
PHP Sorted Collections

Release 1.0.8

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PHP SORTED COLLECTIONS

Sorted Collection for PHP. Insertion, search, and removal compute in $\log(n)$ time where n is the number of items present in the collection. It uses AVL threaded tree [see @Knuth97, 1:320, Sect. 2.3.1] as internal structure.

@Knuth97: Donald E. Knuth, The Art of Computer Programming, Addison-Wesley, volumes 1 and 2, 2nd edition, 1997.

This project uses:

- [PHP Code Sniffer](#) for checking PHP code style
- [PHPUnit](#) for unit test (100% covered)
- [Sphinx](#) and [Doxygen](#) for the [documentation](#)

1.1 Instructions

Using composer: either

```
$ composer create-project chdemko/sorted-collections:1.0.*@dev; cd sorted-collections
```

or create a `composer.json` file containing

```
{
  "require": {
    "chdemko/sorted-collections": "1.0.*@dev"
  }
}
```

and run

```
$ composer install
```

Create a `test.php` file containing

```
<?php

require __DIR__ . '/vendor/autoload.php';

use chdemko\SortedCollection\TreeMap;
```

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```
$tree = TreeMap::create()->put(  
    [1=>1, 9=>9, 5=>5, 2=>2, 6=>6, 3=>3, 0=>0, 8=>8, 7=>7, 4=>4]  
);  
echo $tree . PHP_EOL;
```

And run

```
$ php test.php
```

This should print

```
[0,1,2,3,4,5,6,7,8,9]
```

See the [examples](#) and [benchmarks](#) folders for more information.

1.2 Documentation

Run

```
$ sudo apt install doxygen python3-pip python3-virtualenv  
$ virtualenv venv  
$ venv/bin/activate  
(venv) $ pip install -r docs/requirements.txt  
(venv) $ sphinx-build -b html docs/ html/  
(venv) $ deactivate  
$
```

if you want to create local documentation with Sphinx.

1.3 Citation

If you are using this project including publication in research activities, you have to cite it using ([BibTeX format](#)). You are also pleased to send me an email to chdemko@gmail.com.

- authors: Christophe Demko
- title: php-sorted-collections: a PHP library for handling sorted collections
- year: 2014
- how published: <https://packagist.org/packages/chdemko/sorted-collections>

All releases can be found [here](#)

2.1 Creation

The base class for storing sorted maps is the `TreeMap` class.

```
require __DIR__ . '/vendor/autoload.php';
use chdemko\SortedCollection\TreeMap;

// This will create a map indexed by numbers
// it contains 10 key/value pairs from 0/0 to 9/9
$map = TreeMap::create()->put(
    [1=>1, 9=>9, 5=>5, 2=>2, 6=>6, 3=>3, 0=>0, 8=>8, 7=>7, 4=>4]
);
```

There are two other classes to create maps which are in fact views on another sorted map.

```
require __DIR__ . '/vendor/autoload.php';
use chdemko\SortedCollection\TreeMap;
use chdemko\SortedCollection\ReversedMap;
use chdemko\SortedCollection\SubMap;

$map = TreeMap::create()->put(
    [1=>1, 9=>9, 5=>5, 2=>2, 6=>6, 3=>3, 0=>0, 8=>8, 7=>7, 4=>4]
);

// This will create a map which is the reverse of $map
$reversed = ReversedMap::create($map);

// This will create a map which is a sub map of $reversed
$sub = SubMap::create($reversed, 7, 3);

// This will display {"7":7,"6":6,"5":5,"4":4}
echo $sub . PHP_EOL;
```

For sub maps there are other methods for creation

```
require __DIR__ . '/vendor/autoload.php';
use chdemko\SortedCollection\TreeMap;
use chdemko\SortedCollection\SubMap;

$map = TreeMap::create()->put(
```

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```

    [1=>1, 9=>9, 5=>5, 2=>2, 6=>6, 3=>3, 0=>0, 8=>8, 7=>7, 4=>4]
);

// This will create a map which is a sub map of $map from key 3 to the end
$tail = SubMap::tail($map, 3);

$map[10] = 10;

// This will display {"3":3,"4":4,"5":5,"6":6,"7":7,"8":8,"9":9,"10":10}
echo $tail . PHP_EOL;

// This will create a sub map of $map from beginning to key 7 (inclusive)
$head = SubMap::head($map, 7, true);

// This will display [0,1,2,3,4,5,6,7]
echo $head . PHP_EOL;

```

Sets are created using similar functions

```

require __DIR__ . '/vendor/autoload.php';
use chdemko\SortedCollection\TreeSet;
use chdemko\SortedCollection\ReversedSet;
use chdemko\SortedCollection\SubSet;

$set = TreeSet::create()->put([1, 9, 5, 2, 6, 3, 0, 8, 7, 4]);
$reversed = ReversedSet::create($set);
$sub = SubSet::create($reversed, 7, 3);

// This will display [7,6,5,4]
echo $sub . PHP_EOL;

```

2.2 Iteration

These collections support PHP iteration.

Using maps

```

require __DIR__ . '/vendor/autoload.php';
use chdemko\SortedCollection\TreeMap;
use chdemko\SortedCollection\ReversedMap;
use chdemko\SortedCollection\SubMap;

$map = TreeMap::create()->put(
    [1=>1, 9=>9, 5=>5, 2=>2, 6=>6, 3=>3, 0=>0, 8=>8, 7=>7, 4=>4]
);
$reversed = ReversedMap::create($map);
$sub = SubMap::create($reversed, 7, 3);

// This will display 7:7;6:6;5:5;4:4;
foreach ($sub as $key => $value)
{

```

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```

        echo $key . ':' . $value . ' ';
    }
    echo PHP_EOL;

```

Using sets

```

require __DIR__ . '/vendor/autoload.php';
use chdemko\SortedCollection\TreeSet;
use chdemko\SortedCollection\ReversedSet;
use chdemko\SortedCollection\SubSet;

$set = TreeSet::create()->put([1, 9, 5, 2, 6, 3, 0, 8, 7, 4]);
$reversed = ReversedSet::create($set);
$sub = SubSet::create($reversed, 7, 3);

// This will display 0:7;1:6;2:5;3:4;
foreach ($sub as $key => $value)
{
    echo $key . ':' . $value . ' ';
}
echo PHP_EOL;

```

The behavior is unpredictable if the current key of an iterator is removed of the collection.

2.3 Counting

These collections support PHP counting

```

require __DIR__ . '/vendor/autoload.php';
use chdemko\SortedCollection\TreeMap;
use chdemko\SortedCollection\ReversedMap;
use chdemko\SortedCollection\SubMap;

$map = TreeMap::create()->put(
    [1=>1, 9=>9, 5=>5, 2=>2, 6=>6, 3=>3, 0=>0, 8=>8, 7=>7, 4=>4]
);
$reversed = ReversedMap::create($map);
$sub = SubMap::create($reversed, 7, 3);

// This will display 4
echo count($sub) . PHP_EOL;

```

2.4 Array access

Insertion, modification, access and removal has been designed to work using PHP array access features

Using maps

```
require __DIR__ . '/vendor/autoload.php';
use chdemko\SortedCollection\TreeMap;

$map = TreeMap::create();
$map[4] = 4;
$map[2] = 2;
$map[6] = 6;
unset($map[4]);

// This will display 1
echo isset($map[2]) . PHP_EOL;

// This will display 2
echo $map[2] . PHP_EOL;
```

Using sets

```
require __DIR__ . '/vendor/autoload.php';
use chdemko\SortedCollection\TreeSet;

$set = TreeSet::create();
$set[4] = true;
$set[2] = true;
$set[6] = true;
unset($set[4]);

// This will display 1
echo isset($set[2]) . PHP_EOL;

// This will display 1
echo $set[2] . PHP_EOL;

// This will display nothing
echo $set[4] . PHP_EOL;
```

A lot of methods has been implemented to give access to the minimum element, the lower element...

API DOCUMENTATION

3.1 Interfaces

3.1.1 Sorted Collection

interface () → :SortedCollection

Subclassed by chdemko\SortedCollection\SortedMap, chdemko\SortedCollection\SortedSet

Public Functions

chedemko\SortedCollection\SortedCollection::comparator()

Get the comparator

Since

1.0.0

return

callable The comparator

chedemko\SortedCollection\SortedCollection::first()

Get the first element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The first element

chedemko\SortedCollection\SortedCollection::last()

Get the last element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The last element

chdemko\SortedCollection\SortedCollection::lower(\$key)

Returns the greatest element lesser than the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no lower element

return

mixed The found node

chdemko\SortedCollection\SortedCollection::floor(\$key)

Returns the greatest element lesser than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no floor element

return

mixed The found node

chdemko\SortedCollection\SortedCollection::find(\$key)

Returns the element equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no such element

return

mixed The found node

chdemko\SortedCollection\SortedCollection::ceiling(\$key)

Returns the lowest element greater than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no ceiling element

return

mixed The found node

chdemko\SortedCollection\SortedCollection::higher(\$key)

Returns the lowest element greater than to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no higher element

return

mixed The found node

3.1.2 Sorted Set

interface () → :SortedSet

Subclassed by chdemko\SortedCollection\AbstractSet

3.1.3 Sorted Map

interface () → :SortedMap

Subclassed by chdemko\SortedCollection\AbstractMap

Public Functions

chdemko\SortedCollection\SortedMap::firstKey()

Get the first key or throw an exception if there is no element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The first key

chdemko\SortedCollection\SortedMap::lastKey()

Get the last key or throw an exception if there is no element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The last key

chdemko\SortedCollection\SortedMap::lowerKey(\$key)

Returns the greatest key lesser than the given key or throw an exception if there is no such key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no lower element

return

mixed The found key

chdemko\SortedCollection\SortedMap::floorKey(\$key)

Returns the greatest key lesser than or equal to the given key or throw an exception if there is no such key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no floor element

return

mixed The found key

chdemko\SortedCollection\SortedMap::findKey(\$key)

Returns the key equal to the given key or throw an exception if there is no such key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no such element

return
mixed The found key

chdemko\SortedCollection\SortedMap::ceilingKey(\$key)

Returns the lowest key greater than or equal to the given key or throw an exception if there is no such key

Since
1.0.0

param \$key
The searched key

throws OutOfBoundsException
If there is no ceiling element

return
mixed The found key

chdemko\SortedCollection\SortedMap::higherKey(\$key)

Returns the lowest key greater than to the given key or throw an exception if there is no such key

Since
1.0.0

param \$key
The searched key

throws OutOfBoundsException
If there is no higher element

return
mixed The found key

chdemko\SortedCollection\SortedMap::predecessor(\$node)

Get the predecessor node

Since
1.0.0

param \$node
A tree node member of the underlying TreeMap

return
mixed The predecessor node

chdemko\SortedCollection\SortedMap::successor(\$node)

Get the successor node

Since
1.0.0

param \$node
A tree node member of the underlying TreeMap

return

mixed The successor node

chdemko\SortedCollection\SortedMap::keys()

Keys generator

Since

1.0.0

return

mixed The keys generator

chdemko\SortedCollection\SortedMap::values()

Values generator

Since

1.0.0

return

mixed The values generator

3.2 Abstract classes

3.2.1 Abstract Set

SortedCollection() → :AbstractSet : public chdemko\SortedCollection\SortedSet

Subclassed by chdemko\SortedCollection\ReversedSet, chdemko\SortedCollection\SubSet,
chdemko\SortedCollection\TreeSet

Public Functions

chdemko\SortedCollection\AbstractSet::__get(\$property)

Magic get method

Since

1.0.0

param \$property

The property

throws RuntimeException

If the property does not exist

return

mixed The value associated to the property

chdemko\SortedCollection\AbstractSet::comparator()

Get the comparator

Since

1.0.0

return

callable The comparator

chdemko\SortedCollection\AbstractSet::first()

Get the first element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The first element

chdemko\SortedCollection\AbstractSet::last()

Get the last element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The last element

chdemko\SortedCollection\AbstractSet::lower(\$element)

Returns the greatest element lesser than the given element

Since

1.0.0

param \$element

The searched element

throws OutOfBoundsException

If there is no lower element

return

mixed The found element

chdemko\SortedCollection\AbstractSet::floor(\$element)

Returns the greatest element lesser than or equal to the given element

Since

1.0.0

param \$element

The searched element

throws OutOfBoundsException

If there is no floor element

return

mixed The found element

chdemko\SortedCollection\AbstractSet::find(\$element)

Returns the element equal to the given element

Since

1.0.0

param \$element

The searched element

throws OutOfBoundsException

If there is no such element

return

mixed The found element

chdemko\SortedCollection\AbstractSet::ceiling(\$element)

Returns the lowest element greater than or equal to the given element

Since

1.0.0

param \$element

The searched element

throws OutOfBoundsException

If there is no ceiling element

return

mixed The found element

chdemko\SortedCollection\AbstractSet::higher(\$element)

Returns the lowest element greater than to the given element

Since

1.0.0

param \$element

The searched element

throws OutOfBoundsException

If there is no higher element

return

mixed The found element

chdemko\SortedCollection\AbstractSet::__toString()

Convert the object to a string

Since

1.0.0

return

string String representation of the object

chdemko\SortedCollection\AbstractSet::toArray()

Convert the object to an array

Since

1.0.0

return

array Array representation of the object

chdemko\SortedCollection\AbstractSet::getIterator()

Create an iterator

Since

1.0.0

return

Iterator A new iterator

chdemko\SortedCollection\AbstractSet::offsetGet(\$element)

Get the value for an element

Since

1.0.0

param \$element

The element

return

mixed The found value

chdemko\SortedCollection\AbstractSet::offsetExists(\$element)

Test the existence of an element

Since

1.0.0

param \$element

The element

return

boolean TRUE if the element exists, false otherwise

chdemko\SortedCollection\AbstractSet::offsetSet(\$element, \$value)

Set the value for an element

Since

1.0.0

param \$element

The element

param \$value

The value

throws RuntimeException

The operation is not supported by this class

return

void

chdemko\SortedCollection\AbstractSet::offsetUnset(\$element)

Unset the existence of an element

Since

1.0.0

param \$element

The element

throws RuntimeException

The operation is not supported by this class

return

void

chdemko\SortedCollection\AbstractSet::count()

Count the number of elements

Since

1.0.0

return

integer

3.2.2 Abstract Map

SortedCollection() → :AbstractMap : public chdemko\SortedCollection\SortedMap

Subclassed by chdemko\SortedCollection\ReversedMap, chdemko\SortedCollection\SubMap,
chdemko\SortedCollection\TreeMap

Public Functions

chdemko\SortedCollection\AbstractMap::__get(\$property)

Magic get method

Since

1.0.0

param \$property

The property

throws RuntimeException

If the property does not exist

return

mixed The value associated to the property

chdemko\SortedCollection\AbstractMap::firstKey()

Get the first key

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The first key

chdemko\SortedCollection\AbstractMap::firstValue()

Get the first value

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The first value

chdemko\SortedCollection\AbstractMap::lastKey()

Get the last key

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The last key

chdemko\SortedCollection\AbstractMap::lastValue()

Get the last value

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The last value

chdemko\SortedCollection\AbstractMap::lowerKey(\$key)

Returns the greatest key lesser than the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no lower element

return

mixed The found key

chdemko\SortedCollection\AbstractMap::lowerValue(\$key)

Returns the value whose key is the greatest key lesser than the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no lower element

return

mixed The found value

chdemko\SortedCollection\AbstractMap::floorKey(\$key)

Returns the greatest key lesser than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no floor element

return

mixed The found key

chdemko\SortedCollection\AbstractMap::floorValue(\$key)

Returns the value whose key is the greatest key lesser than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no floor element

return

mixed The found value

chdemko\SortedCollection\AbstractMap::findKey(\$key)

Returns the key equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no such element

return

mixed The found key

chdemko\SortedCollection\AbstractMap::findValue(\$key)

Returns the value whose key equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no such element

return

mixed The found value

chdemko\SortedCollection\AbstractMap::ceilingKey(\$key)

Returns the lowest key greater than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no ceiling element

return

mixed The found key

chdemko\SortedCollection\AbstractMap::ceilingValue(\$key)

Returns the value whose key is the lowest key greater than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no ceiling element

return

mixed The found value

chdemko\SortedCollection\AbstractMap::higherKey(\$key)

Returns the lowest key greater than to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no higher element

return

mixed The found key

chdemko\SortedCollection\AbstractMap::higherValue(\$key)

Returns the value whose key is the lowest key greater than to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no higher element

return

mixed The found value

chdemko\SortedCollection\AbstractMap::keys()

Keys iterator

Since

1.0.0

return

Iterator The keys iterator

chdemko\SortedCollection\AbstractMap::values()

Values iterator

Since

1.0.0

return

Iterator The values iterator

chdemko\SortedCollection\AbstractMap::__toString()

Convert the object to a string

Since

1.0.0

return

string String representation of the object

chdemko\SortedCollection\AbstractMap::toArray()

Convert the object to an array

Since

1.0.0

return

array Array representation of the object

chdemko\SortedCollection\AbstractMap::getIterator()

Create an iterator

Since

1.0.0

return

Iterator A new iterator

chdemko\SortedCollection\AbstractMap::offsetGet(\$key)

Get the value for a key

Since

1.0.0

param \$key

The key

throws OutOfRangeException

If there is no such element

return

mixed The found value

chdemko\SortedCollection\AbstractMap::offsetExists(\$key)

Test the existence of a key

Since

1.0.0

param \$key

The key

return

boolean TRUE if the key exists, false otherwise

chdemko\SortedCollection\AbstractMap::offsetSet(\$key, \$value)

Set the value for a key

Since

1.0.0

param \$key

The key

param \$value

The value

throws RuntimeException

The operation is not supported by this class

return

void

chdemko\SortedCollection\AbstractMap::offsetUnset(\$key)

Unset the existence of a key

Since

1.0.0

param \$key

The key

throws RuntimeException

The operation is not supported by this class

return

void

3.3 Concrete classes

3.3.1 Tree Set

SortedCollection() → :TreeSet : public chdemko\SortedCollection\AbstractSet

Public Functions

chdemko\SortedCollection\TreeSet::put(\$traversable = array())

Put values in the set

Since

1.0.0

param \$traversable

Values to put in the set

return

TreeSet \$this for chaining

chdemko\SortedCollection\TreeSet::clear()

Clear the set

Since

1.0.0

return

TreeSet \$this for chaining

chdemko\SortedCollection\TreeSet::initialise(\$traversable = array())

Initialise the set

Since

1.0.0

param \$traversable

Values to initialise the set

return

TreeSet \$this for chaining

chdemko\SortedCollection\TreeSet::__clone()

Clone the set

Since

1.0.0

return

void

chdemko\SortedCollection\TreeSet::offsetSet(\$element, \$value)

Set the value for an element

Since

1.0.0

param \$element

The element

param \$value

The value

return

void

chdemko\SortedCollection\TreeSet::jsonSerialize()

Serialize the object

Since

1.0.0

return

array Array of values

chdemko\SortedCollection\TreeSet::offsetUnset(\$element)

Unset the existence of an element

Since

1.0.0

param \$element

The element

return

void

Public Static Functions

static chdemko\SortedCollection\TreeSet::create(\$comparator = null)

Create

Since

1.0.0

param \$comparator

Comparison function

return

TreeSet A new TreeSet

3.3.2 Sub Set

SortedCollection() → :SubSet : public chdemko\SortedCollection\AbstractSet

Public Functions

chedemko\SortedCollection\SubSet::__get(\$property)

Magic get method

Since

1.0.0

param \$property

The property

return

mixed The value associated to the property

chedemko\SortedCollection\SubSet::__set(\$property, \$value)

Magic set method

Since

1.0.0

param \$property

The property

param \$value

The new value

throws RuntimeException

If the property does not exist

return

void

chedemko\SortedCollection\SubSet::__unset(\$property)

Magic unset method

Since

1.0.0

param \$property

The property

throws RuntimeException

If the property does not exist

return

void

chdemko\SortedCollection\SubSet::__isset(\$property)

Magic isset method

Since

1.0.0

param \$property

The property

return

boolean

chdemko\SortedCollection\SubSet::jsonSerialize()

Serialize the object

Since

1.0.0

return

array Array of values

Public Static Functions

static chdemko\SortedCollection\SubSet::create(SortedSet \$set, \$from, \$to, \$fromInclusive = true, \$toInclusive = false)

Create

Since

1.0.0

param \$set

Internal set

param \$from

The from element

param \$to

The to element

param \$fromInclusive

The inclusive flag for from

param \$toInclusive

The inclusive flag for to

return

SubSet A new sub set

static chdemko\SortedCollection\SubSet::head(SortedSet \$set, \$to, \$toInclusive = false)

Head

Since

1.0.0

param \$set

Internal set

param \$to

The to element

param \$toInclusive

The inclusive flag for to

return

SubSet A new head set

```
static chdemko\SortedCollection\SubSet::tail(SortedSet $set, $from,
$fromInclusive = true)
```

Tail

Since

1.0.0

param \$set

Internal set

param \$from

The from element

param \$fromInclusive

The inclusive flag for from

return

SubSet A new tail set

```
static chdemko\SortedCollection\SubSet::view(SortedSet $set)
```

View

Since

1.0.0

param \$set

Internal set

return

SubSet A new sub set

3.3.3 Reversed Set

SortedCollection() → :ReversedSet : public chdemko\SortedCollection\AbstractSet

Public Functions

chedemko\SortedCollection\ReversedSet::__get(\$property)

Magic get method

Since

1.0.0

param \$property

The property

return

mixed The value associated to the property

chedemko\SortedCollection\ReversedSet::jsonSerialize()

Serialize the object

Since

1.0.0

return

array Array of values

Public Static Functions

static chdemko\SortedCollection\ReversedSet::create(SortedSet \$set)

Create

Since

1.0.0

param \$set

Internal set

return

ReversedSet A new reversed set

3.3.4 Tree Map

SortedCollection() → :TreeMap : public chdemko\SortedCollection\AbstractMap

Public Functions

chedemko\SortedCollection\TreeMap::comparator()

Get the comparator

Since

1.0.0

return

callable The comparator

chedemko\SortedCollection\TreeMap::first()

Get the first element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The first element

chedemko\SortedCollection\TreeMap::last()

Get the last element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The last element

chedemko\SortedCollection\TreeMap::predecessor(\$element)

Get the predecessor element

Since

1.0.0

param \$element

A tree node member of the underlying TreeMap

throws OutOfBoundsException

If there is no predecessor

return

mixed The predecessor element

chdemko\SortedCollection\TreeMap::successor(\$element)

Get the successor element

Since

1.0.0

param \$element

A tree node member of the underlying TreeMap

throws OutOfBoundsException

If there is no successor

return

mixed The successor element

chdemko\SortedCollection\TreeMap::lower(\$key)

Returns the element whose key is the greatest key lesser than the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no lower element

return

mixed The found element

chdemko\SortedCollection\TreeMap::floor(\$key)

Returns the element whose key is the greatest key lesser than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no floor element

return

mixed The found element

chdemko\SortedCollection\TreeMap::find(\$key)

Returns the element whose key is equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no such element

return

mixed The found element

chdemko\SortedCollection\TreeMap::ceiling(\$key)

Returns the element whose key is the lowest key greater than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no ceiling element

return

mixed The found element

chdemko\SortedCollection\TreeMap::higher(\$key)

Returns the element whose key is the lowest key greater than to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no higher element

return

mixed The found element

chdemko\SortedCollection\TreeMap::put(\$traversable = array())

Put values in the map

Since

1.0.0

param \$traversable

Values to put in the map

return

TreeMap \$this for chaining

chdemko\SortedCollection\TreeMap::clear()

Clear the map

Since

1.0.0

return

TreeMap \$this for chaining

chdemko\SortedCollection\TreeMap::initialise(\$traversable = array())

Initialise the map

Since

1.0.0

param \$traversable

Values to initialise the map

return

TreeMap \$this for chaining

chdemko\SortedCollection\TreeMap::__clone()

Clone the map

Since

1.0.0

return

void

chdemko\SortedCollection\TreeMap::jsonSerialize()

Serialize the object

Since

1.0.0

return

array Array of values

chdemko\SortedCollection\TreeMap::offsetSet(\$key, \$value)

Set the value for a key

Since

1.0.0

param \$key

The key

param \$value

The value

return

void

chdemko\SortedCollection\TreeMap::offsetUnset(\$key)

Unset the existence of a key

Since

1.0.0

param \$key

The key

return

void

chdemko\SortedCollection\TreeMap::count()

Count the number of key/value pairs

Since

1.0.0

return

integer

Public Static Functions

static chdemko\SortedCollection\TreeMap::create(\$comparator = null)

Create

Since

1.0.0

param \$comparator

Comparison function

return

TreeMap A new TreeMap

3.3.5 Sub Map

SortedCollection() → :SubMap : public chdemko\SortedCollection\AbstractMap

Public Functions

chdemko\SortedCollection\SubMap::__get(\$property)

Magic get method

Since

1.0.0

param \$property

The property

throws RuntimeException

If the property does not exist

return

mixed The value associated to the property

chdemko\SortedCollection\SubMap::__set(\$property, \$value)

Magic set method

Since

1.0.0

param \$property

The property

param \$value

The new value

throws RuntimeException

If the property does not exist

return

void

chdemko\SortedCollection\SubMap::__unset(\$property)

Magic unset method

Since

1.0.0

param \$property

The property

throws RuntimeException

If the property does not exist

return

void

chdemko\SortedCollection\SubMap::__isset(\$property)

Magic isset method

Since

1.0.0

param \$property

The property

return

boolean

chdemko\SortedCollection\SubMap::comparator()

Get the comparator

Since

1.0.0

return

callable The comparator

chdemko\SortedCollection\SubMap::first()

Get the first element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The first element

chdemko\SortedCollection\SubMap::last()

Get the last element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The last element

chdemko\SortedCollection\SubMap::predecessor(\$element)

Get the predecessor element

Since

1.0.0

param \$element

A tree node member of the underlying TreeMap

throws OutOfBoundsException

If there is no predecessor

return

mixed The predecessor element

chdemko\SortedCollection\SubMap::successor(\$element)

Get the successor element

Since

1.0.0

param \$element

A tree node member of the underlying TreeMap

throws OutOfBoundsException

If there is no successor

return

mixed The successor element

chdemko\SortedCollection\SubMap::lower(\$key)

Returns the element whose key is the greatest key lesser than the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no lower element

return

mixed The found element

chdemko\SortedCollection\SubMap::floor(\$key)

Returns the element whose key is the greatest key lesser than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no floor element

return

mixed The found element

chdemko\SortedCollection\SubMap::find(\$key)

Returns the element whose key is equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no such element

return

mixed The found element

chdemko\SortedCollection\SubMap::ceiling(\$key)

Returns the element whose key is the lowest key greater than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no ceiling element

return

mixed The found element

chdemko\SortedCollection\SubMap::higher(\$key)

Returns the element whose key is the lowest key greater than to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no higher element

return

mixed The found element

chdemko\SortedCollection\SubMap::jsonSerialize()

Serialize the object

Since

1.0.0

return

array Array of values

chdemko\SortedCollection\SubMap::count()

Count the number of key/value pairs

Since

1.0.0

return

integer

Public Static Functions

```
static chdemko\SortedCollection\SubMap::create(SortedMap $map, $fromKey, $toKey,
$fromInclusive = true, $toInclusive = false)
```

Create

Since

1.0.0

param \$map

A sorted map

param \$fromKey

The from key

param \$toKey

The to key

param \$fromInclusive

The inclusive flag for from

param \$toInclusive

The inclusive flag for to

return

SubMap A new sub map

```
static chdemko\SortedCollection\SubMap::head(SortedMap $map, $toKey,
$toInclusive = false)
```

Return a head portion of a sorted map

Since

1.0.0

param \$map

A sorted map

param \$toKey

The to key

param \$toInclusive

The inclusive flag for to

return

SubMap A new head map

```
static chdemko\SortedCollection\SubMap::tail(SortedMap $map, $fromKey,
$fromInclusive = true)
```

Return a tail portion of a sorted map

Since

1.0.0

param \$map

A sorted map

param \$fromKey
The from key

param \$fromInclusive
The inclusive flag for from

return
SubMap A new tail map

static chdemko\SortedCollection\SubMap::view(SortedMap \$map)
Return a view of the map

Since
1.0.0

param \$map
A sorted map

return
SubMap A new sub map

3.3.6 Reversed Map

SortedCollection() → :ReversedMap : public chdemko\SortedCollection\AbstractMap

Public Functions

chedemko\SortedCollection\ReversedMap::__get(\$property)
Magic get method

Since
1.0.0

param \$property
The property

return
mixed The value associated to the property

chedemko\SortedCollection\ReversedMap::comparator()
Get the comparator

Since
1.0.0

return
callable The comparator

chedemko\SortedCollection\ReversedMap::first()
Get the first element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The first element

chdemko\SortedCollection\ReversedMap::last()

Get the last element

Since

1.0.0

throws OutOfBoundsException

If there is no element

return

mixed The last element

chdemko\SortedCollection\ReversedMap::predecessor(\$element)

Get the predecessor element

Since

1.0.0

param \$element

A tree node member of the underlying TreeMap

throws OutOfBoundsException

If there is no predecessor

return

mixed The predecessor element

chdemko\SortedCollection\ReversedMap::successor(\$element)

Get the successor element

param \$element

A tree node member of the underlying TreeMap

throws OutOfBoundsException

If there is no successor

return

mixed The successor element

chdemko\SortedCollection\ReversedMap::lower(\$key)

Returns the element whose key is the greatest key lesser than the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no lower element

return

mixed The found element

chdemko\SortedCollection\ReversedMap::floor(\$key)

Returns the element whose key is the greatest key lesser than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no floor element

return

mixed The found element

chdemko\SortedCollection\ReversedMap::find(\$key)

Returns the element whose key is equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no such element

return

mixed The found element

chdemko\SortedCollection\ReversedMap::ceiling(\$key)

Returns the element whose key is the lowest key greater than or equal to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no ceiling element

return

mixed The found element

chdemko\SortedCollection\ReversedMap::higher(\$key)

Returns the element whose key is the lowest key greater than to the given key

Since

1.0.0

param \$key

The searched key

throws OutOfBoundsException

If there is no higher element

return

mixed The found element

chdemko\SortedCollection\ReversedMap::jsonSerialize()

Serialize the object

Since

1.0.0

return

array Array of values

chdemko\SortedCollection\ReversedMap::count()

Count the number of key/value pairs

Since

1.0.0

return

integer

Public Static Functions

static chdemko\SortedCollection\ReversedMap::create(SortedMap \$map)

Create

Since

1.0.0

param \$map

Internal map

return

ReversedMap A new reversed map

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