

# Algorithms

## Design Strategies

DPP

**[MCQ]**

1. Consider an array containing the following elements in unsorted order (placed randomly) but 120 as first elements  
120 160 30 190 14 24 70 180 110  
Quick sort partitioning algorithm is applied by choosing first elements as pivot element. Then what is the total number of arrangements of array integers are possible preserving the effect of first pass of partitioning algorithm.
- (a) 680 (b) 700  
(c) 720 (d) 740

**[MCQ]**

2. Let  $T(n) = [n(\log(n^3) - \log n) + \log n]n + \log n$ .  
complexity of  $T(n)$  is
- (a)  $O(n^2)$  (b)  $O(n^3)$   
(c)  $O(n \log n)$  (d)  $O(n^2 \log n)$

**[MCQ]**

3. Assume that there are 4 sorted lists of  $\frac{n}{4}$  elements each, if these lists are merged into a single sorted list of 'n' elements then how many key comparisons are required in the worst case using an efficient algorithm?
- (a)  $2n - 3$  (b)  $\frac{7}{4}n - 3$   
(c)  $\frac{9}{4}n - 3$  (d)  $\frac{6}{4}n - 3$

**[NAT]**

4. Consider the number in the sequence  
2 5 11 17 19 21 26 33 39 40 51 65 79 88 99  
Using binary search, the number of comparisons required to search elements '2' is \_\_\_\_

**[MCQ]**

5. Merging 4 sorted files having 400, 100, 250, 50 records will take  $O(\quad)$  time?
- (a) 800 (b) 400  
(c) 200 (d) 100

**Ans. (a)**

**Sol.** Two sorted file of size m and n takes  $O(m + n)$  time for merging.  
So, total time =  $400 + 100 + 250 + 50 = 800$   
 $\therefore$  (a) is correct.

**[NAT]**

6. Consider a machine which needs a minimum of 50 seconds to sort 500 names by quick sort, then what is the minimum time required to sort 50 names (approximately) is \_\_\_\_ (round off to 2 decimal)

**[NAT]**

7. What is the total number of comparisons that will be required in worst case to merge the following sorted files into a single sorted file into a single sorted file by merging together two files at a time \_\_\_\_.

Files	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>
Number of records	40	42	44	46

## Answer Key

- |             |                   |
|-------------|-------------------|
| 1. (c)      | 5. (a)            |
| 2. (d)      | 6. (3.14 to 3.14) |
| 3. (a)      | 7. (341 to 341)   |
| 4. (4 to 4) |                   |







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