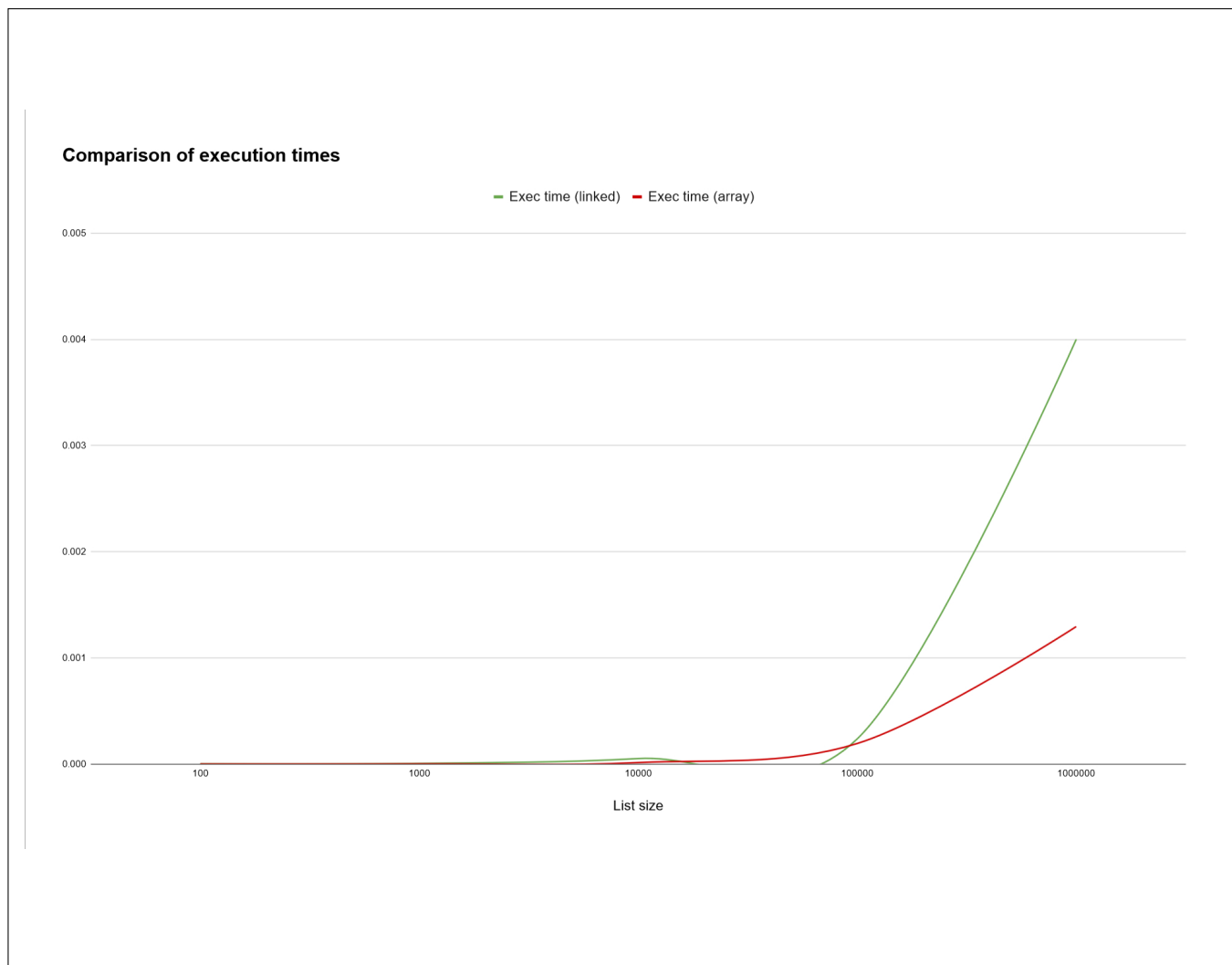| First name | Elliott |
|---|---|
| Last name | McKelvey |
| Collaborator | Daniel Detore |
| Pledge | I pledge my honor that I have abided by the Stevens Honor System. |

# 1 Task 1: Profiling a Linked List and an Array

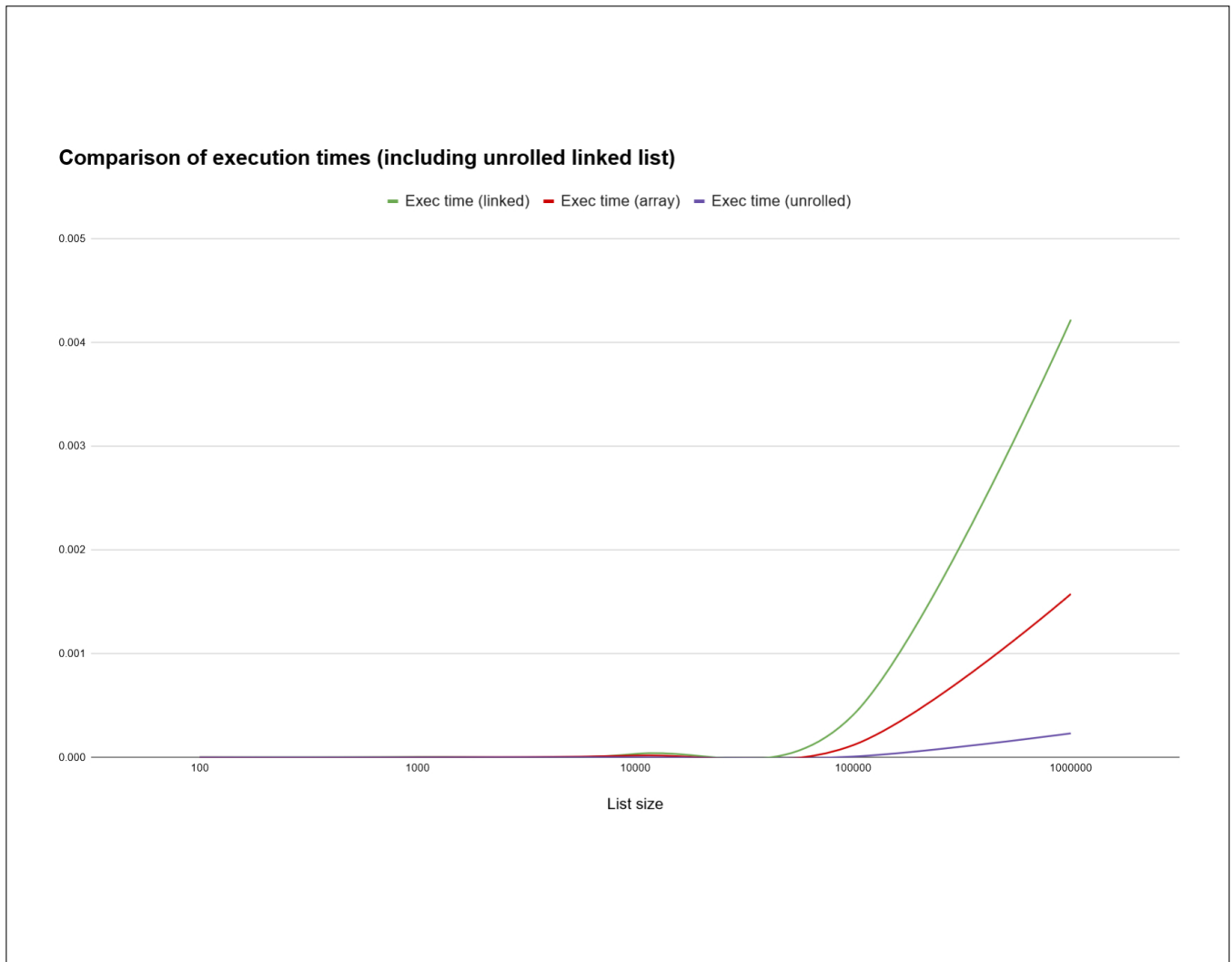Please present your experiment record below: either a graph or a chart.

Please explain: why does the two algorithms with both $\mathcal{O}(n)$ complexity, have very different performance when $n$ increases? You need to explain in detail from the perspective of **locality**.

In the case of the array, each element is next to one another, which provides the advantage of spatial locality. As their addresses are close by, it takes a lesser amount of time to reference each element. The linked list is dissimilar to this; since its items need to be referenced from a different place than within a body of siblings, it relies on temporal locality. Thus, despite both algorithms having with O(n), the array list performs faster when n is increasing.

# 2 Task 2: Locality Improved Linked List

Please present your experiment record below: either a graph or a chart.

**Comparison of execution times (including unrolled linked list)**

— Exec time (linked)  — Exec time (array)  — Exec time (unrolled)

List size

Please explain: what is the time complexity of unrolled linked list? How does a unrolled linked list improve the efficiency of traversal in terms of locality?

**The End** ✋