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Subject : Data Structure

Semester : 3<sup>rd</sup>

Program : BS (CS)

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Q.1 Let the size of  $A[]$  be 15654 and the lower bound be 36767, calculate the upper bound.

Solution

Given data

the size of an array  $A[] = 15654$

lower bound  $lb = 36767$

The required upper bound = ?

Knowing that the size of  $A[] = ub - lb - 1$  put the value of  $lb$  and size of an array in the above given equation

P.T.O



$$A[1] = ub - lb + 1$$

$$15654 = ub - 36767 + 1$$

$$-ub = -15654 - 36767 + 1$$

by taking (-) common to the right side and divide

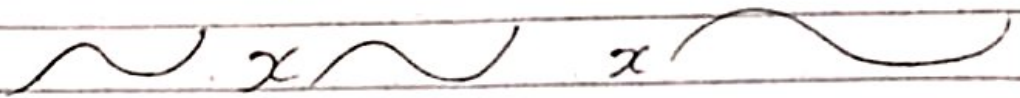
$$-ub = -(15654 + 36767 - 1)$$

$$ub = 15654 + 36767 - 1$$

$$ub = 15654 + 36766$$

$$ub = 52420$$

the upper bound is 52420



(b)

Suppose a list of 350 element is to be sorted using bubble sort, then find

(i) Total number of passes

As it is crystal clear that

total number of passes = total number of elements - 1

total number of passes =  $N - 1$

$$= 350 - 1 = 349$$

P.T.O



(ii) Total number of steps

$$\text{total number of steps} = \frac{n(n-1)}{2}$$

$$\text{as } n = 350$$

$$\begin{aligned} \text{total number of steps} &= \frac{350(350-1)}{2} \\ &= \frac{350(349)}{2} \\ &= \frac{122150}{2} \end{aligned}$$

And the total number of steps = 61075

(iii) Number of steps in pass # 137

$$\begin{aligned} \text{Number of steps in pass \# 137} &= 350 - 137 \\ &= 213 \end{aligned}$$

$$\text{Steps in pass \# 137} = 213$$

(iv) Number of steps in pass # 193

$$\text{Number of steps in pass \# 193} = n - \text{pass \#}$$

As we know that  $n = 350$

$$\text{Number of steps in pass \# 193} = 350 - 193 = 157$$

$$\text{Number of steps in pass \# 193} = 157$$



Q.2 Sort the given list using selection sort.

10, 15, 0, 7, 8, 6

Sol<sup>n</sup>

Sorting by using selection sort  
First we are needed to find the number of steps and after it implement the steps for each element in order for ordering and arranging the above or given list

$N = \text{number of elements}$

$$\text{Steps} = N - 1$$

$$= 6 - 1 = 5$$

And know we need to sort the list in 5 steps

elements of the lists 10, 15, 0, 7, 8, 6

Step 1 = for element 10

(10), 15, (0), 7, 8, 6

element 10 has been circled with the smallest element 0 in the list and know we can interchanging their positions.

$R = 0, 15, 10, 7, 8, 6$

P.T.O



Step 2 = For element 15

0, (15), 10, 7, 8, (6)

the same procedure of Step 1 is repeated.

R = 0, 6, 10, 7, 8, 15

Step 3 = For element 10

0, 6, (10), (7), 8, 15

as the circled member interchanged

R = 0, 6, 7, 10, 8, 15

Step 4 = For element 10

0, 6, 7, (10), (8), 15

R = 0, 6, 7, 8, 10, 15

Step 5 = 0, 6, 7, 8, 10, 15

Sorting is completed as 10 is on its proper position.

The sorting list is as follows.

0, 6, 7, 8, 10, 15

Q 3 Fill in the blanks.

- (i) Physical
- (ii) Logical
- (iii) Data structure
- (iv) non-linear
- (v) Linear
- (vi) Linear
- (vii) 8
- (viii) File
- (ix) Degree of record
- (x) Blocking Factor

