1)Why is a search for "not_here" the worst-case for linear search and binary search?

- Not only does “not_here” have the most indexes out of the elements, meaning there are more indexes for the searches to search, each index is different meaning this element has a linear time complexity(O(n)).

// alternative answer

- Since “not_here” is not in the dataset, both search cases must go through their full cycle before determining whether the element is absent or present.

2)Why is a search for "mzzzz" the average-case for linear search?

- This element is the average case for linear search because it has a time complexity of O(n/2). Meaning it is in the middle of the alphabet and takes half the time that something at the end takes.

// alternative

- Since "m" is the 13th letter of the alphabet, exactly halfway in-between, the linear search case would take exactly half as long as zzzzz would take. If you were to average out the possible time take, “mzzzz” would result in an exact average case.

3)Why is a search for "aaaaa" the best-case for linear search?

- Since “aaaaa” is the very first element of the sequence, it will be found immediately.

4)How do the results you saw compare to the Big-O complexity for these algorithms?

- Binary search would result in a O(log n) and linear in O(n)

5)Why do the binary search results appear so similar, while the linear search results are so divergent?

- Since binary searches are O(log n) complexity, the maximum time taken for the worst case scenario is very similar to an average case. While linear search is O(n) complexity, meaning it’s heavily dependent on where the target is in the sequence.

```
C:\Users\jreyn\AppData\Local\Microsoft\WindowsApps\python3.10.exe "C:\U
Binary search for 'not_here' took 0.0 seconds
not_here Not found

Linear search for 'not_here' took 2.843031644821167 seconds
not_here Not found

Binary search for 'mzzzz' took 0.0 seconds
mzzzz was found in spot 5940687

Linear search for 'mzzzz' took 1.3539276123046875 seconds
mzzzz was found in spot 5940687

Binary search for 'aaaaa' took 0.0 seconds
aaaaa was found in spot 0

Linear search for 'aaaaa' took 0.0 seconds
aaaaa was found in spot 0


Process finished with exit code 0
```