

## Java Programming II Lab8

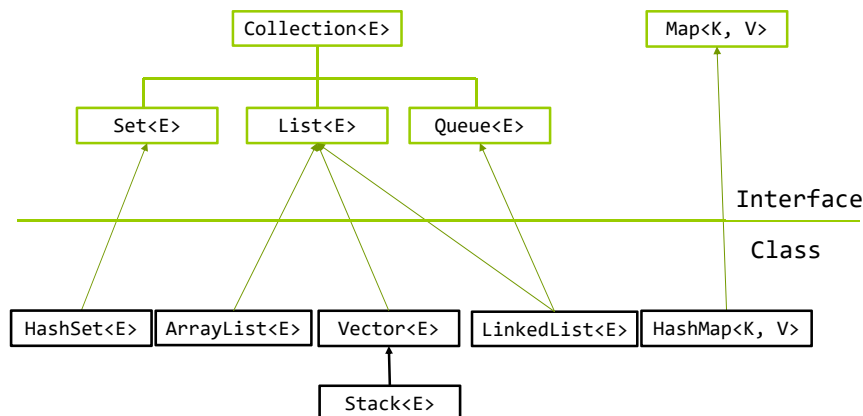
514770-1  
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## Lab8

- Practice to write a program that adapts List<E> to DataCollection<E> using **Adapter pattern**.
  - **java.util.List<E>** interface
    - **ArrayList, LinkedList, Vector, Stack** class implements **List<E>**.
  - **DataCollection<E>** interface extends **java.util.Iterable<E>**.
  - **DynamicArray<E>** class implements **DataCollection<E>**.
  - **ListDataCollection<E>** **adapter class** takes the **List<E>** **adaptee class** to support the **DataCollection<E>** **target** interface.
    - **ArrayListDataCollectionAdapter** implements **DataCollection<E>**

## Lab8

- java.util.Collection

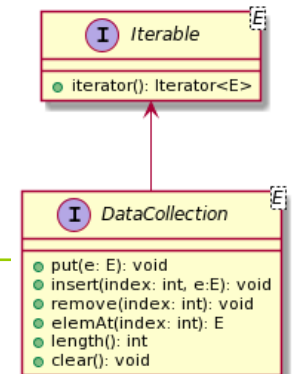


## Lab8

- **DataCollection<E>** interface extends **Iterable<E>** - **foreach**

```

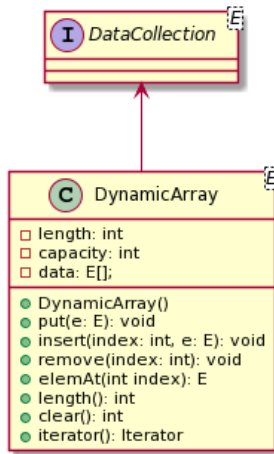
import java.util.Iterator;
public interface DataCollection<E> extends Iterable<E> {
    void put(E e);
    void insert(int index, E e);
    void remove(int index);
    E elemAt(int index);
    int length();
    void clear();
}
  
```



## Lab8

### DynamicArray<E> class implements DataCollection<E>

- A generic dynamic array class using E[] data



## Lab8

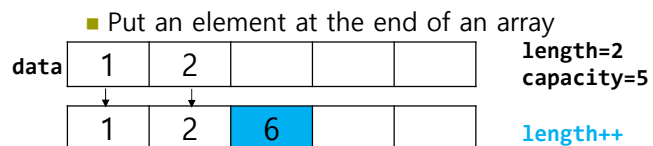
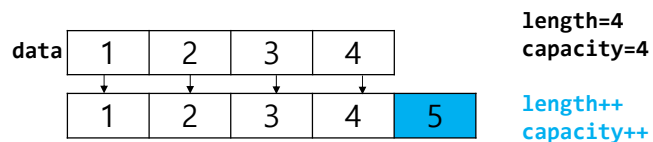
### DynamicArray<E> class implements DataCollection<E>.

- public void put(E e); // put element to the dynamic array
- public void insert(int index, E e); // insert element at the index
- public void remove(int index); // remove element at the index
- public E elemAt(int index); // get element at the index
- public int length(); // get the length of dynamic array (# of elements)
- public void clear(); // remove all elements and reset
- public Iterator<E> iterator(); // returns DynamicArrayIterator<E>()

## Lab8

### Dynamic Array

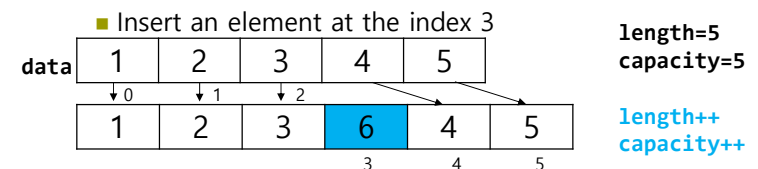
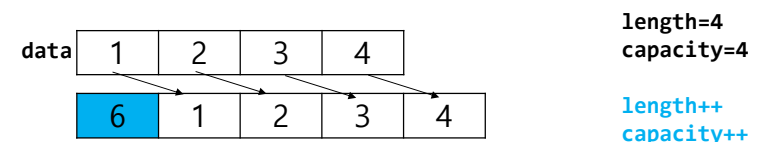
- Put an element at the end of an array



## Lab8

### Dynamic Array

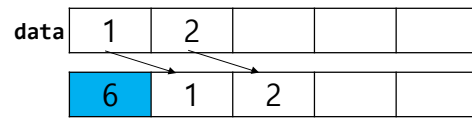
- Insert an element at the index 0



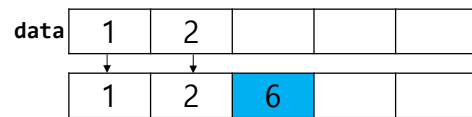
## Lab8

### Dynamic Array

- Insert an element at the index 0



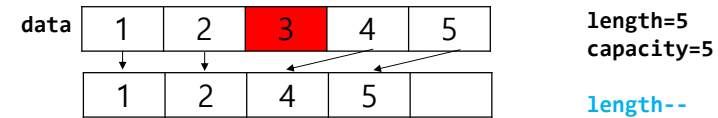
- Insert an element at the index 2 – If (index > size) ArrayIndexOutOfBoundsException



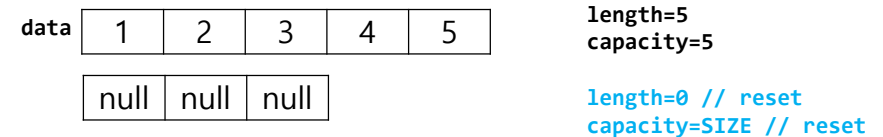
## Lab8

### Dynamic Array

- Remove an element at the index 2

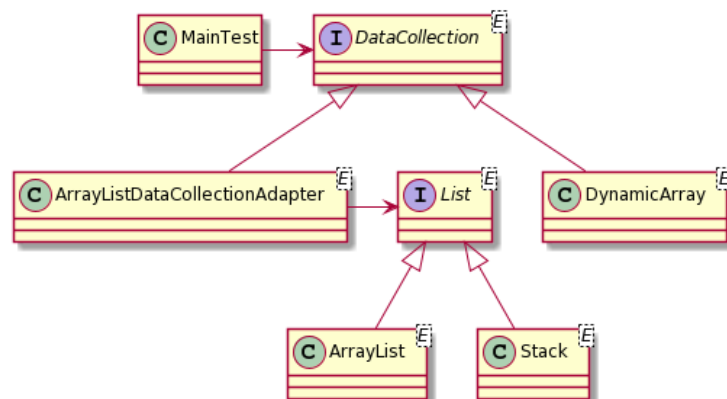


- Clear



## Lab8

- ListDataCollection adapter** class takes the **List adaptee** class to support the **DataCollection target** interface.



## Lab8

```

public class MainTest {
    public static void main(String[] args) {
        System.out.println("\n\nDynamicArray add & print");
        DataCollection<City> arr = new DynamicArray<>();
        arr.put(new City("Seoul", "Korea")); // put 8~10 elements
        arr.forEach(System.out::println); // test Iterable<E>
        // remove & insert & elemAt & clear & remove all using iterator &
        // print using for/while/foreach
        ArrayList<City> list = new ArrayList<>();
        list.add(new City("Seoul", "Korea")); // add 8~10 elements
        DataCollection<City> arr2 =
            new ListDataCollection<>(list);
        arr2.put(new City("Chicago", "USA")); // put 2~3 elements
        // remove & insert & elemAt & clear & remove all using iterator &
        // print using for/while/foreach
    }
}
    
```

## Lab8

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```
Stack<City> stack = new Stack<>();
stack.push(new City("Seoul", "Korea")); // push 8~10 elements
DataCollection<City> arr3 =
    new ListDataCollection<>(stack);
arr3.insert(0, new City("New York", "USA")); // insert 2~3
elements
    // remove & insert & elemAt & clear & remove all using iterator
    & print using for/while/foreach
    // ...
}
```

## Submit to e-learning

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- Add your code (e.g., test all methods with DataCollection using ArrayList, Stack) in the Lab8 assignment.
- Submit the Lab8 assignment (JAVA21-2-Lab8-ID-name.zip including the report) to e-learning.