Name = Farhan Akhtar
ID = 15554
Program = BS(S.E)
Semester = 3rd
Exam = Mid
Paper = Data structure & Algorithm
Teacher = Sir M. Adil.

Q1 (a) Let the size of A[] be 15654 and the lower bound be 36767, Calculate the upper bound.

Ans: As we know that :

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

⇒ For finding upper bound we have

$$ub = A[] + lb - 1$$
$$ub = 15654 + 36767 - 1$$

So :

~~ub = 156~~

$$ub = 52420$$

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 # 193.

Ans(i) To find number of Passes, we have $n-1$ = passes, where "n" is the number of elements. And elements are 350, So :

$n-1$ i-e $350-1$

So

$350-1 = \boxed{349}$ Ans.

Ans(ii) Total number of steps :

we have $\frac{n(n-1)}{2}$ for steps:

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

we get :

$$= \boxed{61075} \text{ Ans}$$

Ans(iii) We have n - pass for Steps in a specific pass :

So :

$$350 - 137 = \boxed{213} \text{ Ans}$$

Ans (iv) Same as upper case no.(iii)

we get :

$$350 - 193 = \boxed{157} \text{ Ans}$$

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Q2: Sort the given list using Selection Sort.

10, 15, 0, 7, 8, 6

Ans: Solution :-

We have $n = 6$:

Steps $= n - 1 = 5$

Step 1 : Element 10

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

0, 15, 10, 7, 8, 6

Step 2 : Element 15

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

0, 6, 10, 7, 8, 15

Step 3 : Element 10

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

0, 6, 7, 10, 8, 15

Step 4 : Element 10

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

0, 6, 7, 8, 10, 15

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Step 5 :- Element 10

0, 6, 7, 8, 10, 15

10 is at its Proper position, so no changes.

Q3:- Fill in the blanks :

(i) Physical Data structure may deal with only a Single value.

(ii) Logical Data Structure may deal with a multiple value.

(iii) The logical / mathematical organization of data is called Data Structure.

(iv) A tree is a non-linear data Structure.

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(v) An array is a linear data structure.

(vi) List must be Sorted for linear Searching.

(vii) 17 int - div 2 = 8 ∴ "5" is ignored

(viii) An ivestigation Parade of criminals is an example of file.

(ix) Number of field in a Record is called degree of record.

(x) Number of Records in a Block is called Blocking factor.