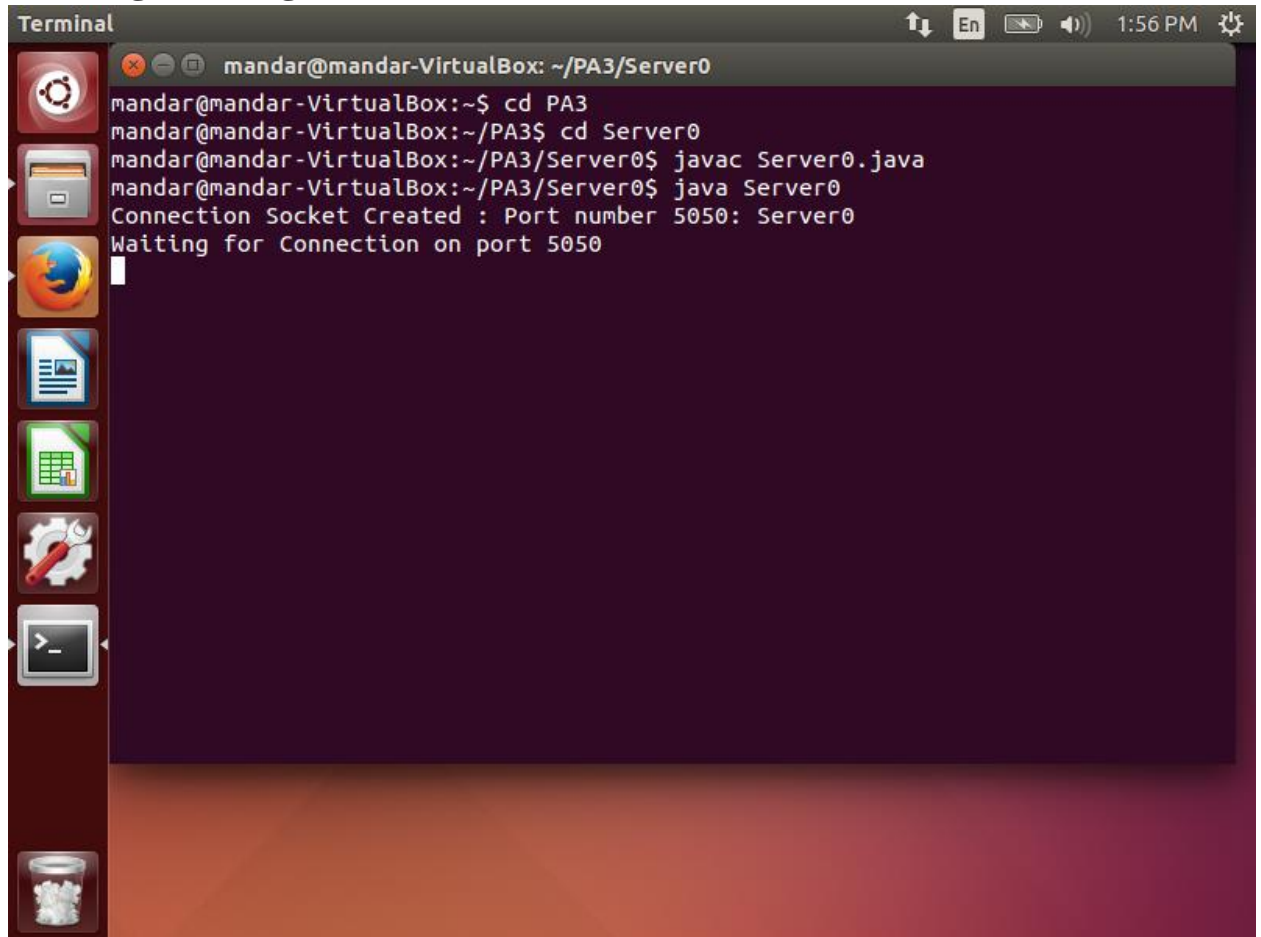


OUTPUT FILE

1. Starting Indexing Server0:

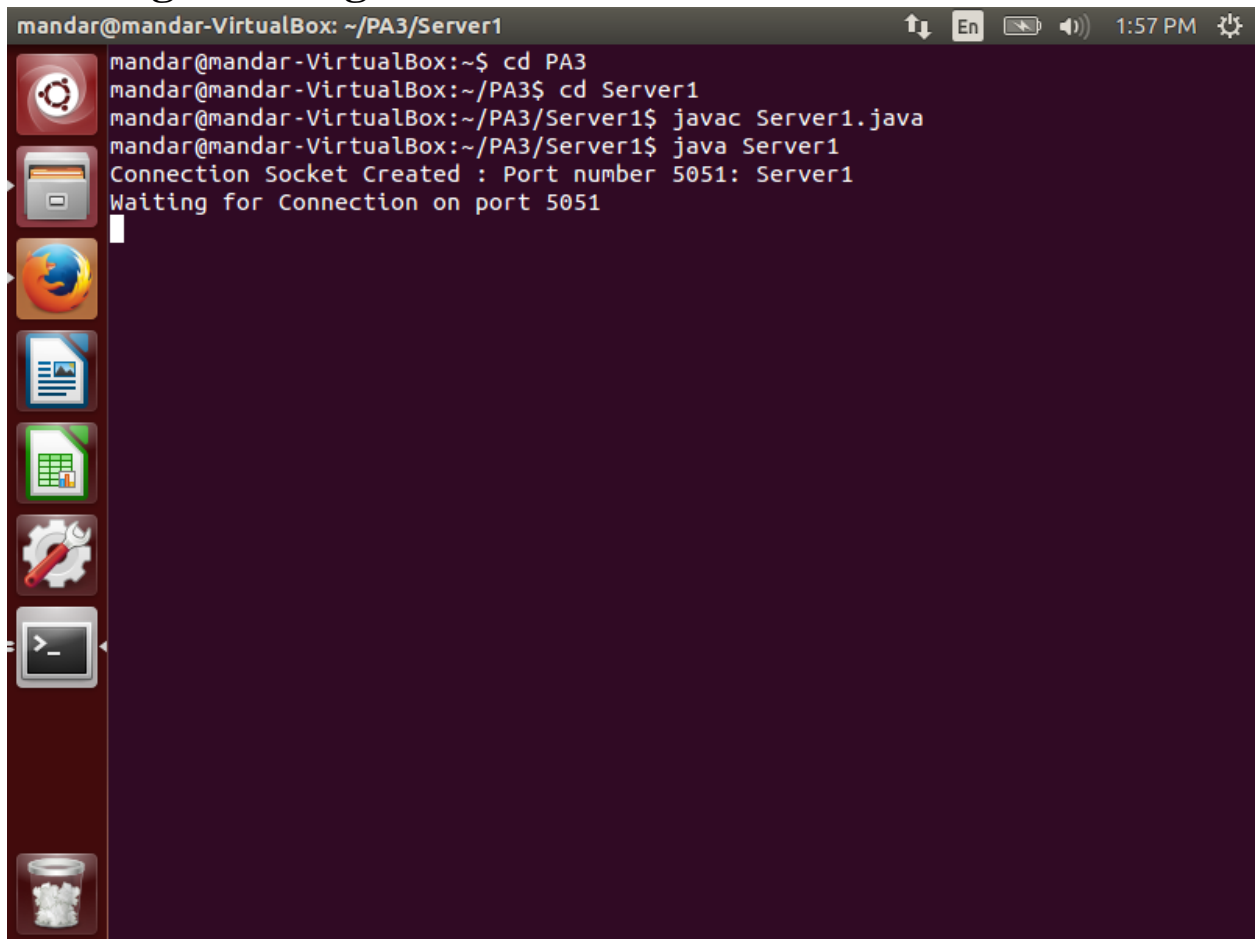


The screenshot shows a terminal window titled "Terminal" with a dark background. The user is logged in as "mandar" on a machine named "mandar-VirtualBox". The terminal shows the following sequence of commands and output:

```
mandar@mandar-VirtualBox: ~$ cd PA3
mandar@mandar-VirtualBox: ~/PA3$ cd Server0
mandar@mandar-VirtualBox: ~/PA3/Server0$ javac Server0.java
mandar@mandar-VirtualBox: ~/PA3/Server0$ java Server0
Connection Socket Created : Port number 5050: Server0
Waiting for Connection on port 5050
```

The terminal window has a standard Linux desktop environment with a sidebar on the left containing icons for applications like a file manager, web browser, and office suite. The top of the window shows system status icons including network, battery, and time (1:56 PM).

2. Starting Indexing Server1:

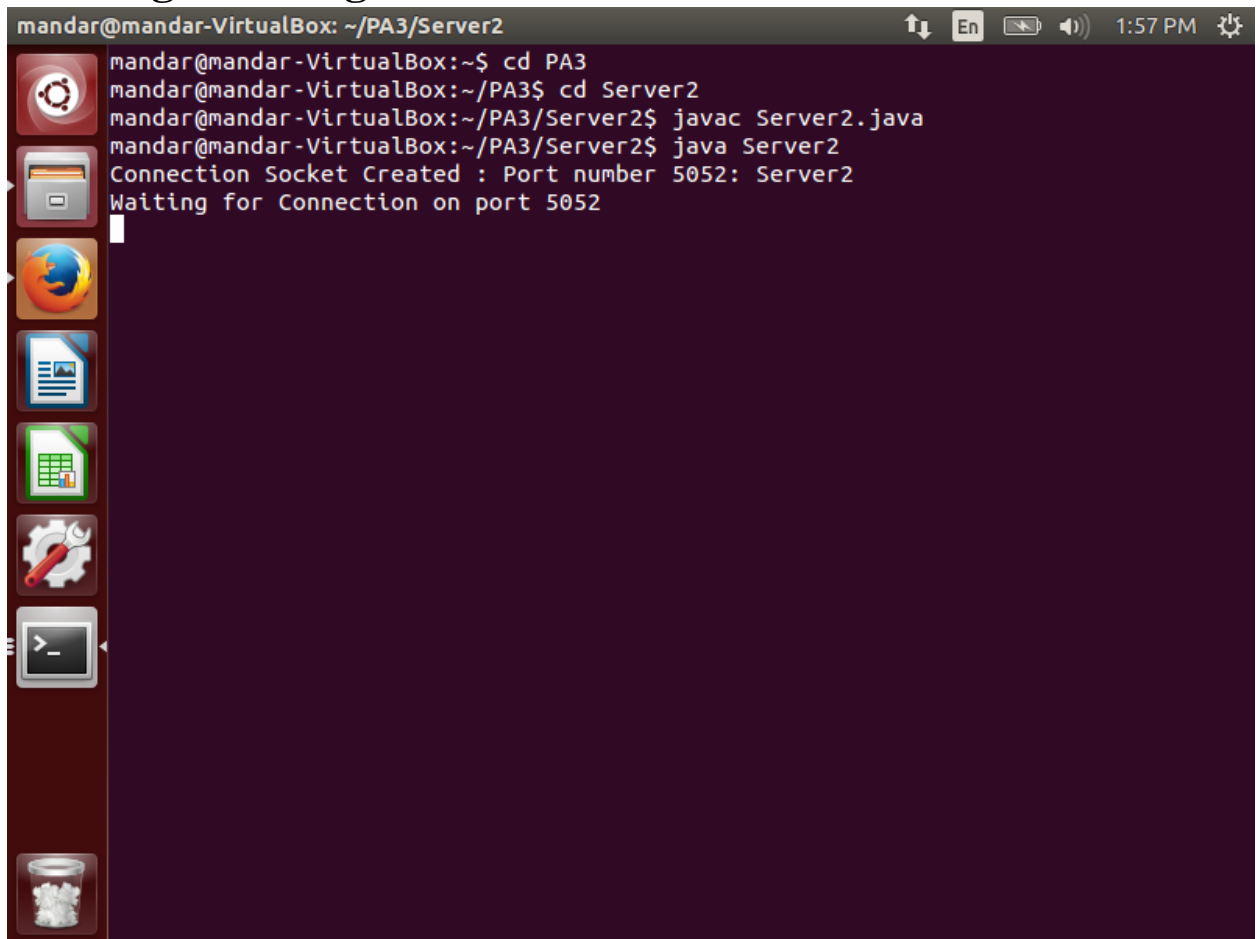


The screenshot shows a terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Server1". The terminal output is as follows:

```
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Server1
mandar@mandar-VirtualBox:~/PA3/Server1$ javac Server1.java
mandar@mandar-VirtualBox:~/PA3/Server1$ java Server1
Connection Socket Created : Port number 5051: Server1
Waiting for Connection on port 5051
```

The terminal window has a dark purple background. On the left side, there is a vertical dock with several application icons: a red gear icon, a folder icon, a Firefox browser icon, a document icon, a spreadsheet icon, a settings icon, a terminal icon, and a trash can icon. The top of the window features a status bar with icons for network, keyboard layout (En), battery, volume, and the time 1:57 PM.

3. Starting Indexing Server2:

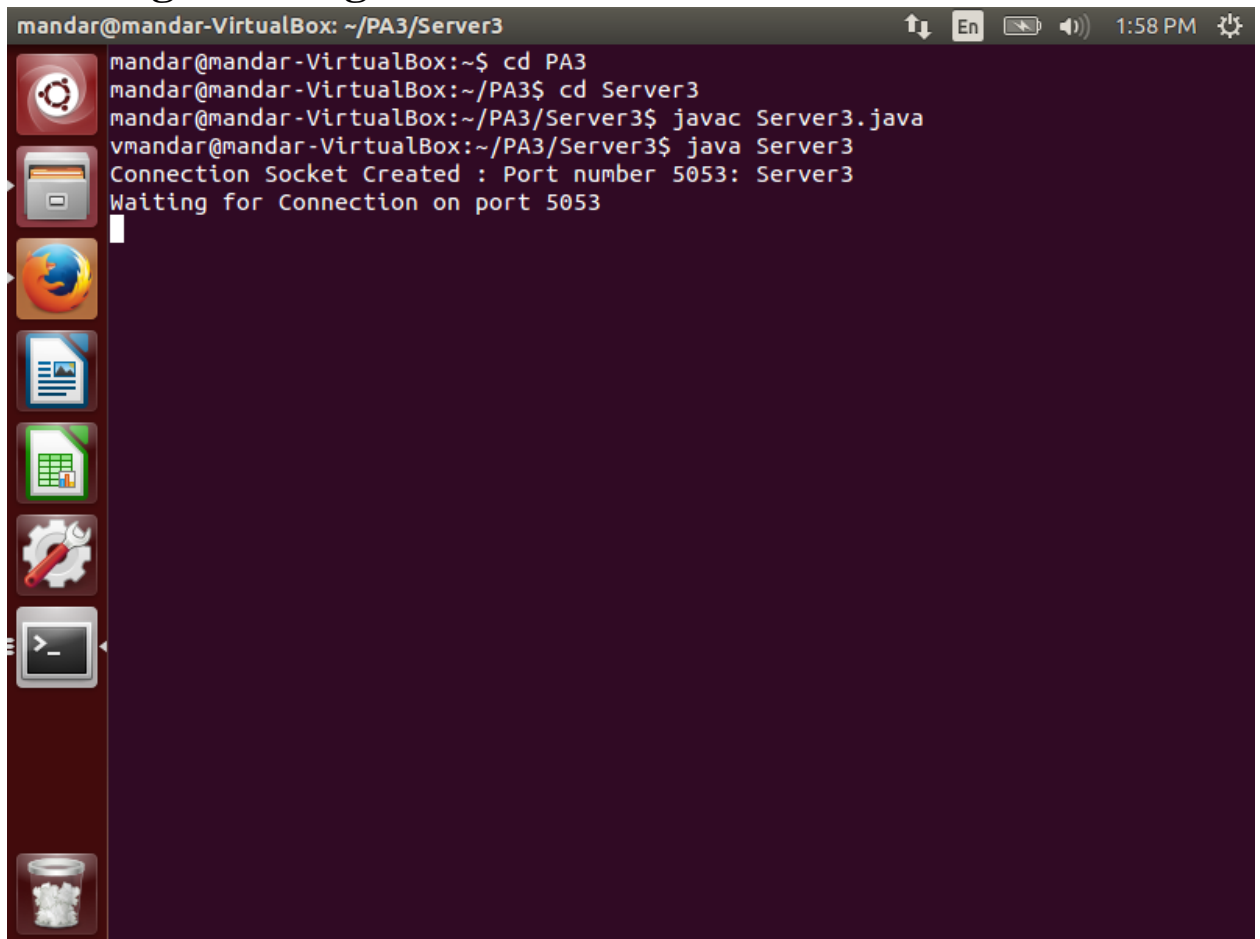


A terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Server2" with a dark purple background. The window shows a series of commands and their outputs. On the left side of the terminal, there is a vertical dock with several application icons: a red gear, a folder, a globe, a document, a spreadsheet, a wrench and gear, a terminal icon, and a trash can. The terminal text is as follows:

```
mandar@mandar-VirtualBox: ~/PA3/Server2
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Server2
mandar@mandar-VirtualBox:~/PA3/Server2$ javac Server2.java
mandar@mandar-VirtualBox:~/PA3/Server2$ java Server2
Connection Socket Created : Port number 5052: Server2
Waiting for Connection on port 5052
```

The status bar at the top right of the terminal window shows system icons for network, battery, and volume, along with the time "1:57 PM".

4. Starting Indexing Server3:

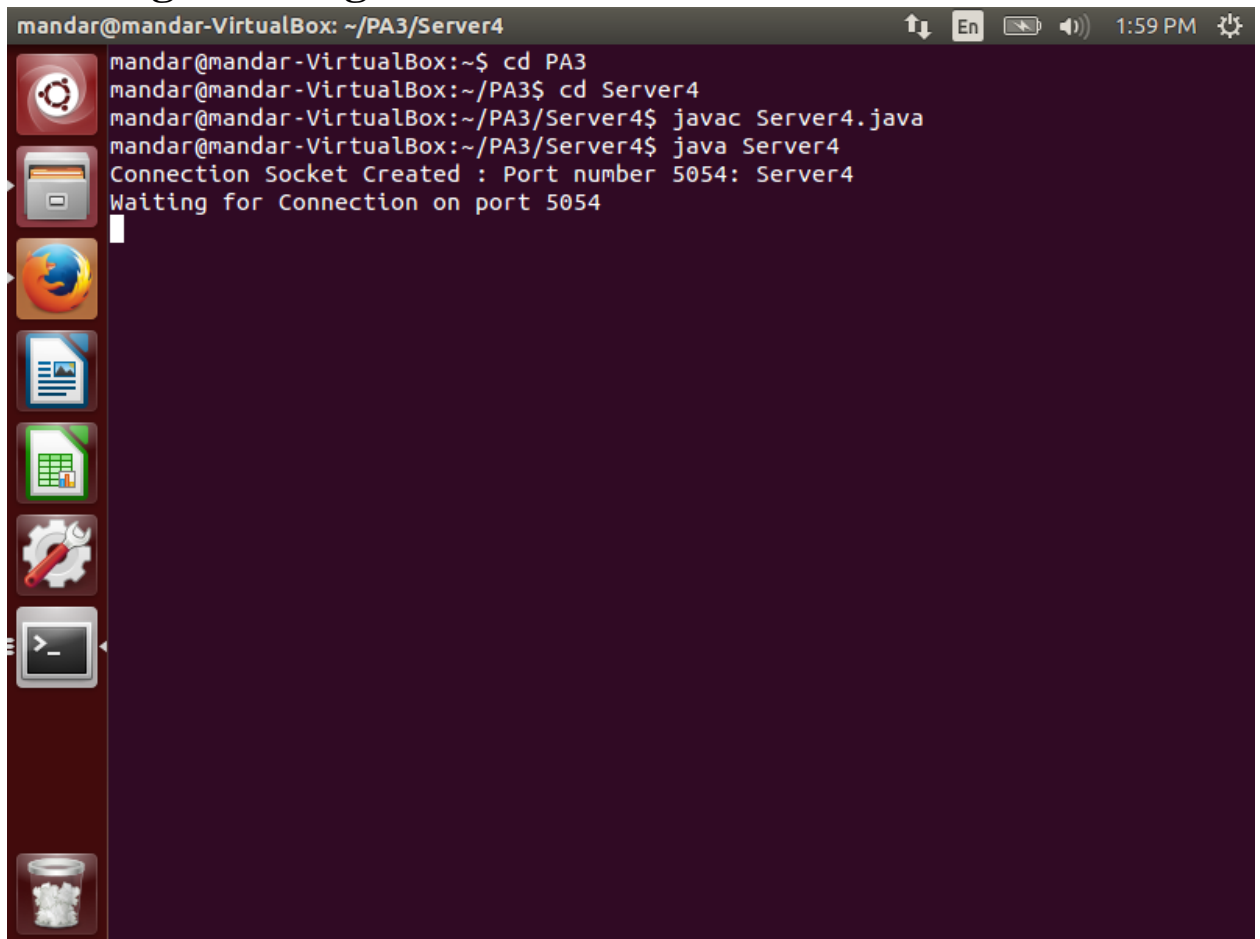


The screenshot shows a terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Server3". The terminal output is as follows:

```
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Server3
mandar@mandar-VirtualBox:~/PA3/Server3$ javac Server3.java
vmmandar@mandar-VirtualBox:~/PA3/Server3$ java Server3
Connection Socket Created : Port number 5053: Server3
Waiting for Connection on port 5053
```

The terminal window has a dark purple background. On the left side, there is a vertical dock with several application icons: a red gear icon, a folder icon, a Firefox browser icon, a document icon, a spreadsheet icon, a settings icon, a terminal icon, and a trash can icon. The top of the window features a status bar with icons for network, keyboard layout (En), battery, volume, and the time 1:58 PM.

5. Starting Indexing Server4:

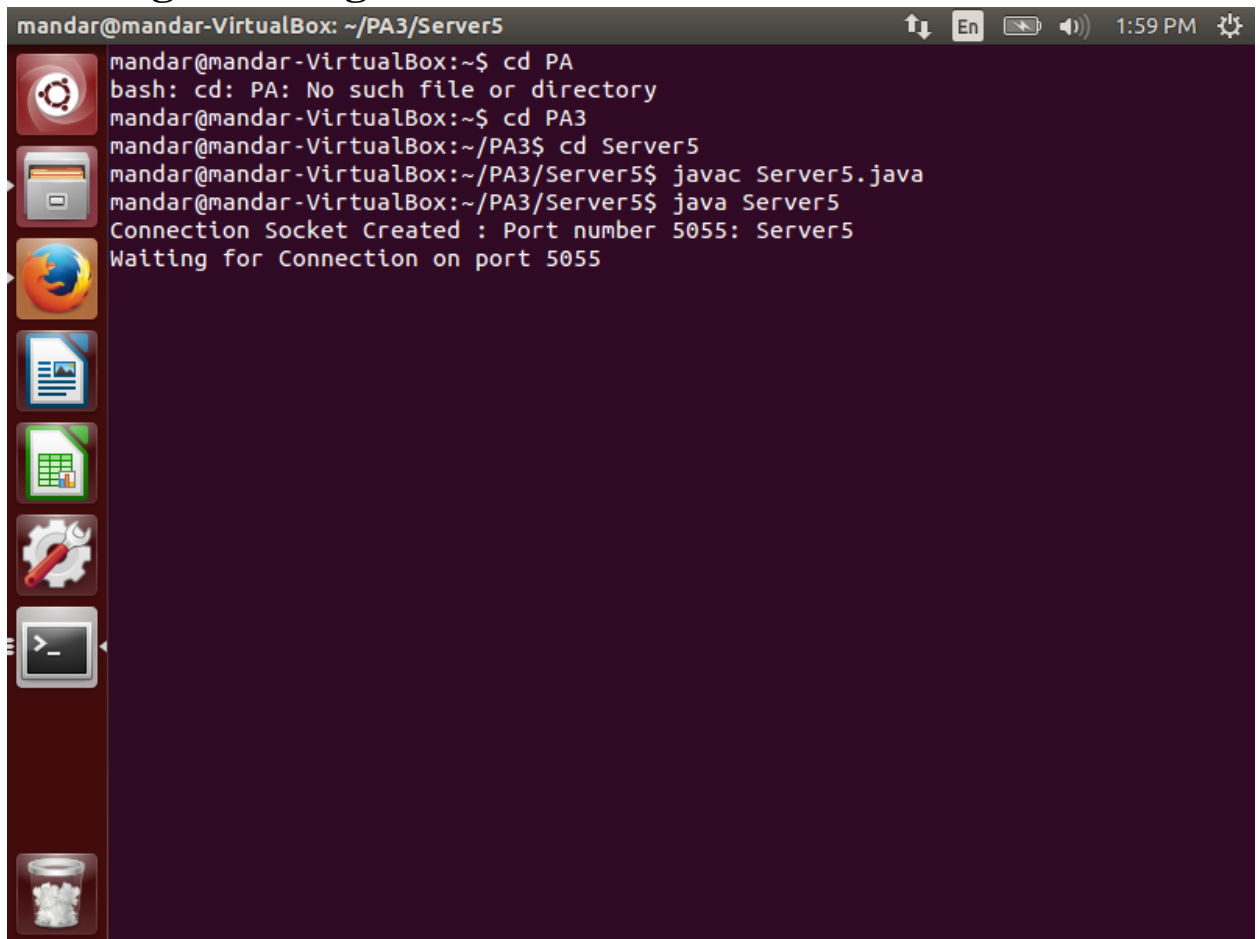


A terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Server4" is shown. The window has a dark purple background and a light-colored title bar. On the left side, there is a vertical dock with several application icons: a red gear, a folder, a globe, a document, a spreadsheet, a wrench and gear, a terminal, and a trash can. The terminal text shows the following commands and output:

```
mandar@mandar-VirtualBox: ~$ cd PA3
mandar@mandar-VirtualBox: ~/PA3$ cd Server4
mandar@mandar-VirtualBox: ~/PA3/Server4$ javac Server4.java
mandar@mandar-VirtualBox: ~/PA3/Server4$ java Server4
Connection Socket Created : Port number 5054: Server4
Waiting for Connection on port 5054
```

The terminal window also shows system status icons in the top right corner, including network, battery, and volume, along with the time "1:59 PM".

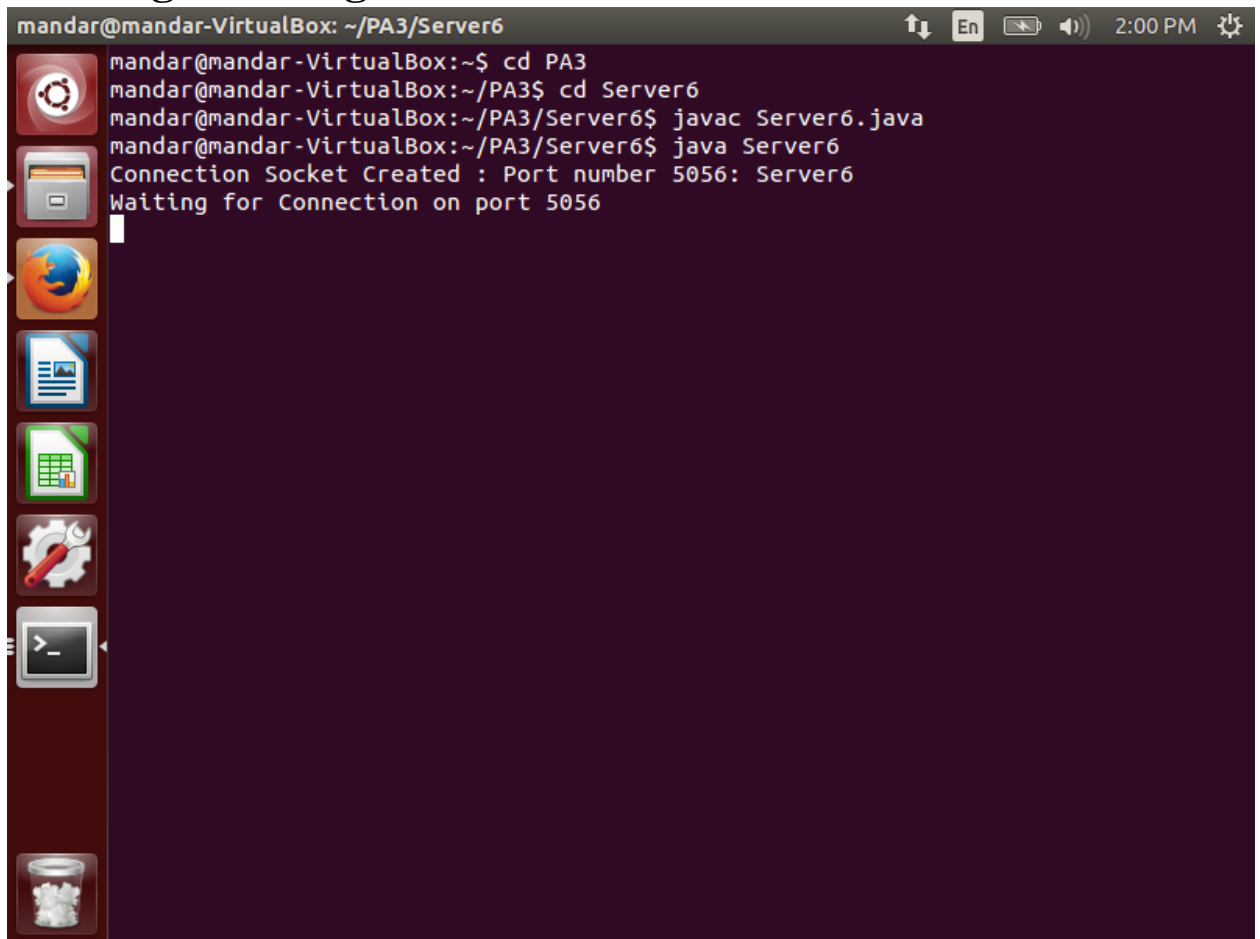
6. Starting Indexing Server5:



A terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Server5" is shown. The window has a dark purple background and a light-colored title bar. On the left side, there is a vertical dock with several application icons: a red gear, a folder, a globe, a document, a spreadsheet, a wrench and gear, a terminal, and a trash can. The terminal text shows the user navigating through directories and running Java commands to start a server.

```
mandar@mandar-VirtualBox: ~/PA3/Server5
mandar@mandar-VirtualBox:~$ cd PA
bash: cd: PA: No such file or directory
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Server5
mandar@mandar-VirtualBox:~/PA3/Server5$ javac Server5.java
mandar@mandar-VirtualBox:~/PA3/Server5$ java Server5
Connection Socket Created : Port number 5055: Server5
Waiting for Connection on port 5055
```

7. Starting Indexing Server6:

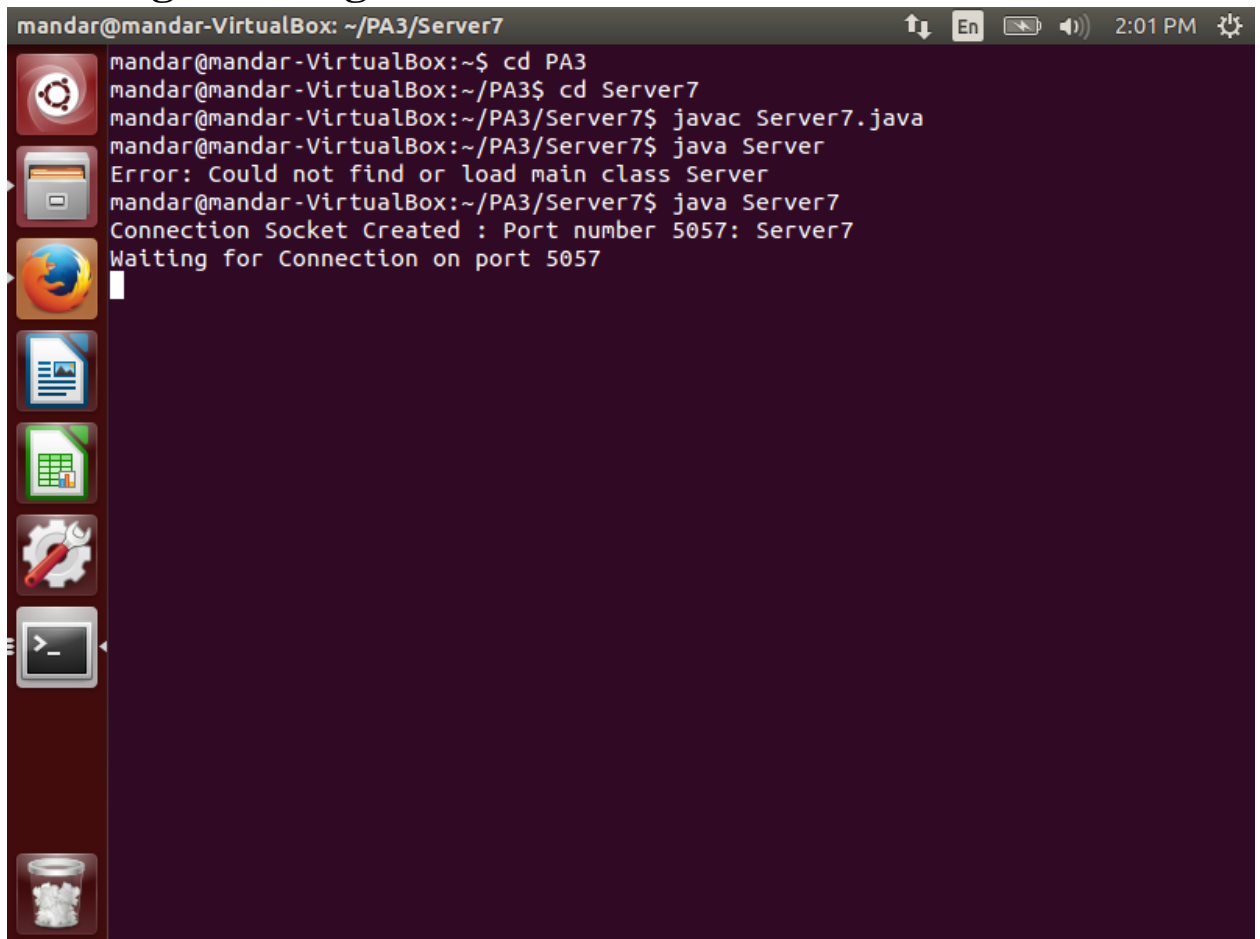


The screenshot shows a terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Server6". The terminal output is as follows:

```
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Server6
mandar@mandar-VirtualBox:~/PA3/Server6$ javac Server6.java
mandar@mandar-VirtualBox:~/PA3/Server6$ java Server6
Connection Socket Created : Port number 5056: Server6
Waiting for Connection on port 5056
```

The terminal window has a dark purple background. On the left side, there is a vertical dock with several application icons: a red gear icon, a folder icon, a Firefox browser icon, a document icon, a spreadsheet icon, a settings icon, a terminal icon, and a trash can icon. The top of the window features a status bar with icons for network, keyboard layout (En), battery, volume, and the time 2:00 PM.

8. Starting Indexing Server7:

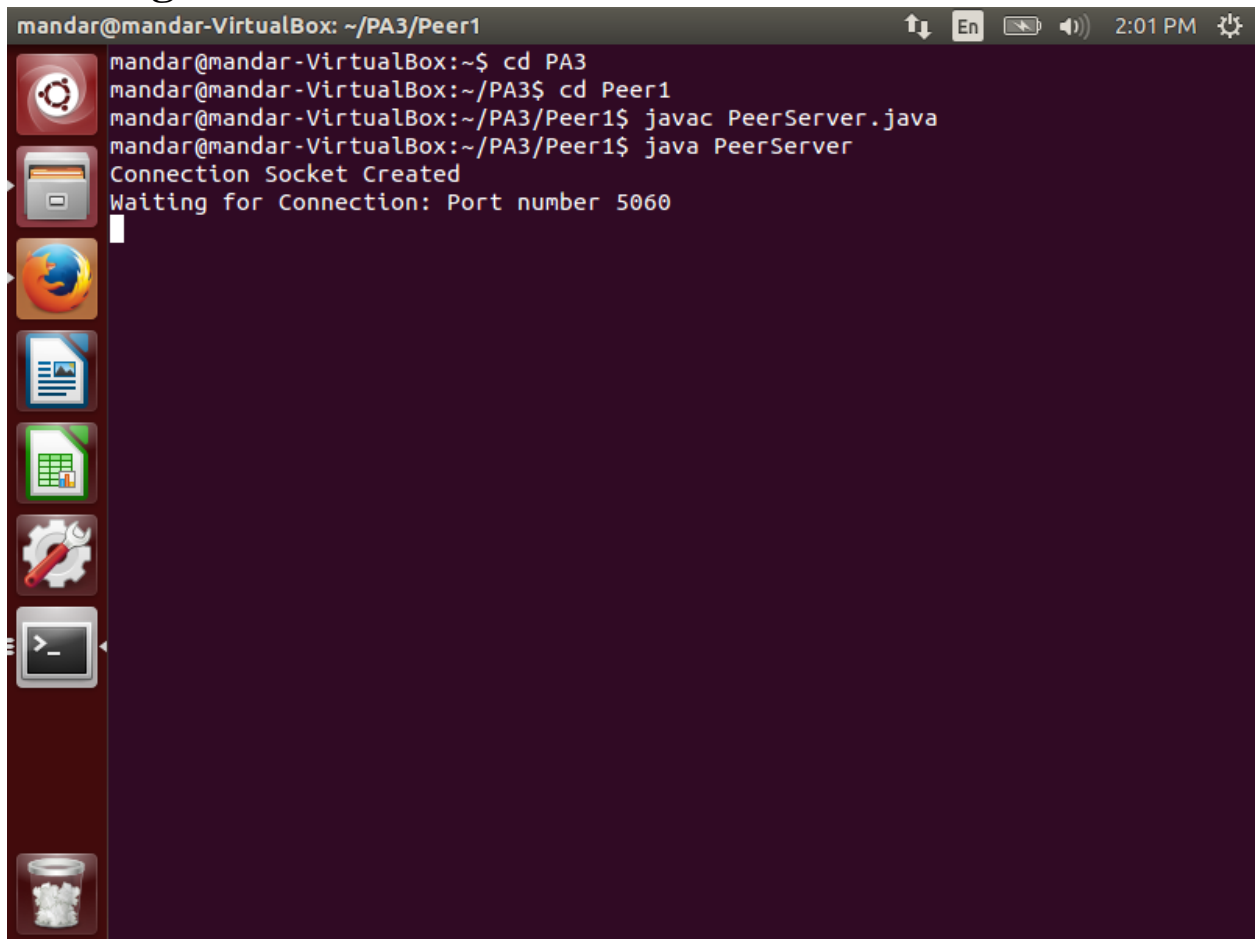


The screenshot shows a terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Server7". The terminal output is as follows:

```
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Server7
mandar@mandar-VirtualBox:~/PA3/Server7$ javac Server7.java
mandar@mandar-VirtualBox:~/PA3/Server7$ java Server
Error: Could not find or load main class Server
mandar@mandar-VirtualBox:~/PA3/Server7$ java Server7
Connection Socket Created : Port number 5057: Server7
Waiting for Connection on port 5057
```

The terminal window has a dark purple background. On the left side, there is a vertical dock with several application icons: a red gear icon, a folder icon, a Firefox browser icon, a document icon, a spreadsheet icon, a settings icon, a terminal icon, and a trash can icon. The top of the window features a status bar with icons for network, language (En), battery, and volume, along with the time "2:01 PM".

9. Starting PeerServer:

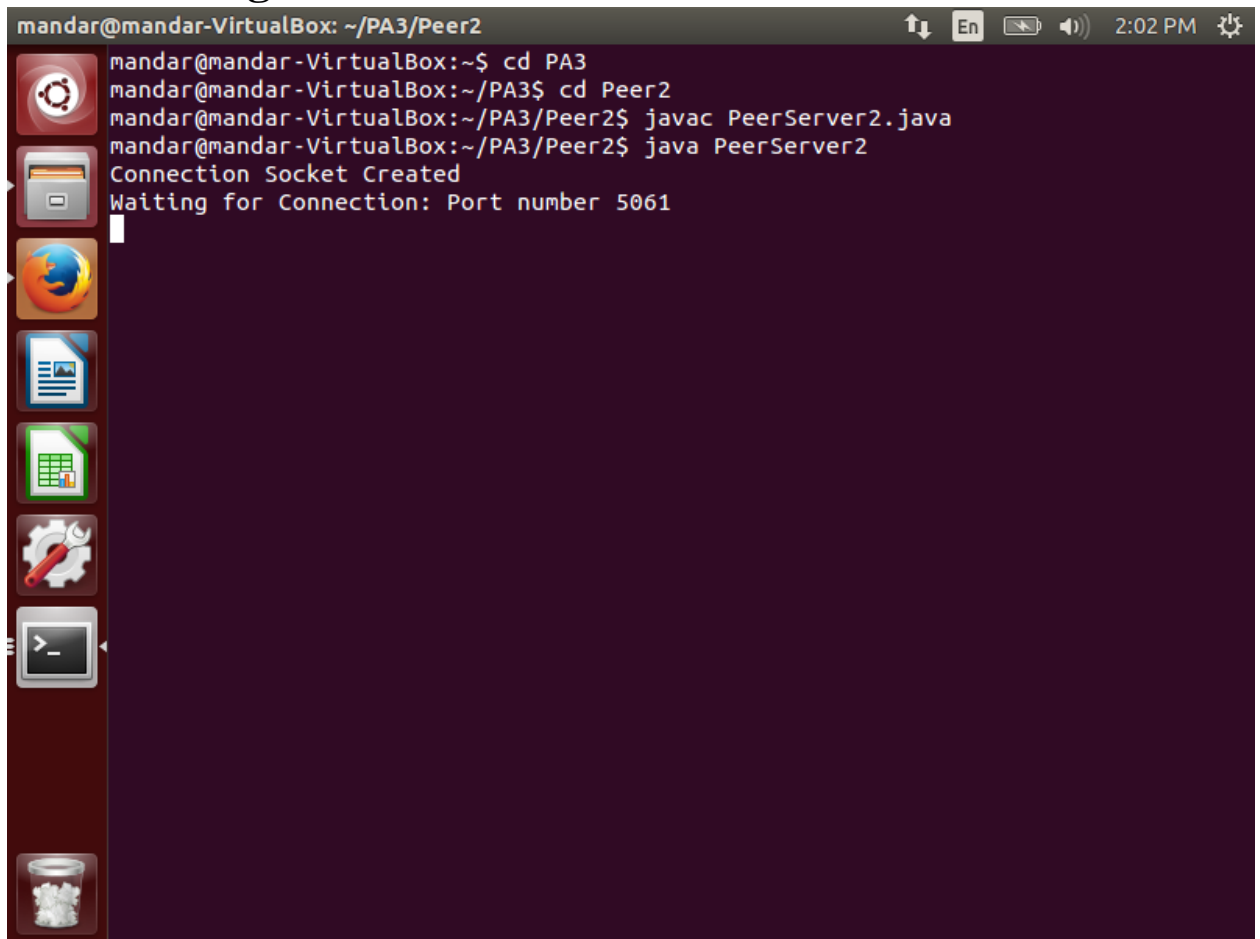


The screenshot shows a terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Peer1". The terminal output is as follows:

```
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Peer1
mandar@mandar-VirtualBox:~/PA3/Peer1$ javac PeerServer.java
mandar@mandar-VirtualBox:~/PA3/Peer1$ java PeerServer
Connection Socket Created
Waiting for Connection: Port number 5060
```

The terminal window has a dark purple background. On the left side, there is a vertical dock with several application icons: a red gear icon, a folder icon, a Firefox browser icon, a document icon, a spreadsheet icon, a settings icon, a terminal icon, and a trash can icon. The top of the window features a status bar with icons for network, keyboard layout (En), battery, volume, and the time 2:01 PM.

10. Starting PeerServer2:

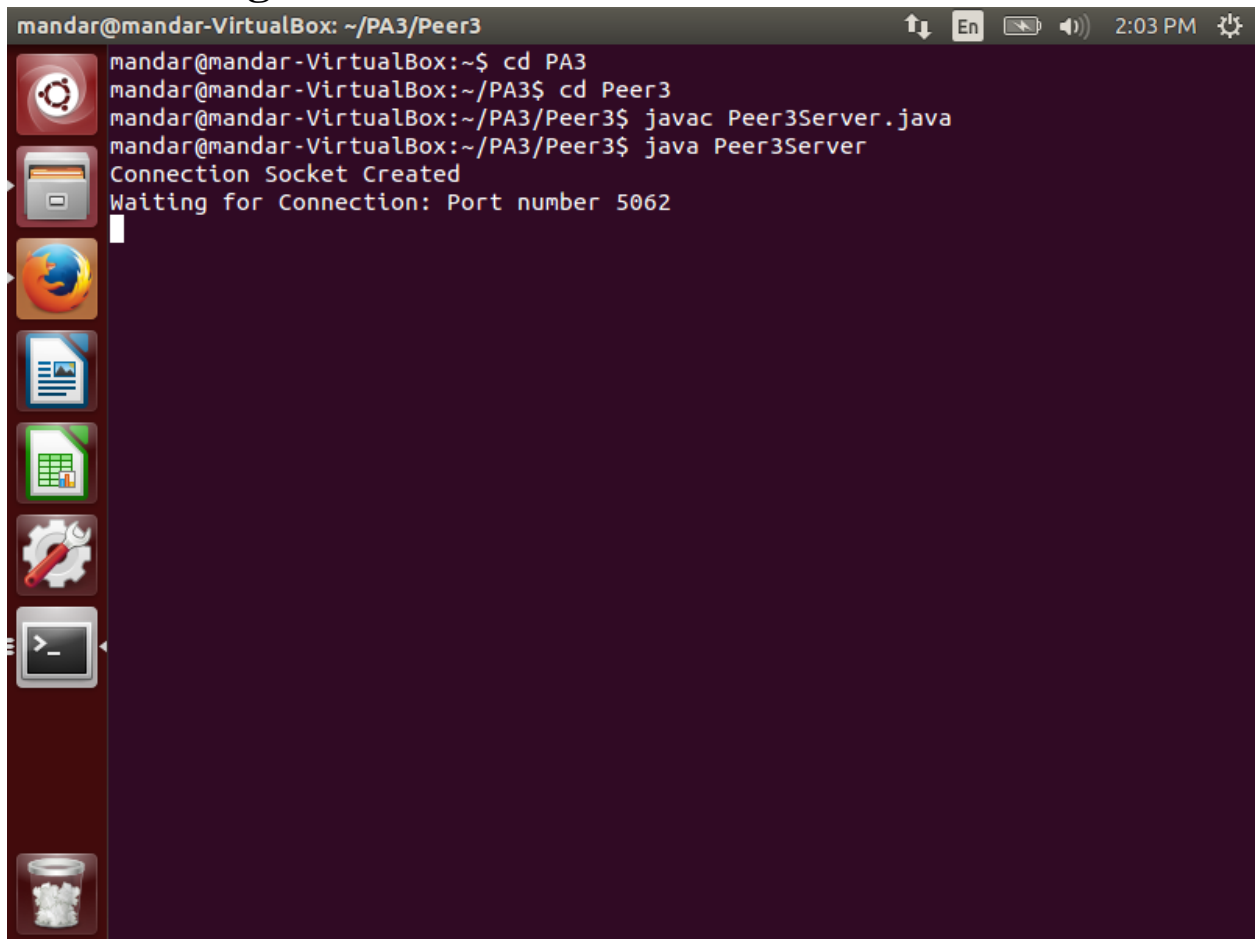


The screenshot shows a terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Peer2". The terminal output is as follows:

```
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Peer2
mandar@mandar-VirtualBox:~/PA3/Peer2$ javac PeerServer2.java
mandar@mandar-VirtualBox:~/PA3/Peer2$ java PeerServer2
Connection Socket Created
Waiting for Connection: Port number 5061
```

The terminal window has a dark purple background. On the left side, there is a vertical dock with several application icons: a red gear icon, a folder icon, a Firefox browser icon, a document icon, a spreadsheet icon, a settings icon, a terminal icon, and a trash can icon. The top of the window features a status bar with icons for network, keyboard layout (En), battery, and volume, along with the time "2:02 PM".

11. Starting PeerServer3:

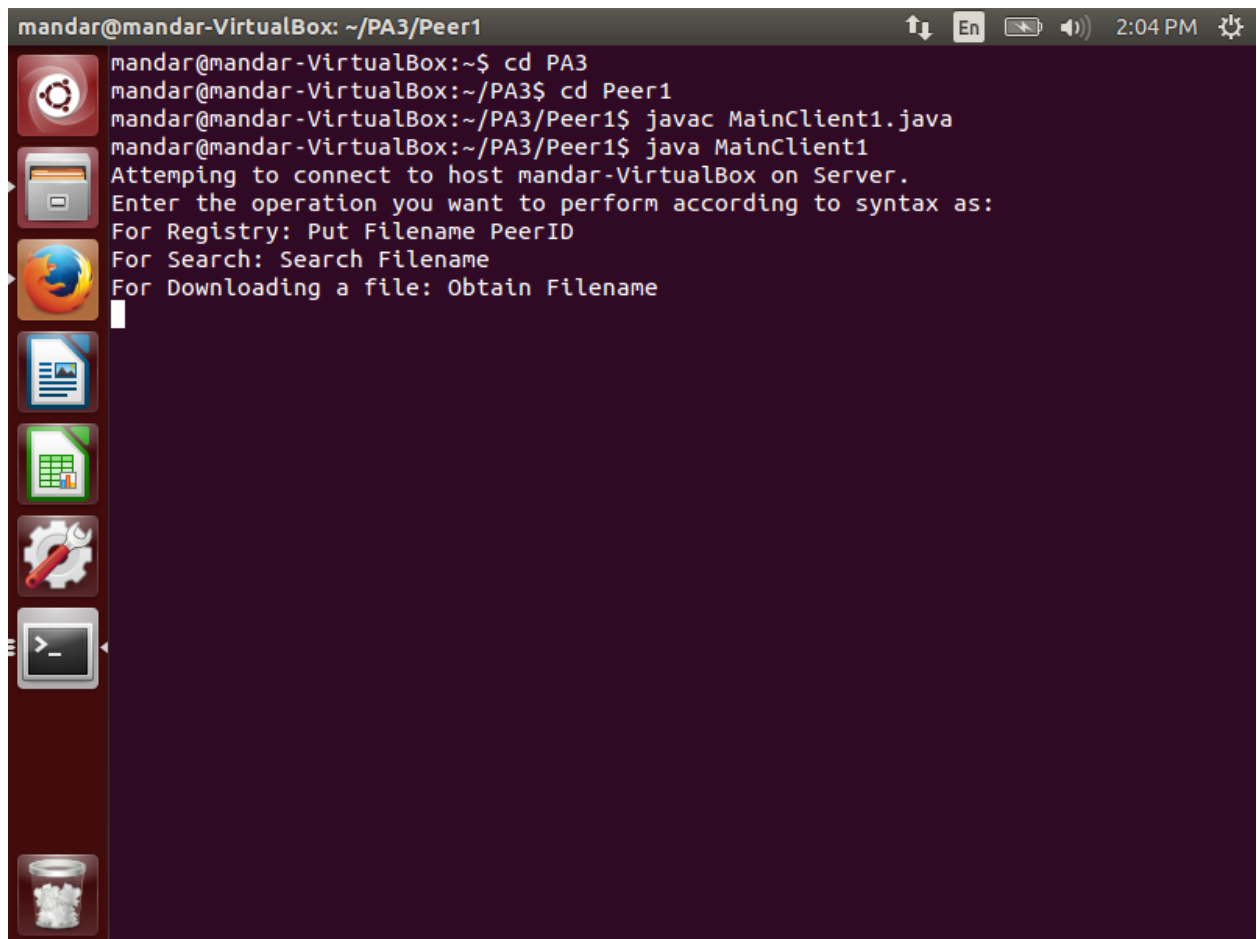


The screenshot shows a terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Peer3". The terminal output is as follows:

```
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Peer3
mandar@mandar-VirtualBox:~/PA3/Peer3$ javac Peer3Server.java
mandar@mandar-VirtualBox:~/PA3/Peer3$ java Peer3Server
Connection Socket Created
Waiting for Connection: Port number 5062
```

The terminal window has a dark purple background. On the left side, there is a vertical dock with several application icons: a red gear icon, a folder icon, a Firefox browser icon, a document icon, a spreadsheet icon, a settings icon, a terminal icon, and a trash can icon. The top of the window features a status bar with icons for network, keyboard layout (En), battery, and volume, along with the time "2:03 PM".

12. Starting Client on Peer1:

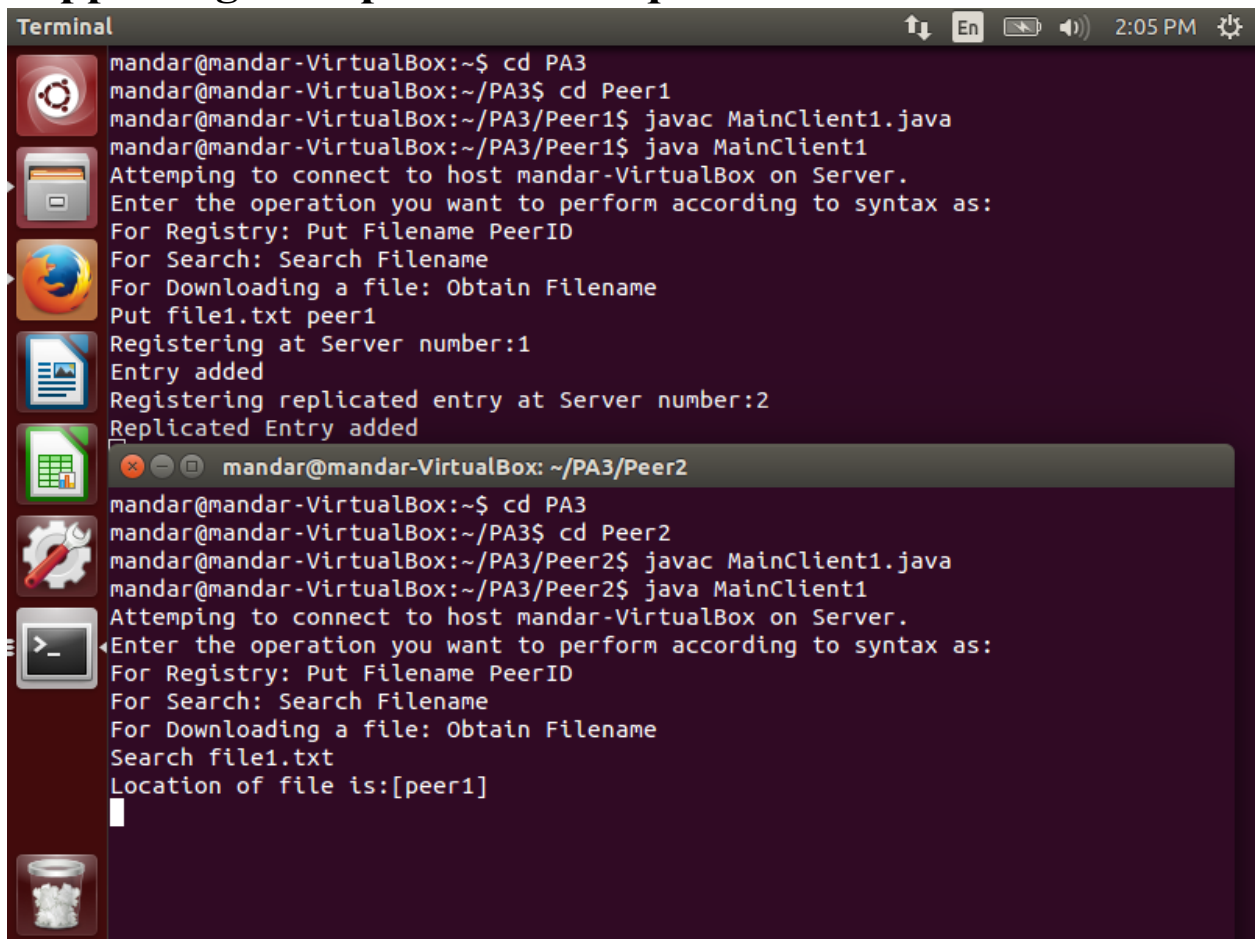


The screenshot shows a terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Peer1". The terminal output is as follows:

```
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Peer1
mandar@mandar-VirtualBox:~/PA3/Peer1$ javac MainClient1.java
mandar@mandar-VirtualBox:~/PA3/Peer1$ java MainClient1
Attempting to connect to host mandar-VirtualBox on Server.
Enter the operation you want to perform according to syntax as:
For Registry: Put Filename PeerID
For Search: Search Filename
For Downloading a file: Obtain Filename
```

The terminal window has a dark purple background. On the left side, there is a vertical dock with several application icons: a red gear icon, a folder icon, a Firefox browser icon, a document icon, a spreadsheet icon, a settings icon, a terminal icon, and a trash can icon. The top of the window shows system status icons including a network icon, a language icon (En), a battery icon, a speaker icon, and the time 2:04 PM.

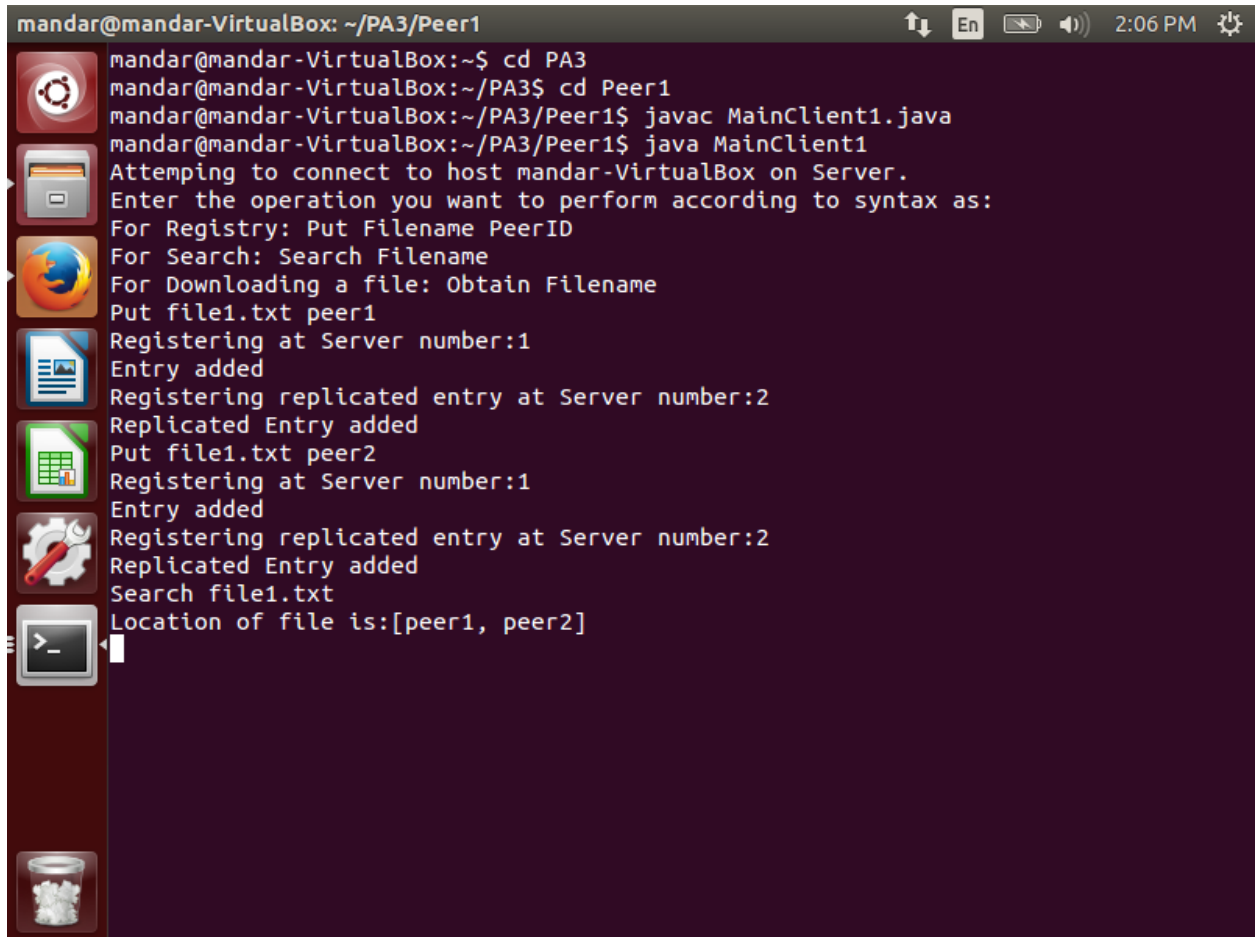
13. Put function by peer1 and search by peer2. Supporting multiple clients' requests:



```
Terminal
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Peer1
mandar@mandar-VirtualBox:~/PA3/Peer1$ javac MainClient1.java
mandar@mandar-VirtualBox:~/PA3/Peer1$ java MainClient1
Attempting to connect to host mandar-VirtualBox on Server.
Enter the operation you want to perform according to syntax as:
For Registry: Put Filename PeerID
For Search: Search Filename
For Downloading a file: Obtain Filename
Put file1.txt peer1
Registering at Server number:1
Entry added
Registering replicated entry at Server number:2
Replicated Entry added

mandar@mandar-VirtualBox: ~/PA3/Peer2
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Peer2
mandar@mandar-VirtualBox:~/PA3/Peer2$ javac MainClient1.java
mandar@mandar-VirtualBox:~/PA3/Peer2$ java MainClient1
Attempting to connect to host mandar-VirtualBox on Server.
Enter the operation you want to perform according to syntax as:
For Registry: Put Filename PeerID
For Search: Search Filename
For Downloading a file: Obtain Filename
Search file1.txt
Location of file is:[peer1]
```

14. File can have more than one location:



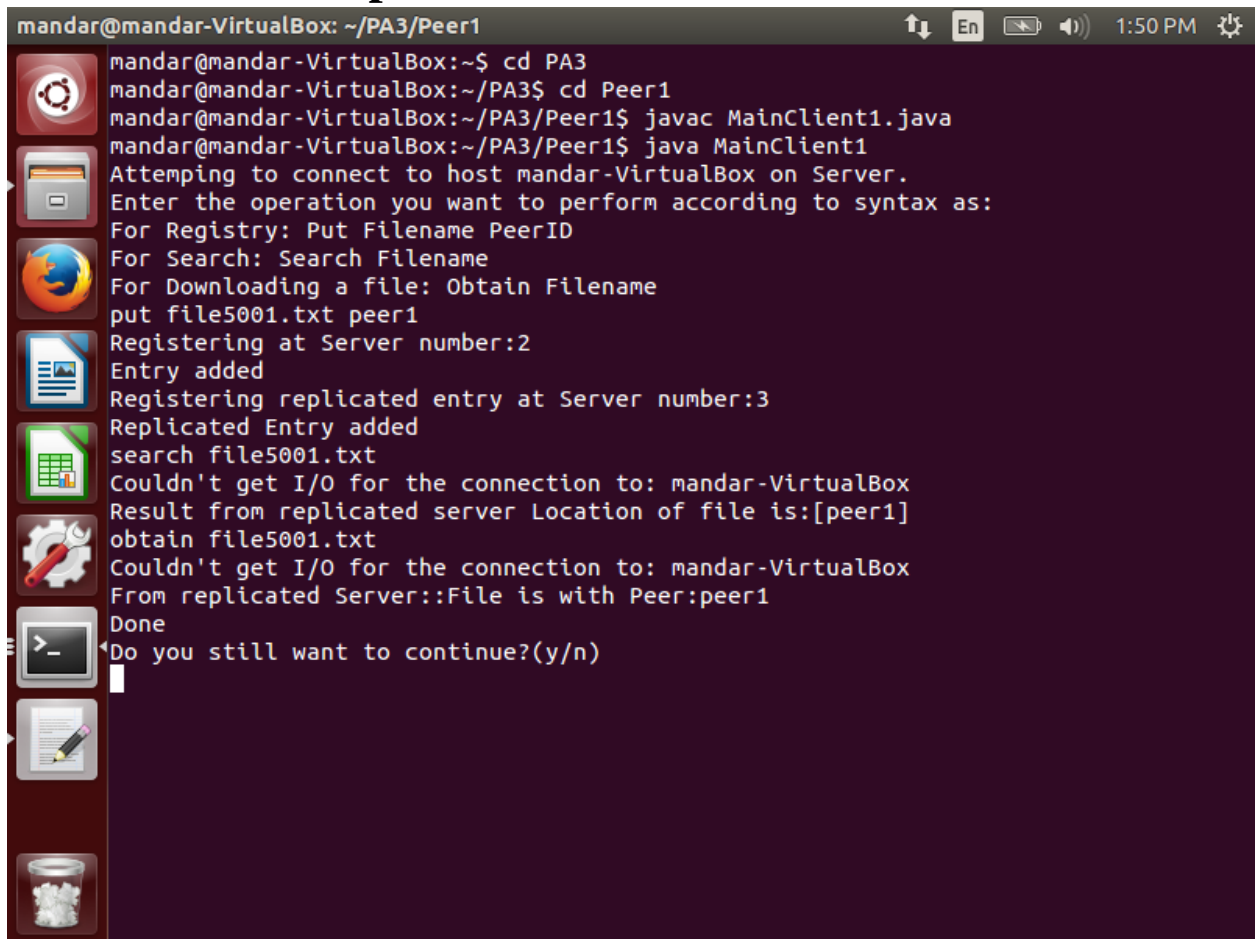
The screenshot shows a terminal window titled "mandar@mandar-VirtualBox: ~/PA3/Peer1". The terminal output shows the execution of a Java program that simulates a peer-to-peer file system. The program starts by registering the peer at server number 1, then registers replicated entries at server number 2. It then puts a file named "file1.txt" at peer1 and peer2, registers them at server number 1, and registers replicated entries at server number 2. Finally, it searches for "file1.txt" and reports its location as "[peer1, peer2]".

```
mandar@mandar-VirtualBox: ~/PA3/Peer1
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Peer1
mandar@mandar-VirtualBox:~/PA3/Peer1$ javac MainClient1.java
mandar@mandar-VirtualBox:~/PA3/Peer1$ java MainClient1
Attempting to connect to host mandar-VirtualBox on Server.
Enter the operation you want to perform according to syntax as:
For Registry: Put Filename PeerID
For Search: Search Filename
For Downloading a file: Obtain Filename
Put file1.txt peer1
Registering at Server number:1
Entry added
Registering replicated entry at Server number:2
Replicated Entry added
Put file1.txt peer2
Registering at Server number:1
Entry added
Registering replicated entry at Server number:2
Replicated Entry added
Search file1.txt
Location of file is:[peer1, peer2]
```

15. Put, Search and Obtain functions by peer1:

```
Attempting to connect to host mandar-VirtualBox on Server.  
Enter the operation you want to perform according to syntax as:  
For Registry: Put Filename PeerID  
For Search: Search Filename  
For Downloading a file: Obtain Filename  
put file5002.txt peer2  
Registering at Server number:3  
Entry added  
Registering replicated entry at Server number:4  
Replicated Entry added  
search file5002.txt  
Location of file is:[peer2]  
obtain file5002.txt  
File is with Peer:peer2  
Done  
Do you still want to continue?(y/n)  
█
```

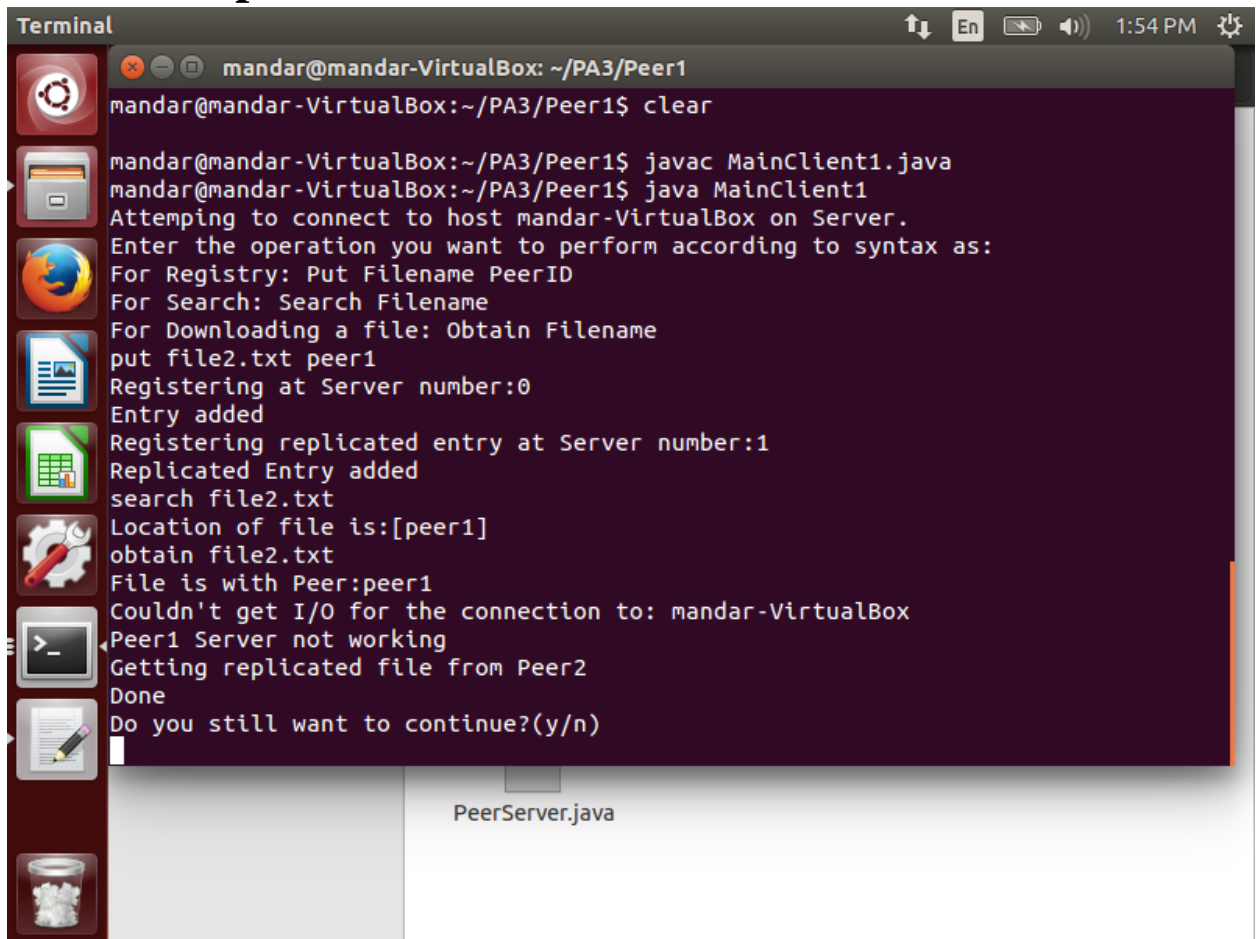
16. Metadata Replication:



```
mandar@mandar-VirtualBox: ~/PA3/Peer1
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Peer1
mandar@mandar-VirtualBox:~/PA3/Peer1$ javac MainClient1.java
mandar@mandar-VirtualBox:~/PA3/Peer1$ java MainClient1
Attempting to connect to host mandar-VirtualBox on Server.
Enter the operation you want to perform according to syntax as:
For Registry: Put Filename PeerID
For Search: Search Filename
For Downloading a file: Obtain Filename
put file5001.txt peer1
Registering at Server number:2
Entry added
Registering replicated entry at Server number:3
Replicated Entry added
search file5001.txt
Couldn't get I/O for the connection to: mandar-VirtualBox
Result from replicated server Location of file is:[peer1]
obtain file5001.txt
Couldn't get I/O for the connection to: mandar-VirtualBox
From replicated Server::File is with Peer:peer1
Done
Do you still want to continue?(y/n)

```

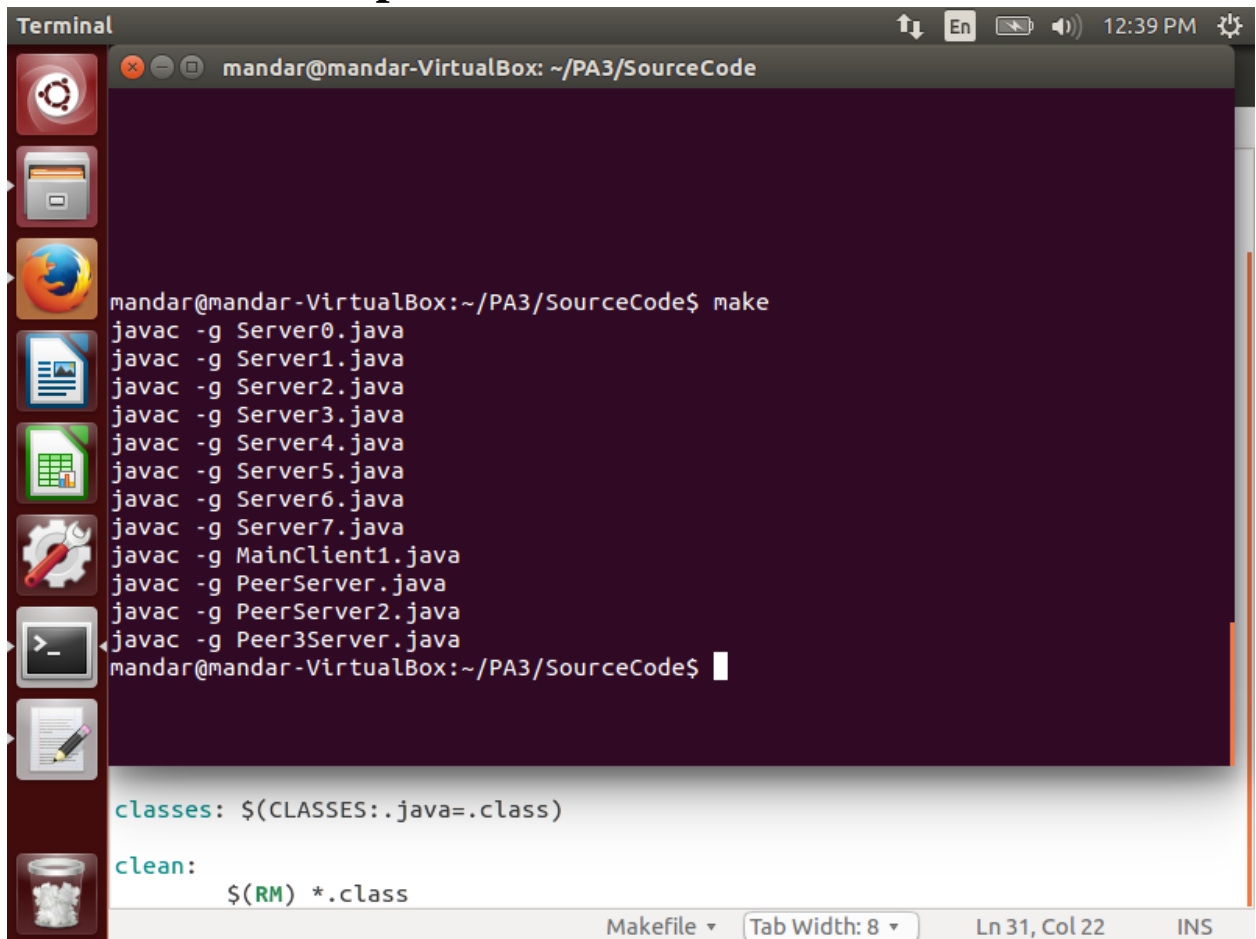

17. File replication:



```
Terminal
mandar@mandar-VirtualBox: ~/PA3/Peer1
mandar@mandar-VirtualBox:~/PA3/Peer1$ clear
mandar@mandar-VirtualBox:~/PA3/Peer1$ javac MainClient1.java
mandar@mandar-VirtualBox:~/PA3/Peer1$ java MainClient1
Attempting to connect to host mandar-VirtualBox on Server.
Enter the operation you want to perform according to syntax as:
For Registry: Put Filename PeerID
For Search: Search Filename
For Downloading a file: Obtain Filename
put file2.txt peer1
Registering at Server number:0
Entry added
Registering replicated entry at Server number:1
Replicated Entry added
search file2.txt
Location of file is:[peer1]
obtain file2.txt
File is with Peer:peer1
Couldn't get I/O for the connection to: mandar-VirtualBox
Peer1 Server not working
Getting replicated file from Peer2
Done
Do you still want to continue?(y/n)
y
```

PeerServer.java

18. Make file output:



```
Terminal
mandar@mandar-VirtualBox: ~/PA3/SourceCode

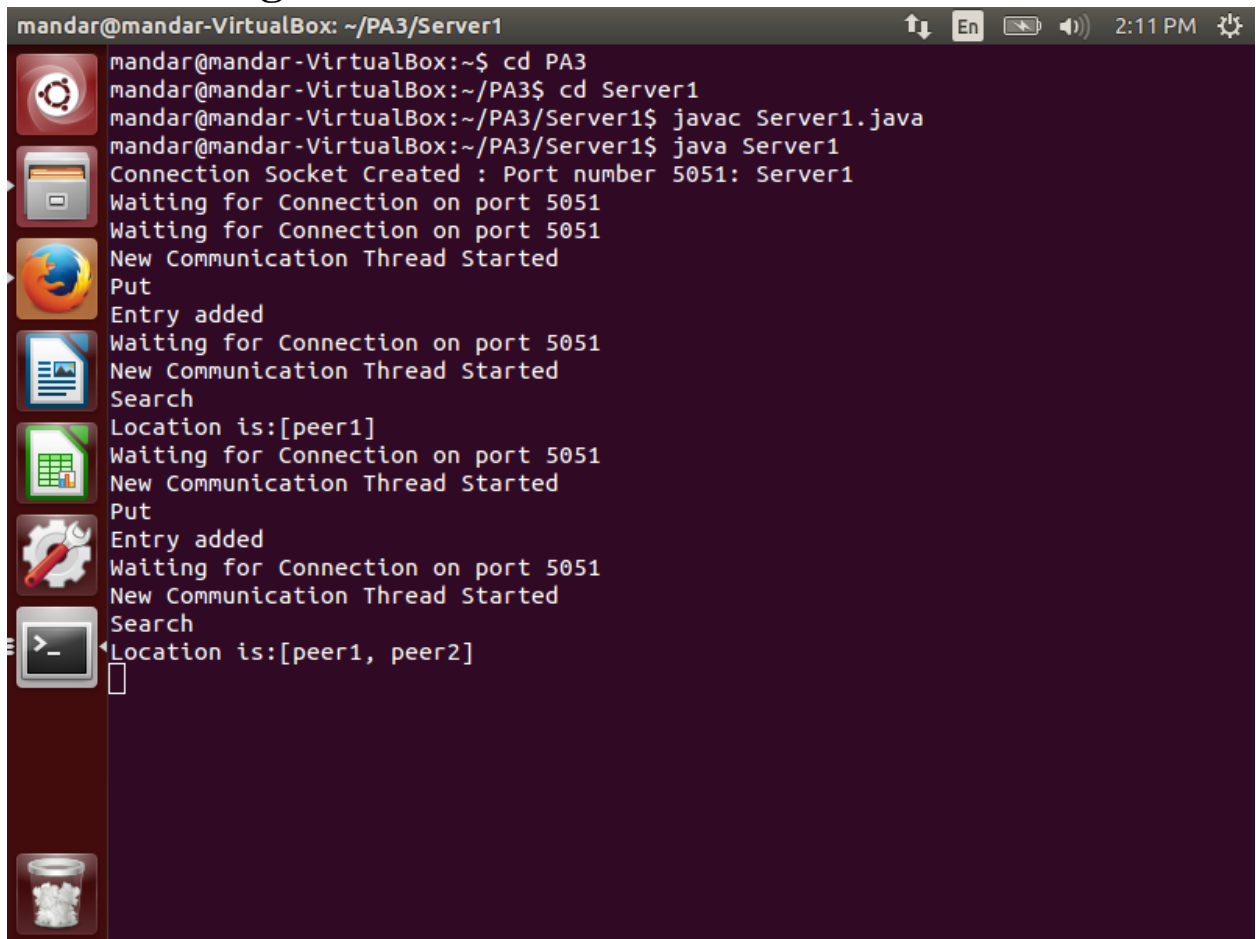
mandar@mandar-VirtualBox:~/PA3/SourceCode$ make
javac -g Server0.java
javac -g Server1.java
javac -g Server2.java
javac -g Server3.java
javac -g Server4.java
javac -g Server5.java
javac -g Server6.java
javac -g Server7.java
javac -g MainClient1.java
javac -g PeerServer.java
javac -g PeerServer2.java
javac -g Peer3Server.java
mandar@mandar-VirtualBox:~/PA3/SourceCode$

classes: ${CLASSES:.java=.class}

clean:
    $(RM) *.class
```

Makefile ▾ Tab Width: 8 ▾ Ln 31, Col 22 INS

19. Indexing Server Screen:



```
mandar@mandar-VirtualBox: ~/PA3/Server1
mandar@mandar-VirtualBox:~$ cd PA3
mandar@mandar-VirtualBox:~/PA3$ cd Server1
mandar@mandar-VirtualBox:~/PA3/Server1$ javac Server1.java
mandar@mandar-VirtualBox:~/PA3/Server1$ java Server1
Connection Socket Created : Port number 5051: Server1
Waiting for Connection on port 5051
Waiting for Connection on port 5051
New Communication Thread Started
Put
Entry added
Waiting for Connection on port 5051
New Communication Thread Started
Search
Location is:[peer1]
Waiting for Connection on port 5051
New Communication Thread Started
Put
Entry added
Waiting for Connection on port 5051
New Communication Thread Started
Search
Location is:[peer1, peer2]
```