61A Lecture 29

Announcements

Data Processing

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Some important ideas in **big data processing:**

- Implicit representations of streams of sequential data
- Declarative programming languages to manipulate and transform data
- Distributed computing

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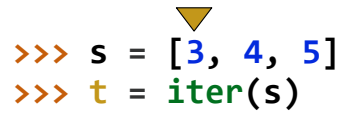

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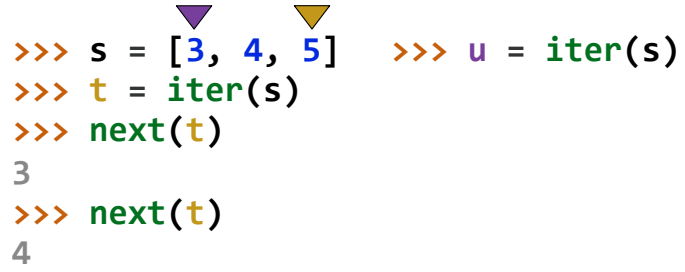

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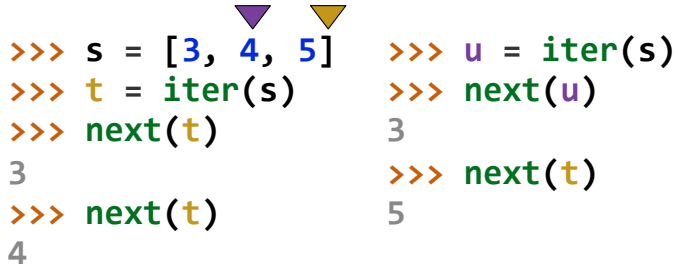

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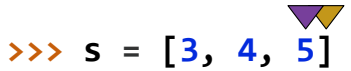

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Keys and values are iterated over in an arbitrary order which is non-random, varies across Python implementations, and depends on the dictionary's history of insertions and deletions. If keys, values and items views are iterated over with no intervening modifications to the dictionary, the order of items will directly correspond.

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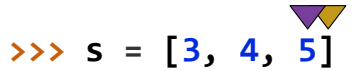

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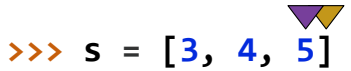

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(Demo)

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```
>>> counts = [1, 2, 3]
>>> items = iter(counts)
>>> try:
        while True:
            item = next(items)
            print(item)
    except StopIteration:
        pass # Do nothing
1
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```

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>>> contains('strength', 'stent')
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>>> contains('strength', 'stent')
True
>>> contains('strength', 'rest')
False
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```

```
def contains(a, b):
    ai = iter(a)
    for x in b:
        while next(ai) != x:
            pass # do nothing
```

Processing Iterators

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def contains(a, b):
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    for x in b:
        try:
            while next(ai) != x:
                pass # do nothing
        except StopIteration:
            return False
    return True
```

Built-In Iterator Functions

Built-in Functions for Iteration

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

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(Demo)

Generators

Generators and Generator Functions

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A normal function **return**s once; a *generator function* can **yield** multiple times

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    def __iter__(self):
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```
class Countdown:
    def __init__(self, start):
        self.start = start

    def __iter__(self):
        v = self.start
        while v > 0:
            yield v
            v -= 1
```

Generators & Iterators

Generators can Yield from Iterators

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def countdown(k):
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