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Subject = Data Structure

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Program = BS (CS)

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Q₁₀) Let the size of $A[]$ be 15654 and the lower bound be 36767. Calculate the upper bound.

Sol

Given data

Size of array $A[] = 15654$

Lower bound $lb = 36767$

Required upper bound = ?

As we know that $\text{Size of } A[] = ub - lb + 1$
Put the value of lb and size of an array in the above given equation

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

$$15654 = ub - 36767 + 1$$

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

Take (-) common to the right side and :-

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

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$$ub = 15654 + 36767 - 1$$

$$ub = 15654 + 36766$$

$$ub = 52420$$

upper bound is 52420

(b) Suppose a list of 350 elements is to be sorted using Bubble Sort then find.

(i) Total number of Passes.

$$\begin{aligned} \text{Total Number of Passes} &= n-1 \\ &= 350-1 \\ &= 349 \end{aligned}$$

(ii) Total number of steps = $\frac{n(n-1)}{2}$
 $\therefore N = 350$

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

$$\text{Total number of steps} = 61075$$

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(iii) Number of Steps in Pass # 137

Number of Steps in Pass # 137 = $n - \text{Pass \#}$

As we know that $n = 350$

Number of Steps in Pass # 137 = $350 - 137 = 213$

Steps in Pass # 137 = 213

(iv) Number of Steps in Pass # 193

Number of Steps in Pass # 193 = $n - \text{Pass \#}$

As we know that $n = 350$

Number of Steps in Pass # 193 = $350 - 193$

Number of Steps in Pass # 193 = 157

Q9 Sort the given list using ~~in Pass~~ Selection Sort.

10, 15, 0, 7, 8, 6

Steps = $N - 1$

= $6 - 1 = 5$

we need to sort the list in 5 steps
elements of the list 10, 15, 0, 7, 8, 6

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Step 1 = For element 10

10, 15, 0, 7, 8, 6

0, 15, 10, 7, 8, 6

Step 2 = For element 15

0, 15, 10, 7, 8, 6

0, 6, 10, 7, 8, 15

Step 3 = For element 10

0, 6, 10, 7, 8, 15

0, 6, 7, 10, 8, 15

Step 4 = For element 10

0, 6, 7, 10, 8, 15

0, 6, 7, 8, 10, 15

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

now 10 is on proper position that is why list sorting is also

Complete and the sorted list is

0, 6, 7, 8, 10, 15

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Q#3

Fill in the blanks.

- (i) Physical Data Structure may deal with only a single value.
- (ii) Logical Data Structure may deal with multiple values.
- (iii) The logical / mathematical organization of data is called data structure.
- (iv) A Tree is a no-linear Data Structure.
- (v) An Array is a linear Data Structure.
- (vi) List must be sorted for linear searching.
- (vii) $17 \text{ int} - \text{div } 2 = \underline{8}$
- (viii) An investigation parade of criminals is an example of file.
- (ix) Number of fields in a Record is called Degree of record.
- (x) Number of Records in a Block is called Blocking factor.