**Cryptography, Network and Security**

Assignment 9

Calculate the message digest of a text using the SHA-1 algorithm

Code:

#include <iostream>

#include <openssl/sha.h> *// Include the OpenSSL library for SHA-1*

#include <iomanip>

#include <sstream>

#include <cstring>

using namespace std;

*// Function to convert bytes to a hexadecimal string*

string toHexString(*const* unsigned char *\**digest, int length)

{

    stringstream ss;

    ss << hex << setfill('0');

    for (int i = 0; i < length; ++i)

    {

        ss << setw(2) << static\_cast<unsigned int>(digest[i]);

    }

    return ss.str();

}

*// Function to calculate the SHA-1 hash of the input text*

string calculateSHA1(*const* string *&*text)

{

    unsigned char digest[SHA\_DIGEST\_LENGTH]; *// 20-byte array to store the result*

    SHA\_CTX ctx;

*// Initialize the SHA-1 context*

    SHA1\_Init(&ctx);

*// Update the context with the text (input)*

    SHA1\_Update(&ctx, text.c\_str(), text.size());

*// Finalize the calculation and store the result in digest*

    SHA1\_Final(digest, &ctx);

*// Convert the digest to a hexadecimal string and return*

    return toHexString(digest, SHA\_DIGEST\_LENGTH);

}

int main()

{

*// Input text to hash*

    string inputText;

    cout << "Enter text to calculate SHA-1 hash: ";

    getline(cin, inputText);

*// Calculate the SHA-1 hash*

    string hash = calculateSHA1(inputText);

*// Display the result*

    cout << "SHA-1 Digest: " << hash << endl;

    return 0;

}