

(1)
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Subject :: Data structures

Department :: Electrical

Semester :: 8th

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Q1) (a)

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

Given data:

$$\text{Size of } A[] = 15654$$

$$\text{Lower bound} = 36767$$

Required = ?

Upper bound = ?

Solution:

As we know that

$$\text{Size of } A[] = \text{ub} - \text{lb} + 1$$

$$\text{ub} = \text{Size of } A[] + \text{lb} - 1 \quad \text{--- (1)}$$

Putting values in equation (1)

$$\text{ub} = 15654 + 36767 - 1$$

$$\boxed{\text{ub} = 52420 \text{ Ans.}}$$

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

(i) Total number of passes.

(ii) Total number of steps.

(iii) Number of steps in pass # 137

(iv) Number of steps in pass # 143

Given Data:

$n = 350$ elements

Required = ?

1) Total number of passes = ?

We know that

$$n - 1 \quad \text{--- (1)}$$

Putting values in eq (1)

$$350 - 1$$

$$349$$

So total number of passes is

349

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2) Total number of steps = ?

We know that

$$\frac{n(n-1)}{2} \quad \text{--- (1)}$$

Putting values in eq (1)

$$\frac{350(350-1)}{2}$$
$$175 \frac{350(349)}{2}$$

$$(175)(349)$$

$$61,075$$

so total number of steps is

$$\boxed{61,075}$$

3) Number of steps in pass # 137 = ?

We know that

n - Pass number

$$n = 350$$

Pass number 137

So,

$$350 - 137$$

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213

so

Number of steps in pass # 137 is

213

4) Number of steps in pass # 193 = ?

n - Pass number

$n = 350$

Pass number = 193

$350 - 193$

157

so number of steps in pass # 193 is

157 Ans

Q2) Sort the given list using selection sort.

10, 15, 0, 7, 8, 6

Solution :

$n = 6$

step : $n - 1$

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6-1

5

so $n = 5$

Step # 1) Element = 10

10, 15, 0, 7, 8, 6

10 and 0 interchange

0, 15, 10, 7, 8, 6

Step # 2)

Element = 15

0, 15, 10, 7, 8, 6

15 and 6 interchange

0, 6, 10, 7, 8, 15

Step # 3)

Element = 10

0, 6, 10, 7, 8, 15

10 and 7 interchange

0, 6, 7, 10, 8, 15

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Step #4)

Element = 10

0, 6, 7, 10, 8, 15

10 and 8 interchange

0, 6, 7, 8, 10, 15

Step #5)

Element = 10

0, 6, 7, 8, 10, 15

10 is at its proper position

0, 6, 7, 8, 10, 15

List is sorted.

QNo #3)

Fill in the blanks.

1) Physical Data structures may deal with only a single value

2) Logical Data structures may deal with multiple values

3) The logical / mathematical organization

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of data is called data structures.

4) A Tree is a non-linear data structure.

5) An array is a linear data structure.

6) List must be sorted for binary searching.

7) $17 \text{ int} - \text{div } 2 = \underline{8}$.

8) An investigation parade of criminals is an example of linear search.

9) Number of fields in a record is called degree.

10) Number of records in a block is called block factor.