CS 3220 Homework 1

out: Wednesday 21 January 2009
due: Monday 26 January 2009

Problem 1: Computer Problem 2.2.1 in Cheney & Kincaid (on page 71 in the 6th edition).

Problem 2: Write MATLAB code to accomplish the task below, using (1) matrix multiplication (*), and (2) elementwise multiplication (.*), respectively, to produce the end result. Don't use any loops; each matrix can be computed in a brief one-liner. *Hint:* The functions diag and ones might be useful.

Given the $n \times n$ matrix M and the column n-vector v:

$$M = \begin{bmatrix} m_{11} & m_{12} & \dots & m_{1n} \\ m_{21} & m_{22} & \dots & m_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ m_{n1} & m_{n2} & \dots & m_{nn} \end{bmatrix} \quad v = \begin{bmatrix} v_1 \\ v_2 \\ \vdots \\ v_n \end{bmatrix}$$

compute the following matrices:

$$N_1 = \begin{bmatrix} v_1 m_{11} & v_1 m_{12} & \dots & v_1 m_{1n} \\ v_2 m_{21} & v_2 m_{22} & \dots & v_2 m_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ v_n m_{n1} & v_n m_{n2} & \dots & v_n m_{nn} \end{bmatrix} \quad N_2 = \begin{bmatrix} v_1 m_{11} & v_2 m_{12} & \dots & v_n m_{1n} \\ v_1 m_{21} & v_2 m_{22} & \dots & v_n m_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ v_1 m_{n1} & v_2 m_{n2} & \dots & v_n m_{nn} \end{bmatrix}$$