**Library Management System**

# **Explain linear search and binary search algorithms.**

* **Linear Search** algorithm iterate over each and every element to search the target element.
* **Binary Search** algorithm works in sorted list. It halves the search space in every iteration and eliminate one half which doesn’t contains the target element. Then do the search operation on other half and continue the same process until it found the element or violet condition.

# **Compare the time complexity of linear and binary search**

* **Linear Search:**
  + **Best Case:** O(1), if the target element is the first element.
  + **Average Case:** O(n), when the target element is in halfway.
  + **Worst Case:** O(n), when the target element is at the last.
* **Binary Search:**
  + **Best Case:** O(1), if the target element is right at the middle.
  + **Average Case:** O(log(n)), because binary search halves the search space in every iteration.
  + **Worst Case:** O(log(n)), if the element is not there, then also it holds O(log(n)) time complexity.

# **Discuss when to use each algorithm based on the data set size and order**

* Linear search can be performed over sorted and unsorted data set.
* Binary Search is performed over only sorted data set.