// 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\n";
    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++)
    for (j=0;j<=n;j++)
        cin>>a[i][j];    // input the elements of array

    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<<"\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...
C++ Program for Gauss-Elimination for solving a System of Linear Equations

```cpp
#include <iostream>
#include <vector>

int main()
{
    std::vector<std::vector<double>> A = {
        {6.0, 1.0, -6.0, -5.0, 6.0},
        {0.0, 2.0, 0.0, 1.0, 0.0},
        {2.0, 2.0, 3.0, 2.0, 0.0},
        {4.0, -3.0, 0.0, 1.0, -7.0}
    };

    std::vector<double> x;
    x.resize(A.size());

    for (int i = 0; i < A.size(); i++)
    {
        double pivot = A[i][i];
        x[i] = A[i][A.size() - 1] / pivot;
        A[i][A.size() - 1] = x[i] * pivot;
    }

    for (int i = A.size() - 2; i >= 0; i--)
    {
        x[i] = A[i][A.size() - 1];
        for (int j = i + 1; j < A.size(); j++)
            x[i] -= A[i][j] * x[j];
        x[i] /= A[i][i];
    }

    for (int i = 0; i < A.size(); i++)
        std::cout << x[i] << std::endl;

    return 0;
}
```

The matrix after Pivotisation is:

```
6.0000  1.0000  -6.0000  -5.0000  6.0000
0.0000  2.0000  0.0000   1.0000  0.0000
2.0000  2.0000  3.0000   2.0000  0.0000
4.0000 -3.0000  0.0000   1.0000 -7.0000
```

The matrix after gauss-elimination is as follows:

```
6.0000  1.0000  -6.0000  -5.0000  6.0000
0.0000  2.0000  0.0000   1.0000  0.0000
0.0000  0.0000  5.0000   2.8333 -4.0000
0.0000  0.0000  0.0000   3.9000 -7.8060
```

The values of the variables are as follows:

```
-0.5000
1.0000
0.3333
-2.0000
```

Sample 1
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:

\[
\begin{align*}
&2.0000 \\
&-2.0000 \\
&3.0000
\end{align*}
\]

Sample 2

Tutorial Video:

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