Shiv Nadar University
CSD101: Introduction to Computing and Programming
Lab #8

Max marks: 80
Due on/before:22.00, 23-Oct-2021.   16-Oct-2021

1. Implement the Gauss elimination method that was discussed in class to solve systems of linear equations. Do this as follows.

   a) Define a function called `void eliminate(float arr[][COLUMNS])` that converts the coefficient matrix to an upper triangular matrix.

   b) Define a function called `void backSubstitute(float arr[][COLUMNS])` which does back substitution and the solution of the system of equations is in the last column.

   c) Use the `main` function to read in the equations, store them in the matrix, solve the system of equations and output the solution.

   d) Address the problem of systems of equations that do not have a solution. For example, this can happen when one equation is a scalar multiple of the other. Indicate via comments in your code how you address this issue.

   [40]

2. A variation of the Gauss elimination method (called the Gauss-Jordan method) converts the coefficient matrix of the system of equations to a diagonal matrix (instead of an upper triangular matrix) in the elimination step. The back substitution step is now trivial.

   Implement the Gauss-Jordan method to solve systems of linear equations similar to the Gauss elimination method.

   Solve a non-trivial example system of equations by both methods and compare the solutions obtained.   [40]