



Design and Analysis of Algorithms

Tutorial 7

Dynamic Programming

It is important that we learn the theory behind dynamic programming.

1. Explain the theory behind the transform and conquer approach
 - (a) What is meant by the transform and conquer approach?
 - (b) What are the two approaches of dynamic programming?
 - (c) What is the principle of optimality?
2. Solve the coin row problem using dynamic programming for the coin row $\{10, 5, 1, 2, 5\}$
3. Solve the change making problem using dynamic programming for the coin denominations $\{1, 2, 5\}$ and where $n = 7$.
4. Solve the 0/1 knapsack problem using dynamic programming for the instance shown in table 1 with a max knapsack capacity of **3**.

Item	Weight	Value
1	2	\$20
2	1	\$15
3	2	\$25

Table 1: A small instance of the 0/1 knapsack problem