Assignment 2
Due date: 27 October 2023
TA: 鄒冠勳 E814

1. (30%) Compute the following determinant:

$$\begin{bmatrix} 2 & 0 & 1 & 2 & 0 \\ 2 & -1 & 0 & 1 & 1 \\ 0 & 1 & 2 & 1 & 2 \\ -2 & 0 & 2 & -1 & 2 \\ 2 & 0 & 0 & 1 & 1 \end{bmatrix}.$$

2. (40%) Compute the eigenspaces of
   a. $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$ (20%)
   b. $B = \begin{bmatrix} -2 & 2 \\ 2 & 1 \end{bmatrix}$ (20%)
3. (10%) Prove that any set of n orthogonal vectors $\{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_n\}$ must be an independent set.
4. (20%) Find a Cholesky Factorization of the following matrix

$$\begin{bmatrix} 4 & 6 \\ 6 & 10 \end{bmatrix}.$$