***Dynamic Programming***

***Definition:***

Dynamic Programming is used to combine the solution of sub - questions just as Divide and Conquer Algorithm.

* Divide and Conquer Algorithm - Divide question into several independent sub-questions, solve these questions and get results of these questions recursively, combine all solutions and get the final original result.

*(Divide and Conquer Algorithm needs to solve the public sub-questions for multi-times.)*

* Dynamic Programming Algorithm - Used in the situation where there have overlapping sub-questions, which is to say the algorithm solves the problem once and save the result in the table, no need to recalculate the question when meets with a sub-question, but just check the table for the result.

*(Dynamic Programming Algorithm can be used to escape the situation that recalculate the results of sub-questions.)*

***Scenario - Optimization Problem***

These kind of problems have a lot of doable solutions, however, each solution only has one value. We hope to find *Optimization Solution* (Maximum or Minimum). This kind of solution is call *an Optimal Solution* but not the Optimal Solution, since there may have several solutions can get the Best Result.

***Four Steps for Dynamic Programming Algorithm***

1. Design Optimized Structure Feature.