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SubCode:- CSA0670.

① Given an array of [4,-2,5,3,10,-5,2,8,-3,6,7,-4,1,9,-1,0,-6,8,11,9] integers find the max and min product that can be obtained by multiply two integers from the array.

Array is [4,-2,5,3,10,-5,2,8,-3,6,7,-4,1,9,-1,0,-6,8,11,4]

we need to consider the target and smallest product that can be formed by selecting two consider from the array.

1) Sort the array

Sorted array

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

Identify the possible candidates for maximum product.

Identify the possible candidates for minimum product.

Calculating the maximum product:-

⇒ The two longest positive numbers and 10x11=110.

⇒ The two smallest negative numbers are -9 and -8 = 72

The maximum product is '0'.

Calculating minimum product:-

The largest positive and negative number 11 and -9

11x-9 = -99.

The smallest positive and negative numbers are -9x8=-72

-99 is smaller than -72.

maximum product =110 and minimum product =-99.

② Demonstrate the priority search method to search, for the key = 23 from the array = {2,5,8,12,16,25,38,56,72,91}

Given array = {2,5,8,12,16,23,38,56,72,91}

1) Intalize pointers:-

low = 0 and high = 9

calculate mid = $\left[\frac{low+high}{2}\right]$

$= \left[\frac{0+9}{2}\right]$

$= 4$

compare arr[mid] with key:

arr[4] = 16

since 16 < 23 update low = mid + 1 = 5

calculate mid = $\left[\frac{low+high}{2}\right]$

$= \frac{5+9}{2}$

$= 7.$

compare arr[mid] with key:

arr[7] = 56

since 56 > 23 update high = mid - 1 = 6

mid = $\left[\frac{5+6}{2}\right] = 5$

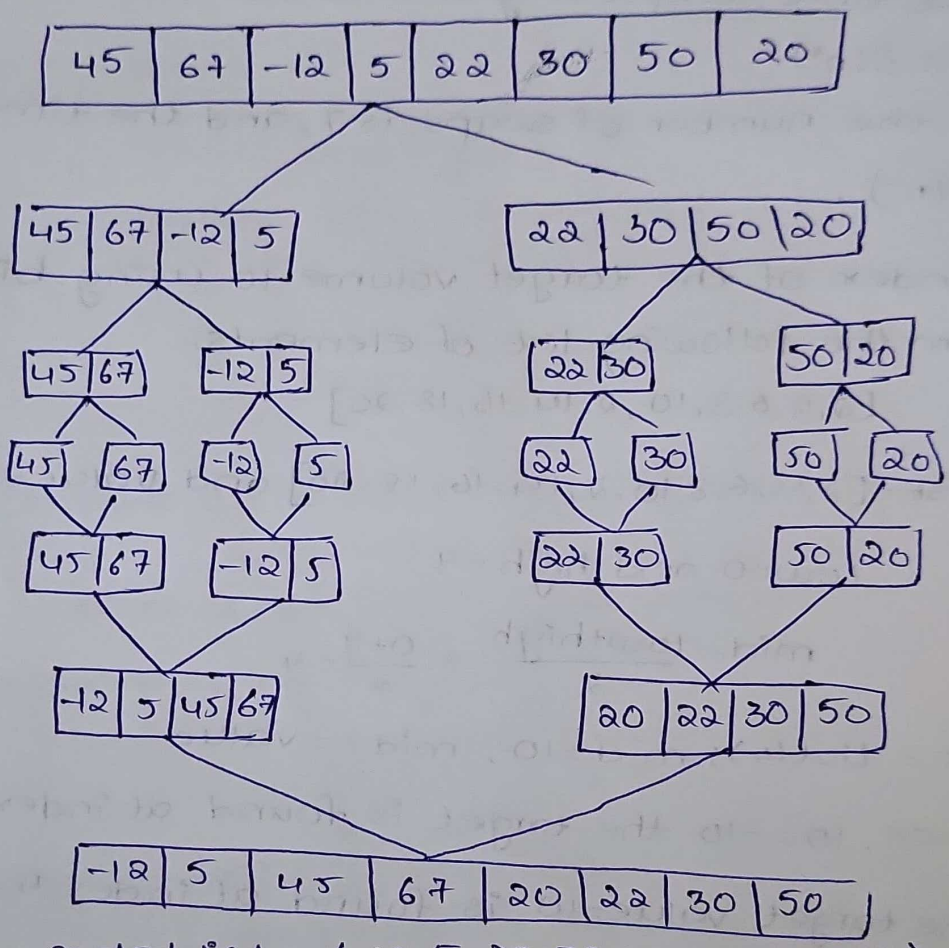
arr[mid] = arr[5] = 23

23 == 23 This is found at index 5

∴ The key = 23 is found at index 5.

③ Apply merge sort and other list of 8 elements, data d={45,67,-12,5,22,30,50,20} setup a recursive relation for the number of key comparision made by merge sort.

Merge sort



∴ The sorted list = (-12, 5, 20, 22, 30, 45, 50, 67).

④ Find the no. of times to perform solving swapping for selection sort also estimate the time complexity for the other of nation set s (12, 7, 5, -2, 18, 6, 13, 4)

The selection sort algorithm always makes exactly n-1 swaps in the worst case, where 'n' is the no. of elements in the list.

given S= {12, 7, 5, -2, 18, 6, 13, 4}

No. of elements $n=8$.

No. of swaps $n=8; n-1=7$

Time complexity:-

The time complexity of selection sort in Big-O notation is $O(n^2)$.

So, the number of swaps is 7, and the time complexity is $O(n^2)$.

5) Find the index of the target volume 10 using binary search from the following list of elements.

[2,4,6,8,10,2,14,16,18,20]

Given list = [2,4,6,8,10,2,14,16,18,20] and value = 10.

low = 0 and high = 9

$$mid = \frac{low+high}{2} = \frac{0+9}{2} = 4$$

Ex:- list(4); mid = 10', mid == value

since, 10 == 10 the target is found at index '4'.

∴ The target value = 10 is found at index 4.