# Algorithms

# Searching algorithms

## Linear search

This is the simplest technique for searching and the most obvious one as well. Time complexity of the algorithm is O(n), this means that our algorithm will take *n* operations to get the result. It goes like this:

1. Start from the left most element of the array. Compare each element with the key that we are searching for.
2. If the element matches the key. Return true/index if the element.
3. Else return false/-1.

## Binary search

Searching a sorted array by repeatedly dividing the search interval in half. If the search key is less than the item in the middle narrow the search interval to the lower half. Otherwise narrow the interval to the upper half. The basic idea behind binary searching algorithm is to use the information that the array is sorted and to reduce the time complexity to O(log n).

1. Compare search key (x) with the middle element. We can find the middle element with the formula L + (R – L ) / 2 where L is start (Left) index and R is the end(Right) index of the current interval.
2. If x matches the middle element, we return the middle index.
3. Else if x is less than the middle element, we take the left side as the next interval of the mid element.
4. Else if x is greater than the middle element, we take the right side as the next interval of the mid element.