Section . A

1. Advantage of varciable length coding over .

Aimed Length coding?

one Varciciolo longth coding (VLC) assigns Shoreter codes to free quent symbols and longer codes to infreequent ones, resulting in better compression and reduced average code Length compared to frend longth Coding.

2. Define knapsack Problem. How to solve it?

one. The knapsack Problem involves solecting items with given weight and values to manimize value without enceeding a weight limit.

Solution! Use Dynamic Programming to build a table that treachs the manimum value achievable for subproblems.

3. What is Dynamic Preogramming?

One Dynamic Preogramming is a method for Solving

Ome Dynamic Problems by breaking them into overlapping

Complian Problems by breaking them into overlapping

Subproblems and Solving each only once, storeing

the results for future uso.

4. What is Newborck flow Problem and what area the proporction?

the optimal way to recute flow through a network from Source to sink.

Properties: Capacity constraounts, flow consorculation and flow must not encode edge capacities.

Sec-B 1- What is Lis Problem? Find Lis of <1,0,0,1,0,1,0,1 7 and <0,1,0,1,1,0,1,1,0) LCS (Longest Common Subsequence) is the) private diprod alaborate 23 longest sequence that appeares in both sequence in the same order, but not necessarily Contiguously.
To find it we use Dynamic Programming to build a table comparing both sequences element by element. . fimil tolprous a partier on a Gluen Sequence gramposof simonion set institutes additions of the state of the stat x= <1,0,0,1,0,1,0,1> 1 = <0,1,0,1,100,1,0) Onie [LCS 95: KO, O, I, O, I, O) Length II 61210 of most produced for amoldows in stone 2. What i's MST (minimum Spanning Tree)? write Prim's algorithm to find mot of an undirected graph. ans: A minimum Spanning Tree (mst) is a Subset of edges that connects all vertices in a greath with the minimum, total weight and no cycles was arus of pas barriego and Brim's Algorithm: of some most someone

1. Starct From any noide.

topes speed business took teams but so

- e. Use a Priorcity quewe to pick the minimum weight edge connecting a visited and unvisited note.
- 3. Add that edge and node to the MBT.
- 4. Repeat until all nodes are included.

It ensures the growing tree remains connected and minimal act each step.

Time complexity: 0 (E log V) using a min-heap.

Sec-c

1. matria Chain multiplication problem:

It's about finding the most efficient may to multiply a chain of matrices. The order of multiplications affects computation cost.

Given Dimensions: <10,5,4,8,6,10,87

let moutrices be A1 (10x5), A2(5x4), A3(4x8),

A4 (8x6), A5 (6x10), A6 (10x8)

Let moutrices be A1 (10x8)

A4 (8x6), A5 (6x10), A6 (10x8)

Use dynamic Porogramming to find the optimal Parcenthesization with minimum scalar multiplications.

2. Aloyd-Warshall Algorithm and Solve Given grouph:
ons floyd-Warshall finds shortest paths between
all pairs of vertices in a weighted grouph
off pairs of vertices in a weighted grouph
offers: Initialized distance matrum with easy e
weights (use INF for no direct edge).

· Updoute distance osing:

dist [i][i] = min (dist [i][i],

dist [i][k] + dist [k][i])

* Repeat for all intermediate hodes k.

" Enscrees the growing tree records tempored and minimal at Each Step.

Time complosity: 0 (c 109 V) using a min- Irap.

matricia chain afrats matrices The cruster of multiplications afrats compared to compared to constitutions afrats compared to cost.

Given Dimensions: xicis 11.8,6,10187

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existing be not seemed the optimal

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Alleged - Wanestall Algorithms and Salva Chiven graph:

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Algorithms inc weighted graphs

Algorithms and graphs

Algorit

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