III. Dynamic Programming

- Dynamic programming, like the divide and conquer method, solves the problems by combining the solutions to subproblems.

  It applies when the subproblems are not independent (they overlap), i.e, when subproblems share subsubproblems.

- Dynamic programming algorithm solves every subsub problem just once and saves its answer in a table, thereby avoiding recomputing the work answer every time the subsubproblem is encountered.

- It is typically applied to optimation problem.

  eg: Optimal matrix multiplication.

- The development of a dynamic programming algorithm can be broken into a sequence of 4 steps:

  1. Characterize the structure of an optimal solution.
  2. Recursively define the value of an optimal solution.
  3. Compute the value of an optimal solution in a bottom-up fashion.
  4. Construct an optimal solution from computed info.

- Essential diff. b/w greedy method & dynamic programming:
  In greedy method, only 1 decision sequence is ever generated.
  In dynamic pgmming, many decision sequences may be generated.