(4) find the not times to perform solving suppling for Selection sort also estimate the time complexity for the orders of rotation sets (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-1 = 8-1 = 7

Time Complexity: $O(n^2)$

the no of swaps is 7, and the Complexity is $O(n^2)$

(5) find the index of the target value 10 using binary Solution Search for 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

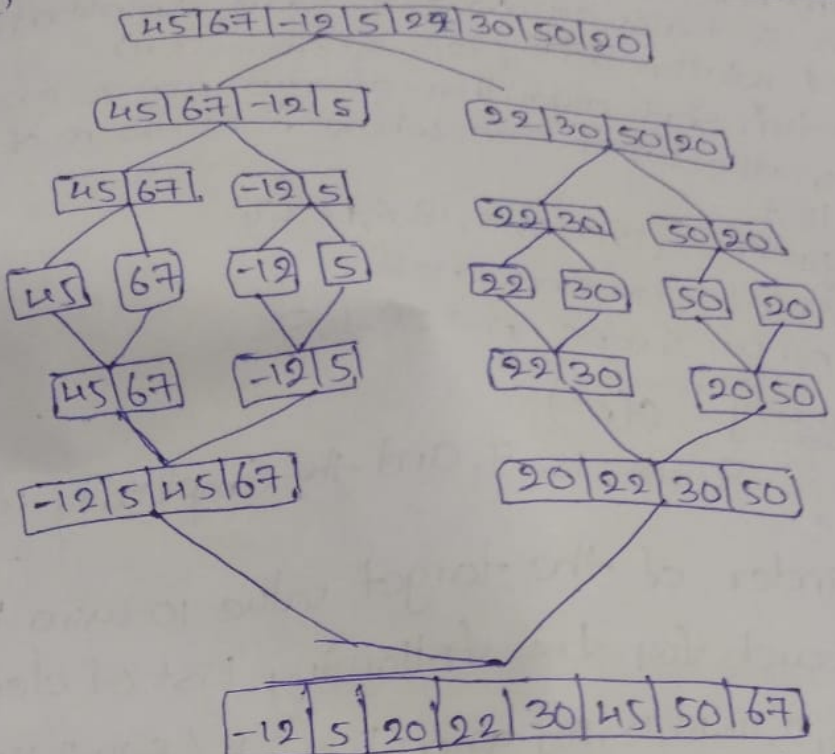
$$mid = \frac{low + high}{2} = \frac{0+9}{2} = 4.$$

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.

Solution



The sorted list : {-12, 5, 20, 22, 30, 45, 50, 67}

(4) Find the no of times to perform Supplying for Selection Sort estimate the time.

Recurrence relation for Comparisons:

$$T(n) = 2T(n/2) + O(n)$$

if $n = 1$, $T(1) = 0$.

→ At each level of Recursion most n-1 comparisions to merge two of Six n so it becomes.

$$T(n) = 2T(n/2) + (n-1)$$

Solving recurrence relation we get

$$T(n) = n \log_2(n) : n+1$$

$$\therefore T(n) = O(n \log n)$$

The recurrence relation is $T(n) = 2T(n/2) + O(n)$

$$T(n) = n\log_2(n) - n + 1$$

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 and find the maximum and minimum product that can be obtained by multiplying two integers from the array

Solution:-

array is [4, -2, 5, 3, 10, -5, 2, 8, -3, 6, 7, -4, 1, 9, -1, 0, -6, -8, 11, -9]
we need to Consider the largest and smallest product that can be formed by selecting two numbers 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]

2) Identify possible Canditates for maximum product
3) identify possible Candidates for minimum product

Calculating maximum products:

- The two largest positive numbers are 10 and 11

$10 \times 11 = 110$

- The two smallest negative numbers are -9 and -8

$-9 \times -8 = 72$

The maximum product is 110

Calculating minimum product:

The largest positive and negative number is 11 and -9

$11 \times -9 = -99$

The Smallest positive and negative

$-9 \times -8 = 72$

-99 is Smaller than 72 So

maximum product = 110, and minimum product = -9

(2) Demonstrate the binary
the key :23 from the array : {2,5,8,12,16,23,38,56,72,91}

Solution

given key : 23 and array : {2,5,8,12,16,23,38,56,72,91}

1) Initialize 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 : $\left[\frac{low+high}{2}\right] = \left[\frac{5+9}{2}\right] = 7$

Compute 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 The key is found at index 5

∴ The key : 23 is found at index 5.

Apply merge sort and otherlist of 8 elements, {
d : (45, 67, -12, 5, 22, 30, 50, 20). Set up recurrence relatio
the numbers of key comparision made by merge