Creating Conformant Collections with the Iterator Pattern

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Object Collections and Iteration

Collections

Iteration

Creativity

Hide Implementation

Iterator Pattern

Motivation

Employee collection

Holds Employee objects

Clients iterate over the collection

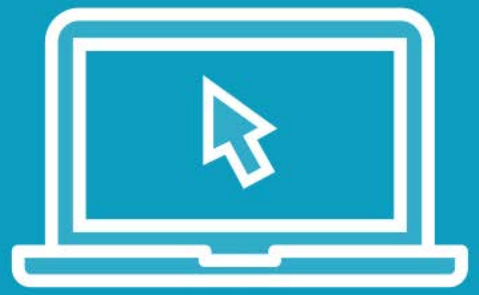
Collection exposes method for iteration

Hide collection implementation

Many ways to do that

No conformity

Demo



Collection of Employees

Could be a list, set, dictionary, tree ...

One possibility for iterating over it

Iterator

Classification: Behavioral

Adds new abilities to a collection

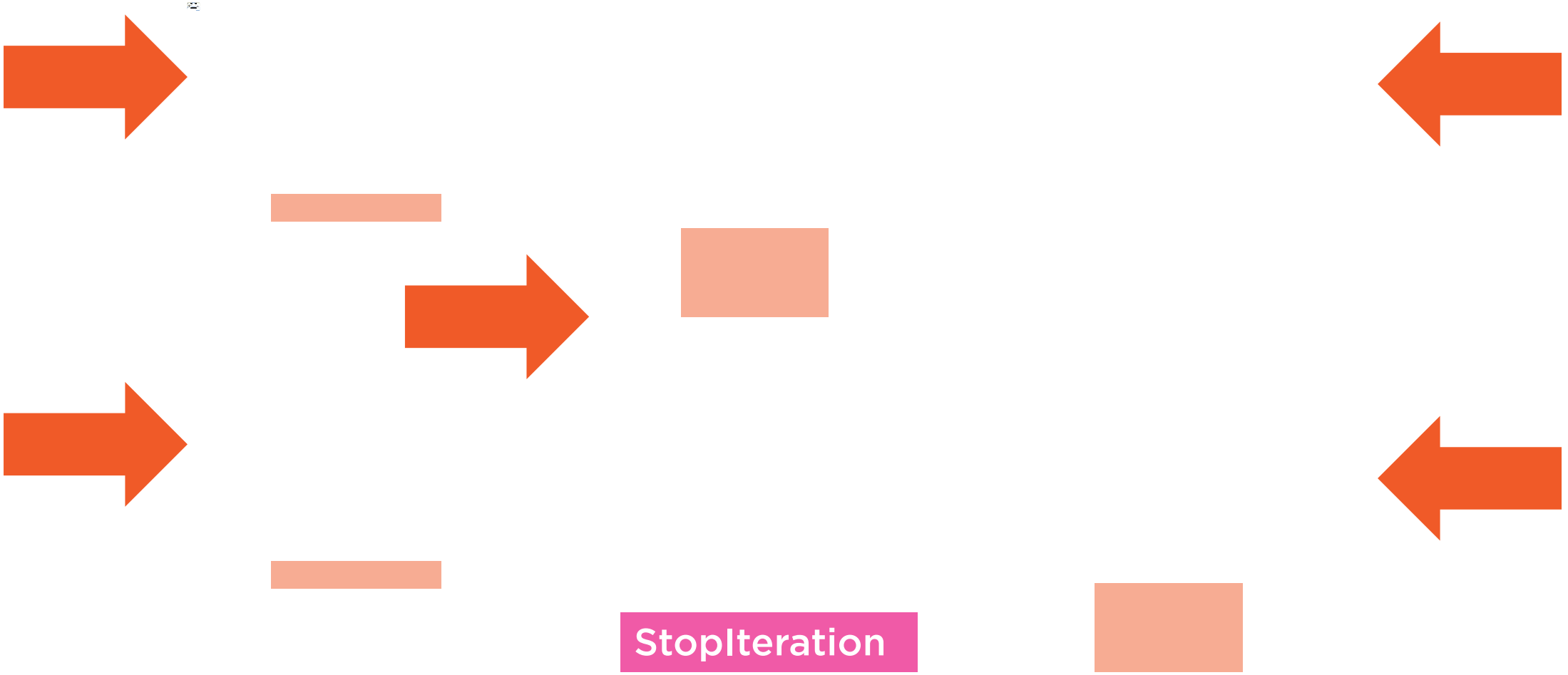
Iterate over the elements

Without exposing the underlying representation

- Preserves Encapsulation

Also know as the Cursor Pattern

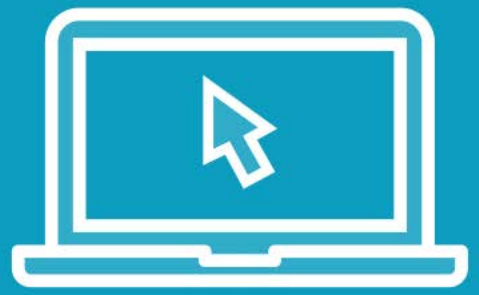
Iterator Pattern Structure



Python Iterators

- Two different iterator objects
  - Sequence iterator
    - __getitem__()
  - Callable object
    - __iter__() and __next__()
    - next() in Python 2.x
- Built into the compiler
- Collections module:
  - Iterable and Iterator
  - Sequence

Demo



Build iterators for the collections

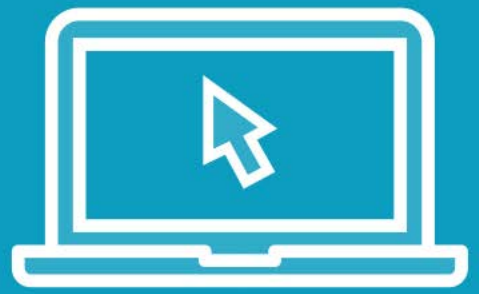
Look at both types

Iterable = Iterator

Use them in the main program

Complete the print_summary function

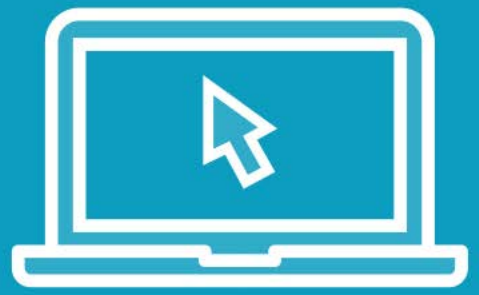
Demo



Subtle bug

Two simultaneous iterators?

Demo



Use generator expressions

(x for x in iterable)

(f(x) for x in iterable)

(f(x) for x in iterable if <condition>)

Python Fundamentals on Pluralsight.com

Consequences

Simple, standard interface

Collection implementation can vary

- n-way tree: depth or breadth first

Multiple active, independent iterators

Summary

When to use Iterator?

Iterate over a collection

Preserve encapsulation

Multiple active iterations

Uniform interface