1 String manipulation

Write the class ArrayRecursor. For each recursive method, write a public method to provide a clean interface, and a private helper method to perform the recursion. You should think carefully about what the helper method needs to have as parameters.

- Do not use loops.
- Do not give the class any attributes
- Do not use static variables.

1.1 Exercise 1

Write the static, recursive method reverseArray which receives an array of integers and reverses it in place. The method does not return anything.

- Note: Do not create a new string.
1.2 Exercise 2

Write the static, recursive method `occurrences` which receives an array `a` of integers, an integer `x` and returns the number of times that `x` appears in `a`.

1) Enter a new array.
2) Print current array.
3) Reverse current array.
4) Count occurrences.
5) Check if array is palindrome
6) Merge with another sorted array.
7) Search in the sorted array.
8) Quit

Enter a choice: 4
Enter a number: 2

The number 2 occurs 3 times in [1, 2, 5, 0, 2, 3, 2]

1.3 Exercise 3

Write the static, recursive method `palindrome` which receives a string `s` and returns true if `s` is a palindrome and returns false otherwise.

1) Enter a new array.
2) Print current array.
3) Reverse current array.
4) Count occurrences.
5) Check if array is palindrome
6) Merge with another sorted array.
7) Search in the sorted array.
8) Quit

Enter a choice: 5

The array [1, 2, 3, 4] is not a palindrome

1) Enter a new array.
2) Print current array.
3) Reverse current array.
4) Count occurrences.
5) Check if array is palindrome
6) Merge with another sorted array.
7) Search in the sorted array.
8) Quit

Enter a choice: 5

The array [1, 2, 3, 2, 1] is a palindrome
1.4 Exercise 6

Write the static, recursive method `isSorted` which receives an integer array `a` and returns true if `a` is in increasing order, and false otherwise.

1.5 Exercise 5

Write the static, recursive method `mergeTwo` which receives two arrays of sorted integers and returns a merged, sorted array containing the elements of both. Your method should verify that both arrays are sorted first. If either of two arrays is not sorted, return an empty array. In the running example, we merge \[1, 2, 5, 7, 9, 12\] with \[4, 8, 9, 10, 42\]

1.6 Exercise 6

Write the static, recursive method `binarySearch` which receives an array of sorted integers and an integer `x`. If `x` is in the array, the method returns the index of `x`. Otherwise, it returns -1. You may assume that the array is sorted. Binary search works as shown in the example. If looking for the number 7 in the array \[1, 2, 3, 4, 5, 6, 7, 8, 9, 10\]:

Note that we found 7 in four steps. An ordinary search would take 7 steps. Another example: Finding 3 in \[1, 2, 4, 5, 10, 21, 23, 24, 26\]

Step 1: \[1, 2, 4, 5, 10, 21, 23, 24, 26\]
1.7 Exercise 7

Write a main program which provides the menu and prompts the user to choose from 1 to 8. Offer one choice for each recursive method and test them. Your program should quit when the user chooses to quit.