Pre Requisites:

- Basic java syntax
- Loops in JAVA

List of concepts involved :

- Linear search
- Binary search

Linear search in 1D array :

To search for an element in the array we need to traverse over the array. In linear search we continuously keep on traversing the array linearly i.e one by one every element until the required condition is satisfied.

Here follows an example of linear search to find a particular element X in a given array.

Q1. Given an array and an integer 'x'. Return true if 'x' is present in the array otherwise false.
Input 1: A = [3 , 4 , 2 , 1 , 8 , 9] , x = 4
Output 1: true
Input 2: A = [3 , 4 , 2 , 1 , 8 , 9] , x = 5
Output 2: false

LP_CODE1_LS.java

Output:

```
enter the number of elements you want : 5
enter the elements :
2 3 6 55 1
enter the target: 6
True
```

Approach:

- We linearly traverse over the array using a for loop and as soon as any element that we are currently on, is equal to the target variable 'target' we return a true.
- If even after complete traversal we are unable to find the element, we will return false.
- We have taken a "flag" variable just to distinguish that if we have already printed a true we need not to print false again.

Time complexity : Since in the worst case we are traversing the whole array therefore the time complexity will be O(size of the array).

Space complexity : For linear search we are not using any extra space therefore we can say that space complexity will be constant or O(1).

Advantages of Linear Search:

- Linear search is simple to implement and easy to understand algorithms.
- Linear search can be used irrespective of whether the array is sorted or not. It can be used on arrays of any data type.
- Does not require any additional memory.