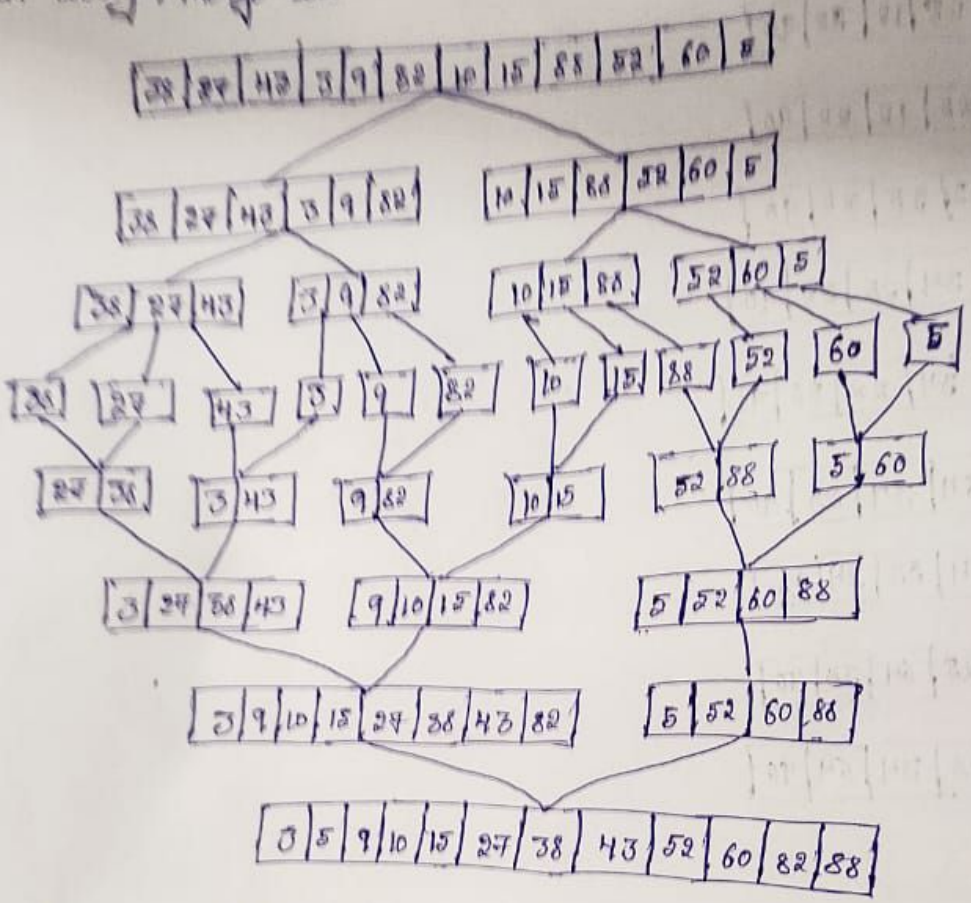
16. Sort the following elements using merge sort divide and conquer strategy [38, 27, 43, 3, 9, 82, 10, 15, 88, 52, 60, 5] and analyze complexity of algorithm.

Sol: Given array : merge sort



The time complexity of merge sort is $O(n \log n)$ where n is the no. of elements in the list is split into halves $\log n$ times and n.

Merging is all the elements at each takes $O(n)$ times.

17. Sort the array 64, 34, 25, 12, 22, 11, 90 using bubble sort in the best, worst and the average case. what is the time complexity of selection

Soli:

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	12	64	34	25	22	90

11	12	64	34	22	25	90

11	12	22	64	34	25	90

11	12	22	64	25	34	90

11	12	22	25	64	34	90

11	12	22	25	34	64	90

18. Sort the array 64, 25, 12, 22, 11 using selection sort what is the p.c of selection sort is the best, worst and avorge case ?

Soli: Given,

64	25	12	22	11

In the selection sort we will fix that from the longest element in there correct position first

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

Time Complexity of Best case :- $O(n^2)$

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

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

Q. Sort the following elements using insertion sort using brute force approach startegy [38, 27, 43, 3, 9, 38, 10, 15, 34, 52, 6, 60, 5] and analyse complexity of the algorithm.

Sol:- Insert 38, 27

27	38

Insert 43

27	38	43

Insert 3

3	27	38	43

Insert 82

3	27	38	43	82

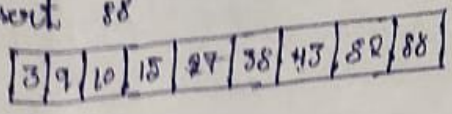
Insert 10

3	10	27	38	43	82

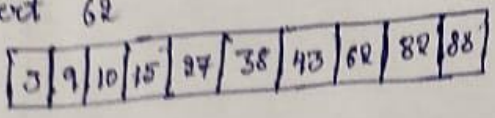
Insert 15

3	10	15	27	38	43	82

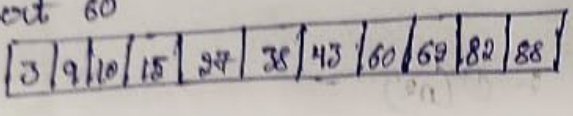
Insert 88



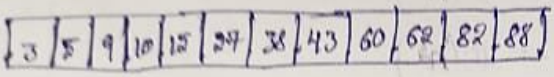
Insert 62



Insert 60



Insert 5



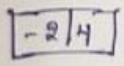
Time Complexity :- Best case :- O(n)

Average case :- O(n2)

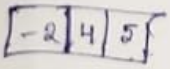
Worst case :- O(n2).

20. Given an array of [4, -2, 5, 3, 10, -5, 2, 8, -3, 6, 7, -4, 1, 9, -1, 0, 16, -8, 11, -9] integers, sort the following elements using insertion sort using brute force approach strategy analyze complexity of the algorithm.

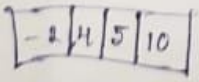
30 :- Insert 4, -2



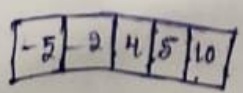
Insert 5



Insert 10



Insert -5



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

Time Complexity of Best case :- $O(n^2)$

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

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

Q. Sort the following elements using insertion sort using brute force approach startegy [38, 27, 43, 3, 9, 38, 10, 15, 34, 52, 6, 60, 5] and analyse complexity of the algorithm.

Sol:- Insert 38, 27

27	38

Insert 43

27	38	43

Insert 3

3	27	38	43

Insert 82

3	27	38	43	82

Insert 10

3	10	27	38	43	82

Insert 15

3	10	15	27	38	43	82