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next(iterator): Return the next element in an iterator

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>>> next(t)
3
>>> next(t)
4
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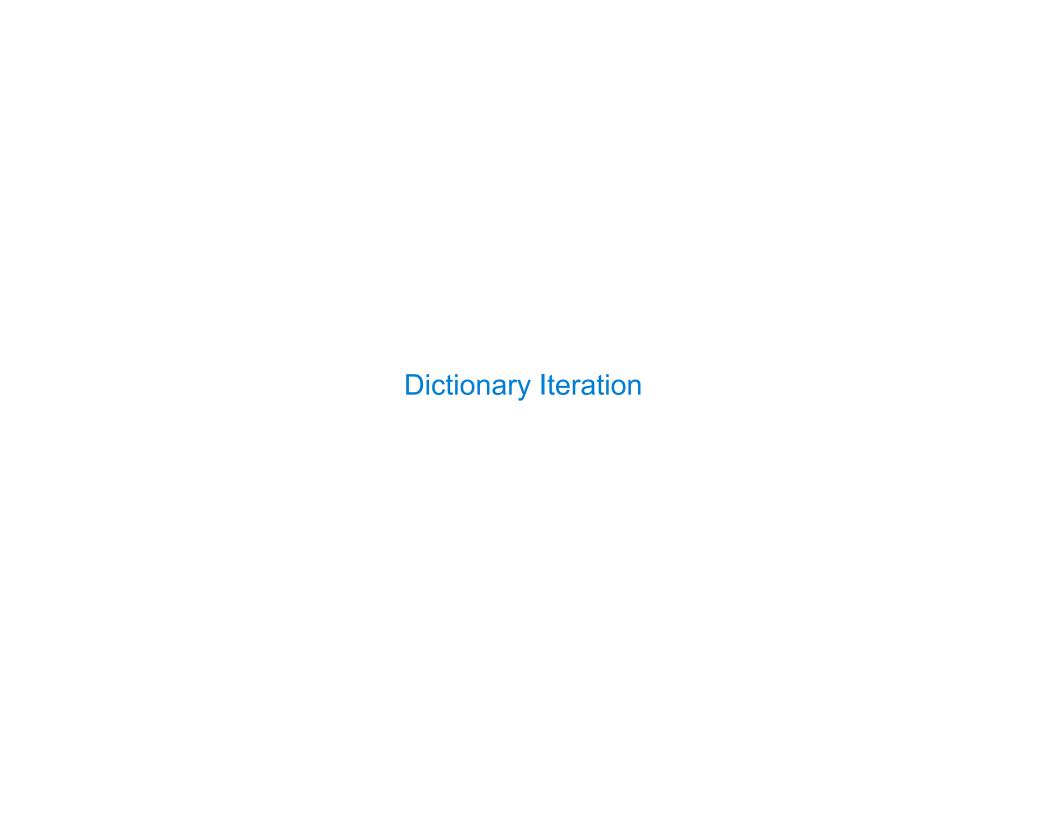
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>>> next(t)
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(Demo)



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A dictionary, its keys, its values, and its items are all iterable values

• The order of items in a dictionary is the order in which they were added (Python 3.6+)

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>>> d = {'one': 1, 'two': 2, 'three': 3}
>>> d['zero'] = 0
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>>> next(k)

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>>> next(k)
'one'
>>> next(k)
'two'
>>> next(k)
'three'
>>> next(k)
'zero'
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An iterable value is any value that can be passed to iter to produce an iterator An iterator is returned from iter and can be passed to next; all iterators are mutable A dictionary, its keys, its values, and its items are all iterable values • The order of items in a dictionary is the order in which they were added (Python 3.6+) Historically, items appeared in an arbitrary order (Python 3.5 and earlier) >>> d = {'one': 1, 'two': 2, 'three': 3} >>> d['zero'] = 0 >>> k = iter(d.keys()) # or iter(d) >>> v = iter(d.values()) >>> next(k) 'one' >>> next(k) 'two' >>> next(k) 'three' >>> next(k)

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 >>> next(k)
 'two'
 >>> next(k)
 'three'
 >>> next(k)
 'zero'
```

'two'

'zero'

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                                     >>> v = iter(d.values())
>>> next(k)
                                            >>> next(v)
'one'
                                            1
>>> next(k)
                                            >>> next(v)
'two'
>>> next(k)
                                            >>> next(v)
'three'
                                            >>> next(v)
>>> next(k)
'zero'
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>>> next(k)

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                                   >>> next(v)
                                                              >>> next(i)
'one'
                                                              ('one', 1)
                                   1
>>> next(k)
                                   >>> next(v)
'two'
>>> next(k)
                                   >>> next(v)
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'one'
                                                                           ('one', 1)
                                           1
                                                                           >>> next(i)
>>> next(k)
                                           >>> next(v)
'two'
                                                                           ('two', 2)
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                                                                             ('one', 1)
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                                                                             >>> next(i)
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'two'
                                                                             ('two', 2)
>>> next(k)
                                            >>> next(v)
                                                                             >>> next(i)
'three'
                                                                             ('three', 3)
>>> next(k)
                                            >>> next(v)
                                                                             >>> next(i)
'zero'
                                                                             ('zero', 0)
```

## Views of a Dictionary

An *iterable* value is any value that can be passed to **iter** to produce an iterator

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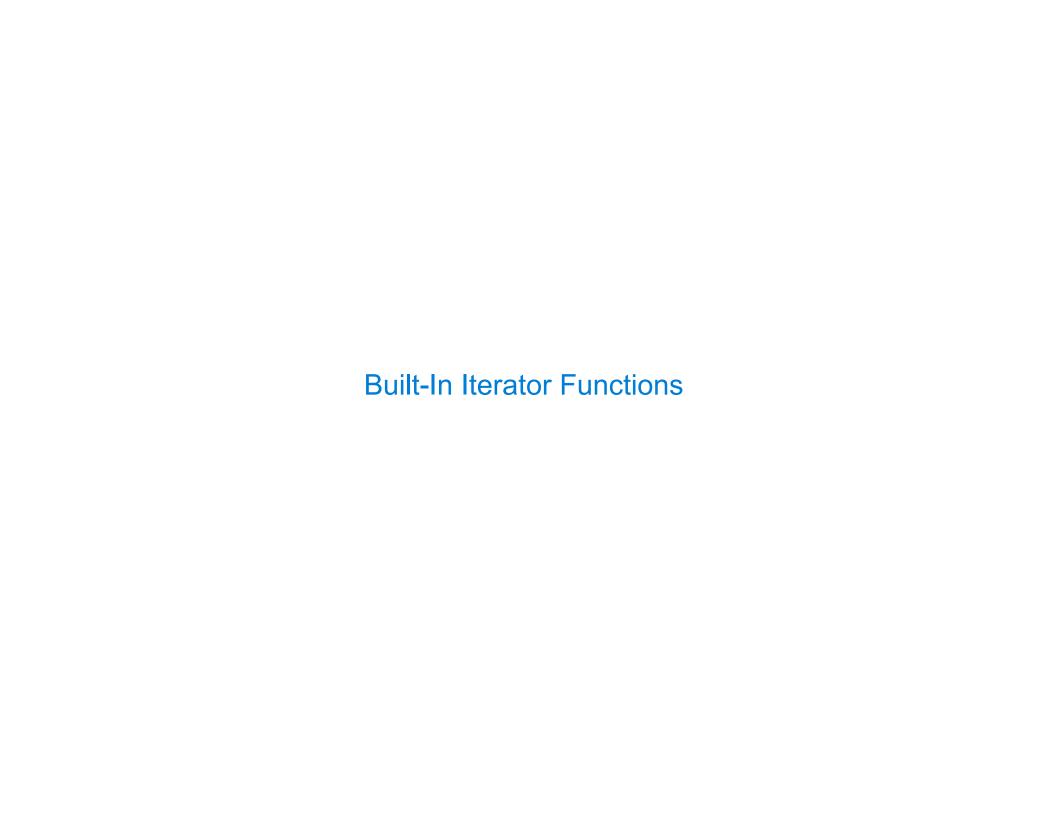
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                                                                              >>> next(i)
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                                             >>> next(v)
                                                                              >>> next(i)
'three'
                                                                              ('three', 3)
>>> next(k)
                                             >>> next(v)
                                                                              >>> next(i)
'zero'
                                                                              ('zero', 0)
```

(Demo)

# For Statements

(Demo)



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Many built-in Python sequence operations return iterators that compute results lazily

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Iterate over co-indexed (x, y) pairs

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list(iterable): Create a list containing all x in iterable

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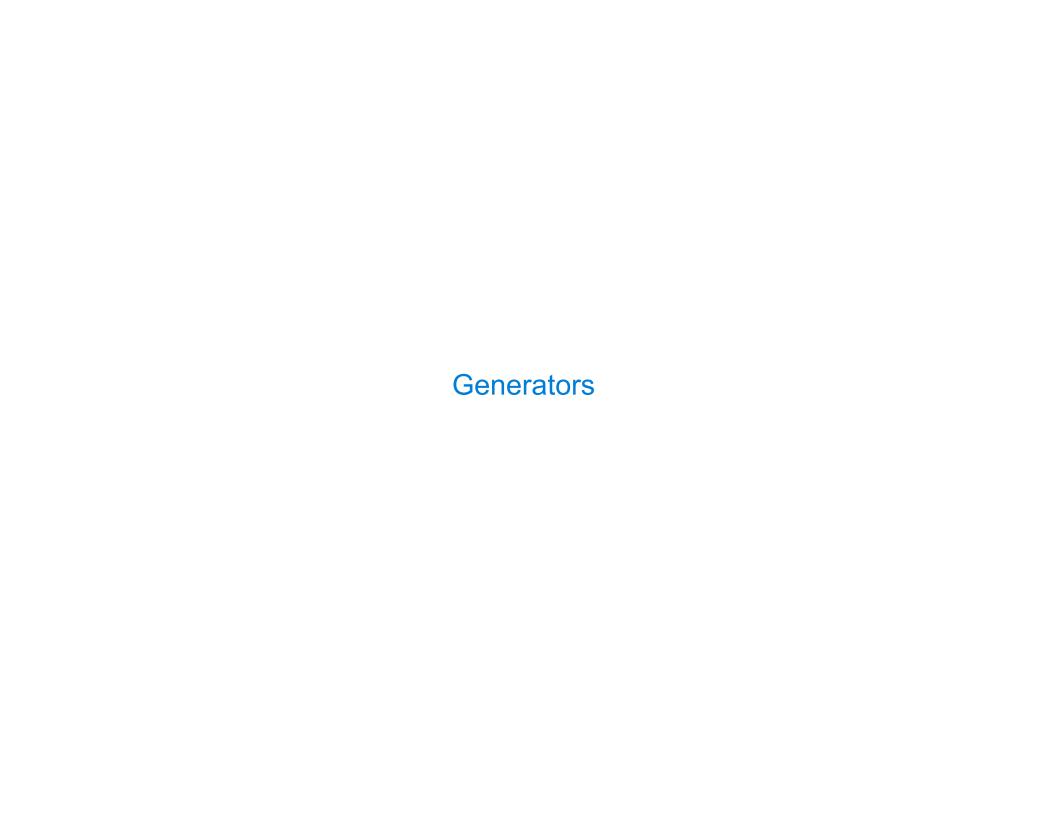
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(Demo)



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>>> def plus_minus(x):
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...     yield -x
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```

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>>> t = plus_minus(3)
>>> next(t)
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>>> next(t)
-3
>>> t
<generator object plus_minus ...>
```

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A generator function is a function that yields values instead of returning them

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A generator function is a function that yields values instead of returning them A normal function returns once; a generator function can yield multiple times

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A generator function is a function that yields values instead of returning them
A normal function returns once; a generator function can yield multiple times
A generator is an iterator created automatically by calling a generator function

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A generator is an iterator created automatically by calling a generator function

When a generator function is called, it returns a generator that iterates over its yields

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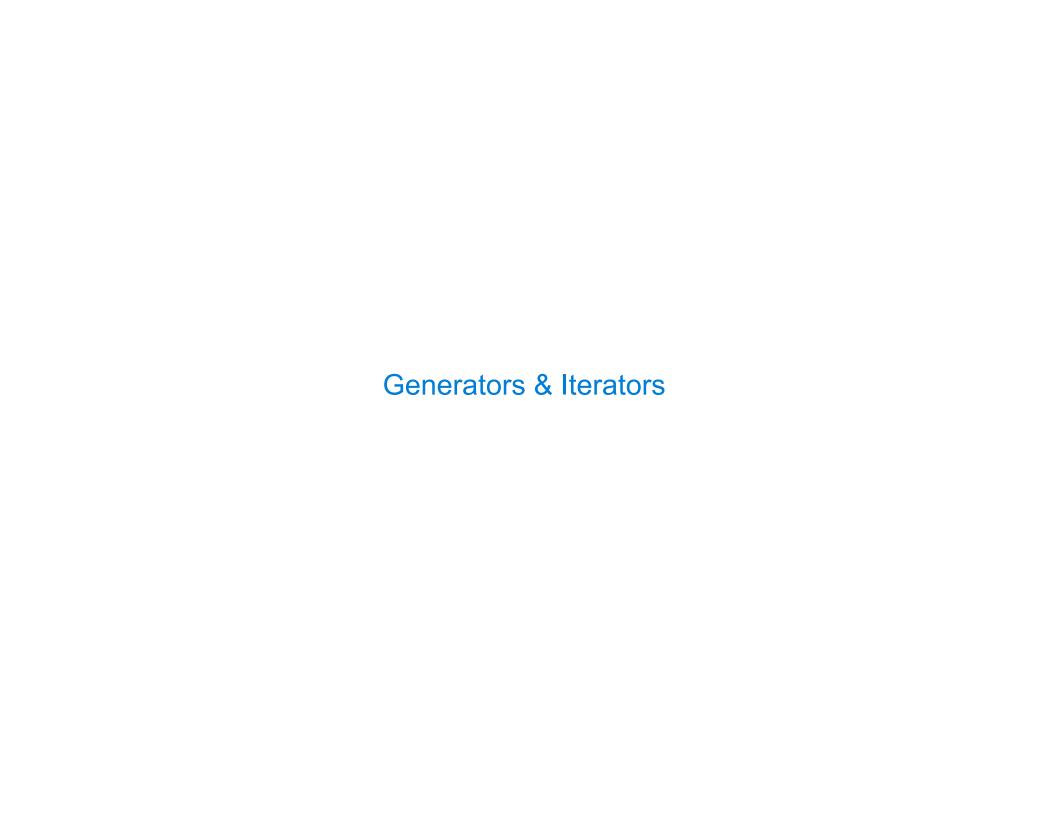
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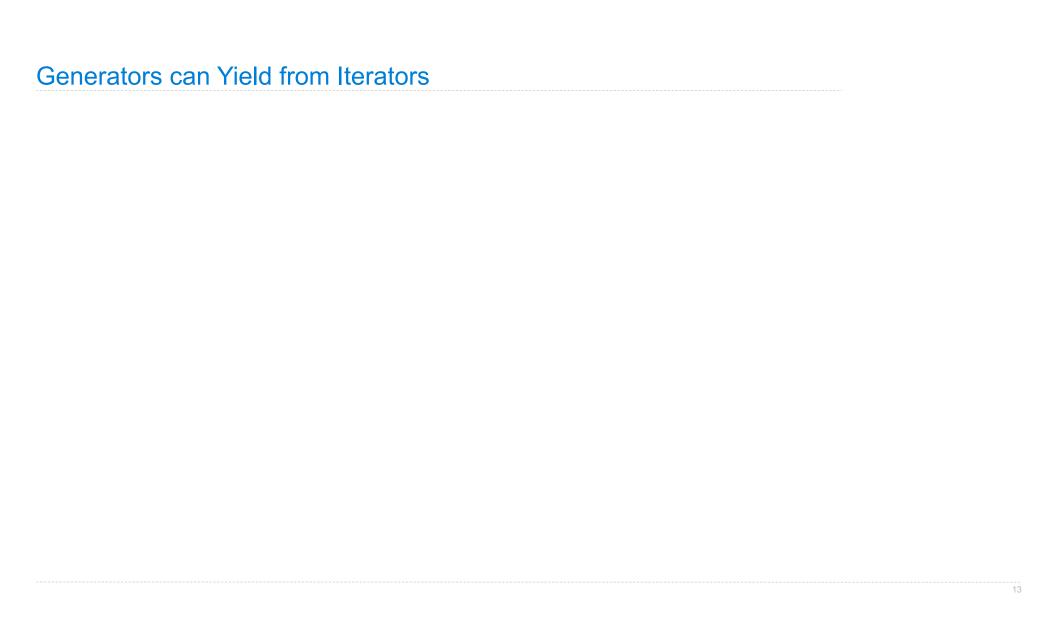
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(Demo)





Generators	can	<b>Yield</b>	from	Iterators
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```
>>> list(a_then_b([3, 4], [5, 6]))
[3, 4, 5, 6]

def a_then_b(a, b):
    for x in a:
        yield x
    for x in b:
        yield x
```

```
>>> list(a_then_b([3, 4], [5, 6]))
[3, 4, 5, 6]

def a_then_b(a, b):
    for x in a:
        yield from a
        yield from b
    for x in b:
        yield x
```

A yield from statement yields all values from an iterator or iterable (Python 3.3)

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    [3, 4, 5, 6]
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   for x in a:
                              yield from a
       yield x
                              yield from b
   for x in b:
       yield x
          >>> list(countdown(5))
          [5, 4, 3, 2, 1]
     def countdown(k):
         if k > 0:
            yield k
             yield from countdown(k-1)
                  (Demo)
```