1. Use Gaussian elimination and pivoting technique to solve

$$1.19x_1 + 2.11x_2 - 100x_3 + x_4 = 1.12$$

$$14.2x_1 - 0.112x_2 + 12.2x_3 - x_4 = 3.44$$

$$100x_2 - 99.9x_3 + x_4 = 2.15$$

$$15.3x_1 + 0.110x_2 - 13.1x_3 - x_4 = 4.16$$

```
PS C:\Users\User\OneDrive\Desktop\數值方
op/數值方法/Hw6/e94116114_hw6-1.py
x1 = 0.176776
x2 = 0.012692
x3 = -0.020661
x4 = -1.183264
PS C:\Users\User\OneDrive\Desktop\數值方
```

2. Find the inverse of the matrix A where

$$A = \begin{bmatrix} 4 & 1 & -1 & 0 \\ 1 & 3 & -1 & 0 \\ -1 & -1 & 6 & 2 \\ 0 & 0 & 2 & 5 \end{bmatrix}$$

```
op/數值方法/Hw6/e94116114_hw6-2.py
A 的反矩陣為：
[[ 0.27969 -0.08046  0.03831 -0.01533]
 [-0.08046  0.37931  0.05747 -0.02299]
 [ 0.03831  0.05747  0.21073 -0.08429]
 [-0.01533 -0.02299 -0.08429  0.23372]]
PS C:\Users\User\OneDrive\Desktop\數值方法\Hw6>
```

3. Use Crout factorization for a tri-diagonal system to solve the problem

$$\begin{bmatrix} 3 & -1 & 0 & 0 \\ -1 & 3 & -1 & 0 \\ 0 & -1 & 3 & -1 \\ 0 & 0 & -1 & 3 \end{bmatrix} \begin{Bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{Bmatrix} = \begin{Bmatrix} 2 \\ 3 \\ 4 \\ 1 \end{Bmatrix}.$$

```
op/數值方法/Hw6/e94116114_hw6-3.py
解 x = [1.43636364 2.30909091 2.49090909 1.16363636]
PS C:\Users\User\OneDrive\Desktop\數值方法\Hw6>
```