

Report - CS3205 Assignment 1

CS18B050 - Aniswar Srivatsa Krishnan

Code explanation:

There are two files emailserver.c (which contains the server code) and emailclient.c (which contains the client code). These files give the respective executables when compiled.

In **server**, the function `command_processor()` is responsible for processing the request from the client, running appropriate system commands and passing the output generated to the NETWORK INTERFACE.

The functions `get_message()` and `send_result()` are part of the NETWORK INTERFACE. The protocol for sending messages is as follows. First a 4 byte integer is sent indicating the number of bytes that the subsequent message will contain. Then the actual message is sent. This allows us to receive arbitrary amount of data without any error. This is necessary because TCP/IP socket is a stream socket and hence `recv()` is not guaranteed to read the number of bytes that `send()` sends. After creating the socket, binding it to the required port and listening, we run `accept()` in an infinite loop and handle the client sessions subsequently. `Accept()` blocks until an incoming connection is made to the listening socket's port number, and then returns a new socket descriptor, which will be used for the current client session.

In **client**, the function `get_user_input()` handles the user-input interface which accepts user commands, processes them, and passes appropriate data to the network interface.

The function `send_message_and_recv()` acts as the NETWORK INTERFACE, which communicates with the server using the protocol described above.

Learning Outcome:

This was my first experience in the domain of socket programming. It gave me a good idea as to how TCP/IP sockets actually work and what are the strategies generally adopted for communicating effectively over networks. I also learnt about port forwarding, this was a setting which needed to be enabled in my router so as to accept a connection from a remote machine. This allowed me to connect with a remote machine purely with the help of C programming and not any other software. This assignment also helped me to learn and understand various C functions like `sprintf()`, `send()`, `recv()`, `sscanf()`, `strcmp()`, `readdir()`, `fseek()`, etc. This would be helpful in order to become a good systems programmer. I hope to understand the topic of networks further and apply my knowledge to build useful products.

Sessions Carried Out:

1) Server and Client Running on the Same Machine:

Server:

```
anish at anish-Inspiron-5379 in ~/D_/Books/Sem 6/CS3205/assignments/A1/ASSIGNMENT1
$ ./server 25678
Socket successfully created..
Socket successfully binded..
Server listening..
server accept the client...
From client: LSTU
From client: ADDU UserA
From client: ADDU UserB
From client: ADDU UserC
From client: LSTU
From client: USER UserA
From client: READM
From client: SEND UserB How do you do?###

From client: SEND UserC What is the time?###

From client: SEND UserB Is the ATM working?###

From client: SEND UserC Are you studying?###

From client: DONEU
From client: USER UserB
From client: READM
From client: SEND UserA Where are you now?###

From client: DELM
From client: DONEU
From client: USER UserA
From client: READM
From client: DONEU
From client: QUIT
```

Client:

```
anish at anish-Inspiron-5379 in ~/D_/Books/Sem 6/CS3205/assignments/A1/ASSIGNMENT1
$ ./client "192.168.1.12" 25678 <in.txt
Socket successfully created..
connected to the server..
Main-Prompt> Listusers

From Server :

Main-Prompt> Adduser UserA

From Server :
User UserA successfully added
Main-Prompt> Adduser UserB

From Server :
User UserB successfully added
Main-Prompt> Adduser UserC

From Server :
User UserC successfully added
Main-Prompt> Listusers

From Server :
UserA UserB UserC
Main-Prompt> SetUser UserA

From Server :
User UserA exists and has 0 number of messages in his/her spool file
Sub-Prompt-UserA> Read

From Server :
No More Mail
Sub-Prompt-UserA> Send UserB

Type Message: How do you do?###

From Server :
Message sent to UserB successfully
Sub-Prompt-UserA> Send UserC

Type Message: What is the time?###
```

```
From Server :  
Message sent to UserC successfully  
Sub-Prompt-UserA> Send UserB  
  
Type Message: Is the ATM working?###  
  
From Server :  
Message sent to UserB successfully  
Sub-Prompt-UserA> Send UserC  
  
Type Message: Are you studying?###  
  
From Server :  
Message sent to UserC successfully  
Sub-Prompt-UserA> Done  
  
From Server :  
User UserA done successfully  
Main-Prompt> SetUser UserB  
  
From Server :  
User UserB exists and has 2 number of messages in his/her spool file  
Sub-Prompt-UserB> Read  
  
From Server :  
From: UserA  
To: UserB  
Date: Wed Mar 3 23:41:39 2021  
Subject: How do you do?  
How do you do?  
###  
  
Sub-Prompt-UserB> Send UserA  
  
Type Message: Where are you now?###  
  
From Server :  
Message sent to UserA successfully  
Sub-Prompt-UserB> Delete
```

```

From Server :
Message Deleted
Sub-Prompt-UserB> Done

From Server :
User UserB done successfully
Main-Prompt> SetUser UserA

From Server :
User UserA exists and has 1 number of messages in his/her spool file
Sub-Prompt-UserA> Read

From Server :
From: UserB
To: UserA
Date: Wed Mar  3 23:58:09 2021
Subject: Where are you now?
Where are you now?
###

Sub-Prompt-UserA> Done

From Server :
User UserA done successfully
Main-Prompt> Quit

From Server :
Session Ended.

```

The Spool files created at the server:

```

anish at anish-Inspiron-5379 in ~/D_/Books/Sem 6/CS3205/assignments/A1/ASSIGNMENT1
$ cat MAILSERVER/UserA
From: UserB
To: UserA
Date: Thu Mar  4 00:05:01 2021
Subject: Where are you now?
Where are you now?
###
(base)
anish at anish-Inspiron-5379 in ~/D_/Books/Sem 6/CS3205/assignments/A1/ASSIGNMENT1
$ cat MAILSERVER/UserB
From: UserA
To: UserB
Date: Thu Mar  4 00:05:01 2021
Subject: How do you do?
How do you do?
###
(base)
anish at anish-Inspiron-5379 in ~/D_/Books/Sem 6/CS3205/assignments/A1/ASSIGNMENT1
$ cat MAILSERVER/UserC
From: UserA
To: UserC
Date: Thu Mar  4 00:05:01 2021
Subject: What is the time?
What is the time?
###
From: UserA
To: UserC
Date: Thu Mar  4 00:05:01 2021
Subject: Are you studying?
Are you studying?
###
(base)

```

2) Client and server running on different machines

Server: @115.99.48.166

```
anish at anish-Inspiron-5379 in ~/D_/Books/Sem 6/CS3205/assignments/A1/ASSIGNMENT1
$ ./server 25678
Socket successfully created..
Socket successfully binded..
Server listening..
server accept the client...
From client: ADDU ramesh
From client: ADDU suresh
From client: LSTU
From client: USER ramesh
From client: SEND suresh Hello there###

From client: DONEU
From client: USER suresh
From client: READM
From client: DONEU
From client: QUIT
```

Client: @106.51.241.0

```
nischith@nischith-PH315-51:~/Downloads$ ./client "115.99.48.166" 25678
Socket successfully created..
connected to the server..
Main-Prompt> Adduser ramesh
From Server :
User ramesh successfully added
Main-Prompt> Adduser suresh
From Server :
User suresh successfully added
Main-Prompt> Listusers
From Server :
ramesh suresh
Main-Prompt> SetUser ramesh
From Server :
User ramesh exists and has 0 number of messages in his/her spool file
Sub-Prompt-ramesh> Send suresh
Type Message: Hello there###
From Server :
Message sent to suresh successfully
Sub-Prompt-ramesh> Done
From Server :
User ramesh done successfully
Main-Prompt> SetUser suresh
From Server :
User suresh exists and has 1 number of messages in his/her spool file
Sub-Prompt-suresh> Read
From Server :
From: ramesh
To: suresh
Date: Thu Mar 4 00:41:48 2021
Subject: Hello there
Hello there
###

Sub-Prompt-suresh> Done
From Server :
User suresh done successfully
Main-Prompt> Quit
From Server :
Session Ended.
```