# **Assignment-4**

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**Assignment : Write a program for error detection and correction for 7/8 bits ASCII codes using CRC.**

**Code:**

#include <iostream>

using namespace std;

int main() {

int fs, gs;

cout << "\nEnter Frame size: ";

cin >> fs;

if (fs <= 0 || fs > 20) {

cout << "\nInvalid frame size. Please enter a size between 1 and 20.";

return 1;

}

int f[20];

cout << "\nEnter Frame (only 0s and 1s): \n";

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

cin >> f[i];

if (f[i] != 0 && f[i] != 1) {

cout << "\nInvalid input. Enter only binary values (0 or 1).";

return 1;

}

}

cout << "\nEnter Generator size: ";

cin >> gs;

if (gs <= 0 || gs > 20) {

cout << "\nInvalid generator size. Please enter a size between 1 and 20.";

return 1;

}

int g[20];

cout << "\nEnter Generator (only 0s and 1s): \n";

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

cin >> g[i];

if (g[i] != 0 && g[i] != 1) {

cout << "\nInvalid input. Enter only binary values (0 or 1).";

return 1;

}

}

if (g[0] != 1) {

cout << "\nInvalid generator. The first bit must be 1.";

return 1;

}

int rs = gs - 1;

cout << "\nNumber of 0's to be appended: " << rs;

for (int i = fs; i < fs + rs; i++) {

f[i] = 0;

}

int temp[20];

for (int i = 0; i < 20; i++) {

temp[i] = f[i];

}

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

if (temp[i] == 1) {

for (int j = 0, k = i; j < gs; j++, k++) {

temp[k] = (temp[k] == g[j]) ? 0 : 1;

}

}

}

int crc[15];

for (int i = 0, j = fs; i < rs; i++, j++) {

crc[i] = temp[j];

}

cout << "\nCRC bits: ";

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

cout << crc[i];

}

int tf[20];

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

tf[i] = f[i];

}

for (int i = fs, j = 0; i < fs + rs; i++, j++) {

tf[i] = crc[j];

}

cout << "\nTransmitted Frame: ";

for (int i = 0; i < fs + rs; i++) {

cout << tf[i];

}

int rf[20];

cout << "\n\nReceiver Side - Enter Received Frame (including CRC bits, only 0s and 1s): \n";

for (int i = 0; i < fs + rs; i++) {

cin >> rf[i];

if (rf[i] != 0 && rf[i] != 1) {

cout << "\nInvalid input. Enter only binary values (0 or 1).";

return 1;

}

}

for (int i = 0; i < fs + rs; i++) {

temp[i] = rf[i];

}

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

if (temp[i] == 1) {

for (int j = 0, k = i; j < gs; j++, k++) {

temp[k] = (temp[k] == g[j]) ? 0 : 1;

}

}

}

int rrem[15];

cout << "\nRemainder after division: ";

bool errorDetected = false;

for (int i = fs, j = 0; i < fs + rs; i++, j++) {

rrem[j] = temp[i];

cout << rrem[j];

if (rrem[j] != 0) {

errorDetected = true;

}

}

if (!errorDetected) {

cout << "\nSince Remainder is 0, the message is CORRECT!";

} else {

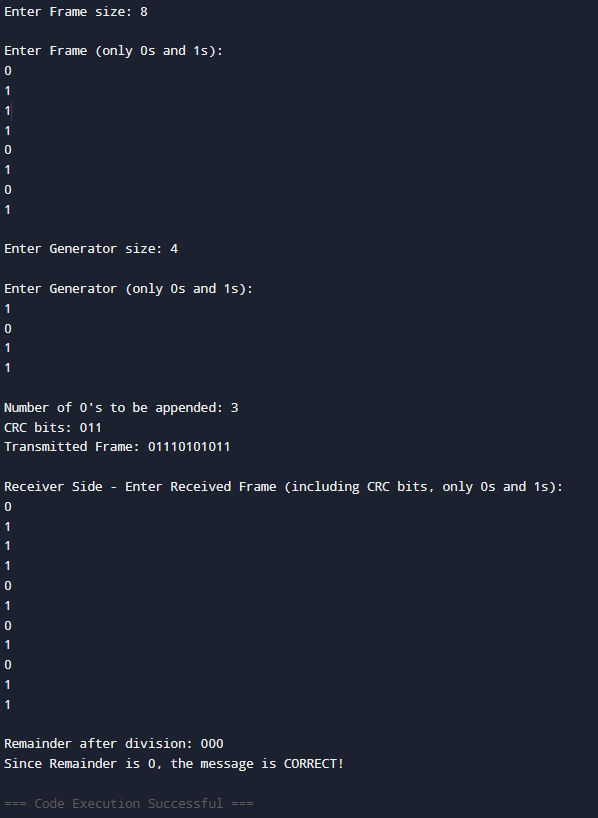
cout << "\nSince Remainder is NOT 0, the message contains an ERROR!";

}

return 0;

}

**Output :**

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