DSA through C++

Sorting

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Agenda

1. Sorting
2. Various Sorting techniques

Sorting

Arranging data elements in some logical order is known as sorting.

Sorting we are going to cover is also known as internal sorting.

when elements are numbers, sorting means arranging numbers in ascending order (by default)

when elements are strings, sorting means arranging strings in dictionary order (alphabetical) order. (by default)

Various Sorting Algorithms

1. Bubble Sort
2. Modified Bubble Sort
3. Selection Sort
4. Insertion sort
5. Quick Sort
6. Merge Sort
7. Heap Soxt.

Bubble Sort

0	1	2	3	4	5
24	58	11	67	92	43
Round-1					
24	11	58	67	43	92
Round-2					
11	24	58	43	67	
Round-3					
11	24	43	58		
Round-4					
11	24	43			
Round-5					
11	24				

n elements
Round n-1

Modified Bubble Sort

n elements

Round - K $\quad 0 \leq K < n$

no swapping in K^{th} round means elements are sorted now. no more rounds to be executed.

Selection Sort

0	1	2	3	4	5	6	7	8
38	90	47	69	52	88	71	18	20

i = 0 to 7

find the smallest element from A[i - 8] = A[k]

Swap (A[i], A[k])

18	20	38	47	52	69	71	88	90

Insertion Sort

0	1	2	3	4	5	6	7	8	9
50	20	37	91	64	18	43	59	72	81
18	20	37	43	50	59	64	72	81	91

temp

Quick Sort

0	1	2	3	4	5	6	7	8
58	62	91	43	29	37	88	72	16

16	37	29	43	58	91	88	72	62

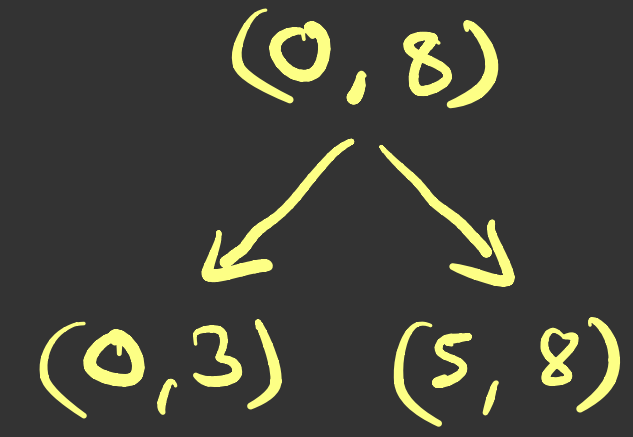
Left = ~~0 1 2 3 4~~

Right = ~~8 7 6 5 4~~

Loc = ~~0 8 1 5 2 4~~

① A[Loc] A[Right] Right--

② A[Left] A[Loc] Left++



Merge Sort

0	1	2	3	4	5	6	7	8	9	10	11	12
75	29	83	42	16	90	56	34	20	71	88	92	7