// Gauss Elimination
#include<iostream>
#include<iomanip>
using namespace std;
int main()
{
    int n,i,j,k;
    cout.precision(4);        // set precision
    cout.setf(ios::fixed);
    cout<<"\nEnter the no. of equations
";
    cin>>n;                // input the no. of equations
    float a[n][n+1],x[n];        // declare an array to store the elements of augmented-matrix
    cout<<"\nEnter the elements of the augmented-matrix row-wise:\n";
    for (i=0;i<n;i++)                    // Pivotisation
        for (k=i+1;k<n;k++)
            if (abs(a[i][i])<abs(a[k][i]))
                for (j=0;j<=n;j++)
                {
                    double temp=a[i][j];
                    a[i][j]=a[k][j];
                    a[k][j]=temp;
                }
    cout<<"\nThe matrix after Pivotisation is:\n";
    for (i=0;i<n;i++)            // print the new matrix
    {
        for (j=0;j<=n;j++)
            cout<<a[i][j]<<setw(16);
        cout<<"\n";
    }
    for (i=0;i<n-1;i++)            // loop to perform the gauss elimination
        for (k=i+1;k<n;k++)
        {
            double t=a[k][i]/a[i][i];
            for (j=0;j<=n;j++)
                a[k][j]=a[k][j]-t*a[i][j];    // make the elements below the pivot elements equal to zero or eliminate the variables
        }
    cout<<"\n\nThe matrix after gauss-elimination is as follows:\n";
    for (i=0;i<n;i++)            // print the new matrix
    {
        for (j=0;j<=n;j++)
            cout<<a[i][j]<<setw(16);
        cout<<"\n";
    }
    for (i=n-1;i>=0;i--)                // back-substitution
    {
        // x is an array whose values correspond to the values of
        x,y,z..
    }
}
```cpp
// make the variable to be calculated equal to the rhs of the last equation
for (j=i+1;j<n;j++)
    if (j!=i) // then subtract all the lhs values except the coefficient of the variable whose value is being calculated
        x[i]=x[i]-a[i][j]*x[j];

x[i]=x[i]/a[i][i]; // now finally divide the rhs by the coefficient of the variable to be calculated
}
cout<<"\nThe values of the variables are as follows:\n";
for (i=0;i<n;i++)
    cout<<x[i]<<endl; // Print the values of x, y, z, ....
return 0;
```
C++ Program for Gauss-Elimination for solving a System of Linear Equations

The matrix after Pivotisation is:
\[
\begin{bmatrix}
4.0000 & -2.0000 & 1.0000 & 15.0000 \\
-3.0000 & 1.0000 & 4.0000 & 8.0000 \\
1.0000 & -1.0000 & 3.0000 & 13.0000 \\
\end{bmatrix}
\]

The matrix after gauss-elimination is as follows:
\[
\begin{bmatrix}
4.0000 & -2.0000 & 1.0000 & 15.0000 \\
0.0000 & -2.5000 & 4.7500 & 19.2500 \\
0.0000 & 0.0000 & 1.8000 & 5.4000 \\
\end{bmatrix}
\]

The values of the variables are as follows:
\[
\begin{align*}
x_1 & = 2.0000 \\
x_2 & = -2.0000 \\
x_3 & = 3.0000 \\
\end{align*}
\]

Sample 2

Tutorial Video:

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