Analysis & Design of Algorithms (ADA) - BCS401

Important Topics to Cover.

Module 1 :-

1. What is an Algorithm? Properties of algo ? Explain algorithmic design & analysis process.
2. General plan of mathematical analysis of recursive/Non recursive alg with eg.
3. Explain Asympotic notations with eg.
4. Sequential Search - BC, WC, AC efficiency.
5. If $t_1(n) \in O(g_1(n))$ and $t_2(n)$ ..... {Theorem Derivation}
6. Fundamentals of Algorithmic Prob Solving - Flowchart
7. Selection Sort, Bubble Sort Alg + Analysis + Problem.

{89,45,68,90,29,34,17} {EXAMPLE} {PROGRAMMING}

Module 2 -

1. Knapsack / TSP Prob using Exhaustive Search.
2. Explain concept of Divide & Conquer. Write recursive alg to perform binary search for list of elem.
3. Master Theorm / Substitution Metho problems
4. Mergesort - 8, 3, 2, 9, 7, 1, 5, 4

   or

   Quicksort - 65, 70, 75, 80, 85, 60, 55, 50, 45
5. Multiplicatn of Large No (or) Strassen Multiplicatn
6. Insertion Sort Prob (or) Topological Sorting prob
7. Binary Tree Traversal.

Module 3 -

1. Problem of AVL Tree or 2-3 Tree
2. Heap sort Prob.
3. Sorting by counting - comparison sort
4. Horspools alg for string matching. Find BARBER in JIM_SAW_ME_IN_A_BARBERSHOP.

Module 4 -

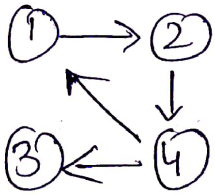
1. Explain DP. {out of 3 eg, any one could be asked}
2. Knapsack Prob

Item	1	2	3	4
W	2	1	3	2
V	12	10	20	15

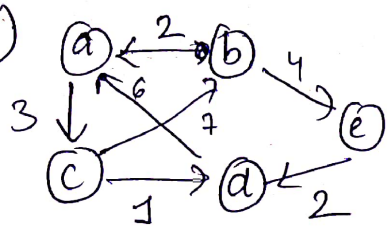
capacity W=5, n=4

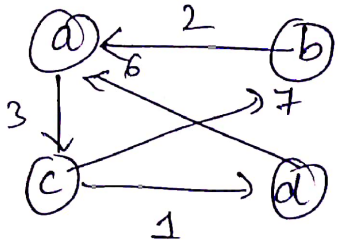
- n=4, m=10, P={40,42,25,12} W={4,7,5,3}

3. Warshalls (Alg + Prob)



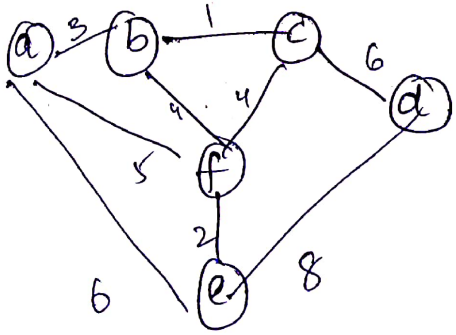
4. Floyds (Alg + Prob)



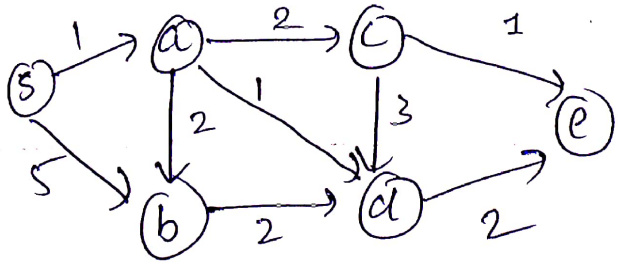


5. Prims (Alg + Prob)

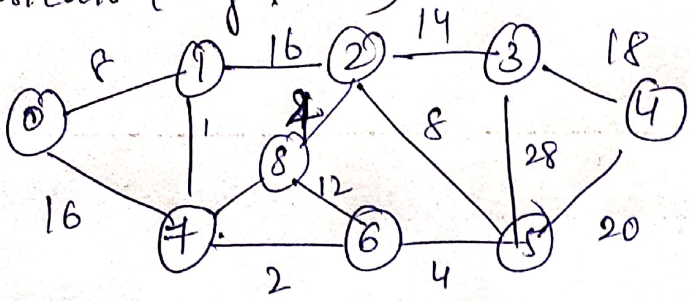
Write a note on Minimum Spanning tree



6. Dijkstra's (Alg + Prob)



7. Kruskals (Alg + Prob)



8. Huffman code

A	B	C	D	-
0.4	0.1	0.2	0.15	0.15

ABACABAD - encode
100010111001010 - Decode

Modules -

1) Backtracking intro (Alg) + Sum of subset $S=\{1,2,3,6,8\}$ $d=9$

2) Assignment prob

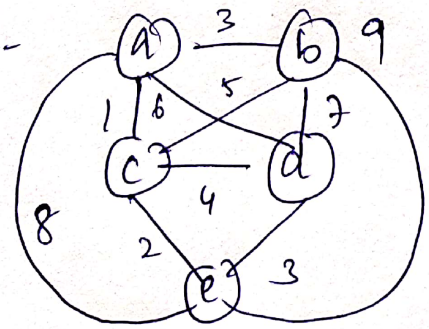
	J1	J2	J3	J4
P1	9	2	7	8
P2	6	4	3	7
P3	5	8	1	8
P4	7	6	9	4

3. N Queens Problem

4. Define - P Problem, NP Prob, Class P, Class NP
   - NP Hard Prob, NP Complete Prob.

5. Knapsack $W=\{4,7,5,3\}$, $V=\{40,42,25,12\}$ $M=10$, $n=4$

6. TSP -



7. Deterministic & Non Deterministic Alg.