

IEOR E4004: Introduction to OR: Deterministic Models

HW 9 (due 04/27)

1. Consider the knapsack problem with five items: The values of the items are 20, 15, 10, 5, and 3; with the corresponding weights being 10, 7, 6, 4, and 2. Solve the knapsack problem with that data, assuming a capacity of 19 lbs.
2. Suppose you are given a graph G with c_{ij} representing cost of the edge (i, j) . Suppose the “cost” of a path P is the cost of the most expensive edge in the path. (Thus, we do not add the cost of the edges in the path, but simply pick the maximum edge in the path.) How will you find a cheapest path from s to t in this graph?
3. Consider the lot-sizing problem discussed in class. Demands (d_1, d_2, \dots, d_N) must be met. Items can be ordered, an order of $x_i > 0$ in period i incurs a cost of $K_i + c_i x_i$; not ordering anything in period i incurs zero cost. Any item held in inventory at the end of period i costs h_i . The objective is to find an ordering schedule that minimizes total cost. Solve this using dynamic programming.
4. Problem 11.17 from the text.