

## Experiment No. : 06

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```
#include <iostream>

#include <string>

using namespace std;

string XOR(string dividend, string divisor) {
    string result = ""; for (int i = 0; i <
        divisor.size(); i++) {
        result += (dividend[i] == divisor[i] ? '0' : '1');
    } return
result; }

string mod2Division(string message, string generator) {
    int msgLen = message.size(); int genLen =
        generator.size(); string dividend =
        message.substr(0, genLen);

    for (int i = genLen; i < msgLen; i++) {
        if (dividend[0] == '1') {
            dividend = XOR(dividend, generator) + message[i];
        } else { dividend = XOR(dividend, string(genLen, '0')) +
            message[i];
        } dividend =
            dividend.substr(1);
    }

    if (dividend[0] == '1') {
        dividend = XOR(dividend, generator);
    } else { dividend = XOR(dividend,
        string(genLen, '0'));
    }

    return dividend.substr(1);
}

string appendZeros(string message, int zeros) {
    return message + string(zeros, '0');
}

string appendRemainder(string message, string remainder) {
    return message.substr(0, message.size() - remainder.size()) + remainder;
}

void checkForErrors(string message, string generator) {
    int genLen = generator.size();
```

```

string messageWithZeros = appendZeros(message, genLen - 1);
string remainder = mod2Division(messageWithZeros, generator);

string encodedMessage = appendRemainder(messageWithZeros, remainder);

cout << "Transmitted Frame : " << encodedMessage << endl;
}

int main() {
    string message, generator;

    cout << "Enter the message: ";
    cin >> message;
    cout << "Enter the generator polynomial: ";
    cin >> generator; checkForErrors(message,
    generator);

    cout<<"Enter the received frame"<<endl;
    string rmessage; cin>>rmessage; string remainderAtReceiver =
    mod2Division(rmessage, generator);

    if (remainderAtReceiver.find('1') != string::npos) {
        cout << "Error detected in the received message." << endl;
    } else { cout << "No error detected in the received message." <<
        endl;
    }

    return 0;
}

```

**Output :**

```
PS D:\CN Lab\codes> cd 'd:\CN Lab\codes\output'
PS D:\CN Lab\codes\output> & .\'CRC.exe'
Enter the message: 100100
Enter the generator polynomial: 1101
Transmitted Frame : 100100001
Enter the received frame
100100100
Error detected in the received message.
PS D:\CN Lab\codes\output> █
```

```
PS D:\CN Lab\codes\output> cd 'd:\CN Lab\codes\output'
PS D:\CN Lab\codes\output> & .\'CRC.exe'
Enter the message: 100100
Enter the generator polynomial: 1101
Transmitted Frame : 100100001
Enter the received frame
100100001
No error detected in the received message.
PS D:\CN Lab\codes\output> █
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