JAC444 - BTP400 Course Object-Oriented Software Development II - Java

Collections

Segment 1

The Collection Interface

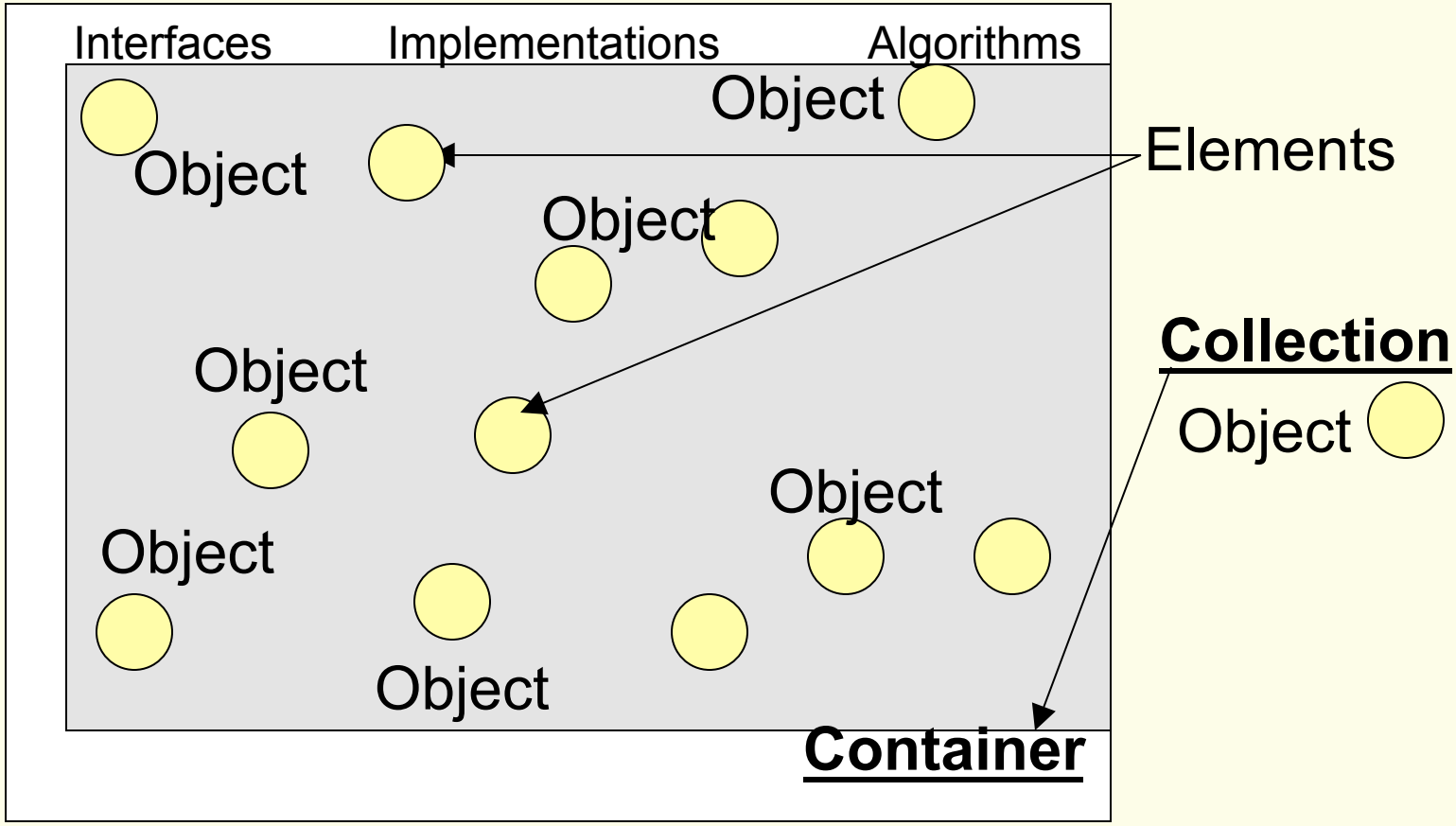
Collections

In this lecture you will be learning about:

- Introduction to Java Collections Framework
- Definition and Structure
  - Interfaces
  - Implementations
  - Algorithms

What is a Collection?

A collection is an object that groups multiple elements into a single unit.



What is a Collection Framework?

A unified architecture for representing and manipulating collections.

Collection Framework

Interfaces

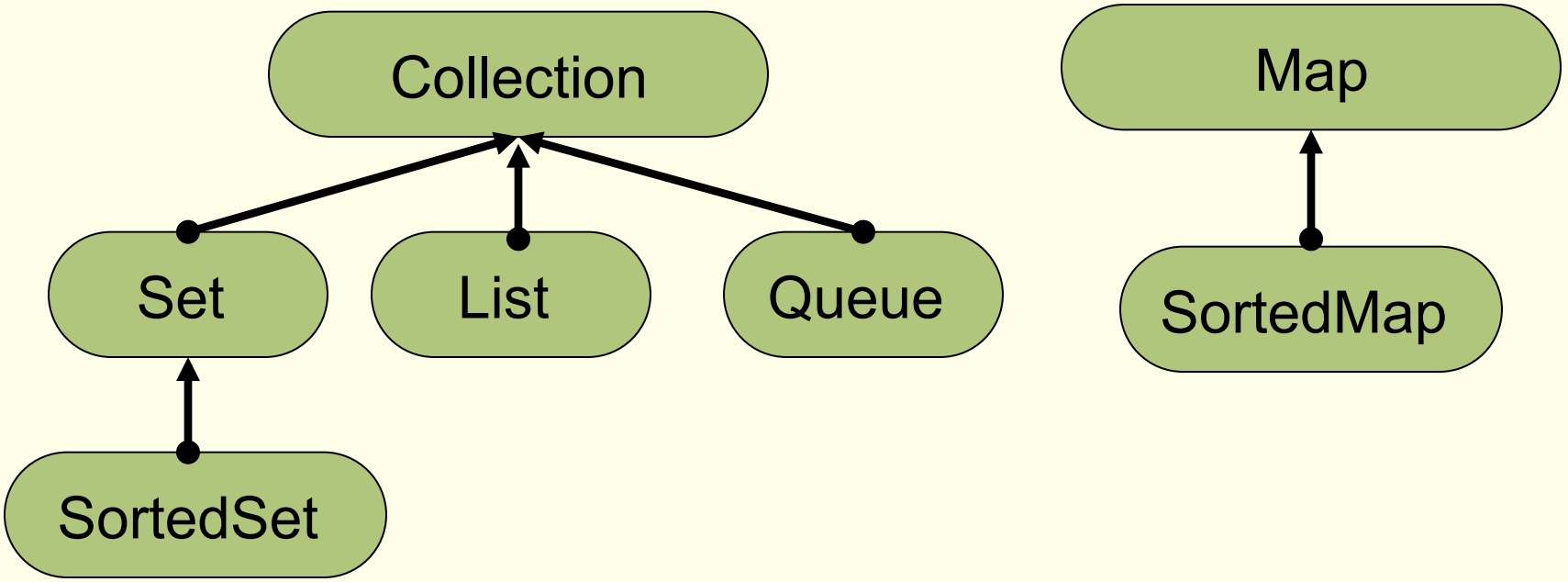
Implementations

Algorithms

Collection

Object

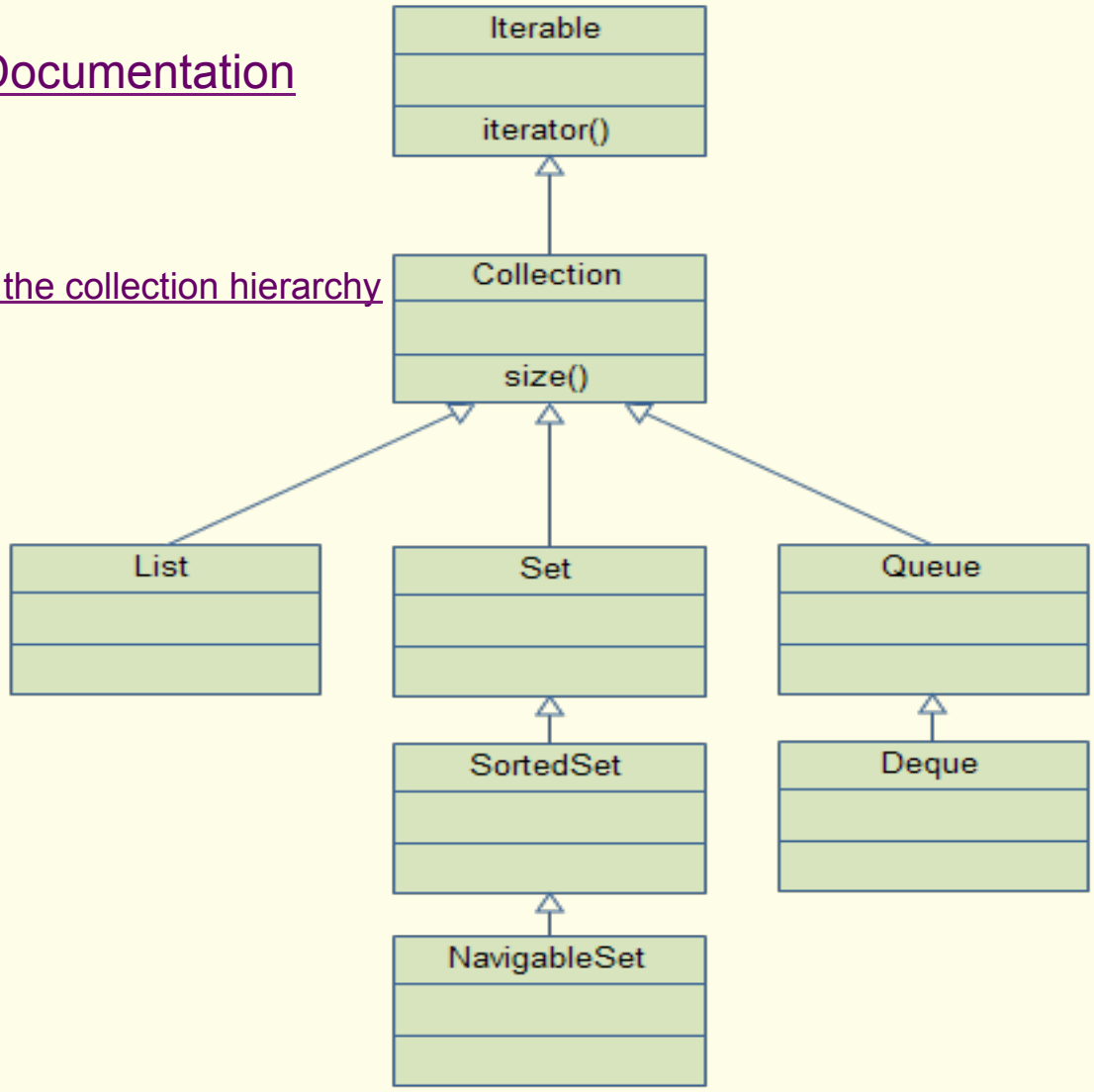
Core collection Interfaces



Collections Hierarchy

Iterable Documentation

The root interface in the collection hierarchy



The Collection<E> Interface

```
public interface Collection<E> {
      // Group 1
      int size();
      boolean isEmpty();
      boolean contains(Object element);
      boolean add(E element);    // Optional
      boolean remove(Object element); // Optional
      Iterator iterator();

      // Group 2
      boolean containsAll(Collection<?> c);
      boolean addAll(Collection<?> c);    // Optional
      boolean removeAll(Collection<?> c); // Optional
      boolean retainAll(Collection<?> c); // Optional
      void clear();                       // Optional

      // Group 3
      Object[] toArray();
      <T> T[] toArray(T[] a);
}
```

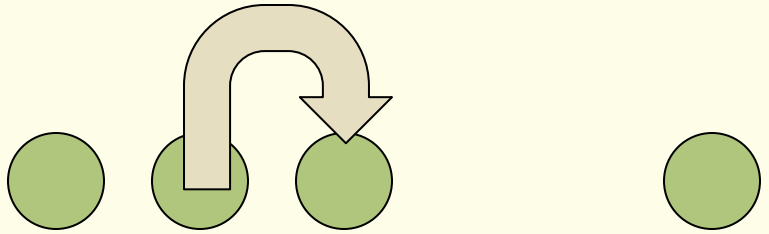
1 Basic Operations

2 Bulk Operations

3 Array Operations

Iterator Interface

```
public interface Iterator<E> {
    boolean hasNext();
    E next();
    default void remove();
}
```



E next()

1. Returns the current element (initially the first element)
2. Steps to the next element and makes it the current element.

Traversing Collections

```
Iterator<E> it = collection.iterator();

while (it.hasNext())
    System.out.println(it.next());
```

```
public static void filter(Collection<E> c) {

  for (Iterator<E> it = c.iterator(); it.hasNext();)
    if (!cond(it.next()))
      it.remove();
}
```