1. Dynamic Programming Solves multiple Subproblems and builds up a final answer. DP works by Solving Small subproblems and placing their Fesults in a table, then Solving larger subproblems and boing the same, until the final result is reached.

- Characterize the structure of an optimal Solution.

- Recursively define values of optimal Solutions.

- Compute the Value of an optimal Solution in a bottom - up fasion with a table.

- Express the final Solution in terms of optimal Solutions.

Parenthesis on the subchain (A,...AK) With the Same for AK+1... An must be the optimal Way for A,...An.

Overlapping Subproblems: DP often results in Many subproblems being worked repeatedly. This is Kandled by using an audiliary table to store sub-results.

4. Floyd's algorithm is a DP technique Which can handle negative Values, and is used instead of running Dijkstras on each vertex.

 $A[0\ 2\ 3\ 1\ 4]$   $A[0\ 2\ 3\ 1\ 4]$   $B[6\ 0\ 3\ 2\ 5]$   $B[6\ 0\ 3\ 2\ 5]$   $C[\infty\ \infty\ 0\ 4\ \infty]$   $C[\infty\ \infty\ 2\ 0\ 3]$   $D[\infty\ \infty\ 2\ 0\ 3]$   $D[0\ 0\ 0\ 4\ 0]$   $E[3\ 5\ 6\ 4\ 0]$   $E[3\ 5\ 6\ 4\ 0]$ 

- 2. Matrix Chain Multiplication involves taking a sequence of matrices (A, Az, ..., An) and computing the product A, Az. .. An. The problem is to determine the most efficient method of associative grouping to reduce Scalar multiplications.
  - 1. Determine the Structure of an optimal parenthesization.
  - 2. Define the cost of an optimal Jolution recursively in terms of the optimal solutions to subproblems.
  - 3. Compute optimal costs with a tabular, bottom-up approach.
  - 4. Construct an optimal Solution from the returned table.
- 3. In the Longest Common Subsequence Problem, We derive the maximum length common subsequence from two Sequences.

  - 1. Characterize a longest common subsequence. 2. Establish a recurrence for the Value of an optimal Solution.
  - 3. Use Dynamic Programming to compute solutions bottom-up. 4. Construct an LCS from the returned table.

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S.	0-1 Knapsack entails finding the optimal use of a
	Carrying devices capacity. With DP We build
	a solution by Starting With an empty set and
	adding items to our recurrance relation.
A - 1 - 1 - 1 - 1 - 1 - 1	

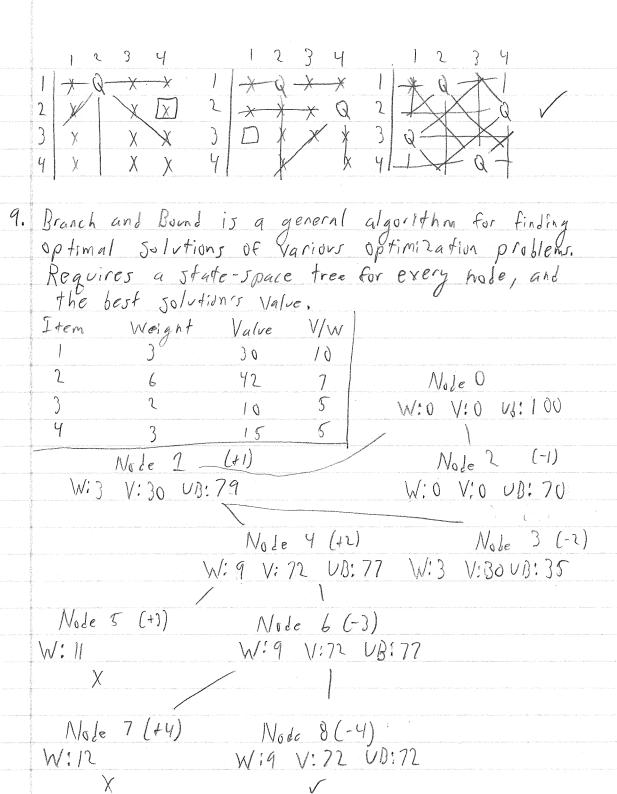
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4	0	15	15	35	40	55	60	
5	0	15	15	35	40	55	65	

6. Depth First Search explores as far down one branch as possible before moving to the next, commonly uses a stack to track progress.

A= O= D= Poporder: E,D,C,B, A Sortes: A,B,C,D,E

Source Removal Visits a vertex, and then "removes" it from the graph to be added to the traversal list.

Topological Order, A, B, C, D, E



HWY

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Worste case efficiency occurs with pre-sorted lists. Such as: 8, 10, 11, 12, 13, 14, 15, 17, 18, 26, 30,31

8 10 11 17 26 - Smallest larger #

18 26 31

18 26 31

Smallest larger #

11.

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12. Huffman Coling gives priority to more frequently used characters and assigns them Shorter binary Values to compress communications.
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                                                            H: 1
     5:1, D:1, L:1, C:1, F:1, R:1, H:1, U:2, B:2,
A:2, N:2, O:2, T:3, I:7
                                                              N: 2
HII, U:2, B:2, A:2, N:2, U:2, T:3, I:7, SDi2, LL:2, FR:2 F: 1.
                                                              (:
     T:3, I:7, SD:2, LC:2, FR: 2, HU:3, BA:4, NO:4
                                                              A:
                                                               B:
     FR: 2, HU: 3, BA: 4, NO: 4, TI: 10, SDLC: 4
                                                              L'
     TI: 10, SDLC: 4, FRHU: 5, BANO: 8
      TIJOLC: 14, FRHUBANO: 13
      TISALC FRHUBANO: 27
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