

## Dynamic Programming

- Dynamic programming is applicable when the subproblems are not independent, i.e., when subproblems share subproblems.
- Dynamic programming algorithm solves every subsubproblem just once & then saves its answer in a table, thereby avoiding the work of recomputing the answer every time the subsubproblem is encountered.
- Dynamic programming is typically applied to optimization problems.
- eg: Optimal matrix multiplication.
- The development of a dynamic programming algorithm can be broken into a sequence of four steps.
  - Characterize the structure of an optimal solution
  - Recursively define the value of an optimal solution
  - Compute the value of an optimal solution in a bottom up fashion
  - Construct an optimal solution from computed information
- The essential difference between the greedy method & dynamic programming is that in the greedy method only one decision sequence is ever generated. In dynamic programming, many decision sequences may be generated.