CSS 455 Winter 2012 C. Jackels
Activity No. 6 January 31, 2012
Names (must be present):

Part 1. **Design an algorithm in pseudo code for solving the following system using forward substitution (start with $x_1=b_1/a_{11}$). Try to design a row-ordered dot-product type algorithm similar to the one for backward substitution:**

$$\mathbf{A} = \begin{pmatrix} a_{11} & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{pmatrix} = \begin{pmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \end{pmatrix}$$

See reverse side

Part II

Given the matrices **M** and **A** below, calculate the product **MA,**

$$\mathbf{M} = \begin{pmatrix} 1 & 0 & 0 \\ \frac{-4}{9} & 1 & 0 \\ \frac{-1}{9} & 0 & 1 \end{pmatrix}$$

$$\mathbf{A} = \begin{pmatrix} 9 & 3 & 2 \\ 4 & 1 & 6 \\ 1 & 7 & 2 \end{pmatrix}$$

Given the matrix $\mathbf{L} = \begin{pmatrix} 1 & 0 & 0 \\ \frac{4}{9} & 1 & 0 \\ \frac{1}{9} & 0 & 1 \end{pmatrix}$ calculate the product **LM:**

Part III

If the $\mathbf{L_1}$ is the inverse of $\mathbf{M_1}$, $\mathbf{L_2}$ is the inverse of $\mathbf{M_2}$, and $\mathbf{L_3}$ is the inverse of $\mathbf{M_3}$, then if $\mathbf{M=M_3M_2M_1}$, **and** $\mathbf{L=L_1L_2L_3}$, show that **L** is the inverse of **M,** that is, $\mathbf{L=M^{-1}}$.

See reverse side