ΠΡΟΓΡΑΜΜΑ C++ ΓΙΑ ΤΗΝ ΜΕΘΟΔΟ ΑΠΑΛΟΙΦΗΣ ΤΟΥ GAUSS

```
#include <stdio.h>
#include <stdlib.h>
int main()
{
        double x[100],a[100][101],sum,c,det, sw;
        int i,j,n,k, inz; nsw; // "inz" dilonei tin grammi stin opoia yparxei mi-
mideniko stoixeio kato apo ton odigo, "nsw" dilonei to synoliko plithos ton
enallagon grammon pou eginan kata tin apaloifi

        // Read the data
        scanf("%d", &n);
        printf("\n");
        for (i=1;i<=n;i++)
        {
                for (j=1;j<=n+1;j++)
                {
                        printf("a[%d][%d]=",i,j);
                        scanf("%lf",&a[i][j]);
                }
        }
        nsw=0;
        for (i=1;i<=n;i++)
            { for (j=i+1; j<=n;j++)
                {if (a[i][i]==0.0)
                    { if(a[j][i]!=0.0)
                        { inz=j;
                        for (k=1;k<=n+1;k++)
                        {
                        sw=a[i][k];
                        a[i][k]=a[inz][k];
                        a[inz][k]=sw;
                        }
                        nsw=nsw+1;
                        for (j=i+1; j<=n;j++)
                        { c=-a[j][i]/a[i][i];
                        for (k=i;k<=n+1;k++)
        a[j][k]=a[j][k]+c*a[i][k];
                        }
                    }
                }
            }
if (a[i][i]==0.0)
printf ("The given linear system either has infinitely many solutions or no solutions");
else
        for (j=i+1; j<=n;j++)
                        { c=-a[j][i]/a[i][i];
                        for (k=i;k<=n+1;k++)
        a[j][k]=a[j][k]+c*a[i][k];
```

```
                        }
}

// ypologismos ths orizousas tou arxikou pinaka ton synteleston ton agnoston
        det=1.0;
        for (i=1;i<=n;i++)
                det=det*a[i][i]*pow(-1,nsw); // orizousa tou anw trigwnikou pinaka
epi to prosimo pou kathorizetai apo to synoliko plithos nsw (number of swaps)
ton enallagon grammon pou eginan kata tin apaloifi
        printf("det=%lf\n",det);
        if (det==0)
        printf("The matrix of the coefficients of the unknowns is not invertible");
        else

// backward substitution (pisw antikatastash)
        {
                for (i=n; i>=1; i--)
                {
                        sum=0.0;
                        {
                        for (k=i+1; k<=n; k++)
                                sum=sum+a[i][k]*x[k];
                        }
                        x[i]=(1/a[i][i])*(a[i][n+1]-sum);
                        printf("x[%d]=%lf\n", i, x[i]);
                }
        }
system("pause");
        return 0;
}
```

Ελευθέριος ΤΑΧΤΣΗΣ