MERGE SORT: ALGORITHM

- ✓ Conceptually, a merge sort works as follows:
  1. If the list is of length 0 or 1, then it is already sorted. Otherwise:
  2. Divide the unsorted list into two sublists of about half the size.
  3. Sort each sublist recursively by re-applying merge sort.
  4. Merge the two sublists back into one sorted list.

- Start with the entire sorted array.
- Compare the target value with the middle element of the array.
- If the target value matches the middle element, the search is successful.
- If the target value is less than the middle element, continue searching in the left half of the array.
- If the target value is greater than the middle element, continue searching in the right half of the array.
- Repeat this process until the target value is found or the search space is exhausted.

3. **Output**:

- If the target value is found, return its index.
- If the target value is not found, return a signal indicating that it's not present in the array.

Insertion Sort: Algorithm

- ***Step 1*** - *If the element is the first element, assume that it is already sorted. Return 1.*
- ***Step2*** - *Pick the next element, and store it separately in a key.*
- ***Step3*** - *Now, compare the key with all elements in the sorted array.*
- ***Step 4*** - *If the element in the sorted array is smaller than the current element, then move to the next element. Else, shift greater elements in the array towards the right.*
- ***Step 5*** - *Insert the value.*
- ***Step 6*** - *Repeat until the array is sorted.*

QUICK SORT: ALGORITHM

Following are the steps involved in quick sort algorithm:

1. After selecting an element as pivot, which is the last index of the array in our case, we divide the array for the first time.
2. Define two variables i and j. Set i and j to first and last elements of the list respectively.
3. Increment i until list[i] > pivot then stop.
4. Decrement j until list[j] < pivot then stop.
5. If i < j then exchange list[i] and list[j].
6. Repeat steps 3,4 & 5 until i > j.
7. Exchange the pivot element with list[j] element.