

A3

1. If you had backed the sorted set with a Java List instead of a basic array, summarize the main points in which your implementation would have differed. Do you expect that using a Java List would have more or less efficient and why? (Consider efficiency both in running time and in program development time.)

Using a Java List (ArrayList or LinkedList) would generally lead to greater program development efficiency because, Lists like ArrayList automatically handle resizing, removing the need to manually implement logic to expand the array when it becomes full. Besides, API Methods such as `size()`, `get(index)`, `add(index, element)`, and `remove(index)` simplify operations compared to directly managing array indices and lengths. List type like Linked List will have longer time for searching, which has a less efficient running time.

2. What do you expect the Big-O behavior of BinarySearchSet's contains method to be and why?

Best Case: $O(1)$, if the middle element of the initial range is the target.

Worst Case: $O(\log n)$, when the target is not found or is located at the farthest end of the search path.