—: Homework-8 :-

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Q-1:- Merge sort :-

Step1:- [3, 6, 7, 2, 8, 4, 1, 9, 5]

[3, 6, 7, 2, 8]   [4, 1, 9, 5]

[3, 6, 7]   [2, 8]   [4, 1]   [9, 5]

[3, 6]   [7]   [2]   [8]   [4] [1]   [9]   [5]

[3]   [6]
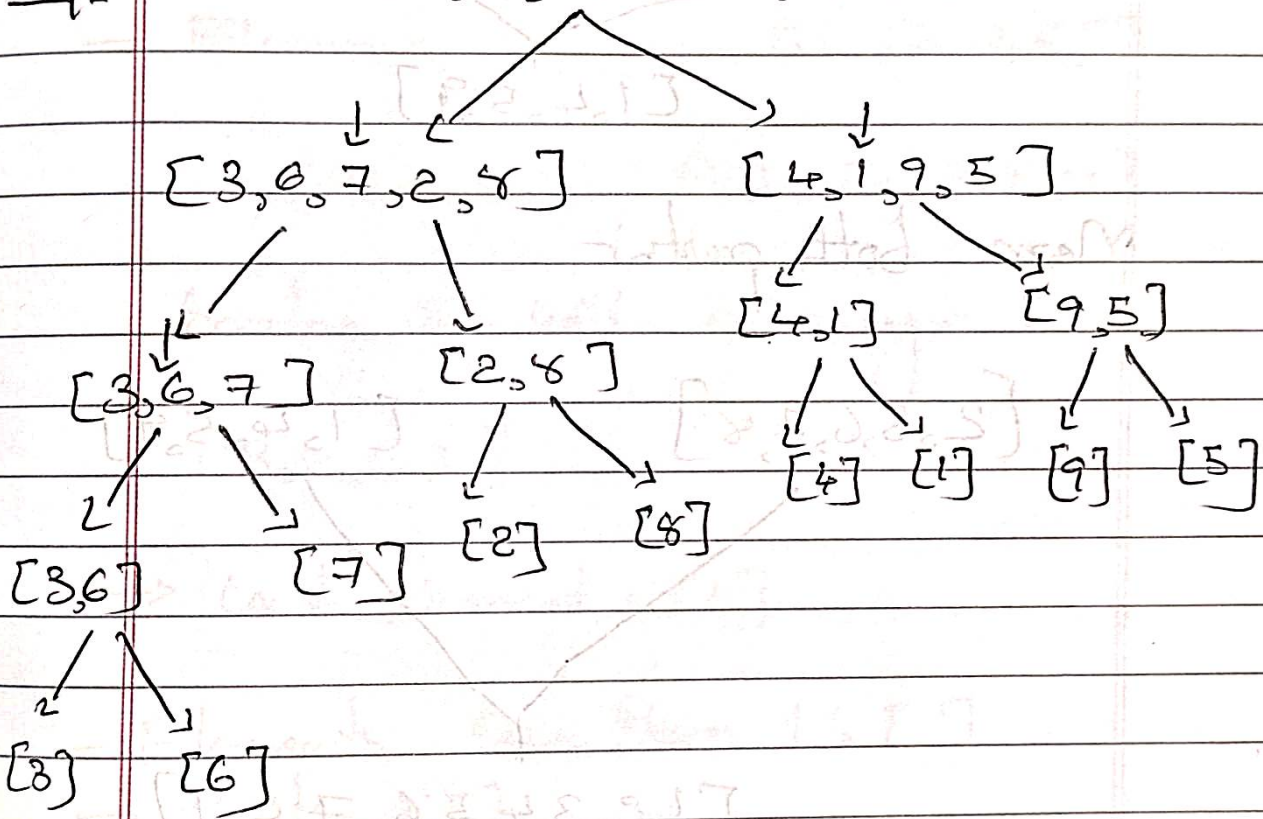
Merge and sort [Left Part]

Step2:-   [3]   [6]   [7]   [2]   [8]

[86]   [2, 8]

[3, 6, 7]
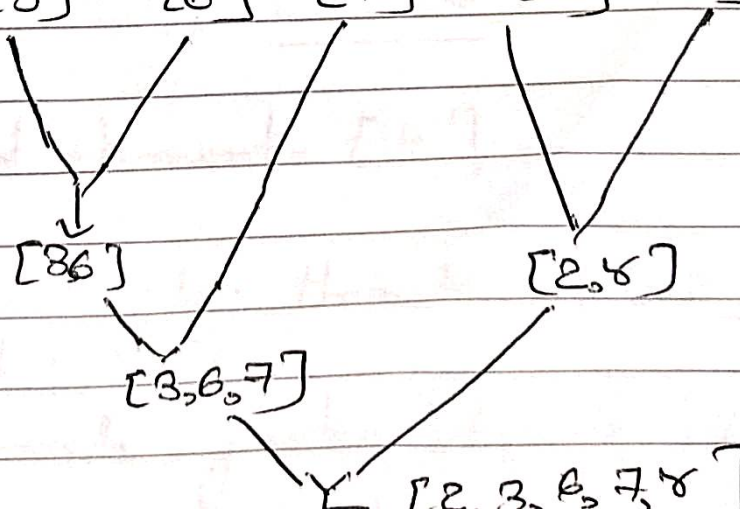
[2, 3, 6, 7, 8]

Right part:
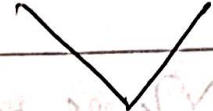
[4]   [1]   [9]   [5]

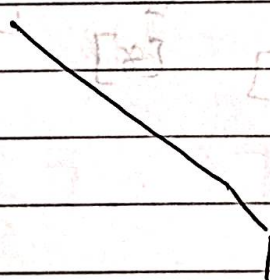[4,1]   [9,5]

[1,4,5,9]

Merge both parts:

[2,3,6,7,8]   [1,4,5,9]

[1,2,3,4,5,6,7,8,9]

Q-2 Quick Sort :-

Step 1 :- Last element is 5. , so
                pivot = 5

→ Elements less than 5 : [3,2,4,1]
→ Pivot : [5]
→ Elements less than 5 : [6,7,8,9]

    [3,2,4,1]   [5]   [6,7,8,9]

Sorting the left subarray's

[3,2,4,1]

→ Last element = [1]

→ Elements less than 1 : [ ]
→ Pivot : [1]
→ Elements greater than 1 : [3,2,4]

        [1] [3,2,4]

→ Last element = [4]

→ Elements less than 4 : [3,2]
→ Pivot : [4]
→ Elements greater than 4 : [ ]

[3,2] [4]

Last element = [2]

→ Elements smaller than [2]: [ ]
→ pivot : [2]
→ Elements greater than [2] : [8]

[2] [8]

⇒ Sorted left subarray is

[1, 2, 3, 4] .

→ For the right subarray is

[6, 7, 4, 9]

→ Last element : [9]

→ less than 9 : [6, 7, 8]

[6, 7, 8] [9]

→ Last element : [8]
→ less than 8 : [6, 7]

[6, 7] [8]

→ $ last element [7]

→ less than [7] : [6]

[6]   [7]

→ Sorted right subarray is :

[6, 7, 8, 9] ...

So, by combining left and right subarray,

[1, 2, 3, 4, 5, 6, 7, 8, 9]

Q-3: Bubblesort :

[3, 6, 7, 2, 8, 4, 1, 9, 5]   1st iteration

1) ☐3 6☐ 7 2 8 4 1 9 5

No swapping [3 < 6]

2) 3 ☐6 7☐ 2 8 4 1 9 5

No swapping [6 < 7]

3) 3 6 ☐7 2☐ 8 4 1 9 5

Swap 7 and 2 [7 > 2]

3 6 2 7 8 4 1 9 5

4).   3   6   2 | 7   8 | 4   1   9   5

No swap

5)   3   6   2   7 | 8   4 | 1   9   5

                    ↓

    3   6   2   7   4   8   1   9   5

6)   3   6   2   7   4 | 8   1 | 9   5

                   ↓

   3   6   2   7   4   1 | 8   9 | 5

7)   3   6   2   7   4   1 | 8   9 | 5

8)   3   6   2   7   4   1   8 | 9   5 |

                  ↓

   3   6   2   7   4   1   8   5   9

2nd iteration :-

1) [3 6] 2 7 4 1 8 5 9

2) 3 [6 2] 7 4 1 8 5 9

3) 3 2 [6 7] 4 1 8 5 9

4) 3 2 6 [7 4] 1 8 5 9

5) 3 2 6 4 [7 1] 8 5 9

6) 3 2 6 4 1 [7 8] 5 9

7) 3 2 6 4 1 7 [8 5] 9

8) 3 2 6 4 1 7 5 [8 9]

↓

3 2 6 4 1 7 5 8 9

3rd iteration's

1) $\boxed{3 \quad 2}$ 6   4   1   7   5   8   9

2) 3 $\boxed{2 \quad 6}$ 4   1   7   5   8   9

3) 3   2 $\boxed{6 \quad 4}$ 1   7   5   8   9

4) 3   2   4 $\boxed{6 \quad 1}$ 7   5   8   9

5) 3   2   4   1 $\boxed{6 \quad 7}$ 5   8   9

6) 3   2   4   1   6 $\boxed{7 \quad 5}$ 8   9

7) 3   2   4   1   6   5 $\boxed{7 \quad 8}$ 9

8) 3   2   4   1   6   5   7 $\boxed{8 \quad 9}$

$\downarrow$

3   2   4   1   6   5   7   8   9

4th iteration's

1) [3 2] 4 1 6 5 7 8 9

2) 2 [3 4] 1 6 5 7 8 9

3) 2 3 [4 1] 6 5 7 8 9

4) 2 3 1 [4 6] 5 7 8 9

5) 2 3 1 4 [6 5] 7 8 9

6) 2 3 1 4 6̶/5 [6̶ 7] 8 9
                ↓

7) 2 3 1 4 5 6 7 8 9

5th iteration's

1) [2 3] 1 4 5 6 7 8 9

2) 2 [3 1] 4 5 6 7 8 9
              ↓

3) 2 1 3 4 5 6 7 8 9

6th iteration :-

1 | 2 | 1 | 3 | 4 | 5 | 6 | 7 | 8 | 9

↓

Final Answer :-

1   2   3   4   5   6   7   8   9