# TreeSet Methods in Java

TreeSet is a data structure in Java that implements the Set interface and maintains elements in sorted order.   
It is based on a red-black tree, providing efficient add, remove, and search operations.

## 1. Constructors

- `TreeSet()` - Creates an empty set sorted in natural order.  
- `TreeSet(Collection<? extends E> c)` - Creates a set containing the elements of the specified collection.  
- `TreeSet(SortedSet<E> s)` - Creates a set containing the elements of the specified sorted set.

## 2. Basic Add and Remove Methods

- `boolean add(E e)` - Adds the specified element to this set if it is not already present.  
- `boolean remove(Object o)` - Removes the specified element from this set, if present.  
- `void clear()` - Removes all elements from this set.

## 3. Element Checking Methods

- `boolean contains(Object o)` - Returns true if this set contains the specified element.  
- `boolean isEmpty()` - Returns true if this set contains no elements.

## 4. Size and Element Retrieval

- `int size()` - Returns the number of elements in this set.  
- `Iterator<E> iterator()` - Returns an iterator over the elements in this set in ascending order.

## 5. Navigational Methods

- `E first()` - Returns the first (lowest) element currently in this set.  
- `E last()` - Returns the last (highest) element currently in this set.  
- `E higher(E e)` - Returns the least element strictly greater than the given element, or null if there is no such element.  
- `E lower(E e)` - Returns the greatest element strictly less than the given element, or null if there is no such element.  
- `E ceiling(E e)` - Returns the least element greater than or equal to the given element, or null if there is no such element.  
- `E floor(E e)` - Returns the greatest element less than or equal to the given element, or null if there is no such element.

## 6. Subset Methods

- `SortedSet<E> subSet(E fromElement, E toElement)` - Returns a view of the portion of this set whose elements range from `fromElement`, inclusive, to `toElement`, exclusive.  
- `SortedSet<E> headSet(E toElement)` - Returns a view of the portion of this set whose elements are strictly less than `toElement`.  
- `SortedSet<E> tailSet(E fromElement)` - Returns a view of the portion of this set whose elements are greater than or equal to `fromElement`.

## 7. Array Conversion Methods

- `Object[] toArray()` - Returns an array containing all of the elements in this set.  
- `<T> T[] toArray(T[] a)` - Returns an array containing all of the elements in this set; the runtime type of the returned array is that of the specified array.