**CSE 274 – Fall 2018**

**PROJECT #2: 75 points – Due Sunday, September 16, by 11:59 p.m.**

**Outcomes:**

* Implement an ADT (specifically a resizable array based implementation of the Set ADT)
* Test a class

**Naming requirements (not following any of these results in a score of 0):**

* The Eclipse project name must be **Project2**.
* You will have write exactly two source code files: **ResizableArraySet.java** and **SetTester.java**
* You will also need to include the Set interface as specified in **SetInterface.java**. Do not modify this file. Your resizable array set must implement this interface.
* You will use the **default package** (this means there should be no package statements in any of your files).

Your assignment is to:

1. In a class named ResizableArraySet, implement the abstract data type Set by implementing all of the methods in the interface found in SetInterface.java. Your implementation will use a resizable array that doubles in size any time an item is added when the array is already full. **Do not use Java's ArrayList**. You should simply work with an array, and handle the array resizing on your own.
2. Any time the number of entries in the set drops to less than half the size of the array, reduce the size of the array to half its size. So, for example, if the array has a size of 20, and there are 11 items in it, and one of those items is removed, the array should still be a size of 20. BUT, if another item is removed, there will be only 9 items remaining. Since 9 is less than half the size of the array, reduce the size of the array to 10.
3. The only instance variables should be the array and a counter for the number of entries in the set.
4. There should be two constructors:
   1. A constructor with no parameters. By default, this should use an array instance variable with a starting size of 10.
   2. A constructor with an int parameter specifying the starting size of the array instance variable.

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1. SetTester should thoroughly test the methods and constructors in the ResizableArraySet class. This is not a JUnit test. Do not use JUnit testing in this assignment. Rather, it should utilize the main() method and helper methods to print to the screen what is being tested, what results are expected, and then show the actual results. **This should not involve any interaction from the user.** Do not ask the user to enter input. Just run test cases. Output should look something like this:

**Creating an empty set and adding three items 4 9 2**

**Expecting to see 4 9 2**

**Result 4 9 2**

**Removing 4 and expecting to see 9 2**

**Result 9 2**

Your test code should not require me to look at your source code. I should know, by running your tester, what is being tested, what results are expected, and what the actual results are. I will be looking for:

* Thoroughness (test all constructors and methods)
* Organization (keep related tests together)
* Readability (use single blank lines in appropriate places to break your code into "chunks" so it's easy to know when one part of your testing is done and the next part begins). The Arrays.toString() is a useful way to display the contents of an array. Feel free to use it to output your results.

**Scoring:**

|  |  |
| --- | --- |
| **Outcome** | **Max score** |
| Constructors implemented correctly | 4 |
| Arrays grow and shrink as specified | 10 |
| Intersection and union work as specified | 24 |
| Remaining methods work as specified | 12 |
| Tester is thorough, organized, and readable | 8 |
| Code formatted according to generally accepted standards | 0 (deductions only) |
| Code follows approaches taught in CSE 174 and 271 | 0 (deductions only) |

**Submission:**

You will submit Java source code files: **ResizableArraySet.java** and **SetTester.java** on Canvas.