Practice Problems: Searching Arrays

0. What must be true of an array before it can be searched using binarySearch?

1. What built-in Java command can sort an array?

2. Tracing Algorithms
For each call to the binarySearch method below, write which elements the search procedure visits.

array $x$:

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<td>45</td>
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int pos = Arrays.binarySearch(x, 21);
int pos = Arrays.binarySearch(x, 51);
int pos = Arrays.binarySearch(x, 9);
int pos = Arrays.binarySearch(x, -15);

array $y$:

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<td>&quot;abba&quot;</td>
<td>&quot;ccr&quot;</td>
<td>&quot;elvis&quot;</td>
<td>&quot;gomez&quot;</td>
<td>&quot;juno&quot;</td>
<td>&quot;mogwai&quot;</td>
<td>&quot;prince&quot;</td>
<td>&quot;rem&quot;</td>
<td>&quot;u2&quot;</td>
<td>&quot;who&quot;</td>
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int pos = Arrays.binarySearch(y, "juno");
int pos = Arrays.binarySearch(y, "prince");
int pos = Arrays.binarySearch(y, "who");
int pos = Arrays.binarySearch(y, "beirut");

3. Writing short methods involving search and sort

a. Translate the binary search algorithm into your own binarySearch() method.

b. Write a method that takes an int array $X$ as an argument. It should return the median value of the array. The median of a set of numbers is defined as the number in the middle position, when the numbers are arranged from smallest to largest.

c. Write a method that takes an int array $X$ as an argument. It should return true if 0 is in the array, and false otherwise.