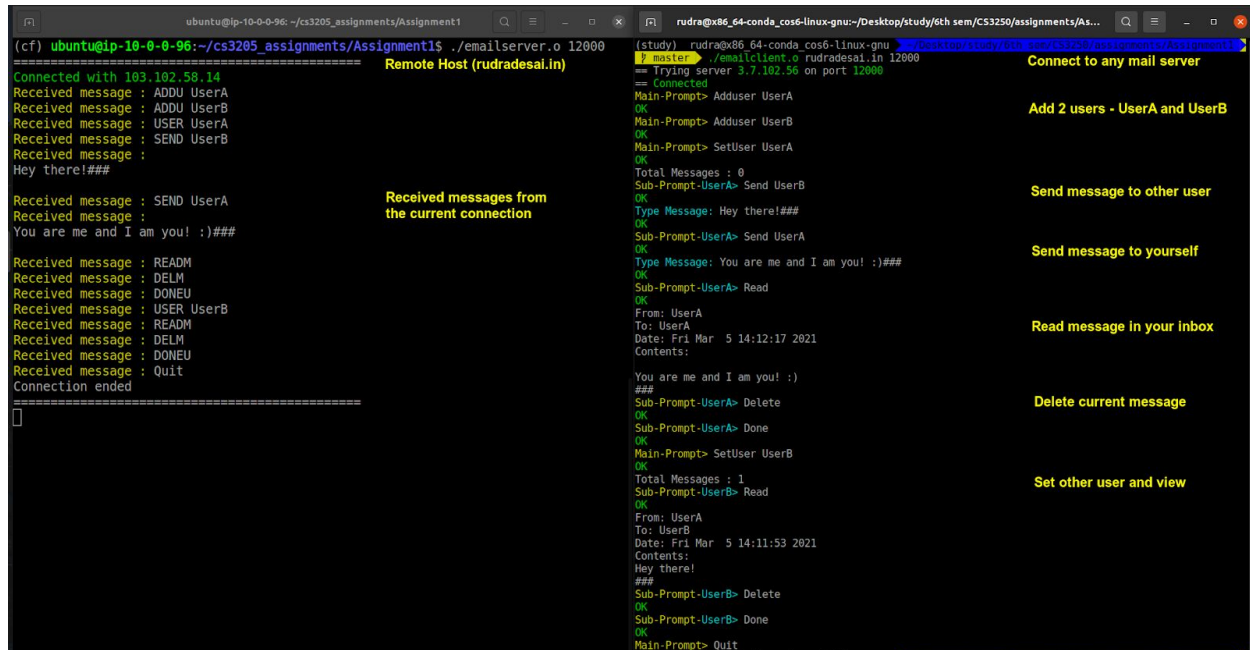


CS3205 Computer Networks

A1 - Report

Note: All the sessions are performed on a remote server.

Session 1



```
(cf) ubuntu@ip-10-0-0-96: ~/cs3205_assignments/Assignment1$ ./emailserver.o 12000
=====
Connected with 103.102.58.14
Received message : ADDU UserA
Received message : ADDU UserB
Received message : USER UserA
Received message : SEND UserB
Received message :
Hey there!###

Received message : SEND UserA
Received message :
You are me and I am you! :)###

Received message : READM
Received message : DELM
Received message : DONEU
Received message : USER UserB
Received message : READM
Received message : DELM
Received message : DONEU
Received message : Quit
Connection ended
=====
[]

Remote Host (rudradesai.in)

(rudrade@x86_64-conda_cos6-linux-gnu:~/Desktop/study/6th sem/CS3205/assignments/As...)
~/mailclient.o rudradesai.in 12000
== Trying server 3.7.102.56 on port 12000
== Connected
Main-Prompt> Adduser UserA
Main-Prompt> Adduser UserB
OK
Main-Prompt> SetUser UserA
OK
Total Messages : 0
Sub-Prompt-UserA> Send UserB
OK
Type Message: Hey there!###
OK
Sub-Prompt-UserA> Send UserA
OK
Type Message: You are me and I am you! :)###
OK
Sub-Prompt-UserA> Read
OK
From: UserA
To: UserA
Date: Fri Mar 5 14:12:17 2021
Contents:
You are me and I am you! :)
###
Sub-Prompt-UserA> Delete
OK
Sub-Prompt-UserA> Done
OK
Main-Prompt> SetUser UserB
OK
Total Messages : 1
Sub-Prompt-UserB> Read
OK
From: UserA
To: UserB
Date: Fri Mar 5 14:11:53 2021
Contents:
Hey there!
###
Sub-Prompt-UserB> Delete
OK
Sub-Prompt-UserB> Done
OK
Main-Prompt> Quit
```

Connect to any mail server

Add 2 users - UserA and UserB

Send message to other user

Send message to yourself

Read message in your inbox

Delete current message

Set other user and view

Features:

- Connection to remote host (rudradesai.in in this case)
- Add 2 new users
- Send messages to other users
- Send messages to yourself
- Read messages in your inbox
- Delete current messages
- Change users to see different inboxes
- Colors provide user experience.

Session 2

```
ubuntu@ip-10-0-0-96: ~/cs3205_assignments/Assignment1
Received message : SEND UserB
Received message :
Hey there!##

Received message : SEND UserA
Received message :
You are me and I am you! :)###

Received message : READM
Received message : DELM
Received message : DONEU
Received message : USER UserB
Received message : READM
Received message : DELM
Received message : DONEU
Received message : Quit
Connection ended
=====
Connected with 103.102.58.14
Received message : LSTU
Received message : USER UserA
Received message : SEND UserB
Received message :
Why did you delete my message?##

Received message : DONEU
Received message : USER UserB
Received message : READM
Received message : DONEU
Received message : Quit
Connection ended
=====
Connected with 103.102.58.14
Received message : LSTU
Received message : USER UserB
Received message : READM
Received message : DONEU
Received message : Quit
Connection ended
=====

rudra@x86_64-conda_cos6-linux-gnu: ~/Desktop/study/6th sem/CS3205/assignments/As...
$ ./emailclient.in 12000
== Trying server 3.7.102.56 on port 12000
== Connected
Main-Prompt> Listusers
OK
UserA UserB
Main-Prompt> SetUser UserA
OK
Total Messages : 0
Sub-Prompt-UserA> Send UserB
OK
Type Message: Why did you delete my message?##
Sub-Prompt-UserA> Done
OK
Main-Prompt> SetUser UserB
OK
Total Messages : 1
Sub-Prompt-UserB> Read
OK
From: UserA
To: UserB
Date: Fri Mar 5 14:23:48 2021
Contents:
Why did you delete my message?
###
Sub-Prompt-UserB> Done
OK
Main-Prompt> Quit
(study) rudra@x86_64-conda_cos6-linux-gnu: ~/Desktop/study/6th sem/CS3205/assignments/Assignment1
$ ./emailclient.in 12000
== Trying server 3.7.102.56 on port 12000
== Connected
Main-Prompt> Listusers
OK
UserA UserB
Main-Prompt> SetUser UserB
OK
Total Messages : 1
Sub-Prompt-UserB> Read
OK
From: UserA
To: UserB
Date: Fri Mar 5 14:23:48 2021
Contents:
Why did you delete my message?
###
Sub-Prompt-UserB> Done
OK
Main-Prompt> Quit
(study) rudra@x86_64-conda_cos6-linux-gnu: ~/Desktop/study/6th sem/CS3205/assignments/Assignment1
$
```

Previous Session

Current Session

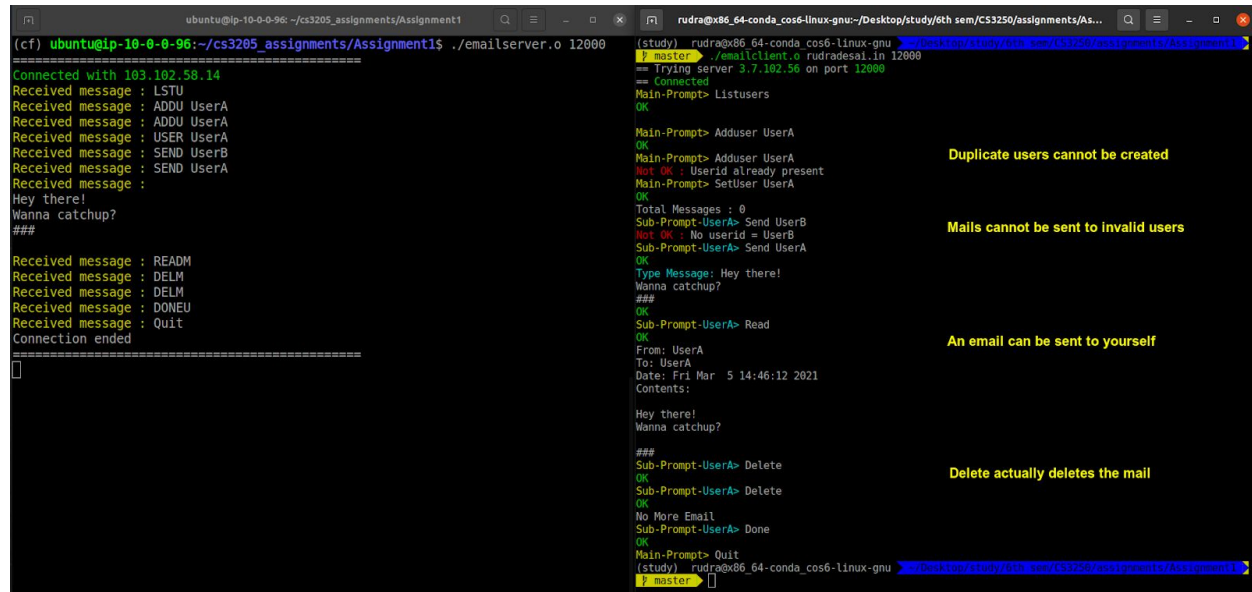
Send and receive messages easily

User session Persistent across boot

Features

- Data is persistent across user session reboots.
- Emails are not lost after the user session completes.
- Emails can be sent and received easily.

Session 3



```
(cf) ubuntu@ip-10-0-0-96:~/cs3205_assignments/Assignment1$ ./emailserver.o 12000
=====
Connected with 103.182.58.14
Received message : LSTU
Received message : ADDU UserA
Received message : ADDU UserA
Received message : USER UserA
Received message : SEND UserB
Received message : SEND UserA
Received message :
Hey there!
Wanna catchup?
###
Received message : READM
Received message : DELM
Received message : DELM
Received message : DONEU
Received message : Quit
Connection ended
=====

(study) rudra@x86_64-conda_cos6-linux-gnu:~/Desktop/study/6th sem/CS3205/assignments/Assignment1$ ./emailclient.o rudradesai.in 12000
== Trying server 3.7.182.56 on port 12000
== Connected
Main-Prompt> Listusers
OK
Main-Prompt> Adduser UserA
OK
Main-Prompt> Adduser UserA
Net OK : Userid already present
Main-Prompt> SetUser UserA
OK
Total Messages : 0
Sub-Prompt-UserA> Send UserB
Net OK : No userid = UserB
Sub-Prompt-UserA> Send UserA
OK
Type Message: Hey there!
Wanna catchup?
###
Sub-Prompt-UserA> Read
OK
From: UserA
To: UserA
Date: Fri Mar 5 14:46:12 2021
Contents:
Hey there!
Wanna catchup?
###
Sub-Prompt-UserA> Delete
OK
Sub-Prompt-UserA> Delete
OK
No More Email
Sub-Prompt-UserA> Done
OK
Main-Prompt> Quit
(study) rudra@x86_64-conda_cos6-linux-gnu:~/Desktop/study/6th sem/CS3205/assignments/Assignment1$
```

Duplicate users cannot be created

Mails cannot be sent to invalid users

An email can be sent to yourself

Delete actually deletes the mail

Features

- Duplicate users cannot be created
 - User id is checked before each operation
- Mails cannot be sent to invalid users
- But, you can send a mail to yourself
- Commands received on the server are printed for debugging purposes.

Session 4

```
(cf) ubuntu@ip-10-0-0-96:~/cs3205_assignments/Assignment1$ ./emailserver.o 12000
=====
Connected with 103.102.58.14
Received message : ADDU UserA
Received message : USER UserA
Received message : SEND UserA
Received message :
Hii###

Received message : SEND UserA
Received message :
Hola##

Received message : READM
Received message : DONEU
Received message : Quit
Connection ended
=====
^C
(cf) ubuntu@ip-10-0-0-96:~/cs3205_assignments/Assignment1$ ./emailserver.o 12000
=====
Connected with 103.102.58.14
Received message : LSTU
Received message : USER UserA
Received message : READM
Received message : DONEU
Received message : Quit
Connection ended
=====
[]
```

Data persistent across server boot

```
(study) rudra@x86_64-conda-cos6-linux-gnu:~/Desktop/study/6th sem/CS3205/assignments/Assignment1$ ./emailclient.o rudradesai.in 12000
== Trying server 3.7.102.56 on port 12000
== Connected
Main-Prompt> Adduser UserA
OK
Main-Prompt> SetUser UserA
OK
Total Messages : 0
Sub-Prompt-UserA> Send UserA
OK
Type Message: Hii###
Sub-Prompt-UserA> Send UserA
OK
Type Message: Hola##
Sub-Prompt-UserA> Read
OK
From: UserA
To: UserA
Date: Fri Mar 5 14:57:57 2021
Contents:
Hii
##
Sub-Prompt-UserA> Done
OK
Main-Prompt> Quit
(study) rudra@x86_64-conda-cos6-linux-gnu:~/Desktop/study/6th sem/CS3205/assignments/Assignment1$ ./emailclient.o rudradesai.in 12000
== Trying server 3.7.102.56 on port 12000
== Connected
Main-Prompt> Listusers
OK
UserA
Main-Prompt> SetUser UserA
OK
Total Messages : 2
Sub-Prompt-UserA> Read
OK
From: UserA
To: UserA
Date: Fri Mar 5 14:58:09 2021
Contents:
Hola
##
Sub-Prompt-UserA> Done
OK
Main-Prompt> Quit
(study) rudra@x86_64-conda-cos6-linux-gnu:~/Desktop/study/6th sem/CS3205/assignments/Assignment1$
```

Data persistent across client boot

Features

- Data stays persistent across server sessions provided it exits cleanly
- Data stays persistent across user sessions provided it exits cleanly
- Note: if any of them crashes, then there is no guarantee of data safety

Session 5

```
(cf) ubuntu@ip-10-0-0-96:~/cs3205_assignments/Assignment1$ ./emailserver.o 12000
=====
Connected with 103.102.58.14
Received message : LSTU
Received message : ADDU UserA
Received message : USER UserA
Received message : SEND UserB
Received message : DONEU
Received message : Quit
Connection ended
=====
[]
```

Incorrect commands are rejected from the client

```
(study) rudra@x86_64-conda-cos6-linux-gnu:~/Desktop/study/6th sem/CS3205/assignments/Assignment1$ ./emailclient.o rudradesai.in 12000
== Trying server 3.7.102.56 on port 12000
== Connected
Main-Prompt> Addu
Incorrect command received.
Available options - Listusers, Adduser <userid>, SetUser <userid>, Quit
Main-Prompt> Listusers
OK
UserA
Main-Prompt> Adduser UserA
Not OK: Userid already present
Main-Prompt> SetUser UserA
OK
Total Messages : 2
Sub-Prompt-UserA> Send UserB
Not OK: No userid = UserB
Sub-Prompt-UserA> Quit
Incorrect command received.
Available options - Read, Delete, Send <receiverid>, Done
Sub-Prompt-UserA> Done
OK
Main-Prompt> Quit
(study) rudra@x86_64-conda-cos6-linux-gnu:~/Desktop/study/6th sem/CS3205/assignments/Assignment1$
```

Illegal commands are rejected from the server

Features

- Syntactically incorrect commands are rejected directly from the client and are not sent for processing.
- Semantically invalid commands are rejected by the server with an error message.

Extra Features

- Connection to any remote server using valid hostnames and not just ip addresses
 - This was done using dns resolution in the client itself.
- Multi-line emails are supported for ease of use
- Linked list structure was implemented for better performance.
 - File read/write is done only at the end and beginning of the session to prevent unnecessary overheads
- Data remains persistent across client as well as server boots provided they do not crash and exit cleanly
 - Spool Files and other structs are used to load and store data.
- Added colors for better user experience.

Summary

- Implemented socket programming to send and receive messages from and to a remote server.
- All the errors are correctly figured out and displayed correctly.
- Added extra structures like linked lists to increase performance.
- File read/writes are minimized for better performance.
- Metadata is stored in a separate file which helps in faster retrieval of data.
- This assignment consisted of a lot of string manipulation which helped me learn C language in a better way.
- While looking at source code and documentation, I got to learn many new bugs and their corrections.
- This assignment also helped me to get an insight on how real email servers and client work