Practice Problems:

Q1. Find the algebraic multiplicity and geometric multiplicity of each eigenvalue of the following matrices in $\mathbb{M}_n(\mathbb{C})$. $\begin{bmatrix} 2 & 0 & 0 \\ 1 & 2 & 1 \\ -1 & 0 & 1 \end{bmatrix}$, $\begin{bmatrix} 2 & 4 & 6 \\ 0 & 2 & 1 \\ 0 & 0 & 4 \end{bmatrix}$, $\begin{bmatrix} 2 & 0 & 0 \\ 2 & 6 & 0 \\ 3 & 2 & 1 \end{bmatrix}$.

Q2 Find the eigenspace of each eigenvalue of the following matrices in $\mathbb{M}_n(\mathbb{C})$. $\begin{bmatrix} 2 & 0 & 0 \\ 1 & 2 & 1 \\ -1 & 0 & 1 \end{bmatrix}$, $\begin{bmatrix} 2 & 4 & 6 \\ 0 & 2 & 1 \\ 0 & 0 & 4 \end{bmatrix}$, $\begin{bmatrix} 2 & 0 & 0 \\ 2 & 6 & 0 \\ 3 & 2 & 1 \end{bmatrix}$.