

Iterator DP

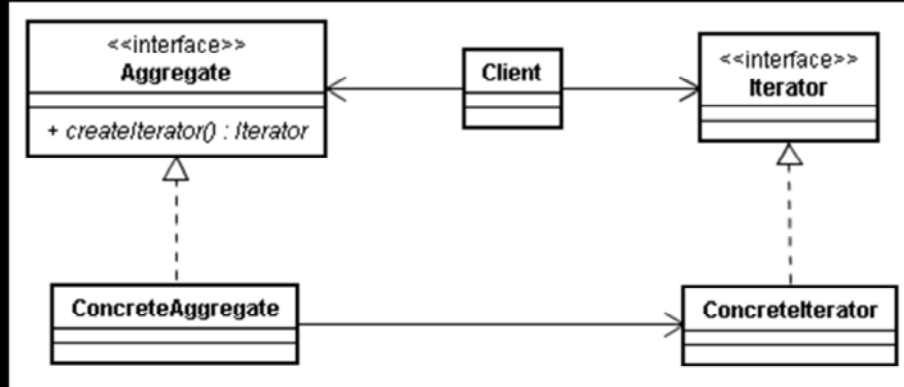
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Problem

- We have a large number of objects. These objects may be stored as an Array, ArrayList, Set or some other Collection.
 - We want to scan all the objects irrespective of how they are stored.

Solution – Iterator DP



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It provides a way to access the elements of an aggregate object sequentially without exposing its underlying representation.

Advantages

We are coding to an interface and not implementation

We can traverse all elements of an aggregate without exposing the underlying implementation.

Any code that we write using Iterators is decoupled from the data structure that the code is manipulating. Thus our code is more general and reusable.

Iterator DP is used

to access an aggregate object's contents without exposing its internal representation.

to support multiple traversals of aggregate object.

In Java,

An Iterator is used for Collections

An ResultSet is used to iterate through the records returned by the SQL

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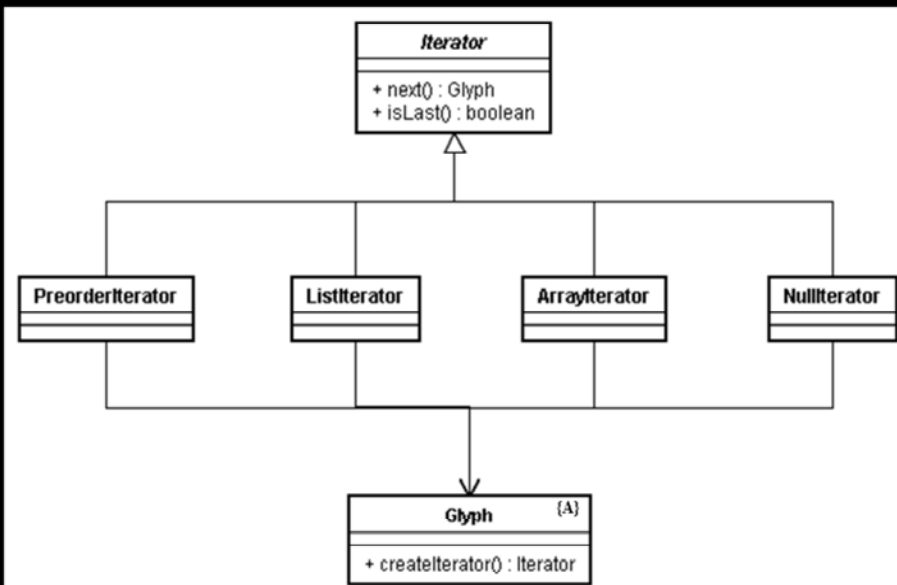
Single Responsibility Principle: There is should be only one reason possible to change a class.

Assignment

- In a rich GUI editor, we need to scan text.
 - Some elements store text in an array.
 - Some elements store text in a list.
 - Some pictorial elements also store text.
 - Different traversals must be supported e.g. forward search, backward search , pre-order, post-order, inorder, etc.



Solution



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Assignment

- Create a class `IntRange` that is iterable
 - `new IntRange(2,10)` should return values 2, 3, 4, 5, 6, 7, 8, 9, 10 using the Iterator



Map-Filter-Reduce Pattern

- Given a list of Numbers, compute the sum of the square of all distinct numbers
 - Map: Create a new list with all squares
 - Filter: Eliminate duplicates
 - Reduce: Compute sum.
- Assignment:
 - Given a list of strings, convert them to Uppercase and join all strings (of length greater than 2) with a comma.

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This popular algorithm / pattern uses Iterator pattern
Java Solution present in `Patterns.mapFilterReduce`.

More Iterators

- Java primarily has List, Set and Map Collections
 - Guava library has many more collections with Iterator pattern.
 - Identify these Collections.
 - Where would you use these collections instead of Java's Collections?