Advanced Analysis of Algorithms

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1. What is Dynamic Programming? Second design technique, optimization problems.
2. 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.
   (i) Time complexity, space complexity. Improving space complexity.
   (j) To extract shortest paths, use Cormen approach. Mention approach in book.
3. Discussion of Homework II and the combinatorial identity from HW 1.