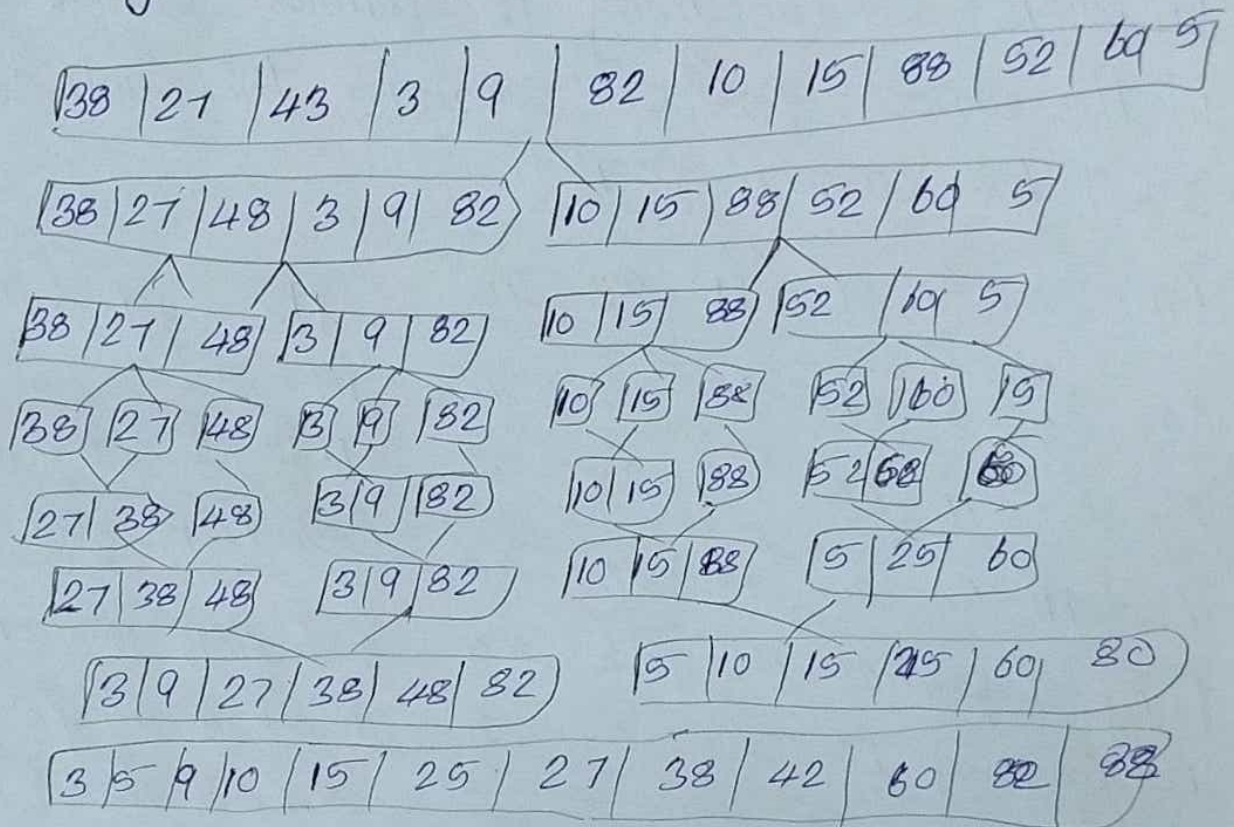


1) Sort the following Elements using merge sort divide and conquered $[3, 8, 27, 43, 39, 87, 10, 15, 88, 52]$ using and analyze time complexity of the algorithm

sol 2
Given array



∴ sorted list = $[3, 5, 9, 10, 15, 25, 27, 38, 43, 52, 60, 82, 88]$

Time complexity:-

Time complexity of merge sort is $O(n \log n)$

n is the num. of Elements in the list $O(n \log n)$

increase \log the input into values $\log n$ times
and n Element of each time values $O(n)$ times

2) sort the array 64, 34, 25, 12, 11, 99 using bubble sort what is the time complexity of solution sort in the best, worst, average cases!

Given array = 64, 34, 25, 12, 22, 11, 90

In bubble sort we bring the smallest element in the correct position continue this each element reach the current position

64	34	25	12	11	22	40
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64	34	25	11	12	22	40
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64	34	11	25	12	22	40
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64	11	34	25	12	22	40
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11	64	34	25	12	22	40
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11	64	34	12	25	22	40
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11	64	12	34	25	22	40
----	----	----	----	----	----	----

11	12	64	32	25	22	40
----	----	----	----	----	----	----

11	12	64	32	22	25	40
----	----	----	----	----	----	----

11	12	64	22	32	25	40
----	----	----	----	----	----	----

11	12	22	64	32	25	40
----	----	----	----	----	----	----

11	12	22	64	25	32	40
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11	12	22	25	64	32	40
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11	12	22	25	32	64	40
----	----	----	----	----	----	----

11	12	22	25	36	40	64
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∴ The sorted arrays

is

(11, 12, 22, 25, 34, 40, 64)

selection sort complexity

$\approx \approx \approx \approx \approx \approx \approx$

selection sort is an another single comparison sorted algorithm

best-case: $O(n^2)$

Average case: $O(n^2)$

worst-case: $O(n^2)$

The selection sort has a time complexity

$O(n^2)$ it always

goes through the same way as

3, Sort the array 64, 25, 12, 22, 11 using selection sort what is the time complexity of selection sort in the best, worst, and average cases.

A) given array:- 64, 25, 12, 22, 11

In the selection we will find the longest element in those correct position best so

64	25	12	22	11
25	64	12	22	11
25	12	64	22	11
12	25	64	22	11
12	25	22	64	11
12	25	22	11	64
12	25	11	22	64
12	11	25	22	64
11	12	25	22	64
11	12	22	25	64

∴ The sorted list is 11, 12, 22, 25, 64

Time complexity

2 2 2 2 2

Selection sort

Best case: $O(n^2)$

Average case: $O(n^2)$

Worst case: $O(n^2)$

The selection sort has a time complexity $O(n^2)$ it always through same $O(n^2)$

4) Sort the following elements using insertion sort using Brute force Approach strategy [38, 27, 43, 3, 9, 82, 10, 88, 56, 60, 5] and analyze complexity of the algorithm

Sol Given array

[38, 27, 43, 3, 9, 82, 10, 15, 88, 52, 60, 5]

Solve:-

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

Time complexity:- worst case $O(n^2)$

Average case $O(n^2)$

Best case $O(n)$

9) Given array of $[4, -2, 5, 3, 10, -6, 2, 8, -3, 6, 7, -4, 1, 9, -1, 0, -6, 5, 11, 9]$ integers sort the following element using insertion sort using Brute Force Approach & analyze complexity of algorithm

ex) Insert $-4 = [4]$

Insert $-2 = [-2, 4]$

Insert $-5 = [-2, 4, 5]$

Insert $-3 = [-2, 3, 4, 5]$

Insert $-10 = [-2, 3, 4, 10]$

Insert $-5 = [-2, -5, 3, 4, 10]$

Insert $2 = [-2, -5, 2, 3, 4, 10]$

Insert $8 = [-2, -5, 2, 3, 4, 8, 10]$

Insert $-3 = [-2, -3, -5, 2, 3, 4, 8, 10]$

Insert $-6 = [-2, -3, -5, 2, 3, 4, 6, 8, 10]$

Insert $7 = [-2, -3, -5, 2, 3, 4, 6, 7, 8, 10]$

Insert $-4 = [-2, -3, -4, -5, 2, 3, 4, 6, 7, 8, 10]$

Insert $1 = [-2, -3, -5, 1, 2, 3, 4, 6, 7, 8, 10]$

Insert $0 = [-2, -3, -5, 0, 1, 2, 3, 4, 6, 7, 8, 10]$

[Insert $-6 = [-2, -3, -5, -6, 0, 1, 2, 3, 4, 6, 8, 10]$

Insert $8 = [-6, -5, -3, -2, 0, 1, 2, 3, 4, 6, 8, 10]$

Insert $11 = [-6, -5, -3, -2, 0, 1, 2, 3, 4, 6, 8, 10]$

Insert:- 9 = [-9, -8, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
10, 11]

Time complexity Best:- $O(n)$ Average:- $O(n^2)$

Worst:- $O(n^2)$