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*CST-201 Exercise 4*

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**Exercise 4: 2.1 - 3**

*Comparing classic sequential search to variation:*

1. Classic Sequential Search:
   1. Scans the list from start to end.
   2. Stops when it finds the first occurrence of the key.
2. Counting Occurrences Variation:
   1. Scans the entire list from start to end.
   2. Counts every occurrence of the key.

*Efficiency Comparison*

1. Classic Sequential Search:
   1. Best case: O(1) if the key is at the beginning.
   2. Worst case: O(n) if the key is at the end or not present.
2. Counting Occurrences Variation:
   1. Always O(n), as it must scan the entire list.

**Exercise 4: 2.2 - 1**

*Indicate the time efﬁciency class of sequential search:*

*a. In the worst case:*

The worst case for sequential search occurs when the element is not in the list or is the last element. In this case, we must search through all elements. O(n)

*b. In the best case:*

The best case for sequential search occurs when the element we're looking for is the first element in the list. Ω(1)

*c. In the average case:*

On average, we expect to search about half of the list before finding the element (assuming it's in the list). Θ(n)