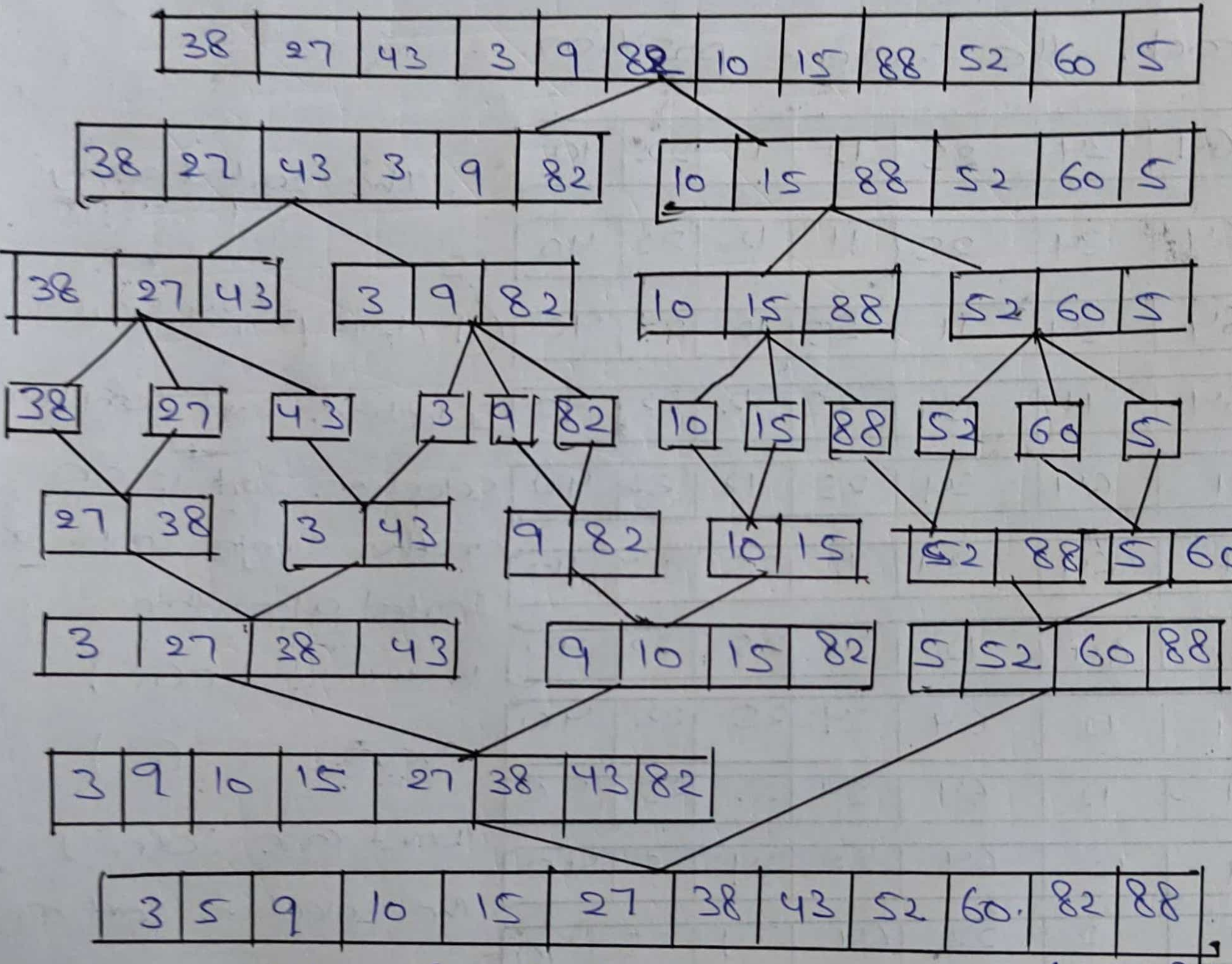
1) Sort the Following elements using merge sort divide and Conqurod [3 8,27,43,3,9,87,10,15,88,52 60,5] using and analysize Time Complexit/ of the algorithm.

Sol) given array



∴ Sorted list = (3,5,9,10,15,27,38,43,52,60,82,88

Time complexity:

Time complexity of merge sort is O(nlogn)

n is the num.of elements in the list O(nlogn)

increase by the input into halves logn time,

and n element of each time takes O(n) times

2) Sort the array 64, 34, 25, 12, 11, 90 using bubble sort what is the time complexity of solution sort in that best, worst, average cases.

Sol) Given array = . 64 34 25 12 22 11 90

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

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

∴ The sorted arrays is (11, 12, 22, 25, 34, 40, 64)

Selection sort Complexity

Selection sort is an another single confusion sorted algorithm

best case : $O(n^2)$

Average : $O(n^2)$

worst case : $O(n^2)$

The selection sort has a time complexity $O(n^2)$ it always gas through the same no of Comparisions

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.

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

In the selection we will the form the largest element in those Correct position best So.

64	25	12	22	11
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 is 11, 12, 22, 25, 64

Time Complexity

Selection sort
Best case : $O(n^2)$
Averge 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. of comparisions

(4) Sort the following elements using insertion Sort using Brute Force Appoach strategy [38 ,27,43 ,3A ,82,10. ,15,88 ,52,60,5) 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
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	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	82	88	52	60	5
3	9	10	15	27	38	43	52	82	88	60	5
3	9	10	15	27	38	43	52	60	82	88	5
~~3~~	~~5~~	~~9~~	~~10~~	~~27~~	~~38~~	~~43~~	~~52~~	~~60~~	~~82~~	~~8~~	
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: $O(n)$

7.

5) given array of [4,-2,5,3,10.,-5,2,8,-3,6,7,-4,1,9, -1,0,-6,8,11,-9] integers sort the following elements using. insertion sort.using Brute Force Approach Strategy. analysze complexity of algorithm

Sol) Insert :-4 =
[4]

Insert :-2 = [-2,4]

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

Insert: 3 = [-2,3,4,5)

Inversert: 10 = [-2,3,4,5,10]

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

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

In sert: 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:-4 = [-5,-4,-3,-2,2,3,4,5,6,7,8,10)

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

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)

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