W3D2 Lab 1: Binary Search

Description:

In this lab you will add a contains() method to the ArrayList which assumes that the list is already sorted and then does a binary search through its items.

Provided:

We've provided the FixedArray class, ArrayList class, and a binary search function with this lab. The Binary Search function can be modified to become a method of ArrayList.

Instructions:

Update the ArrayList class to include a .contains(element) method which uses binary search to find the given element, returning the index of the element if it is found, and -1 if it is not. The method should assume that the user has sorted the list before calling contains().

Test your code making a Mocha / Chai test where you add the following items (see below) to the ArrayList, first sort the array using a proper comparator, and then use contains to check if the list contains: "number" (should return -1) and "tiny" (should return its index).

```
["big", "small", "tall", "short", "round", "square", "enormous",
"tiny","gargantuan", "lilliputian", "numberless", "none", "vast",
"miniscule"]
```

Extra step:

Do this step once you've finished all the other labs. Create a recursive version of binary search called containsRec(element) that returns a boolean true/false instead of an index.

In essence your containsRec method should call a private ._recurse(array, element) method where the array parameter could also be half of an array (you can cut an array in half by using the .spliced() method on Array). This does mean you have to pull the underlying Array out from inside the FixedArray that is inside ArrayList.