LAB 3 Code

SUBJECT :MATHEMATICS FOR EMBEDDED SYSTEMS

SUBMITTED TO :RACHIDA AMJOUN

SUBMITTED BY: SHINU SHAJI(C0761203) & STEBIN YOHANNAN C0770947

PROGRAM:

```
#include <iostream>
using namespace std;
int main() {
      float A[50][50],L[50][50],U[50][50],c1 = 0,X[50],b[50],sum;
      int i, j, n, m;
      cout << "Enter the number of variables" << "\n";</pre>
      cin >> n;
      cout << "Enter the number of equations" << "\n";</pre>
      cin >> m;
      if( m<n)</pre>
      {
             cout << "Calculation not possible" << "\n";</pre>
             return 0:
      for(i=0;i<m;i++)</pre>
             cout << "Enter the equation \n";</pre>
             for(j=0;j<=n;j++)
if(j==i)
      L[i][j] = 1;
else if(j==(n-1))
{
      L[i][j] = A[i][j];
}
else
{
      L[i][j] = 0; // Assigning values to the matrix A and partially to L and U
}
                   cin >> A[i][j];
                   U[i][j] = A[i][j];
             }
      }
for(i=0;i<(m-1);i++)</pre>
      for(j=(i+1);j<(m);j++)
             c1 = (A[j][i])/(A[i][i]);
             if(i<j)
             {
                   L[j][i] = c1; // Making L matrix of LU
             }
```

```
for(int k=0; k<n; k++)
            A[j][k] = A[j][k] - c1*(A[i][k]); // Making U matrix of LU
            U[j][k] = A[j][k];
      }
for(i=0;i<m;i++)</pre>
      for(j=0;j<=(n-1);j++)
                                                   //To display A matrix
            cout <<A[i][j]<<"\t";
      cout << "\n";
}
cout << "\n";
cout \ll "U = \n";
for(i=0;i<m;i++)</pre>
      for(j=0;j<=(n-1);j++)
                                                                //To display U matrix
            cout<<U[i][j]<<"\t";
      cout<< "\n";
}
      cout << " \n L = \n";
      for(i=0;i<m;i++)</pre>
            for(j=0;j<=(n-1);j++)
                                                               //To display L matrix
                  cout <<L[i][j]<<"\t";</pre>
            cout << "\n";
      cout << "\n";
for(i=0;i<n;i++)</pre>
    {
                                                //forward substitution method
        sum=0;
        for(j=0;j<i;j++)
        sum+=L[i][j]*b[j];
        b[i]=(A[i][m]-sum)/L[i][i];
for(i=(m-1);i>=0;i--)
{
      sum = 0;
      for(j=(m-1);j>i;j--)
            sum +=(U[i][j]*X[j]);  // backward substitution
      }
            if(U[i][i]==0)
                   cout << " Backward substitution not possible in this program";</pre>
```

OUTPUT:

```
Activities   ⊜ Eclipse ▼
                                                                                                                                                             ●) 🕃
                                                              eclipse-workspace - LU/src/LU.cpp - Eclipse IDE
                            V C LU
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                    1 #include <instrea
                                                                                             <terminated> (exit value: 0) LU [C/C++ Application] /home/stebin/eclips
                                                                                                                                                        © ⊚ 6 ↑ ▼
    □⑤ 🔊 ▽
                      using namespace std;
                                                                                             Enter the number of variables
▶ ∰ argument
                                                                                                                                                        ▶ ≝argument
▶ ﷺ asd
                                                                                                                                                        ▶ ≅ asd
                                                                                             Enter the number of equations
                    4⊖ int main() {
                           float A[50][50],L[50][50],U[50][50],c1 = 0,X[50],b[50],sum;
▶ 1<sup>22</sup> df
                                                                                                                                                        ▶ ﷺ df
                          int i,j,n,m;
cout << "Enter the number of variables" << "\n";
cin >> n;
cout << "Enter the number of equations" << "\n";</pre>
                                                                                             Enter the equation
▶ ≅ Epsilon
                                                                                                                                                        ▶ ≅ Epsilon
▶ ≝ largest
                                                                                            Enter the equation
▶ ﷺ lower&upper_
                                                                                                                                                        ▶ ≝lower&uppe
                   10
11
                                                                                            Enter the equation
                                                                                                                                                        ▶ ≝LU
                                                                                                                                                        ▶ ≝Math 3
▶ ⊯ Math 3
                              cout << "Calculation not possible" << "\n";
return 0;</pre>
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▶ 1≅ mathlah
                                                                                            0
                                                                                                                                                        ▶ i≅ mathlab
                                                                                                    Θ
                                                                                                            3
▶ ≝ mathlab_3
                                                                                                                                                        ▶ ≝mathlab_3
▶ ≝ MathlabLU
                           for(i=0;i<m;i++)
                                                                                                                                                        ▶ ≅ MathlabLU
                                                                                            U =
                                                                                                                                                        ▶ ≅ parking
▶ ∰ parking
                              cout << "Enter the equation \n";
                                                                                                            2
                                                                                                                                                        ▶ ≅ Parking
▶ # Parking
                               for(j=0;j<=n;j++)
                                                                                            0
▶ ∰ parkingspace
                                                                                                                                                        ▶ Sparkingspac
                      if(j==i)
▶ ≅ pattern
                                                                                                                                                        ▶ ≝ pattern
▶ ≅ Prime number
                                                                                                                                                        ▶ ≅ Prime numb
                          L[i][j] = 1;
                   23
                                                                                                                                                        ▶ ≅ Queue
24 }
25 e
26 {
27
28 }
                      else if(j==(n-1))
▶ ≅ queueprogram
                                                                                                                                                        ▶ ≝ queueprogra
                                                                                            b1=3
                                                                                                                                                        ▶ ☐ rand
▶ ﷺ rand
                          L[i][j] = A[i][j];
▶ ﷺ stack
                                                                                            b3=-6
                                                                                                                                                        ▶ ﷺ stack
                   29 else
30 {
31 L
▶ ∰ zxc
                                                                                                                                                        ▶ ≝zxc
                                                                                             X1=3
                          L[i][j] = 0; // Assigning values to the matrix A and partiall
                   32 }
                                                                                                Smart Insert 14: 18: 322
                                                                                 Writable
```