Dynamic Programming or DP - GeeksforGeeks

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Courses Tutorials Practice Jobs DSA Practice Problems C C++ Java Python JavaScript Data Science Machine Learning Courses Linux DevOps Technical Scripter 2026 Explore Basics DSA Tutorial Maths for DSA Mathematical Algorithms Bit manipulation Bit Manipulation for Competitive Programming Bit Tricks for Competitive Programming Bitwise Hacks for Competitive Programming DP for CP Dynamic Programming (DP) Introduction Dynamic Programming or DP DP on Trees for Competitive Programming Dynamic Programming in Game Theory for Competitive Programming Advanced Graph Algorithms Segment Tree Binary Indexed Tree or Fenwick Tree Array Range Queries Three 90 Challenge 90% Refund Dynamic Programming or DP Last Updated : 26 Jan, 2026 Dynamic Programming is an algorithmic technique with the following properties. It is mainly an optimization over plain recursion. Wherever we see a recursive solution that has repeated calls for the same inputs, we can optimize it using Dynamic Programming. The idea is to simply store the results of subproblems so that we do not have to re-compute them when needed later. This simple optimization typically reduces time complexities from exponential to polynomial. Some popular problems solved using Dynamic Programming are Fibonacci Numbers, Diff Utility (Longest Common Subsequence), Bellman–Ford Shortest Path , Floyd Warshall , Edit Distance and Matrix Chain Multiplication . Basic of DP Introduction Tabulation vs Memoization Steps to solve a DP Problem Basic Problems Fibonacci numbers Tribonacci Numbers Lucas Numbers Climbing Stairs Climbing Stairs with 3 Moves Weighted Climbing Stairs Maximum Segments nth Catalan Number Count Unique BSTs Count Valid Parenthesis Ways to Triangulate a Polygon Min Sum in a Triangle Minimum Perfect Squares Ways to Partition a Set Binomial Coefficient Pascal's Triangle Nth Row of Pascal Triangle Min Sum in a Triangle Easy Problems House Robber Min Cost Path Decode Ways Subset Sum Problem Coin change problem - Count Ways Coin Change – Minimum Coins to Make Sum Painting Fence Algorithm Cutting a Rod Jump Game Longest Common Substring Count all paths in a Grid Paths in a Grid with Obstacles Permutations with K Inversions Max A's using Special Keyboard Medium Problems Water Overflow Longest Common Subsequence Longest Increasing Subsequence Edit Distance Largest Divisible Subset Weighted Job Schedulling 0-1 Knapsack Problem Printing Items in 0/1 Knapsack Unbounded Knapsack Word Break Problem Tile Stacking Problem Box-Stacking Problem Partition Problem Longest Palindromic Subsequence Longest Common Increasing Subsequence (LCS + LIS) All distinct subset (or subsequence) sums Count Derangements Minimum insertions for palindrome Wildcard Pattern Matching Regular Expression Matching Arrange Balls with adjacent of different types Longest Subsequence with 1 adjacent difference Maximum size square sub-matrix with all 1s Bellman–Ford Algorithm Floyd Warshall Algorithm Maximum Tip Calculator Hard Problems Largest X Bordered Square Egg Dropping Problem Palindrome Partitioning Palindromic Substring Count Word Wrap Problem Optimal Strategy for a Game The painter’s partition problem Program for Bridge and Torch problem Matrix Chain Multiplication Printing Matrix Chain Multiplication Maximum sum rectangle Stock Buy and Sell - At-Most k Times Stock Buy and Sell - At Most 2 Times Min cost to sort strings using Reversals Count of AP Subsequences DP on Trees Max Height of Tree when any Node can be Root Longest repeating and non-overlapping substring Palindrome Substrings Count Problems Sorted by Topic / Dimensions DP Standard Problems and Variations. DP Problems Dimension Wise (1D, 2D and 3D) DP Problems Topic Wise Advanced Concepts Bitmasking and DP1 Traveling Salesman Problem Digit DP Sum over Subsets Quick Links: DSA Tutorial DP Interview Questions Practice Dynamic Programming Quiz on Dynamic Programming Comment Article Tags: Article Tags: Competitive Programming