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Inserting end time Vector: 7805 (Micro-sec) 100%
Inserting end time Set: 118676 (Micro-sec) 1520.51%
Inserting end Time List: 24035 (Micro-sec) 307.944%
Inserting end Time Unordered Set: 69915 (Micro-sec) 895.772%
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Inserting begin Time Vector: 5.7927e+06 (Micro-sec) 100%
Inserting begin Time Set: 108009 (Micro-sec) 1.86457%
Inserting begin Time List: 21859 (Micro-sec) 0.377355%
Inserting begin Time Unordered Set: 23586 (Micro-sec) 0.407168%
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Find Time durations for Vector: 4.70992e+07 (Micro-sec)100%
Find Time durations for List: 9.85486e+07 (Micro-sec)209.236%
Find Time durations for Set: 55509 (Micro-sec)0.117856%
Find Time durations for Unordered Set: 22704 (Micro-sec)0.0482047%

RUN SUCCESSFUL (total time: 2m 32s)

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By the data received from our program. we can see that the order of which is fastest to slowest for all four for **insertion at the end and finding** is as follows (in comparison to the vector):

Insertion from end:

- 1) Vector $O(1)$
- 2) List $O(1)$
- 3) Unordered Set $O(1)$
- 4) Set $O(\log n)$

Finding:

- 1) Unordered Set $O(1)$ or $O(n)$
- 2) Set $O(\log n)$
- 3) Vector $O(n)$
- 4) List $O(n)$

The data shows that for **insertion at the front**, from fastest to slowest is as follows:

- 1) List $O(1)$
- 2) Unordered Set $O(1)$
- 3) Set $O(\log n)$
- 4) Vector $O(n)$

List:

- It usually has an inserting time complexity of $O(1)$ for both front and end, however, since this is a double ended list, it works slower than the vector when inserting from the end, which has an insert time complexity of $O(1)$ when inserting at the end.

- When inserting from the beginning it's the fastest however because it is a double linked list.
- For finding - it's linear - goes one by one and takes longer than vector because of the reason mentioned above, it's a double ended linked list.

Unordered Set:

- Normally has an insertion time complexity (regardless if it's from the beginning or end) of $O(1)$ but can go up to linear time $O(n)$ in the worst case, depending on the hash functions. Based on our data, we have a time complexity of $O(n)$ because of the number of key collisions.
- For finding, has a time complexity of $O(1)$, making it the fastest one. Does not have to be in order.

Vector:

- Fastest when inserting from the end because it adds a new element at the end of the vector by default. It also effectively increases the container by size one and causes an automatic reallocation of the allocated storage.
- Slowest when inserting from the beginning because it has to traverse all the way back (shifting) - adds a new element at the end of the vector by default.
- For finding - it's linear - goes one by one.

Set:

- Insertion for set, regardless whether it's from the front or the end will be $O(\log n)$, therefore, relative to the other containers when inserting from the end it ends up last and when inserting to the containers from the front, ends up third.
- For finding, the time complexity is $O(\log n)$, compared to the time complexity of an unordered set which is $O(1)$, set is slower because it has to take the time to order them first