**/\*2023FA-ENGR—2304-81001-P00 TSEGEZAB ATAKLTI\*/ Implementing cram’s rule**

#include <stdio.h>

// Function to calculate the determinant of a 2x2 matrix

double determinant2x2(double a, double b, double c, double d) {

return (a \* d - b \* c);

}

// Function to calculate the determinant of a 3x3 matrix

double determinant3x3(double mat[3][3]) {

return (mat[0][0] \* (mat[1][1] \* mat[2][2] - mat[1][2] \* mat[2][1]) -

mat[0][1] \* (mat[1][0] \* mat[2][2] - mat[1][2] \* mat[2][0]) +

mat[0][2] \* (mat[1][0] \* mat[2][1] - mat[1][1] \* mat[2][0]));

}

// Function to solve a system of two linear equations using Cramer's Rule

void solveSystem2x2(double a, double b, double c, double d, double e, double f, double \*x, double \*y) {

double detA = determinant2x2(a, b, c, d);

if (detA == 0) {

printf("The system has no unique solution.\n");

return;

}

\*x = determinant2x2(e, b, f, d) / detA;

\*y = determinant2x2(a, e, c, f) / detA;

}

// Function to solve a system of three linear equations using Cramer's Rule

void solveSystem3x3(double A[3][3], double B[3], double X[3]) {

double detA = determinant3x3(A);

if (detA == 0) {

printf("The system has no unique solution.\n");

return;

}

double temp[3][3];

for (int i = 0; i < 3; i++) {

for (int j = 0; j < 3; j++) {

temp[i][j] = A[i][j];

}

}

for (int i = 0; i < 3; i++) {

for (int j = 0; j < 3; j++) {

temp[j][i] = B[j];

}

X[i] = determinant3x3(temp) / detA;

for (int j = 0; j < 3; j++) {

temp[j][i] = A[j][i];

}

}

}

int main() {

// Example for a system of two equations (ax + by = e, cx + dy = f)

double a2 = 2.0, b2 = 3.0, c2 = 1.0, d2 = -2.0, e2 = 5.0, f2 = -4.0;

double x2, y2;

// Example for a system of three equations

double A3[3][3] = {

{2, 1, -1},

{1, 3, 2},

{3, 2, -3}

};

double B3[3] = {8, 16, 3};

double X3[3];

solveSystem2x2(a2, b2, c2, d2, e2, f2, &x2, &y2);

solveSystem3x3(A3, B3, X3);

printf("Solution for the system of two equations (ax + by = e, cx + dy = f):\n");

printf("x = %lf\n", x2);

printf("y = %lf\n", y2);

printf("\nSolution for the system of three equations:\n");

for (int i = 0; i < 3; i++) {

printf("x%d = %lf\n", i + 1, X3[i]);

}

return 0;

}