**1.Understand Search Algorithms**

Linear Search

* Definition: Sequentially checks each element in the list until the desired item is found or the list ends.
* Best Case: O(1) *(first element)*
* Worst Case: O(n) *(last or not found)*
* Use When: Data is unsorted or small.

Binary Search

* Definition: Repeatedly divides the sorted list in half to find the target.
* Best Case: O(1) *(middle element)*
* Worst Case: O(log n)
* Use When: Data is sorted

**4.Analysis**

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| --- | --- | --- | --- |
| **Algorithm** | **Time Complexity** | **Space** | **When to Use** |
| Linear Search | O(n) | O(1) | Small or unsorted datasets |
| Binary Search | O(log n) | O(1) | Requires sorted data |

When to Use:

* Use Linear Search:
  + When the list is small
  + When the list is unsorted
  + When you don’t want sorting overhead
* Use Binary Search:
  + When the list is large
  + When the list is sorted
  + For faster repeated lookups