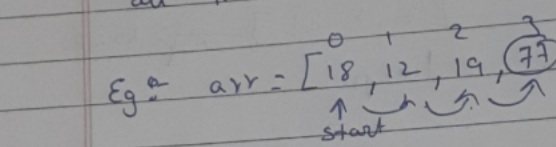
Linear Search in Java

Searching :- It is a process of finding a given value position in a list of values

Linear / Sequential search :-

- It is basic & simple search algorithm
- In sequential search, we compare the target value with all the other elements given in the list

Eg :- arr = [18, 12, 19, 77, 29, 50] (unsorted array)



target = 77

In above example, the target value is compared with all the elements in array in sequential/ linear way

Time Complexity :-

-> Best case : O(1) -> Constant

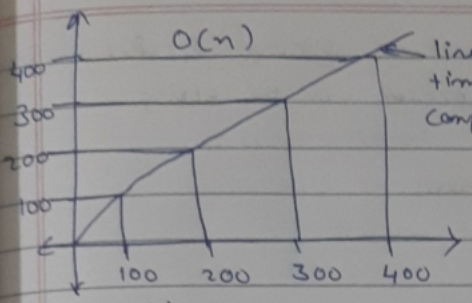
=> How many checks will the loop make in best case i.e the element will be found at 0th index i.e, only one comparison will be made for best case

-> Worst case : O(n)

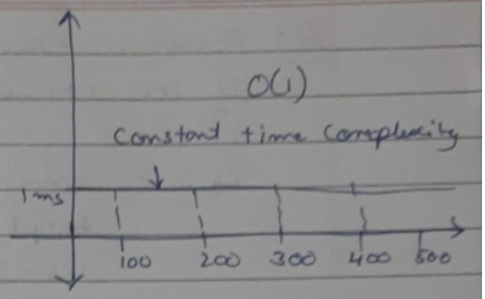
=> Worst case, here it will go through every element and then it says element not found

=>

Size of the array	no. of comparisions	time
100	100	100ms
200	200	200ms
n	n	n



Worst case



Q:- Linear search algorithm code for searching a target element in an array & return the target index of in the array. if not found return -1

Code :-

```
Psvm () {
    int [] nums = {23, 45, 1, 2, 8, 19, 20};
    int target = 19;
    boolean ans = linear search (nums, target);
    System.out.println(ans)
}
Static int linear search (int [] arr, int target) {
    if (arr.length == 0) {
        return -1;
    }
    for (int element : arr) {
        if (element == target) {

    for (int index = 0; index < arr.length; index++) {
        int element = arr[index];
        if (element == target) {
            return index
        }

    return -1
}
```

Q:- Search a character in a string & Return true if the character is present in the string

Eg:- name = Prectham
target = 'p'
ans = True

Code:-

```
PSVm (){
    String name = "Prectham";
    char target = 'p';
    System.out.println(search(name, target))
}
static boolean search(String str, char target){
    if(str.length() == 0){
        return false
    }
    for(int i=0; i<str.length(); i++){
        if(target == str.charAt(i)){
            return true;
        }
    return false;
}
```

Q:- Search for an element(3) in array within the range specified [1,4]

Eg:- arr = [18, [12, -7, 3, 14], 28]
0 1 2 3 4 5

Code:-

```
PSVm (){
boolans=linear_Searchrange(arr, int target, int start, int end)
    Sout(ans)
}
```

```
static boolean linear_search_range(int arr, int target, int start, int end){

    for(int index = start; index <= end; index++){
        if(element == arr[index]){
            return true
        }
    }
    return false
}
```

Q: Find min element in the array

arr: [18, 12, -7, 3, 14, 28]

ans = -7

Code:

```
psvm (){
int[] arr = {18, 12, -7, 3, 14, 28}
sout(min(arr))
}
static int min(int[] arr){
    int ans = arr[0];
    for(int i=0; i<arr.length; i++){
        if(arr[i] < ans){
            ans = arr[i];
        }
    }
    return ans
}
```

Q: Search for an element in 2D Array

Eg:-

$$arr = \begin{bmatrix} [1, 2, 3] \\ [9, 18, 5] \\ [6, 7, 14] \end{bmatrix} \qquad target = 14$$

Code :-

```
Psvm () {
    int [] [] arr = {
                    {1, 2, 3},
                    {9, 18, 3};
                    {6, 7, 14},
                }
    int target = 14
    Sout (search(arr, target))
}

static boolean search (int[][] arr, int target){
    for(int row =0; row< arr.length ; row++) {
        for (int col =0 ; col< arr[row].length; col++){
            if(arr[row][col] == target) {
                return true
            }
        }
        return false
}
```

Q :- Given array of nums of integers, return how many of them contains an even number of digits

Eg :- nums = [12, 345, 2, 6, 7896]

o/p ans = 2

Code :-

```
Psvm () {
    int [] nums = {12, 345, 2, 6, 7896};
    Sout (Findnumbers (nums));
}
Static int Findnumbers (int[] nums){
    int count =0;
```

```
for (int num : nums){
        if (even(num){
            count ++
        }
}
return count

static boolean even(int num){
        int numberofDigits = digits(num)
        return numberofDigits % 2 == 0
}

static int digits(int num){

    if (num < 0){
        num = num * -1
    }
    if (num == 0){
        return 1;
    }
    int count = 0;
    while (num > 0){
        count ++;
        num = num / 10;
    }
    return count;
}
```

PDF Created Using

Camera Scanner

Easily Scan documents & Generate PDF

https://play.google.com/store/apps/details?id=photo.pdf.maker