This programme aims at solving the given sets of linear equations by using Gauss Elimination Method. It transforms the coefficient matrix (the matrix formed by considering the coefficients of the variables) into Row Echelon Form. Then, it uses back substitution to find the values of the variables. In case of infinite solutions, it prints the particular solution where the free variables are assigned zero value.

The programme has been made, keeping the efficiency as the priority, rather than the time . The programme might show wrong results in case, the coefficients or the constant terms are too big .

The two dimensional vector ‘matrix’ contains coefficients of variables and vector coeff stores the constant terms . Use of vectors has been preferred over integer array as the vector can be resized and thus will not occupy unnecessary extra space .The vector ‘solution’ contains solutions of the variables .

display() : This function is displaying the basic information about how to use the code for finding the values of the variables .

update\_matrix() : This function updates the first row and first column of the matrix which stores the sum of absolute values of the elements of the corresponding row and column .

convert\_into\_ref() : This function converts the matrix into Row Echelon Form . Starting from row 1 , for every row it searches for the first non-zero column (i.e. the sum of absolute value of all the elements of that column is zero ). In that column, it finds the last non zero element and exchanges the current row with the newly found row. Then it operates the subsequent rows in such a way that all subsequent elements of that column become zero .Finally, it goes on to the next row and starts searching for the next non zero column from the current column .

find\_first\_elem(int col) : This function finds the last non zero element of the given column .

edit\_matrix(int col,int first\_elem) : This function , operates on the given column , in such a way that , all the subsequent elements of the current column become zero .

show\_matrix() : This function prints the whole matrix along with the coeff vector .

check\_sol() : This function checks weather a solution exists for the given set of equations or not .

find\_sol() : This function finds solutions for all the variables using back substitution . In case of a free variable, it assigns its value as zero for the solution .

solve (int rw,int col) : This is basically back substitution .

fix\_matrix() : This is a very crutial function , while converting into Row Echelon Form , the elements might become too small ,which when used for division , may produce unwanted results .This function, scales down to zero value to every element that is smaller that a certain value ( here 0.001 ).