

# **Assignment 02**

COMP 4981

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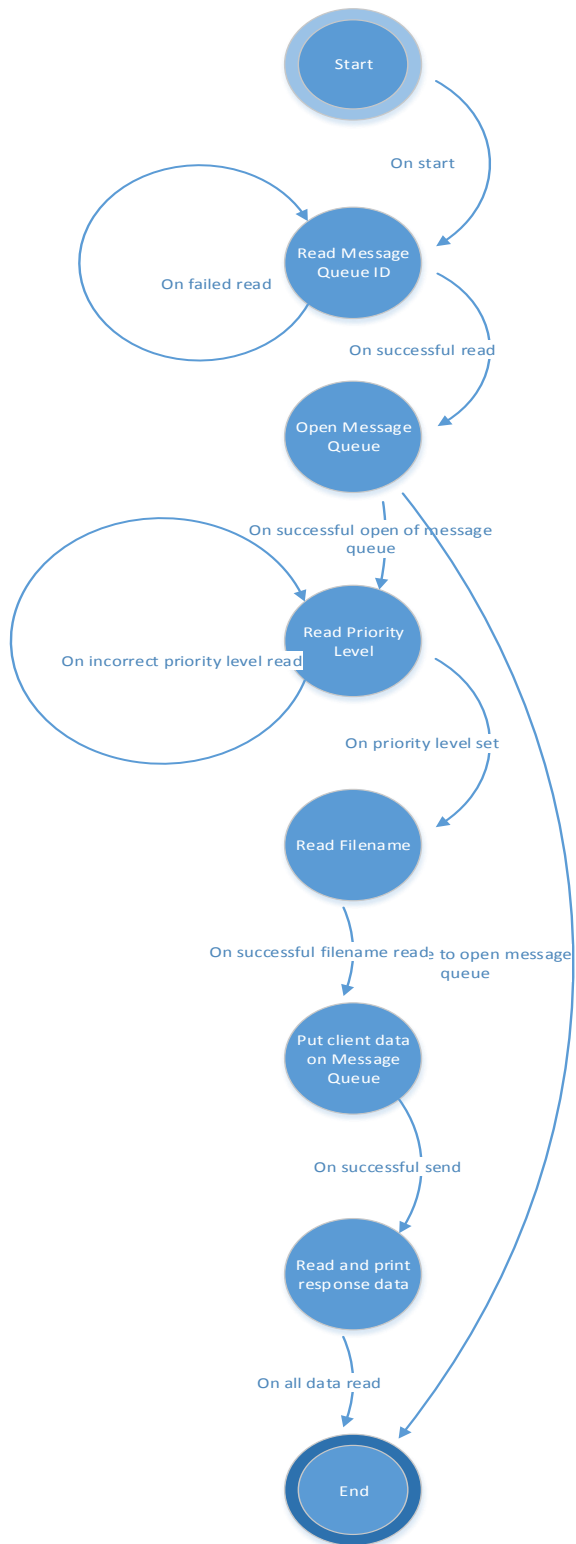
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## Summary:

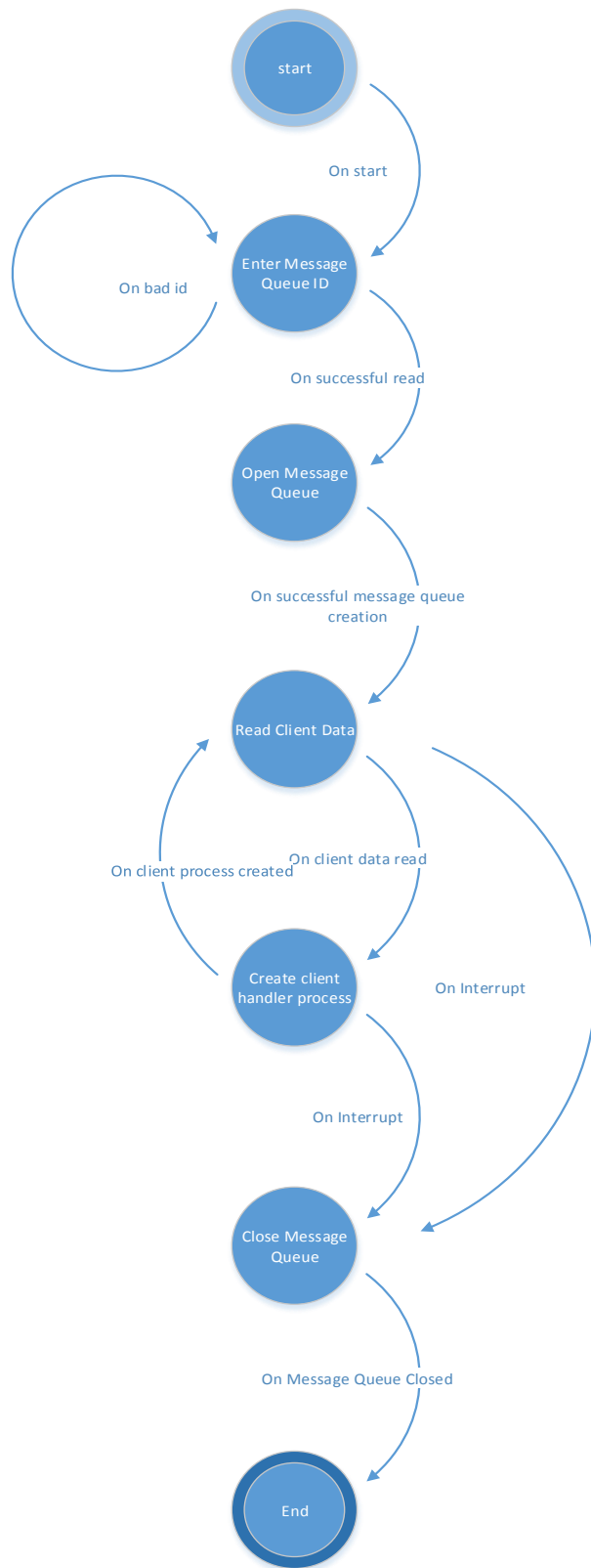
This project uses a client program and a server program that communicate using IPC message queues. The client and server both request which message queue to create/join. For the server, after initializing the message queue, the server listens to new client requests for file data and creates a child process to handle each client. This child process reads in data from a file requested by a client and then sends the file contents to the client using the message queue. For the client, the client also requests a priority level (0 = low, 10 = high), and the name of a file for the server to open and read. The priority level affects how fast the client reads in data when there are multiple clients running. After getting the filename, the client writes its data (filename, priority, process id) to the message queue for the server to read. The client then reads in the file data sent by the server and prints it to the screen.

## State Diagrams:

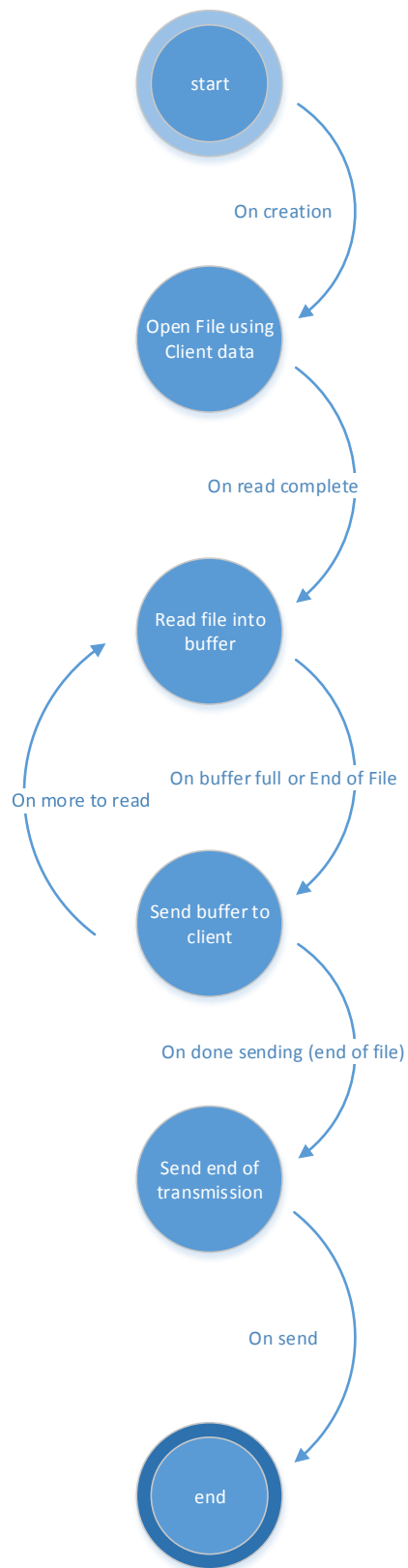
Client:



Server:



## Client-Handler:



## Pseudocode:

function client()

    read in message queue id

    open message queue

    read in priority level

    read in file name

    send filename, priority level, and client id to the server using the message queue

    While there is data to read from the server

        read data into buffer

        print read to screen

    end while

end function

function server()

    read in message queue id

    open message queue

    Enter infinite while loop

        try and read data from the client

        if successful read

            create child handler process for the new client

        end if

    End infinite while loop

end function

```

function client-handler(clientData)
    Set priority using priority level in ClientData
    open file using filename in clientData

    while not end of file
        for i = 0 to buffer size
            read character from file into sendbuffer
        end for

        send buffer to client via message queue

    end while

end function

```

## Test cases:

Test	Expected Result	Result
Message Queues opened	Pass	Pass (See Figures 1, 5, 6, and 7)
Priority levels read	Pass	Pass (See Figure 2)
Filenames read	Pass	Pass (See Figure 3)
Server accepts multiple clients	Pass	Pass (See Figures 5, 6, and 7)
Clients receive data from server	Pass	Pass (See Figures 5, 6, and 7)
Priority levels functional	Pass	Pass (See Figures 4a, b, and c for file sizes (same size); See Figures 5, 6, 7 and 8 for start and finish order)
Server closes message queue	Pass	Pass (See Figure 9)

Figure 1:

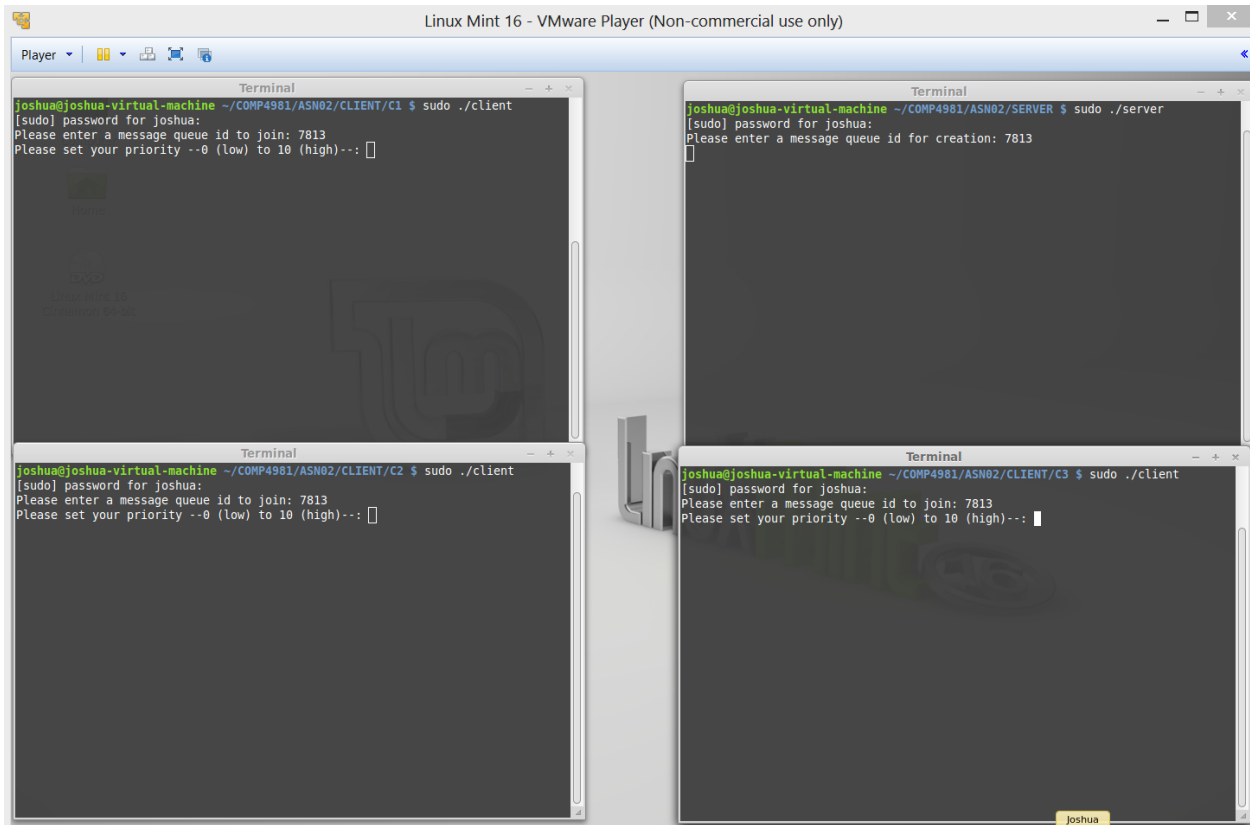




Figure 2:

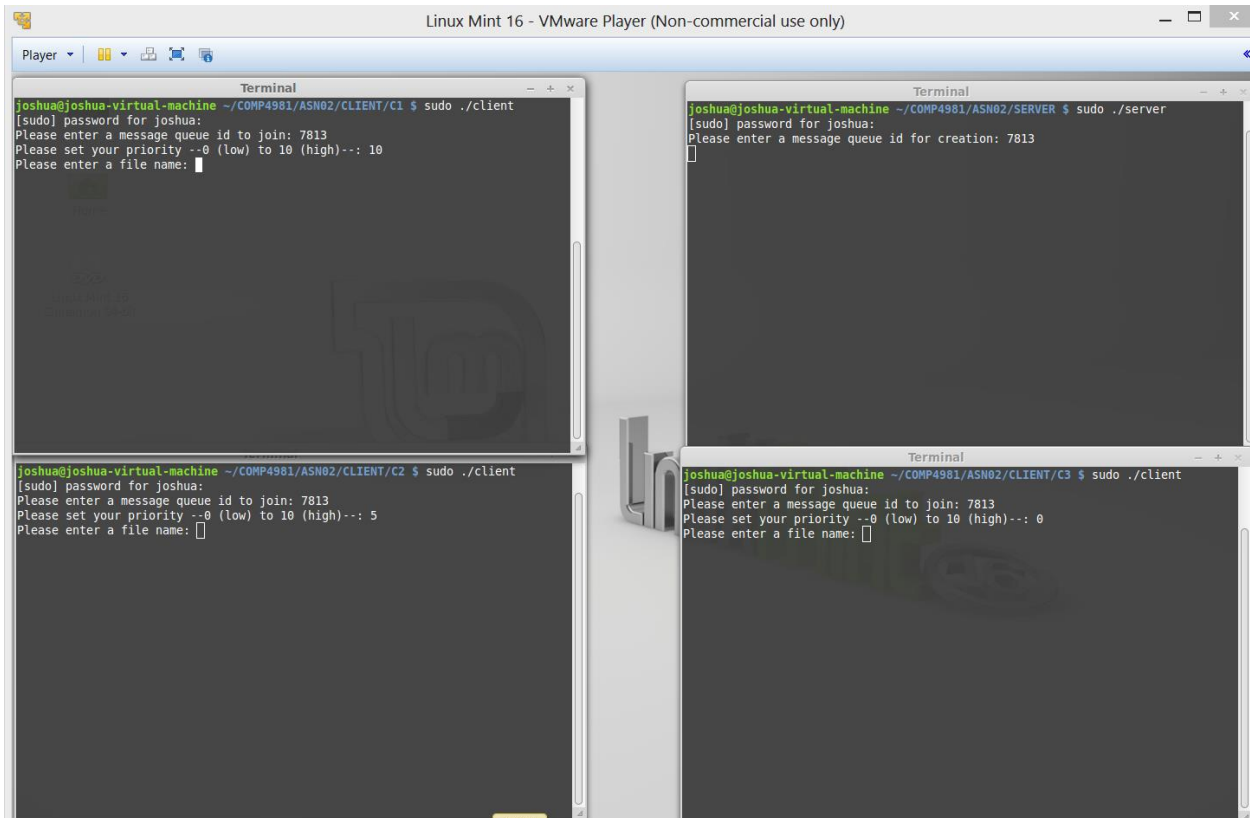


Figure 3:

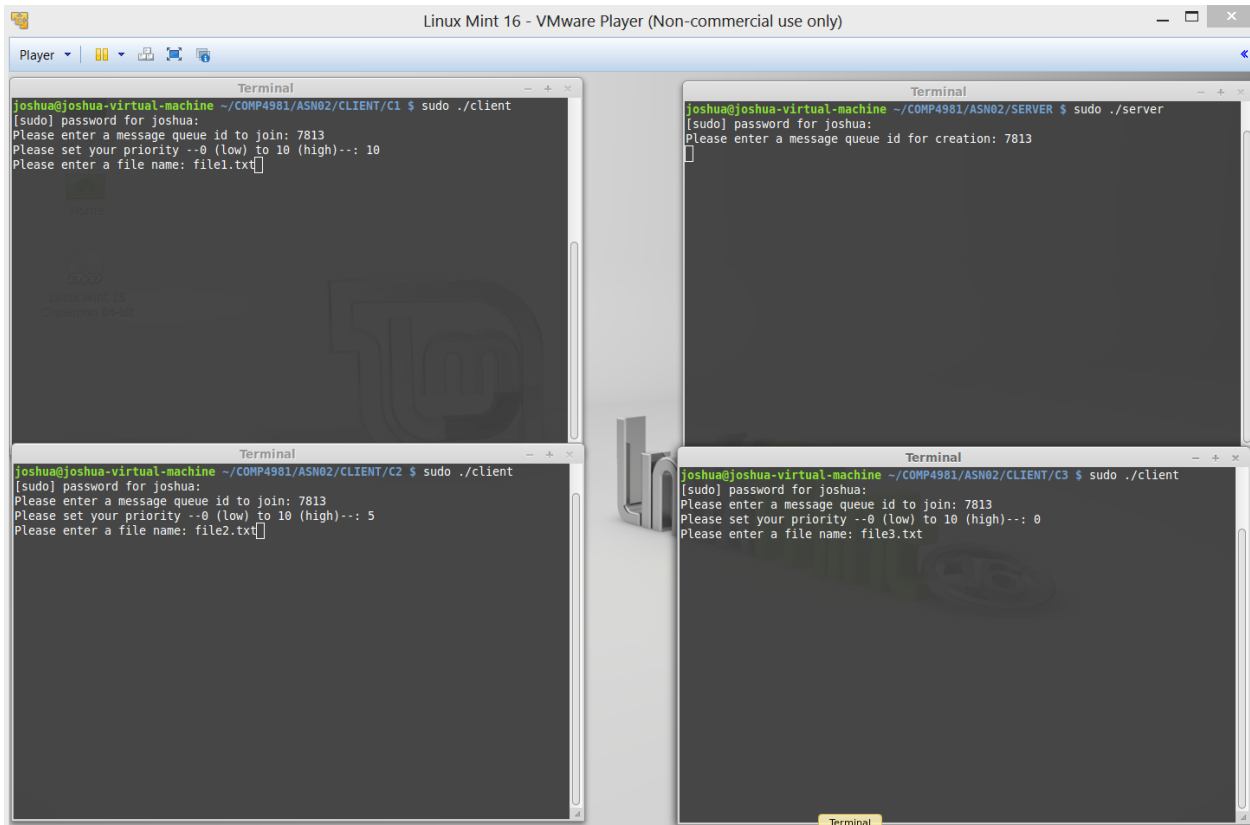


Figure 4a:

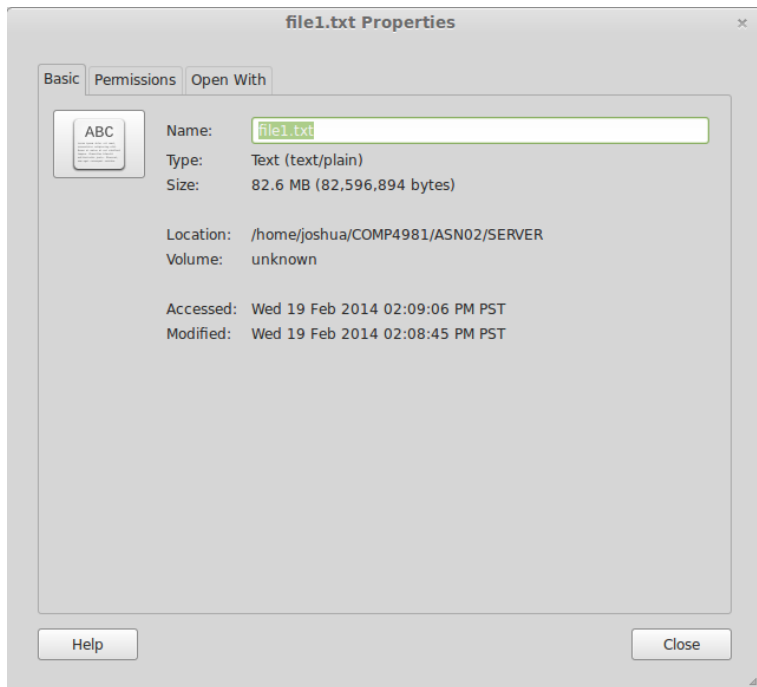


Figure 4b:

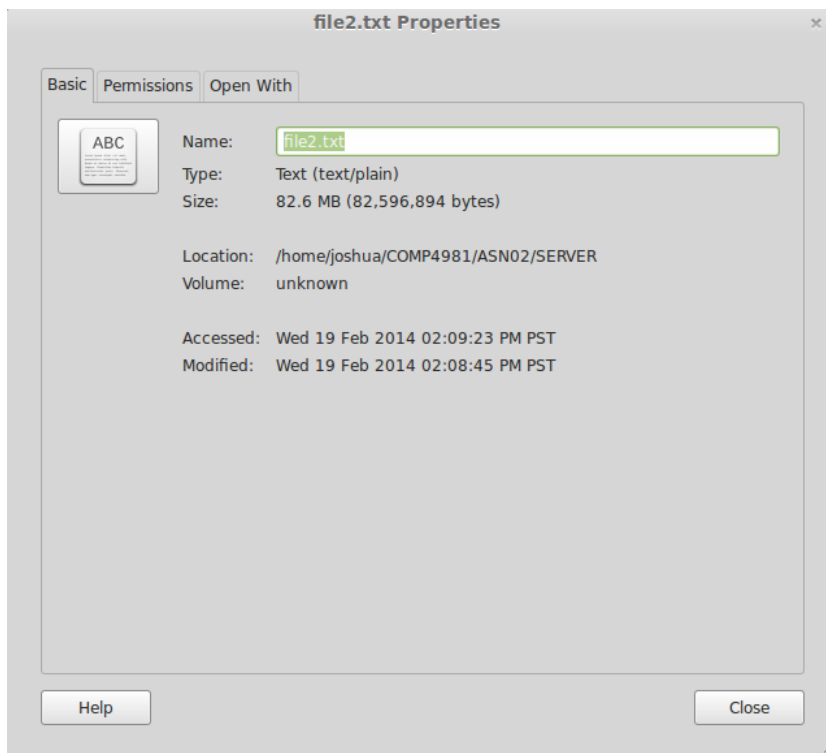


Figure 4c:

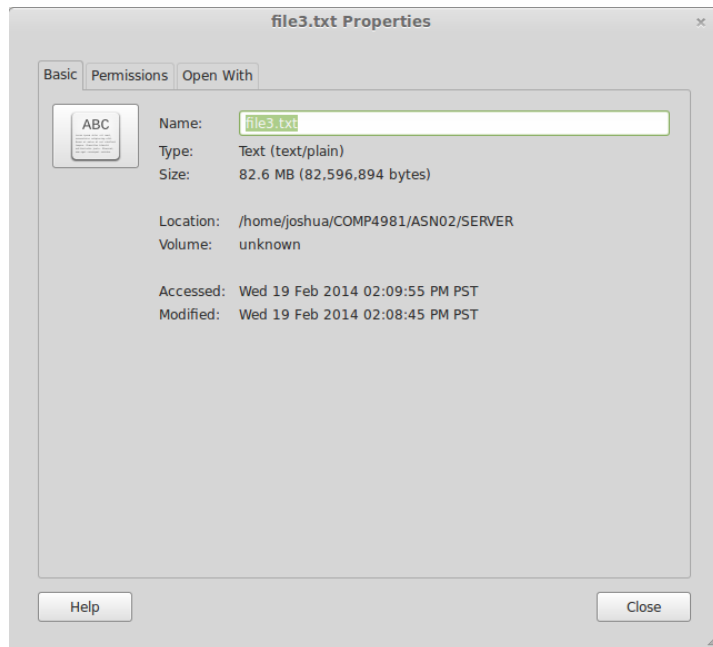


Figure 5:

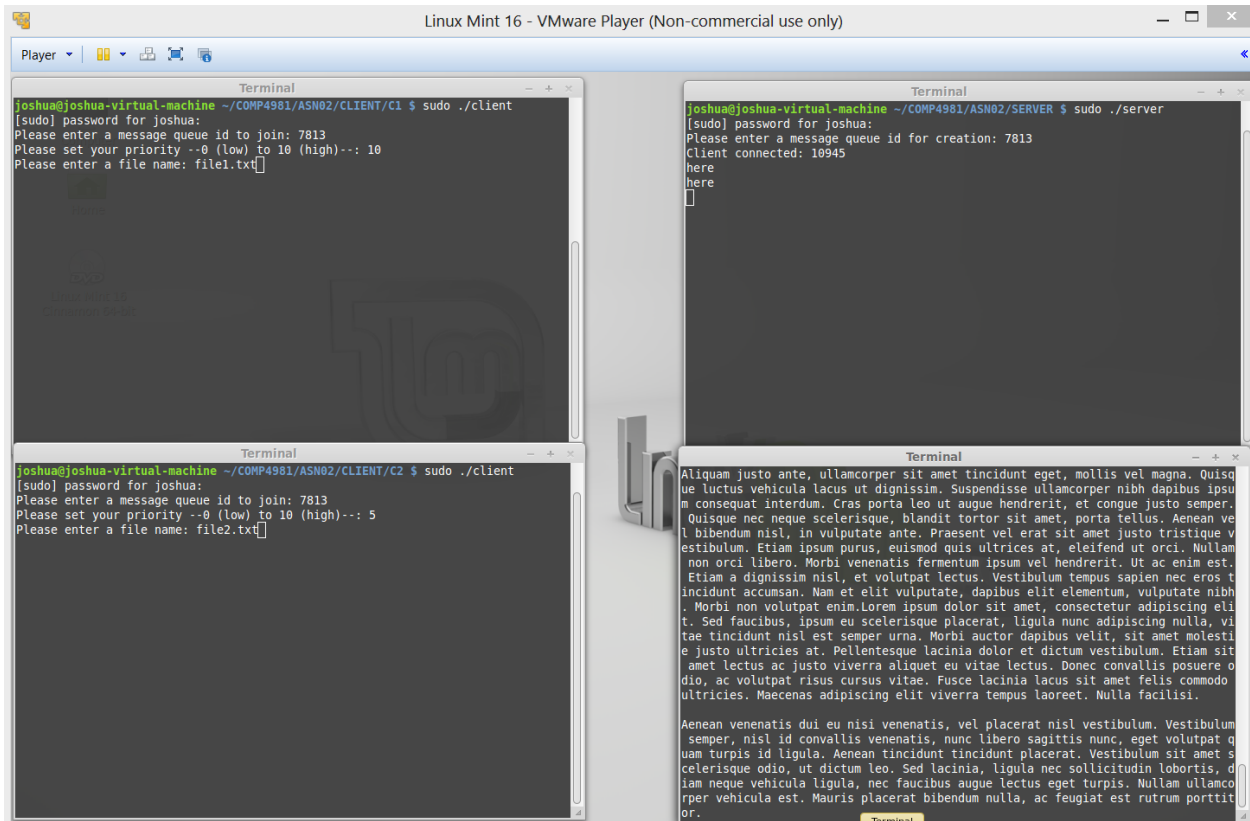


Figure 6:

The image shows a Linux Mint 16 - VMware Player window with three terminal windows open. The top-left terminal runs the client, the top-right runs the server, and the bottom terminal displays a large block of Lorem Ipsum text.

```
joshua@joshua-virtual-machine ~/COMP4981/ASN02/CLIENT/C1 $ sudo ./client
[sudo] password for joshua:
Please enter a message queue id to join: 7813
Please set your priority --0 (low) to 10 (high)--: 10
Please enter a file name: file1.txt
```

```
joshua@joshua-virtual-machine ~/COMP4981/ASN02/SERVER $ sudo ./server
[sudo] password for joshua:
Please enter a message queue id for creation: 7813
Client connected: 10945
here
here
Client connected: 10943
here
here
here
[]
```

```
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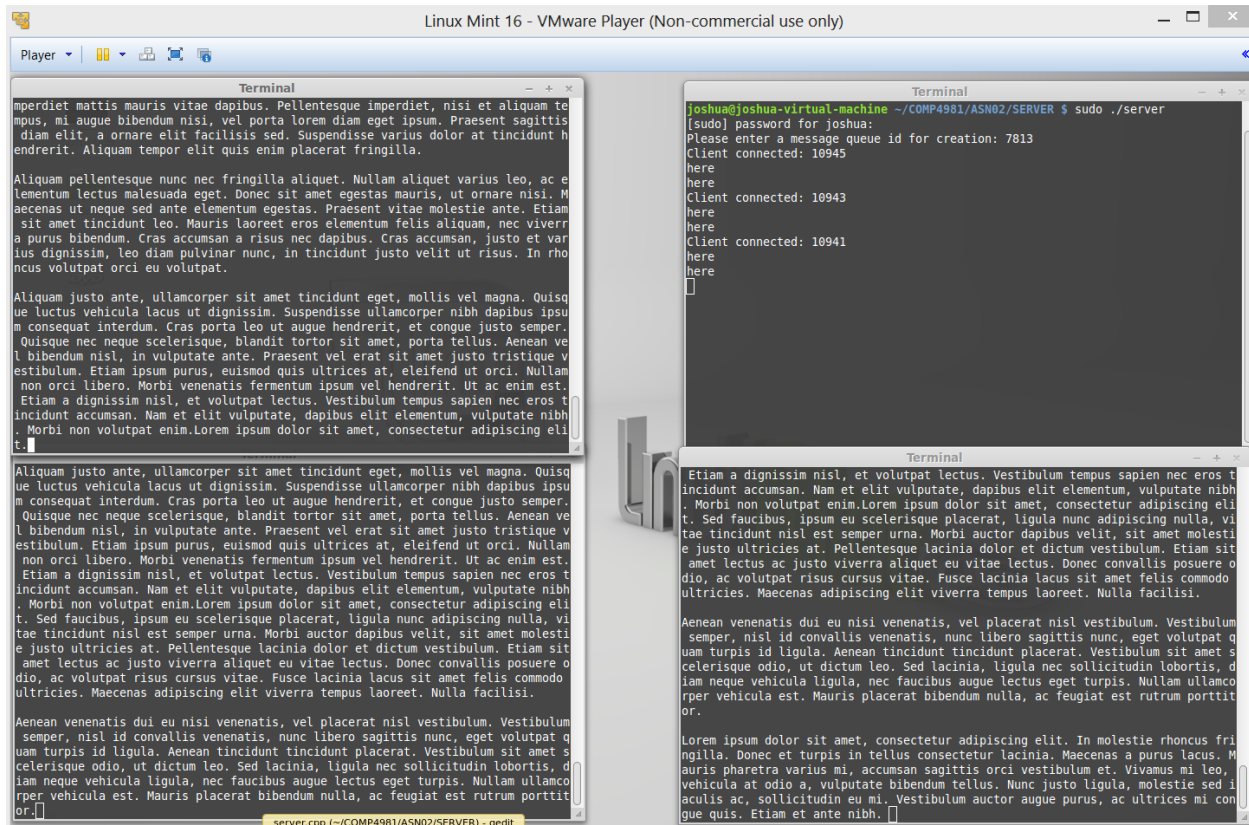
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Figure 7:



```
Linux Mint 16 - VMware Player (Non-commercial use only)

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or.

server.cao (~/COMP4981/ASN02/SERVER) - edit

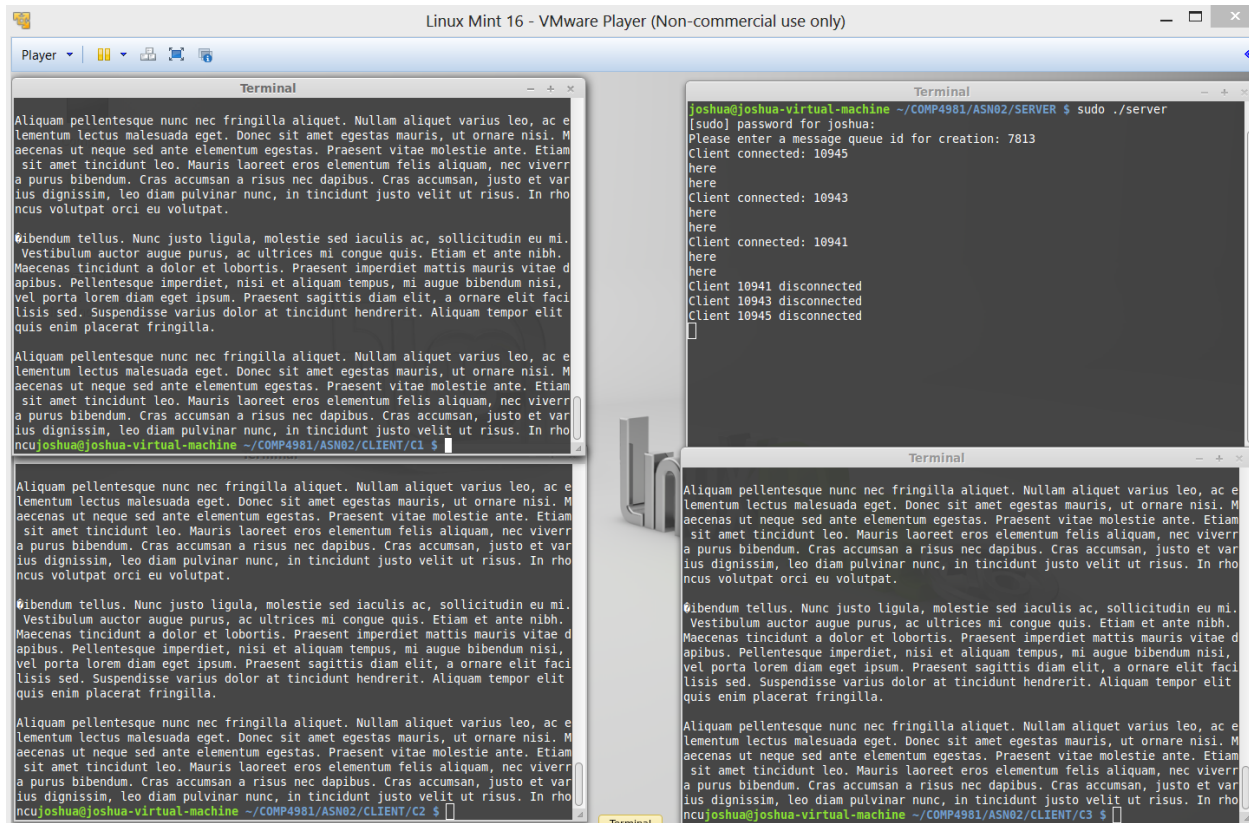
Terminal
joshua@joshua-virtual-machine ~/COMP4981/ASN02/SERVER $ sudo ./server
[sudo] password for joshua:
Please enter a message queue id for creation: 7813
Client connected: 10945
here
here
Client connected: 10943
here
here
Client connected: 10941
here
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Terminal
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Figure 8:



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Linux Mint 16 - VMware Player (Non-commercial use only)

Terminal
Aliquam pellentesque nunc nec fringilla aliquet. Nullam aliquet varius leo, ac e
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Vestibulum auctor augue purus, ac ultrices mi congue quis. Etiam et ante nibh.
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ius dignissim, leo diam pulvinar nunc, in tincidunt justo velit ut risus. In rho
ncuJoshua@joshua-virtual-machine ~/COMP4981/ASN02/CLIENT/C1 $

Terminal
joshua@joshua-virtual-machine ~/COMP4981/ASN02/SERVER $ sudo ./server
[sudo] password for joshua:
Please enter a message queue id for creation: 7813
Client connected: 10945
here
here
Client connected: 10943
here
here
Client connected: 10941
here
here
Client 10941 disconnected
Client 10943 disconnected
Client 10945 disconnected
[]

Terminal
Aliquam pellentesque nunc nec fringilla aliquet. Nullam aliquet varius leo, ac e
lementum lectus malesuada eget. Donec sit amet egestas mauris, ut ornare nisi. M
aecenas ut neque sed ante elementum egestas. Praesent vitae molestie ante. Etiam
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ncuJoshua@joshua-virtual-machine ~/COMP4981/ASN02/CLIENT/C2 $

Terminal
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ncuJoshua@joshua-virtual-machine ~/COMP4981/ASN02/CLIENT/C3 $
```



Figure 9:

The screenshot displays a Linux Mint 16 virtual machine running in a VMware Player. The interface is divided into two main sections. The left section contains three terminal windows, each showing a different client (C1, C2, and C3) connected to a server. These terminals display placeholder text, likely for a chat application. The right section contains a single terminal window showing the server's output. The server terminal displays the command to start the server, followed by the server's status and the list of connected clients (10943, 10941, and 10945). The server terminal also shows the command to close the message queue.

```
Linux Mint 16 - VMware Player (Non-commercial use only)
```

Terminal (Left - Client C1):

```
ncujoshua@joshua-virtual-machine ~/COMP4981/ASN02/CLIENT/C1 $
```

Terminal (Left - Client C2):

```
ncujoshua@joshua-virtual-machine ~/COMP4981/ASN02/CLIENT/C2 $
```

Terminal (Left - Client C3):

```
ncujoshua@joshua-virtual-machine ~/COMP4981/ASN02/CLIENT/C3 $
```

Terminal (Right - Server):

```
joshua@joshua-virtual-machine ~/COMP4981/ASN02/SERVER $ sudo ./server
[sudo] password for joshua:
Please enter a message queue id for creation: 7813
Client connected: 10945
here
here
Client connected: 10943
here
here
Client connected: 10941
here
Client 10941 disconnected
Client 10943 disconnected
Client 10945 disconnected
^C
Closed Message Queue.
joshua@joshua-virtual-machine ~/COMP4981/ASN02/SERVER $
```