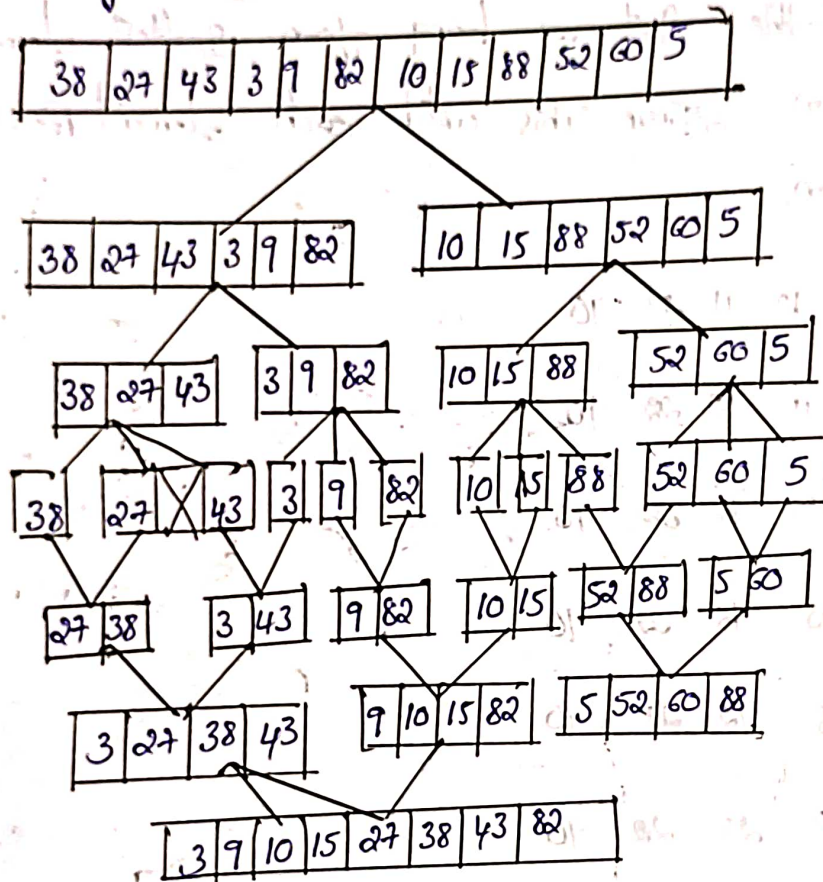


Sort the element using sort divide and conquer stage by [38, 27, 43, 3, 9, 82, 10, 15, 88, 52, 60, 5] using and analyse time complexity of the algorithm.

Sol:- Given array :- merge sort.



Sorted list :- [3, 5, 9, 10, 15, 27, 38, 43, 52, 60, 82, 88]

∴ Sorted list :- [3, 5, 9, 10, 15, 27, 38, 43, 52, 60, 82, 88]

Time Complexity :-

The time complexity of merge sort is $O(n \log n)$ where n is the number of elements in this list. This is because the list is split into halves \log times and n .
merging is all the elements at each level takes $O(n)$ time.

(17) Sort the array 64, 34, 25, 12, 11, 90 using bubble sort what is the time complexity of selection sort in the best, worst and average case.

Sol - Given array = 64, 34, 25, 12, 11, 90.

In bubble sort we bring from smallest element in there correct position continue this until each element reach there correct position.

64 34 25 12 11 22 90

64 34 25 11 12 22 90

64 34 11 25 12 22 90

64 11 34 25 12 22 90

11 64 34 25 12 22 90

11 64 34 12 25 22 90

11 64 12 34 25 22 90

11 12 64 34 25 22 90

11 12 64 34 22 25 90

11 12 64 34 22 25 90

11 12 64 22 34 25 90

11 12 64 22 34 25 90

11 12 22 64 34 25 90

11 12 22 25 64 34 90

11 12 22 25 34 64 90

Sort the array 04, 25, 12, 22, 11 using Selection sort. What is time complexity of Selection sort in the best, worst and average cases?

04 25 12 22 11

In the selection we will fix that from the largest element in there correct position first so.

25 64 12 22 11

25 12 64 22 11

25 12 22 64 11

25 12 22 11 64

12 25 22 11 64

12 22 25 11 64

12 22 11 25 64

12 11 22 25 64

11 12 22 25 64.

The Sorted list :- 11, 12, 22, 25, 64.

Time Complexity :-

Selection Sort is an another Simple Comparison

Sorted algorithm.

Best case :- $O(n^2)$ Merge sort = $O(n \log n)$ worst case = $O(n^2)$.

Given an array of $[4, -2, 5, 3, 10, -5, 2, 8, -3, 6, 7, -4, 1, 9, -1, 0, -6, -8]$,
 integers sort the following elements using insertion sort using
 brute force algorithm. Strategy analyse time complexity.

Given array:- $4, -2, 5, 3, 10, -5, 2, 8, -3, 6, 7, -4, 1, 9, -1, 0, -6, -8$

Insert $4, -2$.

-2	4
----	---

Insert 5

-2	4	5
----	---	---

Insert 3

-2	3	4	5
----	---	---	---

Insert 10

-2	3	4	5	10
----	---	---	---	----

Insert -5

-5	-2	3	4	5	10
----	----	---	---	---	----

Insert 2

-5	-2	2	3	4	5	10
----	----	---	---	---	---	----

Insert 8

-5	-2	2	3	4	5	8	10
----	----	---	---	---	---	---	----

Insert -3

-5	-3	-2	2	3	4	5	8	10
----	----	----	---	---	---	---	---	----

Insert 6

-5	-3	-2	2	3	4	5	6	8	10
----	----	----	---	---	---	---	---	---	----

Insert 7

-5	-3	-2	2	3	4	5	6	7	8	10
----	----	----	---	---	---	---	---	---	---	----

Insert 10-4

-5	-3	-3	-2	2	3	4	5	6	7	8	10
----	----	----	----	---	---	---	---	---	---	---	----

Insert 1

-5	-4	-3	-2	1	2	3	4	5	6	7	8	X10
----	----	----	----	---	---	---	---	---	---	---	---	-----

Insert 9

-5	-4	-3	-2	1	2	3	4	5	6	7	8	9	10
----	----	----	----	---	---	---	---	---	---	---	---	---	----

Insert -1

-5	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10
----	----	----	----	----	---	---	---	---	---	---	---	---	---	----

Insert 0

-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
----	----	----	----	----	---	---	---	---	---	---	---	---	---	---	----

Insert -6

-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
----	----	----	----	----	----	---	---	---	---	---	---	---	---	---	---	----

Insert -8

-8	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
----	----	----	----	----	----	----	---	---	---	---	---	---	---	---	---	---	----

Insert 11

-8	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11
----	----	----	----	----	----	----	---	---	---	---	---	---	---	---	---	---	----	----

Insert -9

-9	-8	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11
----	----	----	----	----	----	----	----	---	---	---	---	---	---	---	---	---	---	----	----

Sort the following elements using insertion Sort using Brute force approach $[38, 27, 43, 3, 9, 82, 10, 15, 88, 52, 60, 5]$ and analyze complexity of the algorithm.

Insert 38, 27

27	38
----	----

Insert 43

27	38	43
----	----	----

Insert 3

3	27	38	43
---	----	----	----

Insert 9

3	9	27	38	43
---	---	----	----	----

Insert 82

3	9	27	38	43	82
---	---	----	----	----	----

Insert 10

3	9	10	27	38	43	82
---	---	----	----	----	----	----

Insert 15

3	9	10	15	27	38	43	82
---	---	----	----	----	----	----	----

Insert 88

3	9	10	15	27	38	43	82	88
---	---	----	----	----	----	----	----	----

Insert 52

3	9	10	15	27	38	43	52	82	88
---	---	----	----	----	----	----	----	----	----

Insert 60

3	9	10	15	27	38	43	52	60	82	88
---	---	----	----	----	----	----	----	----	----	----

Insert 5

3	5	9	10	15	27	38	43	52	60	82	88
---	---	---	----	----	----	----	----	----	----	----	----

Time Complexity:-

Best case $\approx O(n)$

Average case $\approx O(n^2)$

Worst case $\approx O(n^2)$