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org.apache.commons.collections4

## Class IteratorUtils

* [java.lang.Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true)
  + org.apache.commons.collections4.IteratorUtils
* public class IteratorUtils  
  extends [Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true)  
  Provides static utility methods and decorators for [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) instances. The implementations are provided in the iterators subpackage.Since: 2.1

### Field SummaryFields

|  |  |
| --- | --- |
| * + Modifier and Type | * + Field and Description |
| * + static [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html) | * + [EMPTY\_ITERATOR](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#EMPTY_ITERATOR) An iterator over no elements. |
| * + static [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html) | * + [EMPTY\_LIST\_ITERATOR](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#EMPTY_LIST_ITERATOR) A list iterator over no elements. |
| * + static [MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html) | * + [EMPTY\_MAP\_ITERATOR](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#EMPTY_MAP_ITERATOR) A map iterator over no elements. |
| * + static [OrderedIterator](http://docs.google.com/org/apache/commons/collections4/OrderedIterator.html) | * + [EMPTY\_ORDERED\_ITERATOR](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#EMPTY_ORDERED_ITERATOR) An ordered iterator over no elements. |
| * + static [OrderedMapIterator](http://docs.google.com/org/apache/commons/collections4/OrderedMapIterator.html) | * + [EMPTY\_ORDERED\_MAP\_ITERATOR](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#EMPTY_ORDERED_MAP_ITERATOR) An ordered map iterator over no elements. |

### Method SummaryAll Methods Static Methods Concrete Methods

|  |  |
| --- | --- |
| * + Modifier and Type | * + Method and Description |
| * + static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> | * + [arrayIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayIterator-E...-)(E... array) Gets an iterator over an object array. |
| * + static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> | * + [arrayIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayIterator-E:A-int-)(E[] array, int start) Gets an iterator over the end part of an object array. |
| * + static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> | * + [arrayIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayIterator-E:A-int-int-)(E[] array, int start, int end) Gets an iterator over part of an object array. |
| * + static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> | * + [arrayIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayIterator-java.lang.Object-)([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array) Gets an iterator over an object or primitive array. |
| * + static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> | * + [arrayIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayIterator-java.lang.Object-int-)([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array, int start) Gets an iterator over the end part of an object or primitive array. |
| * + static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> | * + [arrayIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayIterator-java.lang.Object-int-int-)([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array, int start, int end) Gets an iterator over part of an object or primitive array. |
| * + static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> | * + [arrayListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayListIterator-E...-)(E... array) Gets a list iterator over an object array. |
| * + static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> | * + [arrayListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayListIterator-E:A-int-)(E[] array, int start) Gets a list iterator over the end part of an object array. |
| * + static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> | * + [arrayListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayListIterator-E:A-int-int-)(E[] array, int start, int end) Gets a list iterator over part of an object array. |
| * + static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> | * + [arrayListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayListIterator-java.lang.Object-)([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array) Gets a list iterator over an object or primitive array. |
| * + static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> | * + [arrayListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayListIterator-java.lang.Object-int-)([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array, int start) Gets a list iterator over the end part of an object or primitive array. |
| * + static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> | * + [arrayListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#arrayListIterator-java.lang.Object-int-int-)([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array, int start, int end) Gets a list iterator over part of an object or primitive array. |
| * + static <E> [Enumeration](https://docs.oracle.com/javase/7/docs/api/java/util/Enumeration.html?is-external=true)<E> | * + [asEnumeration](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#asEnumeration-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an enumeration that wraps an iterator. |
| * + static <E> [Iterable](https://docs.oracle.com/javase/7/docs/api/java/lang/Iterable.html?is-external=true)<E> | * + [asIterable](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#asIterable-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an [Iterable](https://docs.oracle.com/javase/7/docs/api/java/lang/Iterable.html?is-external=true) that wraps an iterator. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [asIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#asIterator-java.util.Enumeration-)([Enumeration](https://docs.oracle.com/javase/7/docs/api/java/util/Enumeration.html?is-external=true)<? extends E> enumeration) Gets an iterator that provides an iterator view of the given enumeration. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [asIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#asIterator-java.util.Enumeration-java.util.Collection-)([Enumeration](https://docs.oracle.com/javase/7/docs/api/java/util/Enumeration.html?is-external=true)<? extends E> enumeration, [Collection](https://docs.oracle.com/javase/7/docs/api/java/util/Collection.html?is-external=true)<? super E> removeCollection) Gets an iterator that provides an iterator view of the given enumeration that will remove elements from the specified collection. |
| * + static <E> [Iterable](https://docs.oracle.com/javase/7/docs/api/java/lang/Iterable.html?is-external=true)<E> | * + [asMultipleUseIterable](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#asMultipleUseIterable-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an iterable that wraps an iterator. |
| * + static <E> [BoundedIterator](http://docs.google.com/org/apache/commons/collections4/iterators/BoundedIterator.html)<E> | * + [boundedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#boundedIterator-java.util.Iterator-long-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, long max) Decorates the specified iterator to return at most the given number of elements. |
| * + static <E> [BoundedIterator](http://docs.google.com/org/apache/commons/collections4/iterators/BoundedIterator.html)<E> | * + [boundedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#boundedIterator-java.util.Iterator-long-long-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, long offset, long max) Decorates the specified iterator to return at most the given number of elements, skipping all elements until the iterator reaches the position at offset. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [chainedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#chainedIterator-java.util.Collection-)([Collection](https://docs.oracle.com/javase/7/docs/api/java/util/Collection.html?is-external=true)<[Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>> iterators) Gets an iterator that iterates through a collections of [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s one after another. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [chainedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#chainedIterator-java.util.Iterator...-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>... iterators) Gets an iterator that iterates through an array of [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s one after another. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [chainedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#chainedIterator-java.util.Iterator-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator1, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator2) Gets an iterator that iterates through two [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s one after another. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [collatedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#collatedIterator-java.util.Comparator-java.util.Collection-)([Comparator](https://docs.oracle.com/javase/7/docs/api/java/util/Comparator.html?is-external=true)<? super E> comparator, [Collection](https://docs.oracle.com/javase/7/docs/api/java/util/Collection.html?is-external=true)<[Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>> iterators) Gets an iterator that provides an ordered iteration over the elements contained in a collection of [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [collatedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#collatedIterator-java.util.Comparator-java.util.Iterator...-)([Comparator](https://docs.oracle.com/javase/7/docs/api/java/util/Comparator.html?is-external=true)<? super E> comparator, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>... iterators) Gets an iterator that provides an ordered iteration over the elements contained in an array of [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [collatedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#collatedIterator-java.util.Comparator-java.util.Iterator-java.util.Iterator-)([Comparator](https://docs.oracle.com/javase/7/docs/api/java/util/Comparator.html?is-external=true)<? super E> comparator, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator1, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator2) Gets an iterator that provides an ordered iteration over the elements contained in a collection of ordered [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s. |
| * + static <E> boolean | * + [contains](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#contains-java.util.Iterator-java.lang.Object-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) object) Checks if the object is contained in the given iterator. |
| * + static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> | * + [emptyIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#emptyIterator--)() Gets an empty iterator. |
| * + static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> | * + [emptyListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#emptyListIterator--)() Gets an empty list iterator. |
| * + static <K,V> [MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html)<K,V> | * + [emptyMapIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#emptyMapIterator--)() Gets an empty map iterator. |
| * + static <E> [OrderedIterator](http://docs.google.com/org/apache/commons/collections4/OrderedIterator.html)<E> | * + [emptyOrderedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#emptyOrderedIterator--)() Gets an empty ordered iterator. |
| * + static <K,V> [OrderedMapIterator](http://docs.google.com/org/apache/commons/collections4/OrderedMapIterator.html)<K,V> | * + [emptyOrderedMapIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#emptyOrderedMapIterator--)() Gets an empty ordered map iterator. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [filteredIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#filteredIterator-java.util.Iterator-org.apache.commons.collections4.Predicate-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Gets an iterator that filters another iterator. |
| * + static <E> [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> | * + [filteredListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#filteredListIterator-java.util.ListIterator-org.apache.commons.collections4.Predicate-)([ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<? extends E> listIterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Gets a list iterator that filters another list iterator. |
| * + static <E> E | * + [find](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#find-java.util.Iterator-org.apache.commons.collections4.Predicate-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Finds the first element in the given iterator which matches the given predicate. |
| * + static <E> E | * + [first](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#first-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator) Shortcut for get(iterator, 0). |
| * + static <E> void | * + [forEach](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#forEach-java.util.Iterator-org.apache.commons.collections4.Closure-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Closure](http://docs.google.com/org/apache/commons/collections4/Closure.html)<? super E> closure) Applies the closure to each element of the provided iterator. |
| * + static <E> E | * + [forEachButLast](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#forEachButLast-java.util.Iterator-org.apache.commons.collections4.Closure-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Closure](http://docs.google.com/org/apache/commons/collections4/Closure.html)<? super E> closure) Executes the given closure on each but the last element in the iterator. |
| * + static <E> E | * + [get](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#get-java.util.Iterator-int-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, int index) Returns the index-th value in [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true), throwing IndexOutOfBoundsException if there is no such element. |
| * + static [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<?> | * + [getIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#getIterator-java.lang.Object-)([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) obj) Gets a suitable Iterator for the given object. |
| * + static <E> int | * + [indexOf](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#indexOf-java.util.Iterator-org.apache.commons.collections4.Predicate-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Returns the index of the first element in the specified iterator that matches the given predicate. |
| * + static boolean | * + [isEmpty](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#isEmpty-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<?> iterator) Checks if the given iterator is empty. |
| * + static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> | * + [loopingIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#loopingIterator-java.util.Collection-)([Collection](https://docs.oracle.com/javase/7/docs/api/java/util/Collection.html?is-external=true)<? extends E> coll) Gets an iterator that loops continuously over the supplied collection. |
| * + static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> | * + [loopingListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#loopingListIterator-java.util.List-)([List](https://docs.oracle.com/javase/7/docs/api/java/util/List.html?is-external=true)<E> list) Gets an iterator that loops continuously over the supplied list. |
| * + static <E> boolean | * + [matchesAll](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#matchesAll-java.util.Iterator-org.apache.commons.collections4.Predicate-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Answers true if a predicate is true for every element of an iterator. |
| * + static <E> boolean | * + [matchesAny](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#matchesAny-java.util.Iterator-org.apache.commons.collections4.Predicate-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Answers true if a predicate is true for any element of the iterator. |
| * + static [NodeListIterator](http://docs.google.com/org/apache/commons/collections4/iterators/NodeListIterator.html) | * + [nodeListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#nodeListIterator-org.w3c.dom.Node-)([Node](https://docs.oracle.com/javase/7/docs/api/org/w3c/dom/Node.html?is-external=true) node) Gets an [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) that wraps the specified node's childNodes. |
| * + static [NodeListIterator](http://docs.google.com/org/apache/commons/collections4/iterators/NodeListIterator.html) | * + [nodeListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#nodeListIterator-org.w3c.dom.NodeList-)([NodeList](https://docs.oracle.com/javase/7/docs/api/org/w3c/dom/NodeList.html?is-external=true) nodeList) Gets an [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) that wraps the specified [NodeList](https://docs.oracle.com/javase/7/docs/api/org/w3c/dom/NodeList.html?is-external=true). |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [objectGraphIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#objectGraphIterator-E-org.apache.commons.collections4.Transformer-)(E root, [Transformer](http://docs.google.com/org/apache/commons/collections4/Transformer.html)<? super E,? extends E> transformer) Gets an iterator that operates over an object graph. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [peekingIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#peekingIterator-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an iterator that supports one-element lookahead. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [pushbackIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#pushbackIterator-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an iterator that supports pushback of elements. |
| * + static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> | * + [singletonIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#singletonIterator-E-)(E object) Gets a singleton iterator. |
| * + static <E> [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> | * + [singletonListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#singletonListIterator-E-)(E object) Gets a singleton list iterator. |
| * + static int | * + [size](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#size-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<?> iterator) Returns the number of elements contained in the given iterator. |
| * + static <E> [SkippingIterator](http://docs.google.com/org/apache/commons/collections4/iterators/SkippingIterator.html)<E> | * + [skippingIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#skippingIterator-java.util.Iterator-long-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, long offset) Decorates the specified iterator to skip the first N elements. |
| * + static [Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true)[] | * + [toArray](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#toArray-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<?> iterator) Gets an array based on an iterator. |
| * + static <E> E[] | * + [toArray](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#toArray-java.util.Iterator-java.lang.Class-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, [Class](https://docs.oracle.com/javase/7/docs/api/java/lang/Class.html?is-external=true)<E> arrayClass) Gets an array based on an iterator. |
| * + static <E> [List](https://docs.oracle.com/javase/7/docs/api/java/util/List.html?is-external=true)<E> | * + [toList](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#toList-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets a list based on an iterator. |
| * + static <E> [List](https://docs.oracle.com/javase/7/docs/api/java/util/List.html?is-external=true)<E> | * + [toList](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#toList-java.util.Iterator-int-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, int estimatedSize) Gets a list based on an iterator. |
| * + static <E> [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> | * + [toListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#toListIterator-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets a list iterator based on a simple iterator. |
| * + static <E> [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) | * + [toString](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#toString-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator) Returns a string representation of the elements of the specified iterator. |
| * + static <E> [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) | * + [toString](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#toString-java.util.Iterator-org.apache.commons.collections4.Transformer-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Transformer](http://docs.google.com/org/apache/commons/collections4/Transformer.html)<? super E,[String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true)> transformer) Returns a string representation of the elements of the specified iterator. |
| * + static <E> [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) | * + [toString](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#toString-java.util.Iterator-org.apache.commons.collections4.Transformer-java.lang.String-java.lang.String-java.lang.String-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Transformer](http://docs.google.com/org/apache/commons/collections4/Transformer.html)<? super E,[String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true)> transformer, [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) delimiter, [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) prefix, [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) suffix) Returns a string representation of the elements of the specified iterator. |
| * + static <I,O> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<O> | * + [transformedIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#transformedIterator-java.util.Iterator-org.apache.commons.collections4.Transformer-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends I> iterator, [Transformer](http://docs.google.com/org/apache/commons/collections4/Transformer.html)<? super I,? extends O> transform) Gets an iterator that transforms the elements of another iterator. |
| * + static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> | * + [unmodifiableIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#unmodifiableIterator-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator) Gets an immutable version of an [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true). |
| * + static <E> [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> | * + [unmodifiableListIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#unmodifiableListIterator-java.util.ListIterator-)([ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> listIterator) Gets an immutable version of a [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true). |
| * + static <K,V> [MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html)<K,V> | * + [unmodifiableMapIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#unmodifiableMapIterator-org.apache.commons.collections4.MapIterator-)([MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html)<K,V> mapIterator) Gets an immutable version of a [MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html). |
| * + static <E> [ZippingIterator](http://docs.google.com/org/apache/commons/collections4/iterators/ZippingIterator.html)<E> | * + [zippingIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#zippingIterator-java.util.Iterator...-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>... iterators) Returns an iterator that interleaves elements from the decorated iterators. |
| * + static <E> [ZippingIterator](http://docs.google.com/org/apache/commons/collections4/iterators/ZippingIterator.html)<E> | * + [zippingIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#zippingIterator-java.util.Iterator-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> a, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> b) Returns an iterator that interleaves elements from the decorated iterators. |
| * + static <E> [ZippingIterator](http://docs.google.com/org/apache/commons/collections4/iterators/ZippingIterator.html)<E> | * + [zippingIterator](http://docs.google.com/org/apache/commons/collections4/IteratorUtils.html#zippingIterator-java.util.Iterator-java.util.Iterator-java.util.Iterator-)([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> a, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> b, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> c) Returns an iterator that interleaves elements from the decorated iterators. |

### Methods inherited from class java.lang.[**Object**](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true)[clone](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#clone--), [equals](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#equals-java.lang.Object-), [finalize](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#finalize--), [getClass](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#getClass--), [hashCode](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#hashCode--), [notify](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#notify--), [notifyAll](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#notifyAll--), [toString](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#toString--), [wait](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#wait--), [wait](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#wait-long-), [wait](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true#wait-long-int-)

### Field Detail

#### EMPTY\_ITERATOR public static final [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html) EMPTY\_ITERATOR An iterator over no elements.

#### EMPTY\_LIST\_ITERATOR public static final [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html) EMPTY\_LIST\_ITERATOR A list iterator over no elements.

#### EMPTY\_ORDERED\_ITERATOR public static final [OrderedIterator](http://docs.google.com/org/apache/commons/collections4/OrderedIterator.html) EMPTY\_ORDERED\_ITERATOR An ordered iterator over no elements.

#### EMPTY\_MAP\_ITERATOR public static final [MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html) EMPTY\_MAP\_ITERATOR A map iterator over no elements.

#### EMPTY\_ORDERED\_MAP\_ITERATOR public static final [OrderedMapIterator](http://docs.google.com/org/apache/commons/collections4/OrderedMapIterator.html) EMPTY\_ORDERED\_MAP\_ITERATOR An ordered map iterator over no elements.

### Method Detail

#### emptyIterator public static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> emptyIterator() Gets an empty iterator. This iterator is a valid iterator object that will iterate over nothing.Type Parameters: E - the element type Returns: an iterator over nothing

#### emptyListIterator public static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> emptyListIterator() Gets an empty list iterator. This iterator is a valid list iterator object that will iterate over nothing.Type Parameters: E - the element type Returns: a list iterator over nothing

#### emptyOrderedIterator public static <E> [OrderedIterator](http://docs.google.com/org/apache/commons/collections4/OrderedIterator.html)<E> emptyOrderedIterator() Gets an empty ordered iterator. This iterator is a valid iterator object that will iterate over nothing.Type Parameters: E - the element type Returns: an ordered iterator over nothing

#### emptyMapIterator public static <K,V> [MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html)<K,V> emptyMapIterator() Gets an empty map iterator. This iterator is a valid map iterator object that will iterate over nothing.Type Parameters: K - the key type V - the value type Returns: a map iterator over nothing

#### emptyOrderedMapIterator public static <K,V> [OrderedMapIterator](http://docs.google.com/org/apache/commons/collections4/OrderedMapIterator.html)<K,V> emptyOrderedMapIterator() Gets an empty ordered map iterator. This iterator is a valid map iterator object that will iterate over nothing.Type Parameters: K - the key type V - the value type Returns: a map iterator over nothing

#### singletonIterator public static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> singletonIterator(E object) Gets a singleton iterator. This iterator is a valid iterator object that will iterate over the specified object.Type Parameters: E - the element type Parameters: object - the single object over which to iterate Returns: a singleton iterator over the object

#### singletonListIterator public static <E> [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> singletonListIterator(E object) Gets a singleton list iterator. This iterator is a valid list iterator object that will iterate over the specified object.Type Parameters: E - the element type Parameters: object - the single object over which to iterate Returns: a singleton list iterator over the object

#### arrayIterator public static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> arrayIterator(E... array) Gets an iterator over an object array.Type Parameters: E - the element type Parameters: array - the array over which to iterate Returns: an iterator over the array Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayIterator public static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> arrayIterator([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array) Gets an iterator over an object or primitive array. This method will handle primitive arrays as well as object arrays. The primitives will be wrapped in the appropriate wrapper class.Type Parameters: E - the element type Parameters: array - the array over which to iterate Returns: an iterator over the array Throws: [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if the array is not an array [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayIterator public static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> arrayIterator(E[] array, int start) Gets an iterator over the end part of an object array.Type Parameters: E - the element type Parameters: array - the array over which to iterate start - the index to start iterating at Returns: an iterator over part of the array Throws: [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if start is less than zero or greater than the length of the array [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayIterator public static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> arrayIterator([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array, int start) Gets an iterator over the end part of an object or primitive array. This method will handle primitive arrays as well as object arrays. The primitives will be wrapped in the appropriate wrapper class.Type Parameters: E - the element type Parameters: array - the array over which to iterate start - the index to start iterating at Returns: an iterator over part of the array Throws: [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if the array is not an array [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if start is less than zero or greater than the length of the array [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayIterator public static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> arrayIterator(E[] array, int start, int end) Gets an iterator over part of an object array.Type Parameters: E - the element type Parameters: array - the array over which to iterate start - the index to start iterating at end - the index to finish iterating at Returns: an iterator over part of the array Throws: [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if array bounds are invalid [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if end is before start [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayIterator public static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> arrayIterator([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array, int start, int end) Gets an iterator over part of an object or primitive array. This method will handle primitive arrays as well as object arrays. The primitives will be wrapped in the appropriate wrapper class.Type Parameters: E - the element type Parameters: array - the array over which to iterate start - the index to start iterating at end - the index to finish iterating at Returns: an iterator over part of the array Throws: [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if the array is not an array or end is before start [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if array bounds are invalid [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayListIterator public static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> arrayListIterator(E... array) Gets a list iterator over an object array.Type Parameters: E - the element type Parameters: array - the array over which to iterate Returns: a list iterator over the array Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayListIterator public static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> arrayListIterator([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array) Gets a list iterator over an object or primitive array. This method will handle primitive arrays as well as object arrays. The primitives will be wrapped in the appropriate wrapper class.Type Parameters: E - the element type Parameters: array - the array over which to iterate Returns: a list iterator over the array Throws: [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if the array is not an array [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayListIterator public static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> arrayListIterator(E[] array, int start) Gets a list iterator over the end part of an object array.Type Parameters: E - the element type Parameters: array - the array over which to iterate start - the index to start iterating at Returns: a list iterator over part of the array Throws: [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if start is less than zero [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayListIterator public static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> arrayListIterator([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array, int start) Gets a list iterator over the end part of an object or primitive array. This method will handle primitive arrays as well as object arrays. The primitives will be wrapped in the appropriate wrapper class.Type Parameters: E - the element type Parameters: array - the array over which to iterate start - the index to start iterating at Returns: a list iterator over part of the array Throws: [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if the array is not an array [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if start is less than zero [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayListIterator public static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> arrayListIterator(E[] array, int start, int end) Gets a list iterator over part of an object array.Type Parameters: E - the element type Parameters: array - the array over which to iterate start - the index to start iterating at end - the index to finish iterating at Returns: a list iterator over part of the array Throws: [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if array bounds are invalid [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if end is before start [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### arrayListIterator public static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> arrayListIterator([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) array, int start, int end) Gets a list iterator over part of an object or primitive array. This method will handle primitive arrays as well as object arrays. The primitives will be wrapped in the appropriate wrapper class.Type Parameters: E - the element type Parameters: array - the array over which to iterate start - the index to start iterating at end - the index to finish iterating at Returns: a list iterator over part of the array Throws: [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if the array is not an array or end is before start [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if array bounds are invalid [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if array is null

#### boundedIterator public static <E> [BoundedIterator](http://docs.google.com/org/apache/commons/collections4/iterators/BoundedIterator.html)<E> boundedIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, long max) Decorates the specified iterator to return at most the given number of elements.Type Parameters: E - the element type Parameters: iterator - the iterator to decorate max - the maximum number of elements returned by this iterator Returns: a new bounded iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if the iterator is null [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if max is negative Since: 4.1

#### boundedIterator public static <E> [BoundedIterator](http://docs.google.com/org/apache/commons/collections4/iterators/BoundedIterator.html)<E> boundedIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, long offset, long max) Decorates the specified iterator to return at most the given number of elements, skipping all elements until the iterator reaches the position at offset. The iterator is immediately advanced until it reaches the position at offset, incurring O(n) time.Type Parameters: E - the element type Parameters: iterator - the iterator to decorate offset - the index of the first element of the decorated iterator to return max - the maximum number of elements returned by this iterator Returns: a new bounded iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if the iterator is null [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if either offset or max is negative Since: 4.1

#### unmodifiableIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> unmodifiableIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator) Gets an immutable version of an [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true). The returned object will always throw an [UnsupportedOperationException](https://docs.oracle.com/javase/7/docs/api/java/lang/UnsupportedOperationException.html?is-external=true) for the [Iterator.remove()](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true#remove--) method.Type Parameters: E - the element type Parameters: iterator - the iterator to make immutable Returns: an immutable version of the iterator

#### unmodifiableListIterator public static <E> [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> unmodifiableListIterator([ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> listIterator) Gets an immutable version of a [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true). The returned object will always throw an [UnsupportedOperationException](https://docs.oracle.com/javase/7/docs/api/java/lang/UnsupportedOperationException.html?is-external=true) for the [Iterator.remove()](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true#remove--), [ListIterator.add(E)](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true#add-E-) and [ListIterator.set(E)](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true#set-E-) methods.Type Parameters: E - the element type Parameters: listIterator - the iterator to make immutable Returns: an immutable version of the iterator

#### unmodifiableMapIterator public static <K,V> [MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html)<K,V> unmodifiableMapIterator([MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html)<K,V> mapIterator) Gets an immutable version of a [MapIterator](http://docs.google.com/org/apache/commons/collections4/MapIterator.html). The returned object will always throw an [UnsupportedOperationException](https://docs.oracle.com/javase/7/docs/api/java/lang/UnsupportedOperationException.html?is-external=true) for the [Iterator.remove()](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true#remove--), [MapIterator.setValue(Object)](http://docs.google.com/org/apache/commons/collections4/MapIterator.html#setValue-V-) methods.Type Parameters: K - the key type V - the value type Parameters: mapIterator - the iterator to make immutable Returns: an immutable version of the iterator

#### chainedIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> chainedIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator1, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator2) Gets an iterator that iterates through two [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s one after another.Type Parameters: E - the element type Parameters: iterator1 - the first iterator to use, not null iterator2 - the second iterator to use, not null Returns: a combination iterator over the iterators Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if either iterator is null

#### chainedIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> chainedIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>... iterators) Gets an iterator that iterates through an array of [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s one after another.Type Parameters: E - the element type Parameters: iterators - the iterators to use, not null or empty or contain nulls Returns: a combination iterator over the iterators Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterators array is null or contains a null

#### chainedIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> chainedIterator([Collection](https://docs.oracle.com/javase/7/docs/api/java/util/Collection.html?is-external=true)<[Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>> iterators) Gets an iterator that iterates through a collections of [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s one after another.Type Parameters: E - the element type Parameters: iterators - the iterators to use, not null or empty or contain nulls Returns: a combination iterator over the iterators Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterators collection is null or contains a null [ClassCastException](https://docs.oracle.com/javase/7/docs/api/java/lang/ClassCastException.html?is-external=true) - if the iterators collection contains the wrong object type

#### collatedIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> collatedIterator([Comparator](https://docs.oracle.com/javase/7/docs/api/java/util/Comparator.html?is-external=true)<? super E> comparator, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator1, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator2) Gets an iterator that provides an ordered iteration over the elements contained in a collection of ordered [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s. Given two ordered [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s A and B, the [Iterator.next()](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true#next--) method will return the lesser of A.next() and B.next(). The comparator is optional. If null is specified then natural order is used.Type Parameters: E - the element type Parameters: comparator - the comparator to use, may be null for natural order iterator1 - the first iterators to use, not null iterator2 - the first iterators to use, not null Returns: a combination iterator over the iterators Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if either iterator is null

#### collatedIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> collatedIterator([Comparator](https://docs.oracle.com/javase/7/docs/api/java/util/Comparator.html?is-external=true)<? super E> comparator, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>... iterators) Gets an iterator that provides an ordered iteration over the elements contained in an array of [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s. Given two ordered [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s A and B, the [Iterator.next()](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true#next--) method will return the lesser of A.next() and B.next() and so on. The comparator is optional. If null is specified then natural order is used.Type Parameters: E - the element type Parameters: comparator - the comparator to use, may be null for natural order iterators - the iterators to use, not null or empty or contain nulls Returns: a combination iterator over the iterators Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterators array is null or contains a null value

#### collatedIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> collatedIterator([Comparator](https://docs.oracle.com/javase/7/docs/api/java/util/Comparator.html?is-external=true)<? super E> comparator, [Collection](https://docs.oracle.com/javase/7/docs/api/java/util/Collection.html?is-external=true)<[Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>> iterators) Gets an iterator that provides an ordered iteration over the elements contained in a collection of [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s. Given two ordered [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)s A and B, the [Iterator.next()](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true#next--) method will return the lesser of A.next() and B.next() and so on. The comparator is optional. If null is specified then natural order is used.Type Parameters: E - the element type Parameters: comparator - the comparator to use, may be null for natural order iterators - the iterators to use, not null or empty or contain nulls Returns: a combination iterator over the iterators Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterators collection is null or contains a null [ClassCastException](https://docs.oracle.com/javase/7/docs/api/java/lang/ClassCastException.html?is-external=true) - if the iterators collection contains the wrong object type

#### objectGraphIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> objectGraphIterator(E root, [Transformer](http://docs.google.com/org/apache/commons/collections4/Transformer.html)<? super E,? extends E> transformer) Gets an iterator that operates over an object graph. This iterator can extract multiple objects from a complex tree-like object graph. The iteration starts from a single root object. It uses a Transformer to extract the iterators and elements. Its main benefit is that no intermediate List is created. For example, consider an object graph: |- Branch -- Leaf | \- Leaf |- Tree | /- Leaf | |- Branch -- Leaf Forest | \- Leaf | |- Branch -- Leaf | | \- Leaf |- Tree | /- Leaf |- Branch -- Leaf |- Branch -- LeafThe following Transformer, used in this class, will extract all the Leaf objects without creating a combined intermediate list: public Object transform(Object input) { if (input instanceof Forest) { return ((Forest) input).treeIterator(); } if (input instanceof Tree) { return ((Tree) input).branchIterator(); } if (input instanceof Branch) { return ((Branch) input).leafIterator(); } if (input instanceof Leaf) { return input; } throw new ClassCastException(); } Internally, iteration starts from the root object. When next is called, the transformer is called to examine the object. The transformer will return either an iterator or an object. If the object is an Iterator, the next element from that iterator is obtained and the process repeats. If the element is an object it is returned. Under many circumstances, linking Iterators together in this manner is more efficient (and convenient) than using nested for loops to extract a list.Type Parameters: E - the element type Parameters: root - the root object to start iterating from, null results in an empty iterator transformer - the transformer to use, see above, null uses no effect transformer Returns: a new object graph iterator Since: 3.1

#### transformedIterator public static <I,O> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<O> transformedIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends I> iterator, [Transformer](http://docs.google.com/org/apache/commons/collections4/Transformer.html)<? super I,? extends O> transform) Gets an iterator that transforms the elements of another iterator. The transformation occurs during the next() method and the underlying iterator is unaffected by the transformation.Type Parameters: I - the input type O - the output type Parameters: iterator - the iterator to use, not null transform - the transform to use, not null Returns: a new transforming iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if either parameter is null

#### filteredIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> filteredIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Gets an iterator that filters another iterator. The returned iterator will only return objects that match the specified filtering predicate.Type Parameters: E - the element type Parameters: iterator - the iterator to use, not null predicate - the predicate to use as a filter, not null Returns: a new filtered iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if either parameter is null

#### filteredListIterator public static <E> [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> filteredListIterator([ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<? extends E> listIterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Gets a list iterator that filters another list iterator. The returned iterator will only return objects that match the specified filtering predicate.Type Parameters: E - the element type Parameters: listIterator - the list iterator to use, not null predicate - the predicate to use as a filter, not null Returns: a new filtered iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if either parameter is null

#### loopingIterator public static <E> [ResettableIterator](http://docs.google.com/org/apache/commons/collections4/ResettableIterator.html)<E> loopingIterator([Collection](https://docs.oracle.com/javase/7/docs/api/java/util/Collection.html?is-external=true)<? extends E> coll) Gets an iterator that loops continuously over the supplied collection. The iterator will only stop looping if the remove method is called enough times to empty the collection, or if the collection is empty to start with.Type Parameters: E - the element type Parameters: coll - the collection to iterate over, not null Returns: a new looping iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if the collection is null

#### loopingListIterator public static <E> [ResettableListIterator](http://docs.google.com/org/apache/commons/collections4/ResettableListIterator.html)<E> loopingListIterator([List](https://docs.oracle.com/javase/7/docs/api/java/util/List.html?is-external=true)<E> list) Gets an iterator that loops continuously over the supplied list. The iterator will only stop looping if the remove method is called enough times to empty the list, or if the list is empty to start with.Type Parameters: E - the element type Parameters: list - the list to iterate over, not null Returns: a new looping iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if the list is null Since: 3.2

#### nodeListIterator public static [NodeListIterator](http://docs.google.com/org/apache/commons/collections4/iterators/NodeListIterator.html) nodeListIterator([NodeList](https://docs.oracle.com/javase/7/docs/api/org/w3c/dom/NodeList.html?is-external=true) nodeList) Gets an [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) that wraps the specified [NodeList](https://docs.oracle.com/javase/7/docs/api/org/w3c/dom/NodeList.html?is-external=true). The returned [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) can be used for a single iteration.Parameters: nodeList - the node list to use, may not be null Returns: a new, single use [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if nodeList is null Since: 4.0

#### nodeListIterator public static [NodeListIterator](http://docs.google.com/org/apache/commons/collections4/iterators/NodeListIterator.html) nodeListIterator([Node](https://docs.oracle.com/javase/7/docs/api/org/w3c/dom/Node.html?is-external=true) node) Gets an [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) that wraps the specified node's childNodes. The returned [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) can be used for a single iteration. Convenience method, allows easy iteration over NodeLists: Iterator<Node> iterator = IteratorUtils.nodeListIterator(node); for(Node childNode : IteratorUtils.asIterable(iterator)) { ... } Parameters: node - the node to use, may not be null Returns: a new, single use [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if node is null Since: 4.0

#### peekingIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> peekingIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an iterator that supports one-element lookahead.Type Parameters: E - the element type Parameters: iterator - the iterator to decorate, not null Returns: a peeking iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if the iterator is null Since: 4.0

#### pushbackIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> pushbackIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an iterator that supports pushback of elements.Type Parameters: E - the element type Parameters: iterator - the iterator to decorate, not null Returns: a pushback iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if the iterator is null Since: 4.0

#### skippingIterator public static <E> [SkippingIterator](http://docs.google.com/org/apache/commons/collections4/iterators/SkippingIterator.html)<E> skippingIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, long offset) Decorates the specified iterator to skip the first N elements.Type Parameters: E - the element type Parameters: iterator - the iterator to decorate offset - the first number of elements to skip Returns: a new skipping iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if the iterator is null [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if offset is negative Since: 4.1

#### zippingIterator public static <E> [ZippingIterator](http://docs.google.com/org/apache/commons/collections4/iterators/ZippingIterator.html)<E> zippingIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> a, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> b) Returns an iterator that interleaves elements from the decorated iterators.Type Parameters: E - the element type Parameters: a - the first iterator to interleave b - the second iterator to interleave Returns: an iterator, interleaving the decorated iterators Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if any iterator is null Since: 4.1

#### zippingIterator public static <E> [ZippingIterator](http://docs.google.com/org/apache/commons/collections4/iterators/ZippingIterator.html)<E> zippingIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> a, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> b, [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> c) Returns an iterator that interleaves elements from the decorated iterators.Type Parameters: E - the element type Parameters: a - the first iterator to interleave b - the second iterator to interleave c - the third iterator to interleave Returns: an iterator, interleaving the decorated iterators Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if any iterator is null Since: 4.1

#### zippingIterator public static <E> [ZippingIterator](http://docs.google.com/org/apache/commons/collections4/iterators/ZippingIterator.html)<E> zippingIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E>... iterators) Returns an iterator that interleaves elements from the decorated iterators.Type Parameters: E - the element type Parameters: iterators - the array of iterators to interleave Returns: an iterator, interleaving the decorated iterators Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if any iterator is null Since: 4.1

#### asIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> asIterator([Enumeration](https://docs.oracle.com/javase/7/docs/api/java/util/Enumeration.html?is-external=true)<? extends E> enumeration) Gets an iterator that provides an iterator view of the given enumeration.Type Parameters: E - the element type Parameters: enumeration - the enumeration to use, may not be null Returns: a new iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if enumeration is null

#### asIterator public static <E> [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> asIterator([Enumeration](https://docs.oracle.com/javase/7/docs/api/java/util/Enumeration.html?is-external=true)<? extends E> enumeration, [Collection](https://docs.oracle.com/javase/7/docs/api/java/util/Collection.html?is-external=true)<? super E> removeCollection) Gets an iterator that provides an iterator view of the given enumeration that will remove elements from the specified collection.Type Parameters: E - the element type Parameters: enumeration - the enumeration to use, may not be null removeCollection - the collection to remove elements from, may not be null Returns: a new iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if enumeration or removeCollection is null

#### asEnumeration public static <E> [Enumeration](https://docs.oracle.com/javase/7/docs/api/java/util/Enumeration.html?is-external=true)<E> asEnumeration([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an enumeration that wraps an iterator.Type Parameters: E - the element type Parameters: iterator - the iterator to use, may not be null Returns: a new enumeration Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterator is null

#### asIterable public static <E> [Iterable](https://docs.oracle.com/javase/7/docs/api/java/lang/Iterable.html?is-external=true)<E> asIterable([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an [Iterable](https://docs.oracle.com/javase/7/docs/api/java/lang/Iterable.html?is-external=true) that wraps an iterator. The returned [Iterable](https://docs.oracle.com/javase/7/docs/api/java/lang/Iterable.html?is-external=true) can be used for a single iteration.Type Parameters: E - the element type Parameters: iterator - the iterator to use, may not be null Returns: a new, single use [Iterable](https://docs.oracle.com/javase/7/docs/api/java/lang/Iterable.html?is-external=true) Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterator is null

#### asMultipleUseIterable public static <E> [Iterable](https://docs.oracle.com/javase/7/docs/api/java/lang/Iterable.html?is-external=true)<E> asMultipleUseIterable([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets an iterable that wraps an iterator. The returned iterable can be used for multiple iterations.Type Parameters: E - the element type Parameters: iterator - the iterator to use, may not be null Returns: a new, multiple use iterable Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterator is null

#### toListIterator public static <E> [ListIterator](https://docs.oracle.com/javase/7/docs/api/java/util/ListIterator.html?is-external=true)<E> toListIterator([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets a list iterator based on a simple iterator. As the wrapped Iterator is traversed, a LinkedList of its values is cached, permitting all required operations of ListIterator.Type Parameters: E - the element type Parameters: iterator - the iterator to use, may not be null Returns: a new iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterator parameter is null

#### toArray public static [Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true)[] toArray([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<?> iterator) Gets an array based on an iterator. As the wrapped Iterator is traversed, an ArrayList of its values is created. At the end, this is converted to an array.Parameters: iterator - the iterator to use, not null Returns: an array of the iterator contents Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterator parameter is null

#### toArray public static <E> E[] toArray([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, [Class](https://docs.oracle.com/javase/7/docs/api/java/lang/Class.html?is-external=true)<E> arrayClass) Gets an array based on an iterator. As the wrapped Iterator is traversed, an ArrayList of its values is created. At the end, this is converted to an array.Type Parameters: E - the element type Parameters: iterator - the iterator to use, not null arrayClass - the class of array to create Returns: an array of the iterator contents Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterator parameter or arrayClass is null [ArrayStoreException](https://docs.oracle.com/javase/7/docs/api/java/lang/ArrayStoreException.html?is-external=true) - if the arrayClass is invalid

#### toList public static <E> [List](https://docs.oracle.com/javase/7/docs/api/java/util/List.html?is-external=true)<E> toList([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator) Gets a list based on an iterator. As the wrapped Iterator is traversed, an ArrayList of its values is created. At the end, the list is returned.Type Parameters: E - the element type Parameters: iterator - the iterator to use, not null Returns: a list of the iterator contents Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterator parameter is null

#### toList public static <E> [List](https://docs.oracle.com/javase/7/docs/api/java/util/List.html?is-external=true)<E> toList([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<? extends E> iterator, int estimatedSize) Gets a list based on an iterator. As the wrapped Iterator is traversed, an ArrayList of its values is created. At the end, the list is returned.Type Parameters: E - the element type Parameters: iterator - the iterator to use, not null estimatedSize - the initial size of the ArrayList Returns: a list of the iterator contents Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if iterator parameter is null [IllegalArgumentException](https://docs.oracle.com/javase/7/docs/api/java/lang/IllegalArgumentException.html?is-external=true) - if the size is less than 1

#### getIterator public static [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<?> getIterator([Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) obj)

* + - Gets a suitable Iterator for the given object.  
      This method can handle objects as follows
      * null - empty iterator
      * Iterator - returned directly
      * Enumeration - wrapped
      * Collection - iterator from collection returned
      * Map - values iterator returned
      * Dictionary - values (elements) enumeration returned as iterator
      * array - iterator over array returned
      * object with iterator() public method accessed by reflection
      * object - singleton iterator
      * NodeList - iterator over the list
      * Node - iterator over the child nodes

Parameters: obj - the object to convert to an iterator Returns: a suitable iterator, never null

#### forEach public static <E> void forEach([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Closure](http://docs.google.com/org/apache/commons/collections4/Closure.html)<? super E> closure) Applies the closure to each element of the provided iterator.Type Parameters: E - the element type Parameters: iterator - the iterator to use, may be null closure - the closure to apply to each element, may not be null Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if closure is null Since: 4.1

#### forEachButLast public static <E> E forEachButLast([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Closure](http://docs.google.com/org/apache/commons/collections4/Closure.html)<? super E> closure) Executes the given closure on each but the last element in the iterator. If the input iterator is null no change is made.Type Parameters: E - the type of object the [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) contains Parameters: iterator - the iterator to get the input from, may be null closure - the closure to perform, may not be null Returns: the last element in the iterator, or null if iterator is null or empty Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if closure is null Since: 4.1

#### find public static <E> E find([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Finds the first element in the given iterator which matches the given predicate. A null or empty iterator returns null.Type Parameters: E - the element type Parameters: iterator - the iterator to search, may be null predicate - the predicate to use, may not be null Returns: the first element of the iterator which matches the predicate or null if none could be found Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if predicate is null Since: 4.1

#### indexOf public static <E> int indexOf([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Returns the index of the first element in the specified iterator that matches the given predicate. A null or empty iterator returns -1.Type Parameters: E - the element type Parameters: iterator - the iterator to search, may be null predicate - the predicate to use, may not be null Returns: the index of the first element which matches the predicate or -1 if none matches Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if predicate is null Since: 4.1

#### matchesAny public static <E> boolean matchesAny([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Answers true if a predicate is true for any element of the iterator. A null or empty iterator returns false.Type Parameters: E - the type of object the [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) contains Parameters: iterator - the [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) to use, may be null predicate - the predicate to use, may not be null Returns: true if any element of the collection matches the predicate, false otherwise Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if predicate is null Since: 4.1

#### matchesAll public static <E> boolean matchesAll([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Predicate](http://docs.google.com/org/apache/commons/collections4/Predicate.html)<? super E> predicate) Answers true if a predicate is true for every element of an iterator. A null or empty iterator returns true.Type Parameters: E - the type of object the [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) contains Parameters: iterator - the [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) to use, may be null predicate - the predicate to use, may not be null Returns: true if every element of the collection matches the predicate or if the collection is empty, false otherwise Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if predicate is null Since: 4.1

#### isEmpty public static boolean isEmpty([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<?> iterator) Checks if the given iterator is empty. A null or empty iterator returns true.Parameters: iterator - the [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) to use, may be null Returns: true if the iterator is exhausted or null, false otherwise Since: 4.1

#### contains public static <E> boolean contains([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Object](https://docs.oracle.com/javase/7/docs/api/java/lang/Object.html?is-external=true) object) Checks if the object is contained in the given iterator. A null or empty iterator returns false.Type Parameters: E - the type of object the [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) contains Parameters: iterator - the iterator to check, may be null object - the object to check Returns: true if the object is contained in the iterator, false otherwise Since: 4.1

#### get public static <E> E get([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, int index) Returns the index-th value in [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true), throwing IndexOutOfBoundsException if there is no such element. The Iterator is advanced to index (or to the end, if index exceeds the number of entries) as a side effect of this method.Type Parameters: E - the type of object in the [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) Parameters: iterator - the iterator to get a value from index - the index to get Returns: the object at the specified index Throws: [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if the index is invalid Since: 4.1

#### first public static <E> E first([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator) Shortcut for get(iterator, 0). Returns the first value in [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true), throwing IndexOutOfBoundsException if there is no such element. The Iterator is advanced to 0 (or to the end, if 0 exceeds the number of entries) as a side effect of this method.Type Parameters: E - the type of object in the [Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true) Parameters: iterator - the iterator to get a value from Returns: the first object Throws: [IndexOutOfBoundsException](https://docs.oracle.com/javase/7/docs/api/java/lang/IndexOutOfBoundsException.html?is-external=true) - if the request is invalid Since: 4.2

#### size public static int size([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<?> iterator) Returns the number of elements contained in the given iterator. A null or empty iterator returns 0.Parameters: iterator - the iterator to check, may be null Returns: the number of elements contained in the iterator Since: 4.1

#### toString public static <E> [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) toString([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator) Returns a string representation of the elements of the specified iterator. The string representation consists of a list of the iterator's elements, enclosed in square brackets ("[]"). Adjacent elements are separated by the characters ", " (a comma followed by a space). Elements are converted to strings as by String.valueOf(Object).Type Parameters: E - the element type Parameters: iterator - the iterator to convert to a string, may be null Returns: a string representation of iterator Since: 4.1

#### toString public static <E> [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) toString([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Transformer](http://docs.google.com/org/apache/commons/collections4/Transformer.html)<? super E,[String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true)> transformer) Returns a string representation of the elements of the specified iterator. The string representation consists of a list of the iterable's elements, enclosed in square brackets ("[]"). Adjacent elements are separated by the characters ", " (a comma followed by a space). Elements are converted to strings as by using the provided transformer.Type Parameters: E - the element type Parameters: iterator - the iterator to convert to a string, may be null transformer - the transformer used to get a string representation of an element Returns: a string representation of iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if transformer is null Since: 4.1

#### toString public static <E> [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) toString([Iterator](https://docs.oracle.com/javase/7/docs/api/java/util/Iterator.html?is-external=true)<E> iterator, [Transformer](http://docs.google.com/org/apache/commons/collections4/Transformer.html)<? super E,[String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true)> transformer, [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) delimiter, [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) prefix, [String](https://docs.oracle.com/javase/7/docs/api/java/lang/String.html?is-external=true) suffix) Returns a string representation of the elements of the specified iterator. The string representation consists of a list of the iterator's elements, enclosed by the provided prefix and suffix. Adjacent elements are separated by the provided delimiter. Elements are converted to strings as by using the provided transformer.Type Parameters: E - the element type Parameters: iterator - the iterator to convert to a string, may be null transformer - the transformer used to get a string representation of an element delimiter - the string to delimit elements prefix - the prefix, prepended to the string representation suffix - the suffix, appended to the string representation Returns: a string representation of iterator Throws: [NullPointerException](https://docs.oracle.com/javase/7/docs/api/java/lang/NullPointerException.html?is-external=true) - if either transformer, delimiter, prefix or suffix is null Since: 4.1

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