Searching → Linear Search & Binary Search

arr = [20, 40, 70, 10, 12, 11, 29, 75, 46]
0 1 2 3 4 5 6 7 8

n = 9

x = 47

Linear Search

x = 11

n = len(arr)

```
for i in range(n):        # 0 to n-1
    if arr[i] == x:
        return i
return -1
```

↳ Element is not present in an array

Time complexity
↳ Worst case Scenario :- O(n)
↙ Element is present almost at the last index.

Best case Scenario :- O(1) → Element is present at initial indexes.

Average case Scenario :-

$$\frac{1+2+3+4+\_\_\_+n}{n}$$

sum of n natural numbers

$$\frac{\frac{n(n+1)}{2}}{n} = O(n)$$

Space complexity → O(1)