**Cryptography, Network and Security**

Assignment 3

3. Implementation of Euclidean and Extended Euclidean Algorithm

Code:

#include <iostream>

#include <string>

using namespace std;

*// Euclidean Algorithm to find GCD*

int euclideanGCD(int a, int b)

{

    while (b != 0)

    {

        int temp = b;

        b = a % b;

        a = temp;

    }

    return a;

}

*// Extended Euclidean Algorithm to find GCD and coefficients x, y*

int extendedEuclidean(int a, int b, int *&*x, int *&*y)

{

    if (b == 0)

    {

        x = 1;

        y = 0;

        return a;

    }

    int x1, y1;

    int gcd = extendedEuclidean(b, a % b, x1, y1);

    x = y1;

    y = x1 - (a / b) \* y1;

    return gcd;

}

int main()

{

    int a, b;

    cout << "Enter two numbers to find GCD and coefficients: ";

    cin >> a >> b;

    int gcd = euclideanGCD(a, b);

    cout << "GCD using Euclidean Algorithm: " << gcd << endl;

int x, y;

    int gcd\_ext = extendedEuclidean(a, b, x, y);

    cout << "GCD using Extended Euclidean Algorithm: " << gcd\_ext << endl;

    cout << "Coefficients: x = " << x << ", y = " << y << endl;

    return 0;

}