//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
    {                           //x is an array whose values correspond to the values of
        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
    {                           //x is an array whose values correspond to the values of
        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
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        cin>>x[i];    //input the values of x
    }
}
C++ Program for Gauss-Elimination for solving a System of Linear Equations

```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;
}
```

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   3.9600 -7.8060
```

The values of the variables are as follows:

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

Sample 1
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The matrix after Pivotisation is:
4.0000  -2.0000     1.0000     15.0000
-3.0000  -1.0000     4.0000     8.0000
 1.0000   -1.0000     3.0000    13.0000

The matrix after gauss-elimination is as follows:
4.0000  -2.0000     1.0000     15.0000
 0.0000  -2.5000     4.7500    19.2500
 0.0000   0.0000     1.8000     5.4000

The values of the variables are as follows:
2.0000
-2.0000
 3.0000

Sample 2

Tutorial Video:

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