CS359 Computer Networks Lab 6

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Hamming Code : Implementation and Demonstration

Introduction: I have written two programs, **client.c** and **server.c**

A string is taken as input from user by the client program. The string is sent to the server in the form of ASCII and Hamming Codes. The ASCII code of each character is taken, split into parts containing 4-bits each, then the parity bits are calculated and the 7-bits are sent as a single packet to the server. The server uses the parity bits to check if the data is corrupted. Necessary corrections are made and the ASCII value is re-calculated. Using this, the corresponding characters are continuously concatenated to reconstruct the string being sent by the client.

Finally, the server acknowledges the client with md5sum of received string. If the md5sums at client and server sides match, the transmission was successful and Hamming Code's purpose is served.

Compilation and Execution:

	client.c	server.c
Compilation	gcc client.c –o client	gcc server.c –o server
Execution	./client	./server

Sample Session:

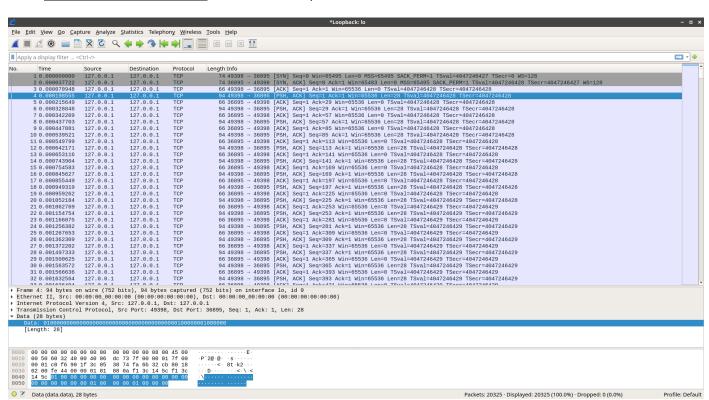| Client Side	Server Side

```
[maheeth@maheeth-PC:~/D/netlab6]-[12:52:10  IST]
->$ gcc client.c -o client
[maheeth@maheeth-PC:~/D/netlab6]-[12:53:21  IST]
->$ ./client
Enter a message: HelLo frOm CliEnT !! :)
[+]Server socket created successfully.
[+]Connected to Server.
[+]Sending Packets.

[+]File data sent successfully.
MD5 client:     04c7d5821666764b790c9dea3d55fcc0
MD5 server:     04c7d5821666764b790c9dea3d55fcc0
[+]MD5 Matched
[+]Closing the connection.
[maheeth@maheeth-PC:~/D/netlab6]-[12:53:33  IST]
->$ 
```

```
[maheeth@maheeth-PC:~/D/netlab6]-[12:52:10  IST]
->$ gcc server.c -o server
[maheeth@maheeth-PC:~/D/netlab6]-[12:53:18  IST]
->$ ./server
[+]Server socket created successfully.
[+]Binding successful.
[+]Listening....
Number 72 ( H ) was received from client
Number 101 ( e ) was received from client
Number 108 ( l ) was received from client
Number 76 ( L ) was received from client
Number 111 ( o ) was received from client
Number 32 (   ) was received from client
Number 102 ( f ) was received from client
Number 114 ( r ) was received from client
Number 79 ( O ) was received from client
Number 109 ( m ) was received from client
Number 32 (   ) was received from client
Number 67 ( C ) was received from client
Number 108 ( l ) was received from client
Number 105 ( i ) was received from client
Number 69 ( E ) was received from client
Number 110 ( n ) was received from client
Number 84 ( T ) was received from client
Number 32 (   ) was received from client
Number 33 ( ! ) was received from client
Number 33 ( ! ) was received from client
Number 32 (   ) was received from client
Number 58 ( : ) was received from client
Number 41 ( ) ) was received from client
------------------
[+]Data received successfully.
"HelLo frOm CliEnT !! :)" was received from client
MD5:    04c7d5821666764b790c9dea3d55fcc0
[+]MD5 sent
[+]Closing the connection.
[maheeth@maheeth-PC:~/D/netlab6]-[12:53:33  IST]
->$ 
```

Wireshark Packet Capture for the following input:

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Aenean commodo ligula eget dolor. Aenean massa. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Donec quam felis, ultricies nec, pellentesque eu, pretium quis, sem. Nulla consequat massa quis enim. Donec pede justo, fringilla vel, aliquet nec, vulputate eget, arcu. In enim justo, rhoncus ut, imperdiet a, venenatis vitae, justo. Nullam dictum felis eu pede mollis pretium. Integer tincidunt. Cras dapibus. Vivamus elementum semper nisi. Aenean vulputate eleifend tellus. Aenean leo ligula, porttitor eu, consequat vitae, eleifend ac, enim.Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Aenean commodo ligula eget dolor. Aenean massa. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Donec quam felis, ultricies nec, pellentesque eu, pretium quis, sem. Nulla consequat massa quis enim. Donec pede justo, fringilla vel, aliquet nec, vulputate eget, arcu. In enim justo, rhoncus ut, imperdiet a, venenatis vitae, justo. Nullam dictum felis eu pede mollis pretium. Integer tincidunt. Cras dapibus. Vivamus elementum semper nisi. Aenean vulputate eleifend tellus. Aenean leo ligula, porttitor eu, consequat vitae, eleifend ac, enim.

Screenshot from Wireshark: Total Packets captured = **20325**

MD5sums matched, hence Hamming Code is working efficiently. This is a *Screenshot of Client side code*.