DYNAMIC PROGRAMMING

→ Dynamic programming is generally used with optimization problems, where sequence of solutions are available, each solutions has a value and we require to find the optimal (min or max) value such a solution is called an optimal solution.

→ There are several solutions that attain optimal value at different stages but we select the best one and call it the optimal solution of the problem.

→ Dynamic programming is a problem solving technique that like divide and conquer, solves problems by dividing them into subproblems.

→ Dynamic programming is used when the subproblems are not independent

→ Dynamic programming solves each subproblem once and stores the result in a table so that it can be rapidly retrieved if needed again.

→ Divide and conquer solves the same subproblem multiple times.

→ Dynamic programming is often used in optimization problems: A problem with many possible solutions for which we want to find an optimal (the best) solution.

→ Dynamic programming can be thought of as the reverse of recursion. Recursion is a top-down mechanism: we take a problem, split it up and solve the smaller problems that are created.

→ Dynamic programming is a bottom-up mechanism: we solve all possible small problems and then combine them to obtain solutions for bigger problems.

APPLICATIONS OF DYNAMIC PROGRAMMING

1. Matrix chain multiplication.
2. Longest Common Sequences (LCS)
3. Knapsack problem.