Section 1.4: Special Matrices

$$\begin{bmatrix} d_1 & & 0 \\ & d_2 & \\ 0 & \ddots & d_n \end{bmatrix} \qquad \begin{bmatrix} d_1 & & * \\ & d_2 \ddots & \\ 0 & & d_n \end{bmatrix} \qquad \begin{bmatrix} d_1 & & 0 \\ & d_2 \ddots & \\ * & & d_n \end{bmatrix}$$

diagonal D   upper triangular U   lower triangular L

These matrices are invertible if and only if $d_i \neq 0$.

$$D^{-1} = \begin{bmatrix} 1/d_1 & & 0 \\ & \ddots & \\ 0 & & \frac{1}{d_n} \end{bmatrix}, \quad D^{-2} = \begin{bmatrix} d_1^{-2} & & 0 \\ & \ddots & \\ 0 & & d_n^{-2} \end{bmatrix}$$

$$D^2 = \begin{bmatrix} d_1^2 & & 0 \\ & \ddots & \\ 0 & & d_n^2 \end{bmatrix}$$

* The transpose operation is defined by:

$$A^T = \begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & & \vdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix}^T = \begin{bmatrix} a_{11} & \cdots & a_{n1} \\ \vdots & & \vdots \\ a_{1n} & \cdots & a_{nn} \end{bmatrix}$$

* A matrix is symmetric if $A^T = A$.