Networks Lab

Week 3– Checksum

Aditya Sai SD

21BCE1889

Aim :

To build the checksum code for the sender and for the receiver.

Code :

Sender :

```
#include <bits/stdc++.h>
using namespace std;

string comp(string inp)
{
    for (int i = 0; i < inp.length(); i++) {
        if (inp[i] == '0')
            inp[i] = '1';
        else
            inp[i] = '0';
    }
```

```
    return inp;
}

string checkSum(string inp, int bs)
{
    int n = inp.length();
    if (n%bs!=0) {
        int ps=bs-(n%bs);
        for (int i=0;i<ps;i++) {
            inp = '0' + inp;
        }
    }
    string result = "";
    for (int i=0;i<bs;i++) {
        result += inp[i];
    }
     for (int i = bs; i < n; i += bs) {
        string next_block = "";
        for (int j = i; j < i + bs; j++) {
            next_block += inp[j];
        }
        string add = "";
        int sum = 0, carry = 0;
```

```
for (int k = bs - 1; k >= 0; k--) {
    sum += (next_block[k] - '0')
          + (result[k] - '0');
    carry = sum / 2;
    switch(sum){
        case 0:
        add = '0' + add;
        sum = carry;
        break;
        case 1:
        add = '1' + add;
        sum = carry;
        break;
        case 2:
        add = '0' + add;
        sum = carry;
        break;
        case 3:
        add = '1' + add;
        sum = carry;
        break;
    }
}
```

```
        string final = "";
        if (carry == 1) {
            for (int l = add.length() - 1; l >= 0; l--) {
                if (carry == 0) {
                    final = add[l] + final;
                }
                else if (((add[l] - '0') + carry) % 2==0) {
                    final = "0" + final;
                    carry = 1;
                }
                else {
                    final = "1" + final;
                    carry = 0;
                }
            }
            result = final;
        }
        else {
            result = add;
        }
    }
    return comp(result);
}
```

```
int main(){
    string data="10010111100101111001011110010111";
    string checksum=checkSum(data,8);
    cout<<"Sender input : "<<data<<"\nChecksum : "<<checksum;
    return 0;
}
```

```
/tmp/v2nX6u1Zrl.o
Sender input : 10010111100101111001011110010111
Checksum : 10100001
```

Receiver :

```
#include <bits/stdc++.h>
using namespace std;

string comp(string inp)
{
    for (int i = 0; i < inp.length(); i++) {
        if (inp[i] == '0')
            inp[i] = '1';
        else
            inp[i] = '0';
    }
    return inp;
}

string checkSum(string inp, int bs)
{
    int n = inp.length();
```

```
if (n%bs!=0) {
    int ps=bs-(n%bs);
    for (int i=0;i<ps;i++) {
        inp = '0' + inp;
    }
}
string result = "";
for (int i=0;i<bs;i++) {
    result += inp[i];
}
 for (int i = bs; i < n; i += bs) {
    string next_block = "";
    for (int j = i; j < i + bs; j++) {
        next_block += inp[j];
    }
    string add = "";
    int sum = 0, carry = 0;
    for (int k = bs - 1; k >= 0; k--) {
        sum += (next_block[k] - '0')
              + (result[k] - '0');
        carry = sum / 2;
        switch(sum){
            case 0:
            add = '0' + add;
            sum = carry;
            break;
            case 1:
            add = '1' + add;
            sum = carry;
            break;
            case 2:
            add = '0' + add;
            sum = carry;
            break;
            case 3:
            add = '1' + add;
            sum = carry;
            break;
        }
    }
```

```
        string final = "";
        if (carry == 1) {
            for (int l = add.length() - 1; l >= 0; l--) {
                if (carry == 0) {
                    final = add[l] + final;
                }
                else if (((add[l] - '0') + carry) % 2==0) {
                    final = "0" + final;
                    carry = 1;
                }
                else {
                    final = "1" + final;
                    carry = 0;
                }
            }
            result = final;
        }
        else {
            result = add;
        }
    }
    return comp(result);
}

bool checker(string rec_message,string sender_checksum,int bs)
{
    string checksum = checkSum(rec_message + sender_checksum, bs);
    for(int i=0;i<checksum.length();i++){
        if (checksum[i]!='0') {
            return false;
        }
    }
    return true;
}


int main(){
    string msg= "10010111100101111001011110010111";
    string checksum="10100001";
    cout<<"Sender input : "<<msg<<"\nChecksum : "<<checksum;
```

```
    if (checker(msg,checksum,8)) {
        cout << "\nCorrect msg";
    }
    else {
        cout << "\nError";
    }

    return 0;
}
```

```
/tmp/v2nX6u1Zrl.o
Sender input : 10010111100101111001011110010111
Checksum : 10100001
Correct msg
```