

K. J. Somaiya Institute of Engineering and Information Technology

Department of Computer Engineering

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Question Bank

Class/ Semester : SY/Sem-IV

Course Name : Analysis of Algorithms

Course Code : 1UCEC402

Module 1

1. Write an algorithm for selection sort and insertion sort. Do the analysis and find complexity.
2. Explain/short note (on) recurrence relation with example
3. Solve following problem using masters method
(example below. similar example can be ask)

i) $7T(n/2) + 18n^2$

ii) $9T(n/3) + 4n^6$

4. Explain mathematical aspects and analysis of algorithm
5. Determine the frequency count for all statement in the following algorithm statement

(example below. similar example can be ask)

A()

```
{ int I;
```

```
for(I=1; I<=n ; i++)
```

```
{ Print("x") }
```

6. Define P, NP, NP Hard and NP Complete

And similar

Module 2

1. Give general method for divide and conquer strategy.
2. Explain merge sort and quick sort with example by using divide and conquer and its analysis
3. One way to sort a file of n records is to scan the files first merging consecutive pairs of size one, then merging pairs of size two etc. Write an algorithm which carries out this process. Show how your algorithm works on data set keys (100, 300, 150, 450, 250, 350, 200, 400, 500)
4. Sort the following numbers using quick sort. Also derive complexity of Quick sort
50, 31, 71, 38, 77, 81, 12, 33
5. Apply merge sort algorithm 12, 25, 4, 12, 25, 14 by using divide and conquer. Analyse using master's method
6. Sort the following numbers using Quick Sort.
50, 30, 10, 90, 80, 20, 40, 70.

And similar

Module 3

1. Explain knapsack problem with example using greedy approach
2. Explain single source shortest path algorithm with example using greedy approach
3. Explain how job sequencing with deadline can be solved using greedy approach.
4. Solve fractional knapsack problem for the following: $n=6$,
 $P=(18, 5, 9, 10, 12, 7)$ $W=(7, 2, 3, 5, 3, 2)$
5. Apply job sequencing algorithm and find feasible solution for

(example below. similar example can be ask)

i) $N=4$, $(P1,P2,P3,P4)=(100, 10, 15, 27)$ and $(d1,d2,d3,d4)=(2, 1, 2, 1)$

ii) $n=7$, $(P1,P2,P3,P4,P5,P6,P7) =(3, 5, 20, 18, 1, 6, 30)$ and $(d1,d2,d3,d4,d5,d6,d7) =(1, 3, 4, 3, 2, 1, 2)$

6. Apply Prim's algorithm(graph will provide)

7. Apply Kruskal's algorithm (graph will provide)

And similar

Module 4

1. Explain all pair shortest path algorithm (Floyd Warshal algorithm).
2. Describe the Travelling salesperson problem and discuss how to solve it using dynamic programming with example.
3. Describe Longest common subsequence with example
4. Consider following two sequence of strings and find LCS
(example below. similar example can be ask)

X=ABCBDAB

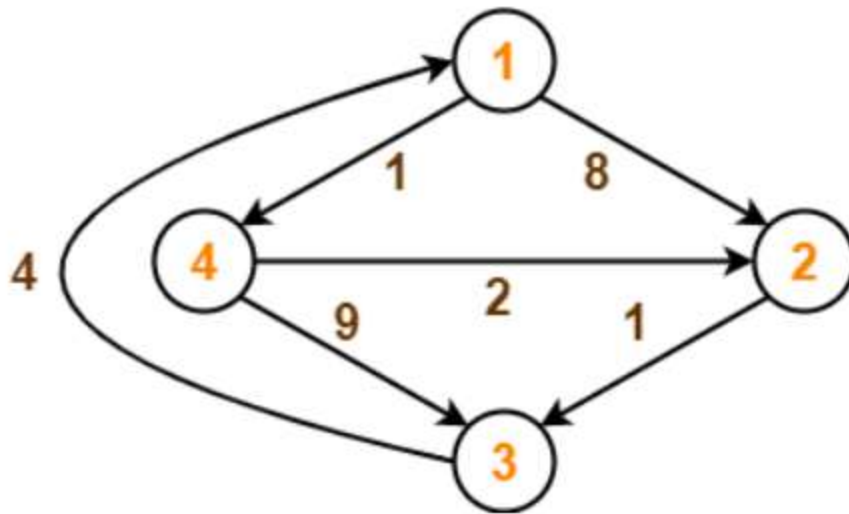
Y= BDCABA

5. Find Longest Common Subsequence for the following:
(example below. similar example can be ask)

String x=ACBAED

String y=ABCABE

6. Compute all pair shortest path for
(example below. similar example can be ask)



7. Explain multistage graph with example.
8. Let us consider that the capacity of the knapsack is $W = 25$ and the items are as shown in the following table. (example below. similar example can be ask)

Item	A	B	C	D
Profit	24	18	18	10
Weight	24	10	10	7

Apply 0/1 knapsack. Calculate maximum profit and items in knapsack.

And similar

Module 5 Backtracking and Branch and Bound

1. Explain Backtracking approach? Explain how it is used in graph coloring?
2. Solve 4 queens/ 8 queens problem using backtracking.
3. Solve the following problem of the sum of subset and draw portion of state space tree.
(example below. similar example can be ask)

$w = (5, 7, 10, 12, 15, 18, 20)$ and $m = 35$.

Find all possible subsets of w that sum to m .

4. Solve the sum of subset problems using backtracking algorithm for $n=4$,
(example below. similar example can be ask)

$(w_1, w_2, w_3, w_4) = (11, 13, 24, 7)$ and $M=31$.

5. Solve 15 puzzle problem using Branch and bound (draw state space tree).
6. Difference between backtracking and branch & bound
7. What is a chromatic number?

And similar

Module 6 String Matching

1. Write short note on string matching algorithms.
2. Describe the Kruth Morris Pratt algorithm with example.
3. List all string matching algorithms and compare them

And similar