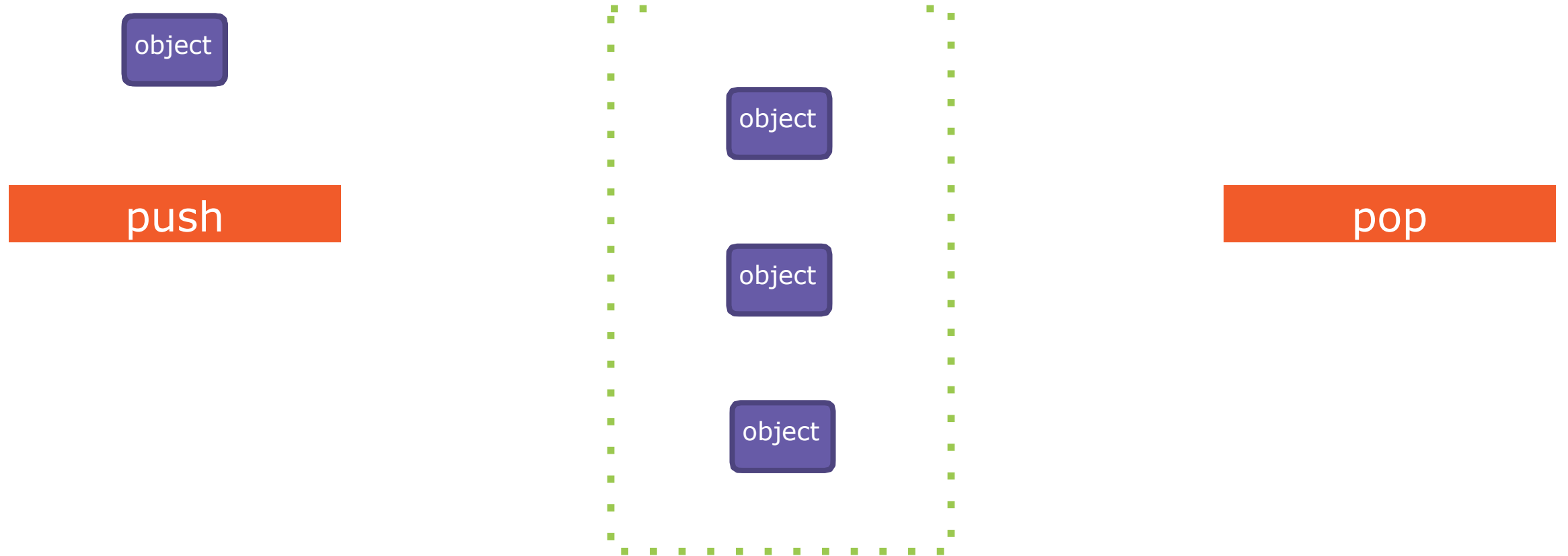
push

object

object

object

pop



First In First Out
FIFO

Queue Data structure

object

enqueue

object

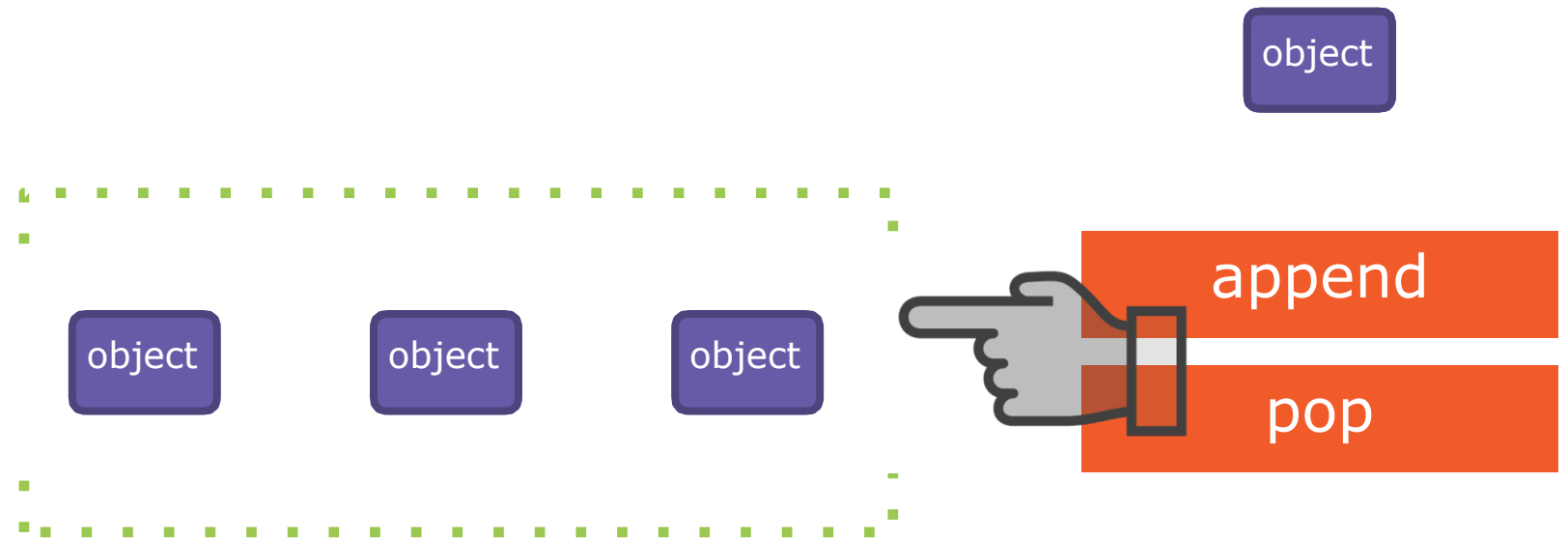
object

object

dequeue

deque to make stack

Last In First Out
LIFO

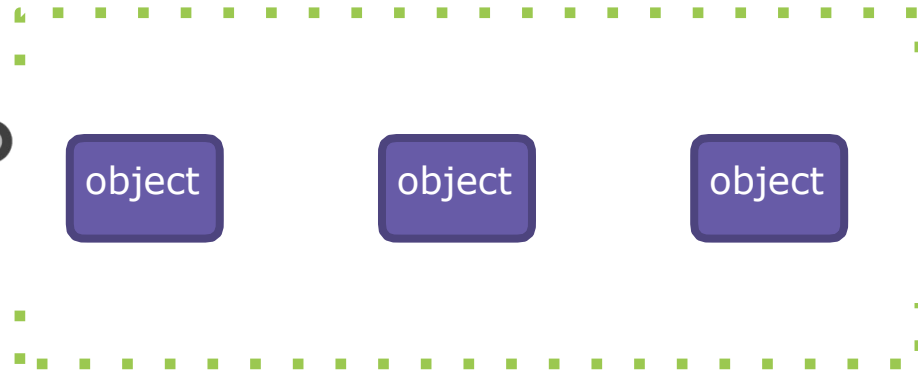
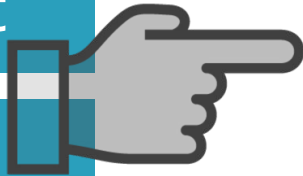


deque

Last In First Out
LIFO

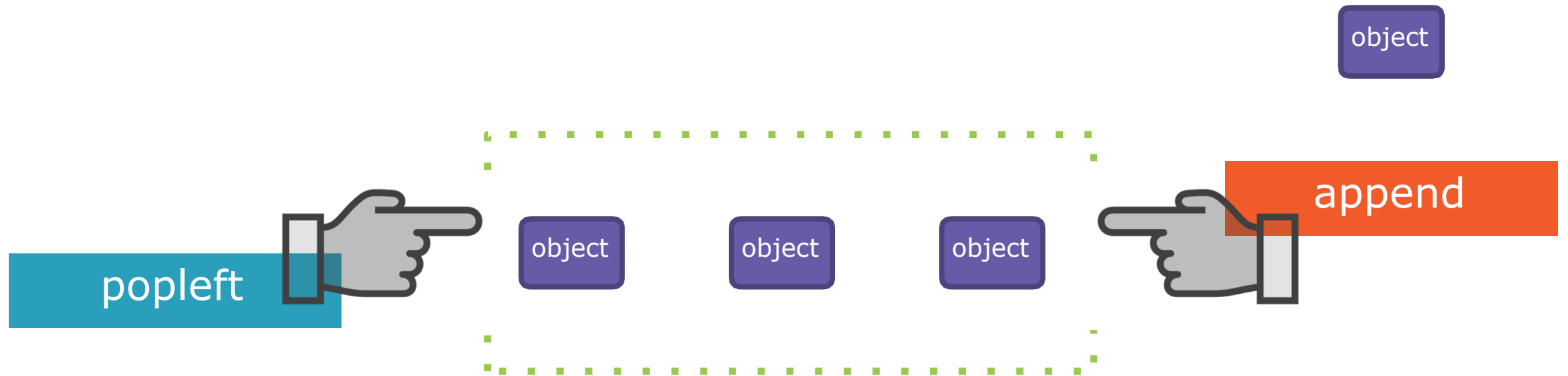
object

appendleft
popleft



First In First Out
FIFO

deque for queue

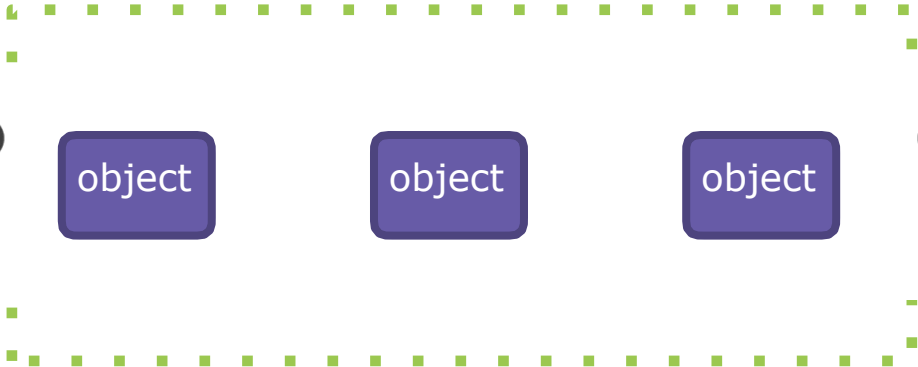
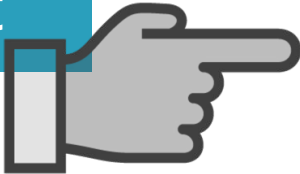


First In First Out
FIFO

deque

object

appendleft



object

object

object



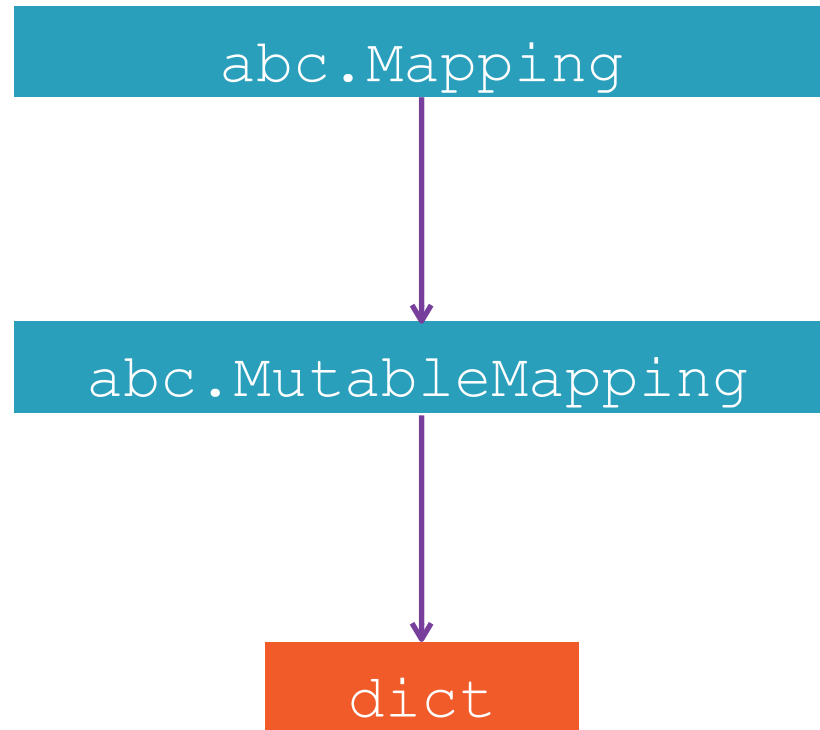
pop



Mapping Type

A collection where contained objects are stored with and retrieved via a key.

Base Classes: collections.abc



Additional Mapping Types



defaultdict



Counter

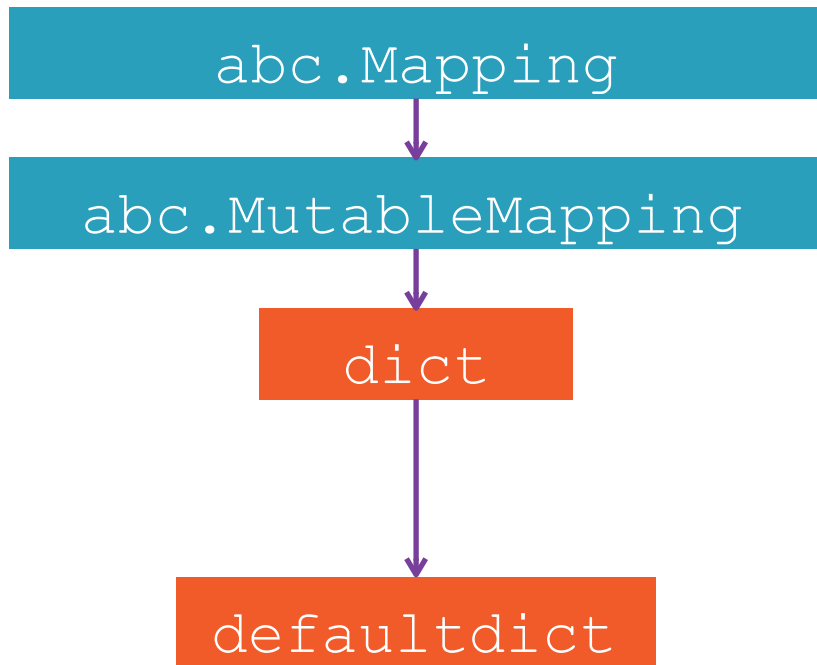


OrderedDict



dict

defaultdict



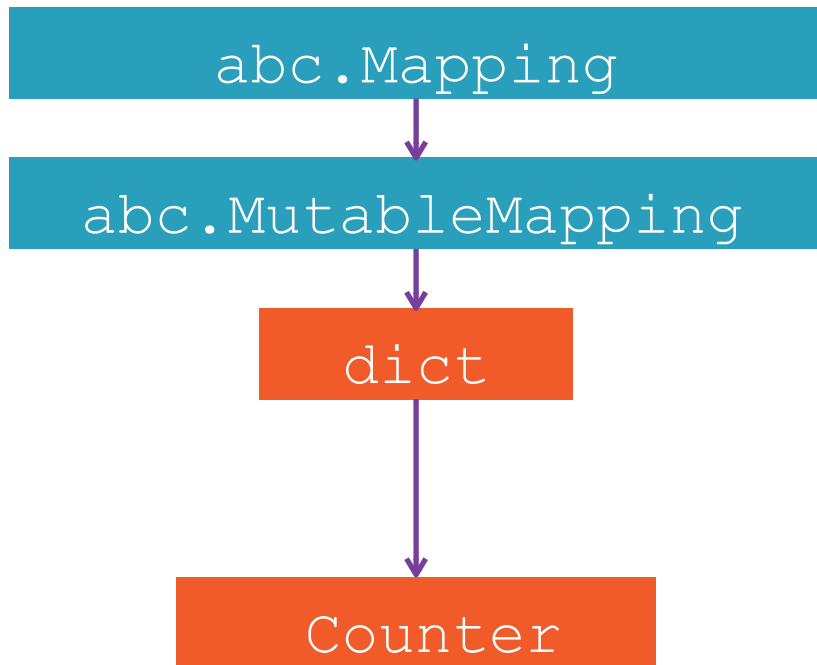
Single default value type

You provide type/function

If key doesn't exist, function is called No KeyError

Useful when aggregating data

Counter



Not a general use Mapping type

Value for each key is always an int

Automatically creates count from sequence

`most_common` is significant

Known as bag or Multiset in other languages