

**Business Decision Analytics under Uncertainty
Fall 2017, Professor Eckstein
Homework 4**

Due Wednesday, October 18

Show your work for each problem.

Q1: Shortest Path

In the network shown in Figure 14 on page 270 of the book, use dynamic programming to find the shortest path from node 1 to node 10. State the shortest path and its length. Note that you may ignore nodes 2 and 5 because they are not reachable along any path starting at node 1 (you may only travel in the direction of the arrows).

Q2: Airline Schedule Planning

Using dynamic programming, problem 4 on page 270 of the textbook (with data table on page 271). Clearly state the definition of the states, stages, and decisions in your procedure, and the definition of the value function $f_i(i)$. Assume that the contribution to profit from having zero flights to any given destination (say, New York) is \$0. Assume that Indianapolis airport has a “use it or lose it” policy with respect to the flight slots it grants to carriers, so the airline has a policy of using all the flight slots assigned to it (otherwise it will lose them to another carrier). When there are six flight slots, you should find two equally good alternative optimal solutions; state them both, along with the optimal profit. As requested at the end of the problem, also state the optimal solution and profit if there are only four available flight slots.