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\afatf\Desktop\E94116067_numerical_hw6>
x1: 0.176776
x2: 0.012692
x3: -0.020661
x4: -1.183264
```

2. Find the inverse of the matrix A where

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

```
PS C:\Users\afatf\Desktop\E94116067_numerical_hw6>
[0.279693, -0.08046, 0.038314, -0.015326]
[-0.08046, 0.37931, 0.057471, -0.022989]
[0.038314, 0.057471, 0.210728, -0.084291]
[-0.015326, -0.022989, -0.084291, 0.233716]
```

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

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

```
PS C:\Users\afatf\Desktop\E94116067_numerical_hw6>
x1: 1.436
x2: 2.309
x3: 2.491
x4: 1.164
```