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Lecture 10: Bag Implementations that Use Arrays - 2

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Making the Implementation Secure

Making the Implementation Secure

```
/** Adds a new entry to this bag.
    @param newEntry The object to be added as a new entry.
    @return True if the addition is successful, or false if not. */
public boolean add(T newEntry)
{
    checkIntegrity();
    boolean result = true;
    if (isArrayFull())
    {
        result = false;
    }
    else
    {
        // Assertion: result is true here
        bag[numberOfEntries] = newEntry;
        numberOfEntries++;
    } // end if

    return result;
} // end add
```

Revise the method `add`

Incomplete Methods - Stubs

```
/** Removes one unspecified entry from this bag, if possible.
    @return Either the removed entry, if the removal
            was successful, or null */
public T remove()
{
    return null; // STUB
} // end remove

/** Removes one occurrence of a given entry from this bag.
    @param anEntry The entry to be removed
    @return True if the removal was successful, or false otherwise */
public boolean remove(T anEntry)
{
    return false; // STUB
} // end remove

/** Removes all entries from this bag. */
public void clear()
{
    // STUB
} // end clear
```

Stubs for **remove** and **clear**

Testing the Core Methods

```
/** A test of the constructors and the methods add and toArray,
    as defined in the first draft of the class ArrayBag. */
public class ArrayBagDemo1
{
    public static void main(String[] args)
    {
        // Adding to an initially empty bag with sufficient capacity
        System.out.println("Testing an initially empty bag with " +
                           " sufficient capacity:");
        BagInterface<String> aBag = new ArrayBag<>();
        String[] contentsOfBag1 = {"A", "A", "B", "A", "C", "A"};
        testAdd(aBag, contentsOfBag1);

        // Filling an initially empty bag to capacity
        System.out.println("\nTesting an initially empty bag that " +
                           " will be filled to capacity:");
        aBag = new ArrayBag<>(7);
        String[] contentsOfBag2 = {"A", "B", "A", "C", "B", "C", "D",
                                   "another string"};
        testAdd(aBag, contentsOfBag2);
    } // end main
}
```

Listing 2-2: A program that tests core methods of the class `ArrayBag`

Testing the Core Methods

```
// Tests the method add.
private static void testAdd(BagInterface<String> aBag, String[] content)
{
    System.out.print("Adding the following strings to the bag: ");

    for (int index = 0; index < content.length; index++)
    {
        if (aBag.add(content[index]))
            System.out.print(content[index] + " ");
        else
            System.out.print("\nUnable to add " + content[index] +
                             " to the bag.");
    } // end for
    System.out.println();

    displayBag(aBag);
} // end testAdd
```

Listing 2-2: A program that tests core methods of the class `ArrayBag`

Testing the Core Methods

```
// Tests the method toArray while displaying the bag.
private static void displayBag(BagInterface<String> aBag)
{
    System.out.println("The bag contains the following string(s):");
    Object[] bagArray = aBag.toArray();

    for (int index = 0; index < bagArray.length; index++)
    {
        System.out.print(bagArray[index] + " ");
    } // end for

    System.out.println();
} // end displayBag
} // end ArrayBagDemo1
```

Listing 2-2: A program that tests core methods of the class `ArrayBag`

Testing the Core Methods

Output

Testing an initially empty bag with sufficient capacity:

Adding the following 6 strings to the bag: A A B A C A

The bag contains the following string(s):

A A B A C A

Testing an initially empty bag that will be filled to capacity:

Adding the following 8 strings to the bag: A B A C B C D

Unable to add another string to the bag.

The bag contains the following string(s):

A B A C B C D

Listing 2-2: A program that tests core methods of the class `ArrayBag`

Question

- Download [L10_E1](#) from “[In-class Exercise](#)” on the Brightspace
- Please write a testing program to use [ArrayBag](#) class to add a few heroes to your bag, and implement a method, [display\(\)](#), to print out all heroes in the bag.

`myBag contains following heroes:`

`Tony Stark
Steve Rogers
Bruce Banner
Natasha Romanoff`

Expected result

Answer

```
public class MyHeroes {

    public static void main(String[] args) {
        BagInterface<String> myBag = new ArrayBag<>();
        myBag.add("Tony Stark");
        myBag.add("Steve Rogers");
        myBag.add("Bruce Banner");
        myBag.add("Natasha Romanoff");
        display(myBag);
    }

    public static void display(BagInterface<String> aBag) {
        System.out.println("myBag contains following heroes:");
        Object[] bagArray = aBag.toArray();
        System.out.println(" ");

        for(int index = 0; index < bagArray.length; index++) {
            System.out.println(bagArray[index]);
        }

        System.out.println();
    }
}
```