

Advanced Analysis of Algorithms

K. Subramani, LCSEE, West Virginia University

October 3, 2013

1. What is Dynamic Programming? Second design technique, optimization problems.
2. Binomial coefficient.
 - (a) Computing $C(n, k)$ by brute-force.
 - (b) Recursion. Number of steps.
 - (c) Bottom-up procedure using a table.
 - (d) Number of steps.
3. Shortest paths.
 - (a) Graph representation. Adjacency matrix.
 - (b) All positive weights.
 - (c) Paths, cycles. Simple paths. Length of a path.
 - (d) Shortest path must be simple. (What happens if weights are negative?)
 - (e) Multiple shortest paths possible.
 - (f) Brute-Force solution.
 - (g) Dynamic programming based approach. The Floyd-Warshall algorithm.
 - (h) Recursive formulation. Computing solutions bottom-up. Example from book.