1. Check whether the following system is singular or non-singular $u + v + w = 1,\ \ 2u + 2v + 5w = 2,\ \ 4u + 6v + 8w = 3$.
2. Test whether the system is singular/non-singular $u + v + w = 1,\ \ 2u + 2v + 5w = 2,\ \ 4u + 4v + 8w = 3$. If this system is singular then discuss about its solution?
3. Solve system of equation $x + y - 2z = -3,\ 2x + 5y + 3z = 11, -x + 3y + z = 5$. Check whether the system is singular or non-singular.
4. Test the system is singular or non-singular $y - 2z = 4, x + 3y + 2z = 1, -2x + 3y + z = 2$.
5. Is this system of equation is singular or non-singular
   $u + v + w = 0,\ u + 2v + 3w = 0,\ 3u + 5v + 7w = 1$

1. Solve the following system of equations using Gaussian elimination method
   i. $2x + y + 3z = 1, 2\text{x} + 6\text{y} + 8\text{z} = 3, 6\text{x} + 8\text{y} + 18\text{z} = 5$
   ii. $3x - y + 2z = 1, 4x + +y - z = 7, x + 2y - 3z = 5$
2. Using Gaussian elimination solve the equations $2x + y + z = 3, 2x - y + z = 2 \ and \ 6x + 9y + 10z = 1$
3. Use Gaussian elimination to solve the system $x + 3y = 4{,}2x - y = 1{,}3x + 2y = 5{,}5x + 15y = 20$
4. Solve $: x + y + z = 9, x - 2y + 3z = 8, 2x + y - z = 3$ by using Gauss elimination method

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4. Solve : $x + y + z = 9, x - 2y + 3z = 8, 2x + y - z = 3$ by using Gauss elimination method

1. Solve $2x - y + z = 1, 4x - 2y + 2z = 2, 2x + 3x + y = -1$
2. Determine the values of a & b for which the system of equation $x + y + az = 2b, x + 3y + (2 + 2a)z = 7b, 3x + y + (3 + 3a)z = 11b$ will have(i) unique non trivial solution (ii) trivial solution (iii) no solution (iv) many solution.
3. Find the value of a for which elimination breaks down, temporarily or permanently, in $au + v = 1, 4u + av = 2$.
4. Test the consistency of the system $x + z = 1, x + y + z = 2, x - y + z = 1$. What if the right hand side is 1,2,0 ?
5. Check the consistency / Inconsistency of the system $x - 2y - 3z = 0,\ y + z = -8, -x + y + 2z = 3$

1. If possible factorize following matrix into LDU $A = \begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & -4 \end{bmatrix}$.
2. Find LU and LDU factorization for $A = \begin{bmatrix} 3 & 1 & 2 \\ 2 & -3 & -1 \\ 1 & 2 & 1 \end{bmatrix}$
3. Find 'L' and 'U' for the matrix $A = \begin{bmatrix} a & r & r & r \\ a & b & s & s \\ a & b & c & t \\ a & b & c & d \end{bmatrix}$. Find the four conditions on a,b,c,d,r,s,t to get A = LU with four pivots.
4. Suppose A is a 4×4 identity matrix except for a vector V in column 2. Factor A into LU assuming $v_2 \neq 0$, $A = \begin{bmatrix} 1 & v_1 & 0 & 0 \\ 0 & v_2 & 0 & 0 \\ 0 & v_3 & 1 & 0 \\ 0 & v_4 & 0 & 1 \end{bmatrix}$
5. Find L, D, U factors for $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 2 & 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 1 & 1 \end{bmatrix}$
6. Find LU factorization for $A = \begin{bmatrix} 0 & 2 & -6 & -2 & 4 \\ 0 & -1 & 3 & 3 & 2 \\ 0 & -1 & 3 & 7 & 10 \end{bmatrix}$

1. Find inverse of the permutation matrices
   a. $P = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ and
   b. $P = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$
2. If P_1 and P_2 are permutation matrices, so is P_1P_2. This still has the rows of I in some order. Give examples with $P_1P_2 \neq P_2P_1$ and $P_3P_4 = P_4P_3$.
3. Which permutation matrix is required to solve by elimination for the system $u + 4v + 2w = -2, -2u - 8v + 3w = 32, v + w = 1$
4. Which permutation makes PA upper triangular? Which permutation makes P_1AP_2 lower triangular for $A = \begin{bmatrix} 0 & 0 & 6 \\ 1 & 2 & 3 \\ 0 & 4 & 5 \end{bmatrix}$.

1. *Using Gauss-Jordan method to find* A^{-1} *where* $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 3 \\ 1 & 0 & 8 \end{bmatrix}$
2. Use Gauss Jordan method to invert the following matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$
3. Find the inverse of $A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$, using Gauss-Jordon method
4. Apply Gauss Jordan method on the matrix A= $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 2 \\ 1 & 2 & 3 \end{bmatrix}$ and hence get the inverse of A^T
5. Use Gauss Jordan method to invert the matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 2 \\ 1 & 2 & 3 \end{bmatrix}$