Experiment 13

AIM: Write a program for error detecting code using CRC-CCITT (16-bits).

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Experiment 13
Esternité a program pre envior détecting code using CRC-CCIT ((6-646)
     Story xord (story &a, string xb)
                      commeter ou remark define but
          Story result;
       for untied; in b. length(); itt)
                vesult += (a(i) == b(i))? '0': 11';
          return mesuti, and survey the
    dring model din (costoling & druidend, storing & divisor)
       8 bring temp = dividend substr (0, divisor-length ());
              but d = druisor. lougth();
              storng divo = storng (d, 'o');
          for cout i = d; i < dividend leugth(); i++)
               A (comb (a) = = ,1,)
                   remp = x001 (divisor, temp) + dividend (i);

temp = x001 (divisor, temp) + dividend (i);
                llde
          if (homplo) = = '(1)
                 temp. x001 (dowsoo, temp);
           else temp = xorl (strong(d, 'o'), remp);
          return temp;
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Story encodedata (strong & data, strong & key)
   string appended = data + string (key, siyel)-1, '0');
   String remainder = modedin (appended, key);
    court of "remainder: " - remainder & counder;
    story volemented = data + remainder;
    coul- << dodeword;
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               the short knewspass in the
nois receiver ( storngk codemord, storng k key)
     story received;
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     string the chesum canadatable accordance to the larger.
    = mod 2 den (received-substro (0, key-size));
     but cutte = key-sizel);
    while (autin ) = neceived. esject)
         of (checkenm. style ) = key size())
                checksum, push-back (received (curent));
              checkenn = modadin (checkenn, key);
     of (cheeksum. styll) == key. styll)
             cheekum = modd der (cheekum, key);
    if ( cool thethrum. find (1') } = coloreram '/a') / string: neos
          cent << " LHHOr"
    else cout << "No entror" < cond!;
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Columbo: 1010110011010.

Receiveris und:

1010110011010

No estroc

PROGRAM:

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#include <iostream>
using namespace std;
string xor1(const string &a, const string &b) {
    string result;
    for (size_t i = 1; i < b.length(); ++i)
        result += (a[i] == b[i]) ? '0' : '1';
    return result;
string mod2div(const string &dividend, const string &divisor) {
    string tmp = dividend.substr(0, divisor.length());
    size_t pick = divisor.length();
    for (size_t i = pick; i < dividend.length(); ++i) {
        if (tmp[0] == '1')
            tmp = xor1(divisor, tmp) + dividend[i];
        else
            tmp = xor1(string(pick, '0'), tmp) + dividend[i];
    }
    if (tmp[0] == '1')
        tmp = xor1(divisor, tmp);
    else
        tmp = xor1(string(pick, '0'), tmp);
    return tmp;
string encodeData(const string &data, const string &key) {
    string appended data = data + string(key.size() - 1, '0');
    string remainder = mod2div(appended_data, key);
    cout << "Remainder: " << remainder << "\n";</pre>
    string codeword = data + remainder;
    cout << "Encoded Data (Data + Remainder): " << codeword << "\n";</pre>
    return codeword;
void receiver(const string &codeword, const string &key) {
    string received codeword;
    cout << "Enter received codeword: ";</pre>
    cin >> received codeword;
    string currxor = mod2div(received_codeword.substr(0, key.size()), key);
    size_t curr = key.size();
    while (curr != received_codeword.size()) {
        if (currxor.size() != key.size())
            currxor.push_back(received_codeword[curr++]);
        else
            currxor = mod2div(currxor, key);
```

```
if (currxor.size() == key.size())
        currxor = mod2div(currxor, key);
    cout << ((currxor.find('1') != string::npos) ? "There is an error in data" : "Correct</pre>
message received") << endl;</pre>
int main() {
    string data, key;
    cout << "Enter data: ";</pre>
    cin >> data;
    cout << "Enter key: ";</pre>
    cin >> key;
    cout << "Sender side..." << endl;</pre>
    string codeword = encodeData(data, key);
    // receiver(codeword, key);
    cout<<"enter recieved..";</pre>
    string recieved;
    cin>>recieved;
    string res = mod2div(recieved, key);
    int flag = 1;
    for(auto x : res) {
        if(x=='1') {
             cout<<"error";</pre>
             flag = 0;
    if(flag) {
        cout<<"correct";</pre>
    return 0;
```

OUTPUT:

PS C:\Users\anosh\OneDrive\Desktop\CPP in VS> cd "c:\Users\anosh'
Enter data: 10101011001101
Enter key: 1011
Sender side...
Remainder: 100
Encoded Data (Data + Remainder): 10101011001101100
enter recieved..101010110011001
correct
PS C:\Users\anosh\OneDrive\Desktop\CPP in VS> []