**Wentworth Institute of Technology**

**Department of Computer Science and Networking.**

**Comp 2000 Data Structures**

**Lab #1 Bags** (total 100 pts)

*A preparation for the programming project “Bags”*

1. Implement all the interface methods for the class ResizableArrayBag <T>. (25 pts)
2. Define an *equals()* method for the class ResizableArrayBag <T>, that returns ***true*** if the contents of two bags are the same, and ***false*** otherwise. Note that two bags are equal if each item from one bag occurs in another bag the same number of times. (25 pts)

**Hint. Create an array out of the first bag; create a copy of the second bag (you may create a private method *copy*(); loop through the array and remove each element from the copy of the second bag. If remove(item) returns false, the bags are different. If the loop finished and the copy is empty, the bags are equal; otherwise not.**

1. For the class ResizableArrayBag <T>, define two methods: *union*() and *intersection*().

The method *union()* works as if contents of two bags are combined in one bag. That is, the method returns a new bag that contains all the entries from both bags; if a specific item occurs n1 times in the original bag and n2 times in the other bag, then it will occur (n1+n2) times in the union. The method should not alter the bags.

The method intersection() returns a new bag which contains only items that are present in both bags. For instance, if a specific item occurs n1 times in bag1 and n2 times in bag2, then bag1.intersection(bag2) will contain this item *min(n1, n2)* times. (30 pts)

1. A test driver working with bags of type String is provided (Lab1test.java). It creates two bags by reading two text files which are also provided. Copy the text files in your project directory and copy the source file in your package. Change the first line according to the name of your package. When you see the resulting output is correct, add more code to the file to test the method *equals*(). For instance, you can create a text file lionesses.txt where you type the same names as in lions.txt, but in different order, create the ResizableArrayBag bag3 out of this file, and check the output of bag2.equals(bag3) as well as bag3.equals(bag2).

(20 pts)