Assignment:

1) Merge sort:

* Divide then sort & merge.

Array = [4, 6, 0, 12, 78, 45]

Step 1 :- Divide.

[4, 6, 0] [12, 78, 45].

[4] [6, 0] [12] [78, 45]

[4] [6] [0] [12] [78] [45]

Step 2:- Merge subarrays in sorted order.

[4] [0] [6] [12] [45] [78]

[0, 4, 6] [12, 45, 78]

Step 3:- Final Merge.

Compare 0 and 12. → pick 0.

Compare 4 and 12 → 4

compare 6 and 12 → 6.

Compare end of left array → add 12, 45, 78.

Merge sorted array = [0, 4, 6, 12, 45, 78].

2) Quick Sort:

* chooses pivot (usually last element).
* partition:- Move smaller to left and larger to right.
* Recursively sort left and right partitions.

Array = [4, 6, 0, 12, 7, 8, 45]

pivot = 45.

* Elements smaller than 45 moves left and larger moves right.

[4, 6, 0, 12] [45] [78]

Step 2 :- Recursively sort left subarray [4, 6, 0, 12]

pivot = 12 ⇒ [4, 6, 0] [12] [ ].

Step 3:- pivot = 0 ⇒ [ ] [0] [4, 6]

pivot = 6 ⇒ [ ] [4] [6]. [ ]

Step 4 :- Merge sorted subarrays.

Sort left → [0, 4, 6]

add pivot 12 → [0, 4, 6, 12]

45 → [0, 4, 6, 12, 45]

78 → [0, 4, 6, 12, 78]