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CN LAB6

1. To calculate the hamming distance of the given codewords.

SERVER

```java
import java.net.ServerSocket;
import java.net.Socket;
import java.io.*;
public class hmserver{
    static int calculatedistance(String num1, String num2){
        int count = 0;
        for(int i = 0;i<num1.length();i++){
            if(num1.charAt(i) != num2.charAt(i)){
                count++;
            }
            else{
                continue;
            }
        }
        return count;
    }
    public static void main(String [] args){
        try{
            System.out.println("waiting for clients...");
            ServerSocket ss = new ServerSocket(2380);
            Socket soc = ss.accept();
            System.out.println("Connection established");
            BufferedReader in = new BufferedReader(new
InputStreamReader(soc.getInputStream()));
            String s1 = in.readLine();
            String s2 = in.readLine();
            int n = calculatedistance(s1,s2);
            PrintWriter out = new PrintWriter(soc.getOutputStream(),true);
            out.println(n);
            ss.close();
        }
        catch(Exception e){
            e.printStackTrace();
        }
    }
}
```

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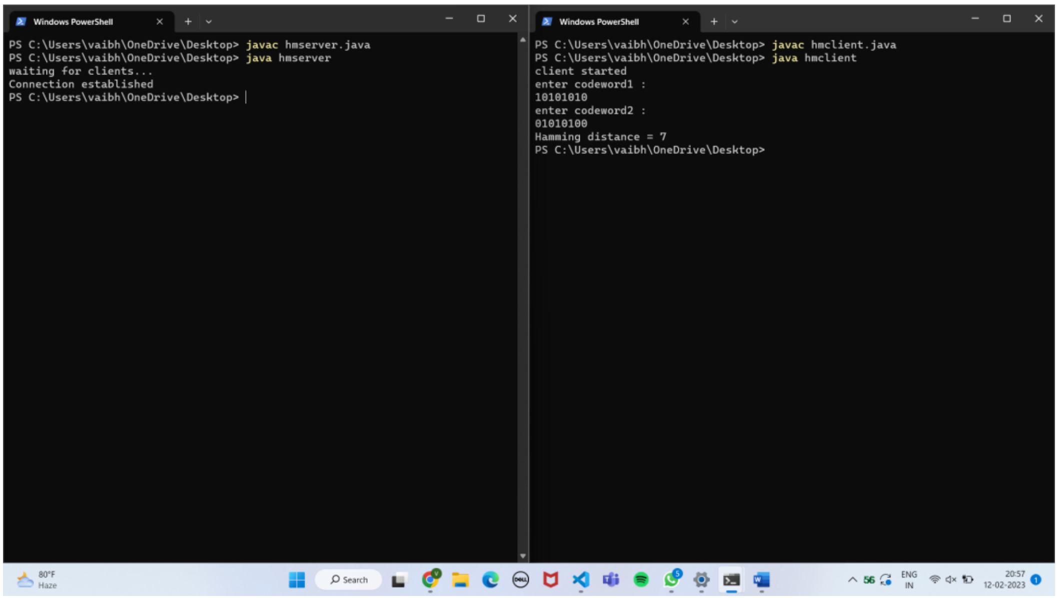
CLIENT

```
import java.net.Socket;
import java.io.*;
public class hmclient{
    public static void main(String [] args){
        try{
            System.out.println("client started");
            Socket soc = new Socket("localhost", 2380);
            BufferedReader userinput = new BufferedReader(new
InputStreamReader(System.in));
            System.out.println("enter codeword1 : ");
            String s1 = userinput.readLine();
            System.out.println("enter codeword2 : ");
            String s2 = userinput.readLine();
            PrintWriter out = new PrintWriter(soc.getOutputStream(),true);
            out.println(s1);
            out.println(s2);
            BufferedReader in = new BufferedReader(new
InputStreamReader(soc.getInputStream()));
            System.out.println("Hamming distance =
"+Integer.parseInt(in.readLine()));
            soc.close();
        }
        catch(Exception e){
            e.printStackTrace();
        }
    }
}
```

OUTPUT



```
PS C:\Users\vaibh\OneDrive\Desktop> javac hmserver.java
PS C:\Users\vaibh\OneDrive\Desktop> java hmserver
waiting for clients...
Connection established
PS C:\Users\vaibh\OneDrive\Desktop> |
```

```
PS C:\Users\vaibh\OneDrive\Desktop> javac hmclient.java
PS C:\Users\vaibh\OneDrive\Desktop> java hmclient
client started
enter codeword1 :
10101010
enter codeword2 :
01010100
Hamming distance = 7
PS C:\Users\vaibh\OneDrive\Desktop>
```

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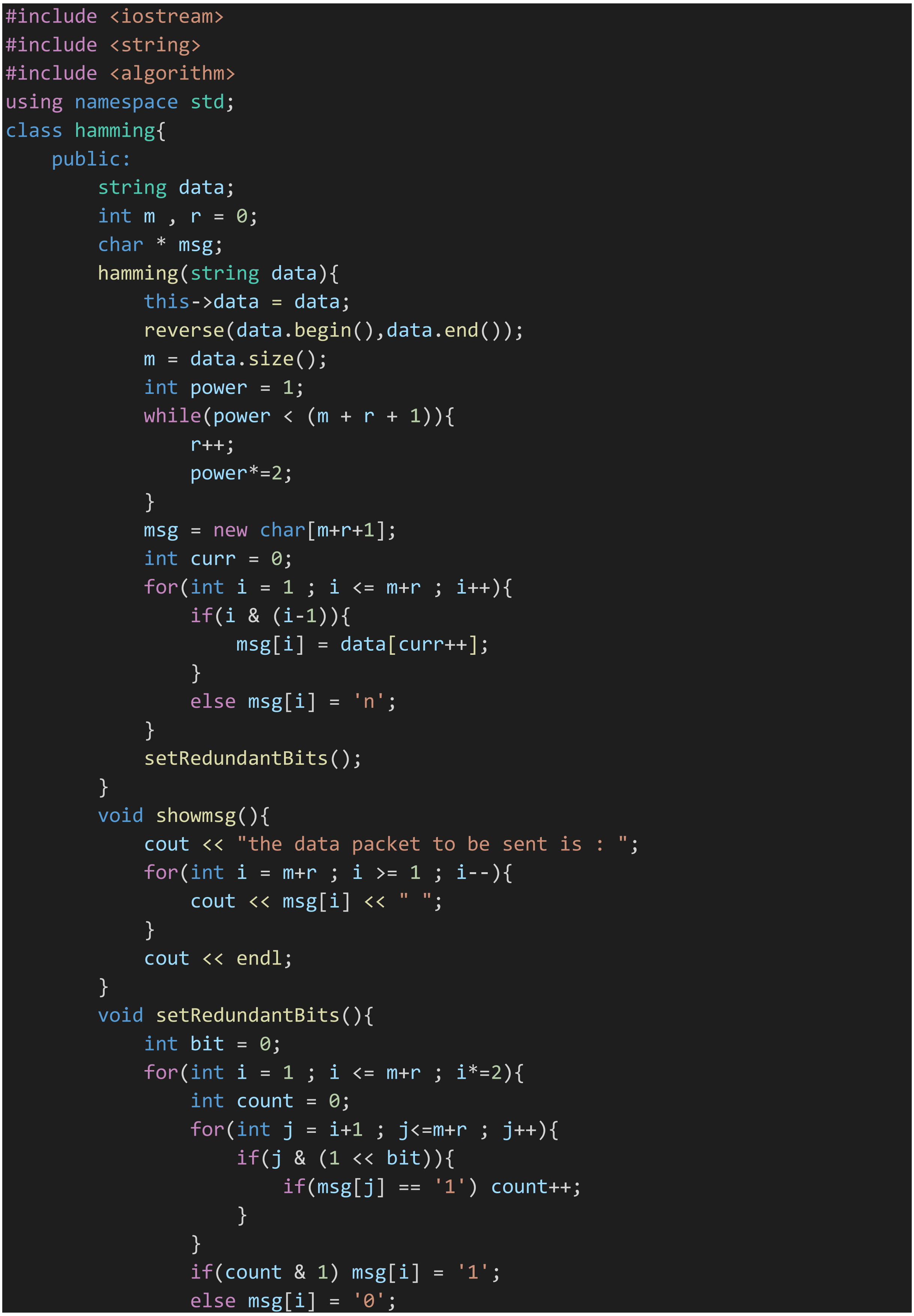
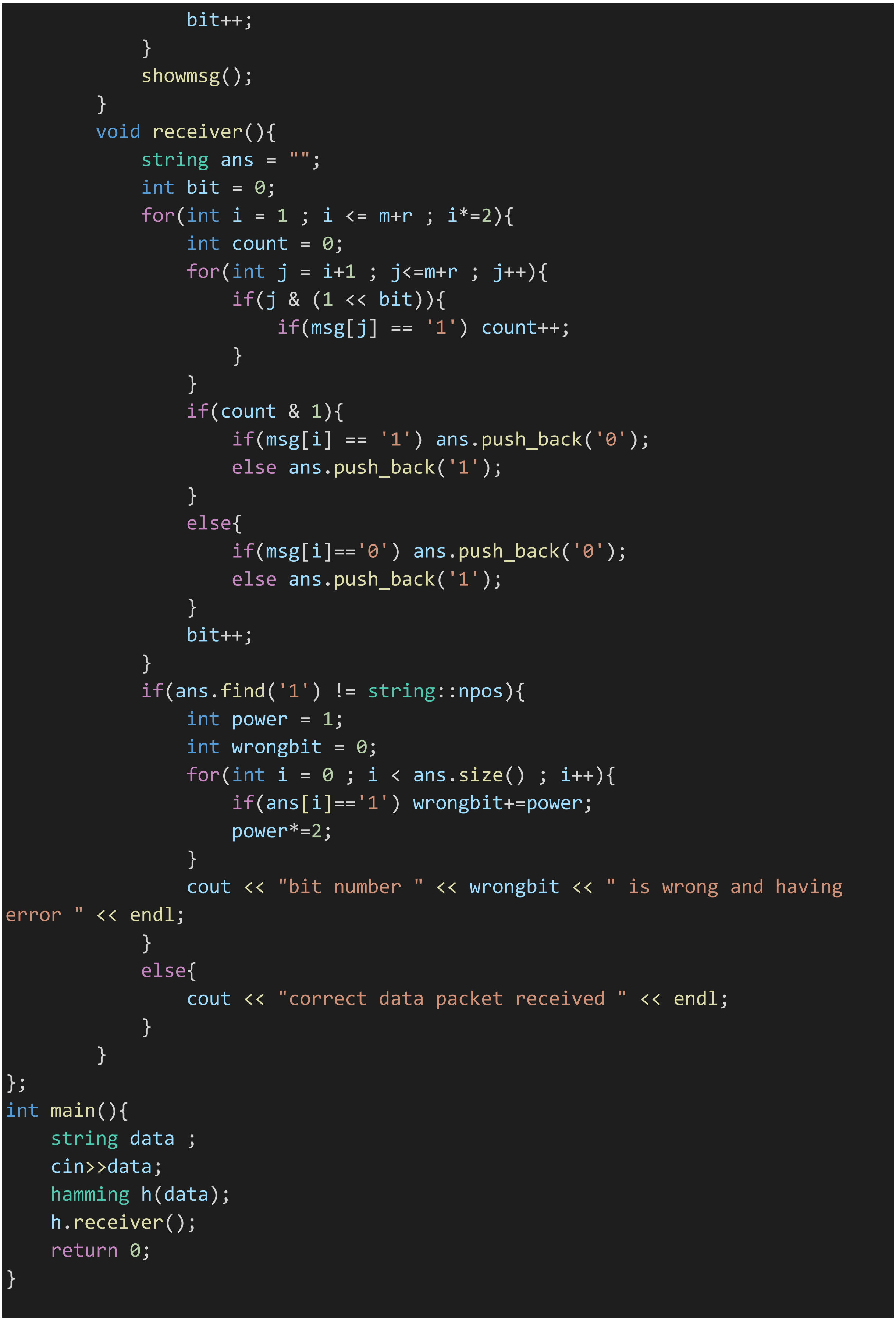
2. To calculate the hamming distance of the given word.

CODE



```
#include <iostream>
#include <string>
#include <algorithm>
using namespace std;
class hamming{
    public:
        string data;
        int m , r = 0;
        char * msg;
        hamming(string data){
            this->data = data;
            reverse(data.begin(),data.end());
            m = data.size();
            int power = 1;
            while(power < (m + r + 1)){
                r++;
                power*=2;
            }
            msg = new char[m+r+1];
            int curr = 0;
            for(int i = 1 ; i <= m+r ; i++){
                if(i & (i-1)){
                    msg[i] = data[curr++];
                }
                else msg[i] = 'n';
            }
            setRedundantBits();
        }
        void showmsg(){
            cout << "the data packet to be sent is : ";
            for(int i = m+r ; i >= 1 ; i--){
                cout << msg[i] << " ";
            }
            cout << endl;
        }
        void setRedundantBits(){
            int bit = 0;
            for(int i = 1 ; i <= m+r ; i*=2){
                int count = 0;
                for(int j = i+1 ; j<=m+r ; j++){
                    if(j & (1 << bit)){
                        if(msg[j] == '1') count++;
                    }
                }
                if(count & 1) msg[i] = '1';
                else msg[i] = '0';
```



```
                bit++;
            }
            showmsg();
        }
        void receiver(){
            string ans = "";
            int bit = 0;
            for(int i = 1 ; i <= m+r ; i*=2){
                int count = 0;
                for(int j = i+1 ; j<=m+r ; j++){
                    if(j & (1 << bit)){
                        if(msg[j] == '1') count++;
                    }
                }
                if(count & 1){
                    if(msg[i] == '1') ans.push_back('0');
                    else ans.push_back('1');
                }
                else{
                    if(msg[i]=='0') ans.push_back('0');
                    else ans.push_back('1');
                }
                bit++;
            }
            if(ans.find('1') != string::npos){
                int power = 1;
                int wrongbit = 0;
                for(int i = 0 ; i < ans.size() ; i++){
                    if(ans[i]=='1') wrongbit+=power;
                    power*=2;
                }
                cout << "bit number " << wrongbit << " is wrong and having 
error " << endl;
            }
            else{
                cout << "correct data packet received " << endl;
            }
        }
};
int main(){
    string data ;
    cin>>data;
    hamming h(data);
    h.receiver();
    return 0;
}
```

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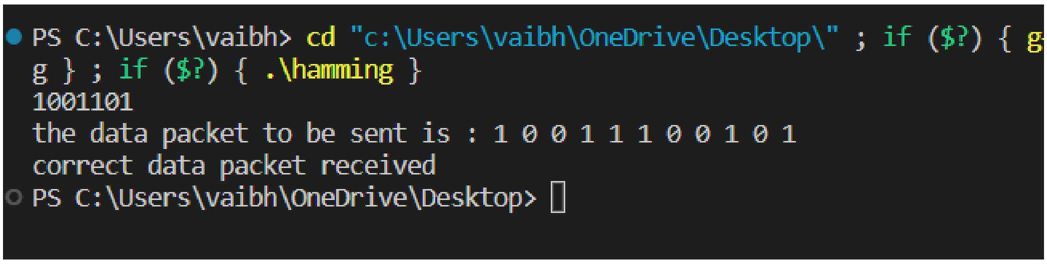
OUTPUT



```
PS C:\Users\vaibh> cd "c:\Users\vaibh\OneDrive\Desktop\" ; if ($?) { g
g } ; if ($?) { .\hamming }
1001101
the data packet to be sent is : 1 0 0 1 1 1 0 0 1 0 1
correct data packet received
PS C:\Users\vaibh\OneDrive\Desktop> 
```