

Topic

Solved Example of Quick Sort

Unit No.

III

Q.1

Apply Quick sort and sort these Number.

78, 21, 14, 97, 87, 62, 74, 85, 76, 45, 84, 22

Ans:-

PASS. I - pivot - 78

$l=0, r=11$

$l++$  and  $r--$  until appropriate element  
 $> \text{pivot}$        $< \text{pivot}$

$\therefore l=3, r=11$

$3 < 11 \therefore$  swap (97) and (22)

78, 21, 14, 22, 87, 62, 74, 85, 76, 45, 84, 97

$\therefore l=4, r=9$

$4 < 9 \therefore$  swap (87) and (45)

78, 21, 14, 22, 45, 62, 74, 85, 76, 87, 84, 97

$l=7, r=8$

$7 < 8 \therefore$  swap (85) and (76)

78, 21, 14, 22, 45, 62, 74, 76, 85, 87, 84, 97

$l=8, r=7$

$8 < 7 \therefore$  swap  $a[r]$  with pivot i.e. 78 and 76

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76, 21, 14, 22, 45, 62, 74, 78, 85, 87, 84, 97  
 (A) (B)

After pass-I (A) and (B) created  
 Let, (A) part

**PASS-II, pivot = 76**

76, 21, 14, 22, 45, 62, 74, 78  
 ↑ l ↑ r

Increase l upto  $a[l] > \text{pivot} \therefore l = 7$  7 < 6  
 Decrease 'r' upto  $a[r] < \text{pivot} \therefore r = 6$   $\therefore$  ie 776

swap pivot with  $a[r]$  ie 76 and 74

74, 21, 14, 22, 45, 62, 76, 78, 85, 87, 84, 97  
 (D)

**PASS-III pivot 74**

l now 6 and r = 5  $6 > 5 \therefore$  swap 62 and 74

62, 21, 14, 22, 45, 74, 76, 78, 85, 87, 84, 97  
 (E)

**PASS-IV pivot 62**

62, 21, 14, 22, 45  $\therefore$  swap 45 and 62  
 ↑ ↑ l

45, 21, 14, 22, 62, 74, 76, 78, 85, 87, 84, 97  
 (F)

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Unit No.

**PASS-V / pivot 45**

45, 21, 14, 22



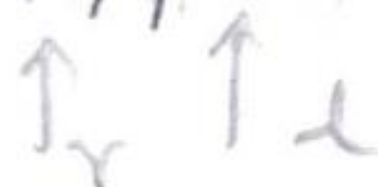
$l > r \therefore$  swap with pivot

22, 21, 14, 45

G

**PASS-6 / pivot = 22**

22, 21, 14,



$\therefore$  swap with pivot

14, 21, 22

H

**PASS-7 / pivot 14**

14, 21



$\Rightarrow$  (14), 21

only element  
ie  $l = r \therefore$  stop

Now take "B"

85, 87, 84, 97

**PASS-8 / pivot = 85**

(85), 87, 84, 97

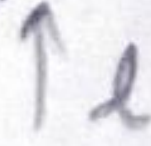
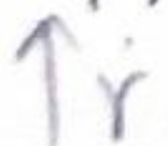
$\therefore$  swap 85 and 84

~~85~~

$l = 1$  and  $r = 2$

$1 \times 2$  swap 87 and 84

85, 84, 87, 97



$\therefore$  swap 84 and 85  
a[r] and pivot

84, (85), 87, 97

I

I

take this



Only element  $\therefore$  stop

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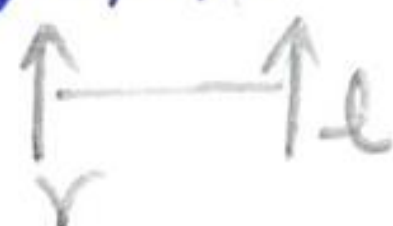


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PASS-9 / pivot = 87 87, 97



∴ finally,

14, 21, 22, 45, 62, 74, 76, 78, 84, 85, 87, 97

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Topic

EDS - Unit 3

Unit No.

EDS-III

\* Quick Sort Algorithm:-

Void QuickSort (int a[], int l, int r)

{ sort the a[l:r] elements  
a[l] is pivot element i.e. 1st element of given list

if (l < r)

{ i = l, j = r + 1

  pivot = a[l]

  do {

    do { i++ } while (a[i] < pivot)  
    // increase until find larger than v

    do { j-- } while (a[j] > pivot)  
    //

    if (i < j)

      then swap a[i] and a[j]

  } while (i < j);

  swap pivot and a[j]

  QuickSort (a, left, j-1); // sort left side

  QuickSort (a, j+1, r); // right side element.

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Topic Solved Example of Quick

Unit No.

Example - ① Consider 10 elements 26, 5, 37, 1, 61, 11, 59, 15, 48, 19.

pivot  
I) 26

26, 5, 37, 1, 61, 11, 59, 15, 48, 19      left      right  
0      9

~~11, 5, 37, 1, 61, 26, 59, 15, 48, 1~~  
 0 1 2 3 4 5 6 7 8 9  
 11, 5, 19, 1, 15, 26, 59, 61, 48, 37

II)  $v = 11$

→ 1, 5, (11) 19, 15 26 59 61 48 37

III)  $v = 1$

1 5 11 19 15 26 59 61 48 37

IV  $p = 59 \rightarrow$

1, 5, 11, 19, 26, 48, 37, (59), 61

$p = \underline{y}, p = 48$

1, 5, 11, 19, 15, 26, 37 48 59 61 9 9

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