UWI

Design and Analysis of Algorithms

Tutorial 7- Sample Solutions

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