

Network Optimization (Fall 2008) — Homework 5

- Exercises marked with a [G] target the graduate students (Math 566), but undergrads can attempt them for extra credit.
 - You **must** attempt problem 6.
 - The total points (given in parentheses) add up to 140. Math 566 students will be graded for 130 points, and Math 466 students for 115 points.
 - **This homework is due in class on Thursday, October 2.**
1. (20) AMO 3.48 (page 92). The imbalance $e(i)$ of node i is essentially the same as $b(i)$, which you can calculate using the flow-balance equation for the node (outflow – inflow).
 2. (25) [G] AMO 3.52 (page 92).
 3. (25) AMO 4.3 (pages 124-125).
 4. (25) AMO 4.18 (page 128).
 5. (20) AMO 4.19 (page 128).
 6. (25) Write a MATLAB code that takes as input the forward star representation of a network and a starting node s , and finds the shortest path to all nodes using Dijkstra's algorithm. The program should output the *pred* vector as well as the shortest path lengths (the vector d). Name your file as `Dijkstra_firstname_lastname.m` and email the MATLAB file to me. For the sake of illustration, demonstrate your code by solving the shortest path instance given in Figure 4.15 (a), Page 127.