Instructions for preparing the solution script:

- Write your name, ID#, and Section number clearly in the very front page.
- Write all answers sequentially.
- Start answering a question (not the part of the question) from the top of a new page.
- Write legibly and in orderly fashion maintaining all mathematical norms and rules. Prepare a single solution file.
- Start working right away. There is no late submission form. If you miss the deadline, you need to use the make-up assignment to cover up the marks.

A. Consider the following linear system:

$$\begin{aligned} 6y + 2z &= 10 \\ 3x + 2y + z &= 6 \\ 4x + 5y + 2z &= 9 \end{aligned}$$

1. (3 marks) From the given system, identify the matrices A, x and b such that this system can be expressed as a matrix equation. Also, explain how to find this system has a unique solution or not.
2. (2 marks) Write down $Aug(A)$ for this system and explain why the Gaussian elimination method fails to solve this system. Also explain how we can overcome the problem to actually solve it. (You don't have to solve this system for this question)
3. (2+3 marks) Find the upper triangular matrix U and compute the solution of this system by Gaussian elimination method.

B. A linear system is described by the following equations:

$$\begin{aligned} a + b + c &= 6 \\ 2a + 3b + 4c &= 20 \\ 3a + 4b + 2c &= 17 \end{aligned}$$

1. (3 marks) Construct the Frobenius matrices $F^{(1)}$ and $F^{(2)}$ from this system.
2. (2 marks) Evaluate the unit lower triangular matrix L using the Frobenius matrices.
3. (5 marks) Now find the solution of the linear system using LU decomposition method.