ODL127 Algorithms and Data Structures   30 January 2006

Exercise 3: Operations on ArrayLists and Strings

1) Make sure you have read and understood the sections of notes numbered 6 and 7 ("ArrayLists in Java" and "Strings and Related Types in Java").

2) Download the file `UseArrayLists2.java` and `UseArrayLists8.java` from the course code directory (subdirectory `arrayLists`). Check you can compile and run this code. You can make use of the support code here to test the methods you have to write in the other parts of this exercise for arrayLists of integers and arrayLists of strings

3) Write a static method which takes an arrayList of integers and an integer and changes the arrayList to remove all occurrences of the integer argument. So if the integer argument is 9 and the arrayList is

21	9	13	9	5	10	19	36	9	21

the arrayList should be changed to:

21	13	5	10	19	36	21

4) Write a static method which performs the same operation as the one in part 3, but constructively rather than destructively. Show using aliasing that your method for part 3 is destructive and your method for part 4 is not.

5) Write static methods which perform the operations of parts 3 and 4, but which are generic. Show that the same method can be used on an arrayList of strings and on an arrayList of integers. The file `UseArrayLists10.java` shows supporting code for creating arrayLists of strings and arrayLists of integers, and an example of a generic method.

6) Write a static method which takes two strings and returns a boolean saying whether the first string occurs as a substring within the second. For example, if the strings are "blis" and "antidisestablishment", the method should return `true`.

7) A palindrome is a string which is exactly the same read backwards or forwards. An example is "redivider". Write a static method which takes a string and returns a boolean saying whether it is a palindrome.

8) A palindromic sentence reads the same either backwards or forwards, ignoring spaces, punctuation, and whether letters are upper case or lower case. An example is

"Madam, I'm Adam"

Write a static method which takes a string and returns a boolean indicating whether it is a palindromic sentence.

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