| | [**Overview**](http://docs.google.com/overview-summary.html) | **Package** | Class | [**Use**](http://docs.google.com/package-use.html) | [**Tree**](http://docs.google.com/package-tree.html) | [**Deprecated**](http://docs.google.com/deprecated-list.html) | [**Index**](http://docs.google.com/index-files/index-1.html) | [**Help**](http://docs.google.com/help-doc.html) | | --- | --- | --- | --- | --- | --- | --- | --- | | | ***Java™ Platform***  ***Standard Ed. 6*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [**PREV PACKAGE**](http://docs.google.com/java/text/spi/package-summary.html)   [**NEXT PACKAGE**](http://docs.google.com/java/util/concurrent/package-summary.html) | [**FRAMES**](http://docs.google.com/index.html?java/util/package-summary.html)    [**NO FRAMES**](http://docs.google.com/package-summary.html)     [**All Classes**](http://docs.google.com/allclasses-noframe.html) |

## Package java.util

Contains the collections framework, legacy collection classes, event model, date and time facilities, internationalization, and miscellaneous utility classes (a string tokenizer, a random-number generator, and a bit array).

**See:**

[**Description**](#3znysh7)

| **Interface Summary** | |
| --- | --- |
| [**Collection<E>**](http://docs.google.com/java/util/Collection.html) | The root interface in the *collection hierarchy*. |
| [**Comparator<T>**](http://docs.google.com/java/util/Comparator.html) | A comparison function, which imposes a *total ordering* on some collection of objects. |
| [**Deque<E>**](http://docs.google.com/java/util/Deque.html) | A linear collection that supports element insertion and removal at both ends. |
| [**Enumeration<E>**](http://docs.google.com/java/util/Enumeration.html) | An object that implements the Enumeration interface generates a series of elements, one at a time. |
| [**EventListener**](http://docs.google.com/java/util/EventListener.html) | A tagging interface that all event listener interfaces must extend. |
| [**Formattable**](http://docs.google.com/java/util/Formattable.html) | The Formattable interface must be implemented by any class that needs to perform custom formatting using the 's' conversion specifier of [Formatter](http://docs.google.com/java/util/Formatter.html). |
| [**Iterator<E>**](http://docs.google.com/java/util/Iterator.html) | An iterator over a collection. |
| [**List<E>**](http://docs.google.com/java/util/List.html) | An ordered collection (also known as a *sequence*). |
| [**ListIterator<E>**](http://docs.google.com/java/util/ListIterator.html) | An iterator for lists that allows the programmer to traverse the list in either direction, modify the list during iteration, and obtain the iterator's current position in the list. |
| [**Map<K,V>**](http://docs.google.com/java/util/Map.html) | An object that maps keys to values. |
| [**Map.Entry<K,V>**](http://docs.google.com/java/util/Map.Entry.html) | A map entry (key-value pair). |
| [**NavigableMap<K,V>**](http://docs.google.com/java/util/NavigableMap.html) | A [SortedMap](http://docs.google.com/java/util/SortedMap.html) extended with navigation methods returning the closest matches for given search targets. |
| [**NavigableSet<E>**](http://docs.google.com/java/util/NavigableSet.html) | A [SortedSet](http://docs.google.com/java/util/SortedSet.html) extended with navigation methods reporting closest matches for given search targets. |
| [**Observer**](http://docs.google.com/java/util/Observer.html) | A class can implement the Observer interface when it wants to be informed of changes in observable objects. |
| [**Queue<E>**](http://docs.google.com/java/util/Queue.html) | A collection designed for holding elements prior to processing. |
| [**RandomAccess**](http://docs.google.com/java/util/RandomAccess.html) | Marker interface used by List implementations to indicate that they support fast (generally constant time) random access. |
| [**Set<E>**](http://docs.google.com/java/util/Set.html) | A collection that contains no duplicate elements. |
| [**SortedMap<K,V>**](http://docs.google.com/java/util/SortedMap.html) | A [Map](http://docs.google.com/java/util/Map.html) that further provides a *total ordering* on its keys. |
| [**SortedSet<E>**](http://docs.google.com/java/util/SortedSet.html) | A [Set](http://docs.google.com/java/util/Set.html) that further provides a *total ordering* on its elements. |

| **Class Summary** | |
| --- | --- |
| [**AbstractCollection<E>**](http://docs.google.com/java/util/AbstractCollection.html) | This class provides a skeletal implementation of the Collection interface, to minimize the effort required to implement this interface. |
| [**AbstractList<E>**](http://docs.google.com/java/util/AbstractList.html) | This class provides a skeletal implementation of the [List](http://docs.google.com/java/util/List.html) interface to minimize the effort required to implement this interface backed by a "random access" data store (such as an array). |
| [**AbstractMap<K,V>**](http://docs.google.com/java/util/AbstractMap.html) | This class provides a skeletal implementation of the Map interface, to minimize the effort required to implement this interface. |
| [**AbstractMap.SimpleEntry<K,V>**](http://docs.google.com/java/util/AbstractMap.SimpleEntry.html) | An Entry maintaining a key and a value. |
| [**AbstractMap.SimpleImmutableEntry<K,V>**](http://docs.google.com/java/util/AbstractMap.SimpleImmutableEntry.html) | An Entry maintaining an immutable key and value. |
| [**AbstractQueue<E>**](http://docs.google.com/java/util/AbstractQueue.html) | This class provides skeletal implementations of some [Queue](http://docs.google.com/java/util/Queue.html) operations. |
| [**AbstractSequentialList<E>**](http://docs.google.com/java/util/AbstractSequentialList.html) | This class provides a skeletal implementation of the List interface to minimize the effort required to implement this interface backed by a "sequential access" data store (such as a linked list). |
| [**AbstractSet<E>**](http://docs.google.com/java/util/AbstractSet.html) | This class provides a skeletal implementation of the Set interface to minimize the effort required to implement this interface. |
| [**ArrayDeque<E>**](http://docs.google.com/java/util/ArrayDeque.html) | Resizable-array implementation of the [Deque](http://docs.google.com/java/util/Deque.html) interface. |
| [**ArrayList<E>**](http://docs.google.com/java/util/ArrayList.html) | Resizable-array implementation of the List interface. |
| [**Arrays**](http://docs.google.com/java/util/Arrays.html) | This class contains various methods for manipulating arrays (such as sorting and searching). |
| [**BitSet**](http://docs.google.com/java/util/BitSet.html) | This class implements a vector of bits that grows as needed. |
| [**Calendar**](http://docs.google.com/java/util/Calendar.html) | The Calendar class is an abstract class that provides methods for converting between a specific instant in time and a set of [calendar fields](http://docs.google.com/java/util/Calendar.html#fields) such as YEAR, MONTH, DAY\_OF\_MONTH, HOUR, and so on, and for manipulating the calendar fields, such as getting the date of the next week. |
| [**Collections**](http://docs.google.com/java/util/Collections.html) | This class consists exclusively of static methods that operate on or return collections. |
| [**Currency**](http://docs.google.com/java/util/Currency.html) | Represents a currency. |
| [**Date**](http://docs.google.com/java/util/Date.html) | The class Date represents a specific instant in time, with millisecond precision. |
| [**Dictionary<K,V>**](http://docs.google.com/java/util/Dictionary.html) | The Dictionary class is the abstract parent of any class, such as Hashtable, which maps keys to values. |
| [**EnumMap<K extends Enum<K>,V>**](http://docs.google.com/java/util/EnumMap.html) | A specialized [Map](http://docs.google.com/java/util/Map.html) implementation for use with enum type keys. |
| [**EnumSet<E extends Enum<E>>**](http://docs.google.com/java/util/EnumSet.html) | A specialized [Set](http://docs.google.com/java/util/Set.html) implementation for use with enum types. |
| [**EventListenerProxy**](http://docs.google.com/java/util/EventListenerProxy.html) | An abstract wrapper class for an EventListener class which associates a set of additional parameters with the listener. |
| [**EventObject**](http://docs.google.com/java/util/EventObject.html) | The root class from which all event state objects shall be derived. |
| [**FormattableFlags**](http://docs.google.com/java/util/FormattableFlags.html) | FomattableFlags are passed to the [Formattable.formatTo()](http://docs.google.com/java/util/Formattable.html#formatTo(java.util.Formatter,%20int,%20int,%20int)) method and modify the output format for [Formattables](http://docs.google.com/java/util/Formattable.html). |
| [**Formatter**](http://docs.google.com/java/util/Formatter.html) | An interpreter for printf-style format strings. |
| [**GregorianCalendar**](http://docs.google.com/java/util/GregorianCalendar.html) | GregorianCalendar is a concrete subclass of Calendar and provides the standard calendar system used by most of the world. |
| [**HashMap<K,V>**](http://docs.google.com/java/util/HashMap.html) | Hash table based implementation of the Map interface. |
| [**HashSet<E>**](http://docs.google.com/java/util/HashSet.html) | This class implements the Set interface, backed by a hash table (actually a HashMap instance). |
| [**Hashtable<K,V>**](http://docs.google.com/java/util/Hashtable.html) | This class implements a hashtable, which maps keys to values. |
| [**IdentityHashMap<K,V>**](http://docs.google.com/java/util/IdentityHashMap.html) | This class implements the Map interface with a hash table, using reference-equality in place of object-equality when comparing keys (and values). |
| [**LinkedHashMap<K,V>**](http://docs.google.com/java/util/LinkedHashMap.html) | Hash table and linked list implementation of the Map interface, with predictable iteration order. |
| [**LinkedHashSet<E>**](http://docs.google.com/java/util/LinkedHashSet.html) | Hash table and linked list implementation of the Set interface, with predictable iteration order. |
| [**LinkedList<E>**](http://docs.google.com/java/util/LinkedList.html) | Linked list implementation of the List interface. |
| [**ListResourceBundle**](http://docs.google.com/java/util/ListResourceBundle.html) | ListResourceBundle is an abstract subclass of ResourceBundle that manages resources for a locale in a convenient and easy to use list. |
| [**Locale**](http://docs.google.com/java/util/Locale.html) | A Locale object represents a specific geographical, political, or cultural region. |
| [**Observable**](http://docs.google.com/java/util/Observable.html) | This class represents an observable object, or "data" in the model-view paradigm. |
| [**PriorityQueue<E>**](http://docs.google.com/java/util/PriorityQueue.html) | An unbounded priority [queue](http://docs.google.com/java/util/Queue.html) based on a priority heap. |
| [**Properties**](http://docs.google.com/java/util/Properties.html) | The Properties class represents a persistent set of properties. |
| [**PropertyPermission**](http://docs.google.com/java/util/PropertyPermission.html) | This class is for property permissions. |
| [**PropertyResourceBundle**](http://docs.google.com/java/util/PropertyResourceBundle.html) | PropertyResourceBundle is a concrete subclass of ResourceBundle that manages resources for a locale using a set of static strings from a property file. |
| [**Random**](http://docs.google.com/java/util/Random.html) | An instance of this class is used to generate a stream of pseudorandom numbers. |
| [**ResourceBundle**](http://docs.google.com/java/util/ResourceBundle.html) | Resource bundles contain locale-specific objects. |
| [**ResourceBundle.Control**](http://docs.google.com/java/util/ResourceBundle.Control.html) | ResourceBundle.Control defines a set of callback methods that are invoked by the [ResourceBundle.getBundle](http://docs.google.com/java/util/ResourceBundle.html#getBundle(java.lang.String,%20java.util.Locale,%20java.lang.ClassLoader,%20java.util.ResourceBundle.Control)) factory methods during the bundle loading process. |
| [**Scanner**](http://docs.google.com/java/util/Scanner.html) | A simple text scanner which can parse primitive types and strings using regular expressions. |
| [**ServiceLoader<S>**](http://docs.google.com/java/util/ServiceLoader.html) | A simple service-provider loading facility. |
| [**SimpleTimeZone**](http://docs.google.com/java/util/SimpleTimeZone.html) | SimpleTimeZone is a concrete subclass of TimeZone that represents a time zone for use with a Gregorian calendar. |
| [**Stack<E>**](http://docs.google.com/java/util/Stack.html) | The Stack class represents a last-in-first-out (LIFO) stack of objects. |
| [**StringTokenizer**](http://docs.google.com/java/util/StringTokenizer.html) | The string tokenizer class allows an application to break a string into tokens. |
| [**Timer**](http://docs.google.com/java/util/Timer.html) | A facility for threads to schedule tasks for future execution in a background thread. |
| [**TimerTask**](http://docs.google.com/java/util/TimerTask.html) | A task that can be scheduled for one-time or repeated execution by a Timer. |
| [**TimeZone**](http://docs.google.com/java/util/TimeZone.html) | TimeZone represents a time zone offset, and also figures out daylight savings. |
| [**TreeMap<K,V>**](http://docs.google.com/java/util/TreeMap.html) | A Red-Black tree based [NavigableMap](http://docs.google.com/java/util/NavigableMap.html) implementation. |
| [**TreeSet<E>**](http://docs.google.com/java/util/TreeSet.html) | A [NavigableSet](http://docs.google.com/java/util/NavigableSet.html) implementation based on a [TreeMap](http://docs.google.com/java/util/TreeMap.html). |
| [**UUID**](http://docs.google.com/java/util/UUID.html) | A class that represents an immutable universally unique identifier (UUID). |
| [**Vector<E>**](http://docs.google.com/java/util/Vector.html) | The Vector class implements a growable array of objects. |
| [**WeakHashMap<K,V>**](http://docs.google.com/java/util/WeakHashMap.html) | A hashtable-based Map implementation with *weak keys*. |

| **Enum Summary** | |
| --- | --- |
| [**Formatter.BigDecimalLayoutForm**](http://docs.google.com/java/util/Formatter.BigDecimalLayoutForm.html) |  |

| **Exception Summary** | |
| --- | --- |
| [**ConcurrentModificationException**](http://docs.google.com/java/util/ConcurrentModificationException.html) | This exception may be thrown by methods that have detected concurrent modification of an object when such modification is not permissible. |
| [**DuplicateFormatFlagsException**](http://docs.google.com/java/util/DuplicateFormatFlagsException.html) | Unchecked exception thrown when duplicate flags are provided in the format specifier. |
| [**EmptyStackException**](http://docs.google.com/java/util/EmptyStackException.html) | Thrown by methods in the Stack class to indicate that the stack is empty. |
| [**FormatFlagsConversionMismatchException**](http://docs.google.com/java/util/FormatFlagsConversionMismatchException.html) | Unchecked exception thrown when a conversion and flag are incompatible. |
| [**FormatterClosedException**](http://docs.google.com/java/util/FormatterClosedException.html) | Unchecked exception thrown when the formatter has been closed. |
| [**IllegalFormatCodePointException**](http://docs.google.com/java/util/IllegalFormatCodePointException.html) | Unchecked exception thrown when a character with an invalid Unicode code point as defined by [Character.isValidCodePoint(int)](http://docs.google.com/java/lang/Character.html#isValidCodePoint(int)) is passed to the [Formatter](http://docs.google.com/java/util/Formatter.html). |
| [**IllegalFormatConversionException**](http://docs.google.com/java/util/IllegalFormatConversionException.html) | Unchecked exception thrown when the argument corresponding to the format specifier is of an incompatible type. |
| [**IllegalFormatException**](http://docs.google.com/java/util/IllegalFormatException.html) | Unchecked exception thrown when a format string contains an illegal syntax or a format specifier that is incompatible with the given arguments. |
| [**IllegalFormatFlagsException**](http://docs.google.com/java/util/IllegalFormatFlagsException.html) | Unchecked exception thrown when an illegal combination flags is given. |
| [**IllegalFormatPrecisionException**](http://docs.google.com/java/util/IllegalFormatPrecisionException.html) | Unchecked exception thrown when the precision is a negative value other than -1, the conversion does not support a precision, or the value is otherwise unsupported. |
| [**IllegalFormatWidthException**](http://docs.google.com/java/util/IllegalFormatWidthException.html) | Unchecked exception thrown when the format width is a negative value other than -1 or is otherwise unsupported. |
| [**InputMismatchException**](http://docs.google.com/java/util/InputMismatchException.html) | Thrown by a Scanner to indicate that the token retrieved does not match the pattern for the expected type, or that the token is out of range for the expected type. |
| [**InvalidPropertiesFormatException**](http://docs.google.com/java/util/InvalidPropertiesFormatException.html) | Thrown to indicate that an operation could not complete because the input did not conform to the appropriate XML document type for a collection of properties, as per the [Properties](http://docs.google.com/java/util/Properties.html) specification. |
| [**MissingFormatArgumentException**](http://docs.google.com/java/util/MissingFormatArgumentException.html) | Unchecked exception thrown when there is a format specifier which does not have a corresponding argument or if an argument index refers to an argument that does not exist. |
| [**MissingFormatWidthException**](http://docs.google.com/java/util/MissingFormatWidthException.html) | Unchecked exception thrown when the format width is required. |
| [**MissingResourceException**](http://docs.google.com/java/util/MissingResourceException.html) | Signals that a resource is missing. |
| [**NoSuchElementException**](http://docs.google.com/java/util/NoSuchElementException.html) | Thrown by the nextElement method of an Enumeration to indicate that there are no more elements in the enumeration. |
| [**TooManyListenersException**](http://docs.google.com/java/util/TooManyListenersException.html) | The TooManyListenersException Exception is used as part of the Java Event model to annotate and implement a unicast special case of a multicast Event Source. |
| [**UnknownFormatConversionException**](http://docs.google.com/java/util/UnknownFormatConversionException.html) | Unchecked exception thrown when an unknown conversion is given. |
| [**UnknownFormatFlagsException**](http://docs.google.com/java/util/UnknownFormatFlagsException.html) | Unchecked exception thrown when an unknown flag is given. |

| **Error Summary** | |
| --- | --- |
| [**ServiceConfigurationError**](http://docs.google.com/java/util/ServiceConfigurationError.html) | Error thrown when something goes wrong while loading a service provider. |

## Package java.util Description

Contains the collections framework, legacy collection classes, event model, date and time facilities, internationalization, and miscellaneous utility classes (a string tokenizer, a random-number generator, and a bit array).

## Package Specification

* [**Collections Framework Overview**](http://docs.google.com/technotes/guides/collections/overview.html)
* [**Collections Framework Annotated Outline**](http://docs.google.com/technotes/guides/collections/reference.html)

## Related Documentation

For overviews, tutorials, examples, guides, and tool documentation, please see:

* [**Collections Framework Tutorial**](http://www.java.sun.com/docs/books/tutorial/collections/)
* [**Collections Framework Design FAQ**](http://docs.google.com/technotes/guides/collections/designfaq.html)

**Since:** JDK1.0

| | [**Overview**](http://docs.google.com/overview-summary.html) | **Package** | Class | [**Use**](http://docs.google.com/package-use.html) | [**Tree**](http://docs.google.com/package-tree.html) | [**Deprecated**](http://docs.google.com/deprecated-list.html) | [**Index**](http://docs.google.com/index-files/index-1.html) | [**Help**](http://docs.google.com/help-doc.html) | | --- | --- | --- | --- | --- | --- | --- | --- | | | ***Java™ Platform***  ***Standard Ed. 6*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| [**PREV PACKAGE**](http://docs.google.com/java/text/spi/package-summary.html)   [**NEXT PACKAGE**](http://docs.google.com/java/util/concurrent/package-summary.html) | [**FRAMES**](http://docs.google.com/index.html?java/util/package-summary.html)    [**NO FRAMES**](http://docs.google.com/package-summary.html)     [**All Classes**](http://docs.google.com/allclasses-noframe.html) |

[Submit a bug or feature](http://bugs.sun.com/services/bugreport/index.jsp)

For further API reference and developer documentation, see [Java SE Developer Documentation](http://docs.google.com/webnotes/devdocs-vs-specs.html). That documentation contains more detailed, developer-targeted descriptions, with conceptual overviews, definitions of terms, workarounds, and working code examples.

Copyright 2006 Sun Microsystems, Inc. All rights reserved. Use is subject to [license terms](http://docs.google.com/legal/license.html). Also see the [documentation redistribution policy](http://java.sun.com/docs/redist.html).