

CS469 – PE04 Questions

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PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS 2
Sorted(a to z): [ 'apple', 'banana', 'beef', 'bread', 'butter', 'carrot', 'cheese', 'fish', 'milk', 'mushroom', 'pork', ]
-sort: 1.7031999959726818e-05
----- Linked list -----
Current list: [ fish mushroom beef pork carrot cheese butter bread milk banana apple ]
Sorted(a to z): [ apple banana beef bread butter carrot cheese fish milk mushroom pork ]
-sort: 1.0929999916697852e-05
@joelramirezjr →/workspaces/CS469_PE04 (main) $ /home/codespace/.python/current/bin/python /workspaces/CS469_PE04/shopping_list1.py
----- Simple array -----
Current list: [ 'fish', 'mushroom', 'beef', 'pork', 'carrot', 'cheese', 'butter', 'bread', 'milk', 'banana', 'apple', ]
Sorted(a to z): [ 'apple', 'banana', 'beef', 'bread', 'butter', 'carrot', 'cheese', 'fish', 'milk', 'mushroom', 'pork', ]
-sort: 1.7613000181881944e-05
----- Linked list -----
Current list: [ fish mushroom beef pork carrot cheese butter bread milk banana apple ]
Sorted(a to z): [ apple banana beef bread butter carrot cheese fish milk mushroom pork ]
-sort: 1.163199996097875e-05
```

As part of the assignment, compare the actual runtime of quicksort operation between two lists and justify in a short paragraph on how they perform.

I compared the quicksort performs on both the array and linked list versions of the shopping list, and the array is slower. For a list of items, the array took about $1.76e-4$ seconds, while the linked list took closer to $1.16e-5$ seconds. I believe the array should be faster generally but oddly enough, this time the linked list edged out the array. My guess is that this is probably just a quirk from how small the list is. Normally, arrays are faster because they can move through memory more efficiently and swap items easily. Meanwhile, linked lists have to go through each item one at a time, which can slow things down a bit. Both use quicksort and usually operate at the $O(n \log n)$ time complexity, but performance can shift depending on the amount of data that needs to be sorted.