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|  | Course Number | | |  |  | ESE2005 | | |  |  |  |
|  | Section Number | | |  | **1** | |  |  |  |  |  |
|  | Course Title | | |  | MTH-1444 | | | | | |  |
|  | Semester/Year | | |  |  | 2nd/2019 | | | | |  |
|  |  | |  | |  |  |  |  | |  | |
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|  |  | |  | | |  |  |  |  |  |  |
|  |  | | **Lab No.** | | | |  |  | **3** |  |  |
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|  | | |  | |  |  | |  |  |  | |
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**Program:**

#include<iostream>

using namespace std;

void LUdecomposition(float A[10][10], float L[10][10], float v[10][10], int m) {

int p = 0, q = 0, r = 0;

for (p = 0; p < m; p++) {

for (q = 0; q < m; q++) {

if (q < p)

L[q][p] = 0;

else {

L[q][p] = A[q][p];

for (r = 0; r < p; r++) {

L[q][p] = L[q][p] - L[q][r]\*v[r][p];

}

}

}

for (q = 0; q < m; q++) {

if (q < p)

v[p][r] = 0;

else if (q== p)

v[p][q] = 1;

else {

v[p][q] = A[p][q] / L[p][p];

for (r= 0; r < p; r++) {

v[p][q] = v[p][q] - ((L[p][r] \* v[r][q]) / L[p][p]);

}

}

}

}

}

int main() {

float A[10][10], L[10][10], v[10][10];

int m = 0, p = 0, q = 0;

cout << "Enter size of square matrix : "<<endl;

cin >> m;

cout<<"Enter matrix values: "<<endl;

for (p = 0; p < m; p++)

for (q= 0; q < m; q++)

cin >>A[p][q];

LUdecomposition(A, L, v, m);

cout << "L Decomposition is as follows..."<<endl;

for (p = 0; p < m; p++) {

for (q = 0; q < m; q++) {

cout<<L[p][q]<<" ";

}

cout << endl;

}

cout << "U Decomposition is as follows..."<<endl;

for (p = 0; p < m; p++) {

for (q = 0; q < m; q++) {

cout<<v[p][q]<<" ";

}

cout << endl;

}

return 0;

}

**Result:**

