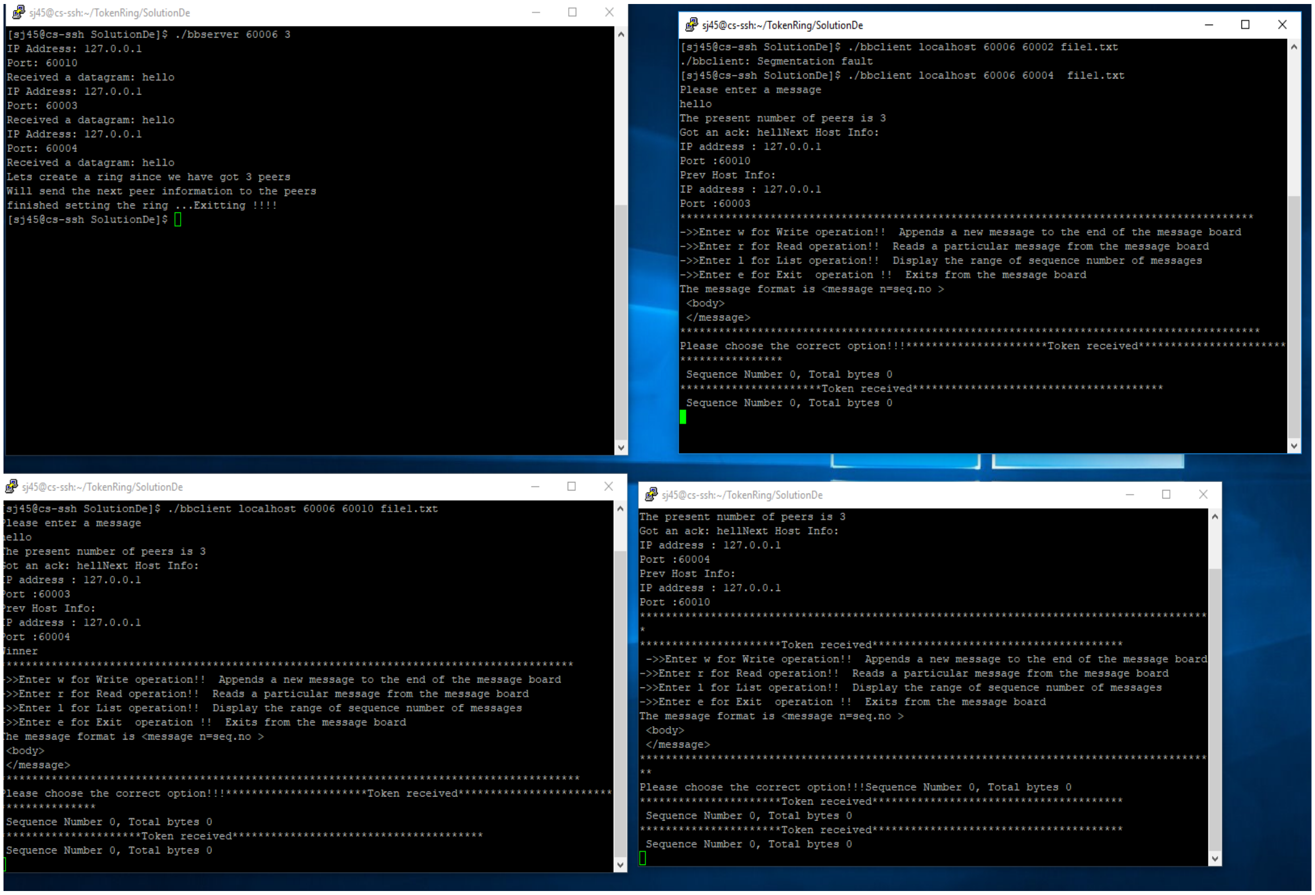
Project 2: Token Ring

This document contains screen shots of how the token ring is set up and run on our SSH server. The following screen shots only reveal how the program will be run and tested.

As the first step, we run the server code. The following command starts the server code.

./bbserver 60006 3

You can see in this in the top left window in Figure 1.


sj45@cs-ssh:~/TokenRing/SolutionDe
sj45@cs-ssh:~/TokenRing/SolutionDe
sj45@cs-ssh:~/TokenRing/SolutionDe
sj45@cs-ssh:~/TokenRing/SolutionDe

```
[sj45@cs-ssh SolutionDe]$ ./bbserver 60006 3
IP Address: 127.0.0.1
Port: 60010
Received a datagram: hello
IP Address: 127.0.0.1
Port: 60003
Received a datagram: hello
IP Address: 127.0.0.1
Port: 60004
Received a datagram: hello
Lets create a ring since we have got 3 peers
Will send the next peer information to the peers
finished setting the ring ...Exitting !!!!
[sj45@cs-ssh SolutionDe]$
```

```
[sj45@cs-ssh SolutionDe]$ ./bbclient localhost 60006 60002 file1.txt
./bbclient: Segmentation fault
[sj45@cs-ssh SolutionDe]$ ./bbclient localhost 60006 60004  file1.txt
Please enter a message
hello
The present number of peers is 3
Got an ack: hellNext Host Info:
IP address : 127.0.0.1
Port :60010
Prev Host Info:
IP address : 127.0.0.1
Port :60003
****************************************************************************************
->>Enter w for Write operation!!  Appends a new message to the end of the message board
->>Enter r for Read operation!!  Reads a particular message from the message board
->>Enter l for List operation!!  Display the range of sequence number of messages
->>Enter e for Exit  operation !!  Exits from the message board
The message format is <message n=seq.no >
 <body>
 </message>
*****************************************************************************************
Please choose the correct option!!!*********************Token received******************
****************
 Sequence Number 0, Total bytes 0
*********************Token received*************************************
 Sequence Number 0, Total bytes 0
```

```
[sj45@cs-ssh SolutionDe]$ ./bbclient localhost 60006 60010 file1.txt
lease enter a message
ello
he present number of peers is 3
ot an ack: hellNext Host Info:
P address : 127.0.0.1
ort :60003
rev Host Info:
P address : 127.0.0.1
ort :60004
inner
****************************************************************************************
->>Enter w for Write operation!!  Appends a new message to the end of the message board
->>Enter r for Read operation!!  Reads a particular message from the message board
->>Enter l for List operation!!  Display the range of sequence number of messages
->>Enter e for Exit  operation !!  Exits from the message board
he message format is <message n=seq.no >
 <body>
 </message>
*****************************************************************************************
lease choose the correct option!!!*********************Token received*******************
**************
 Sequence Number 0, Total bytes 0
*********************Token received*************************************
 Sequence Number 0, Total bytes 0
```

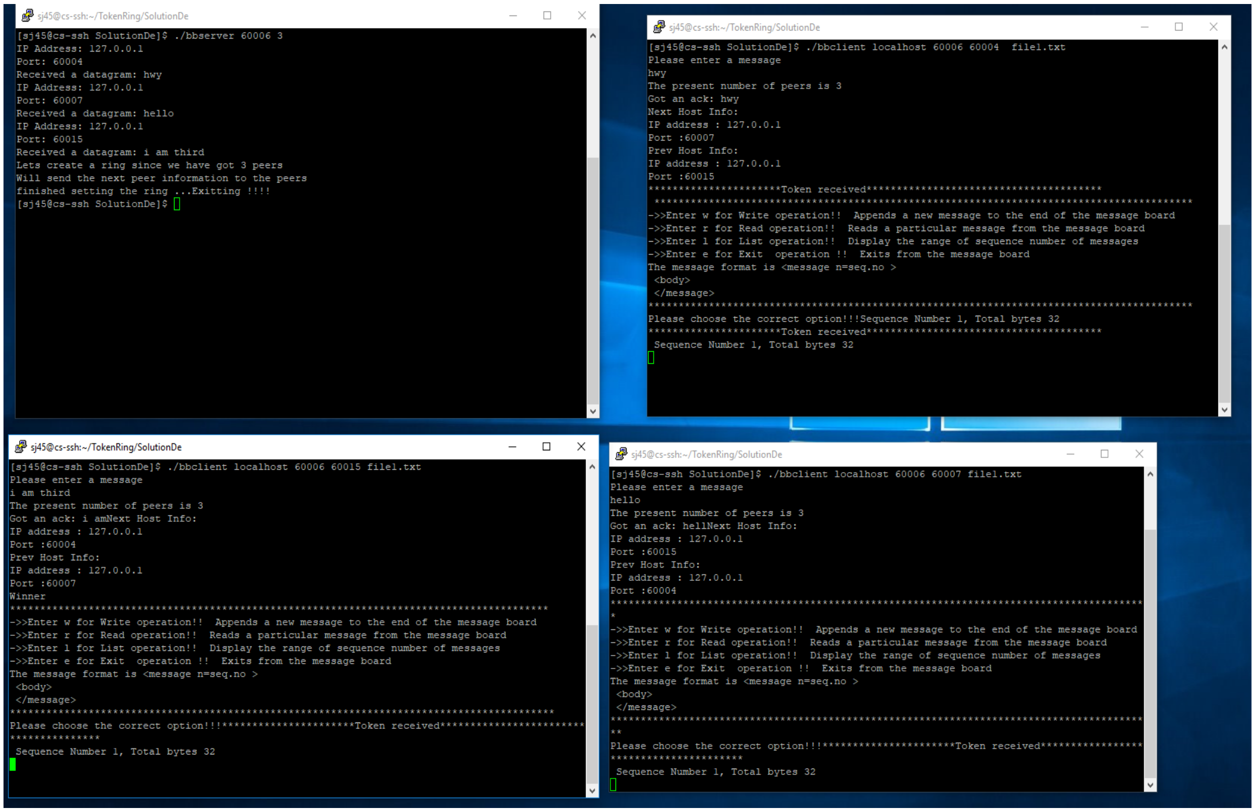
```
The present number of peers is 3
Got an ack: hellNext Host Info:
IP address : 127.0.0.1
Port :60004
Prev Host Info:
IP address : 127.0.0.1
Port :60010
****************************************************************************************
*
*********************Token received*************************************
 ->>Enter w for Write operation!!  Appends a new message to the end of the message board
->>Enter r for Read operation!!  Reads a particular message from the message board
->>Enter l for List operation!!  Display the range of sequence number of messages
->>Enter e for Exit  operation !!  Exits from the message board
The message format is <message n=seq.no >
 <body>
 </message>
****************************************************************************************
**
Please choose the correct option!!!Sequence Number 0, Total bytes 0
*********************Token received*************************************
 Sequence Number 0, Total bytes 0
*********************Token received*************************************
 Sequence Number 0, Total bytes 0
```

Figure 1: Creation of Token Ring

After which the bulletinboard file is created by the user in this case file1.txt. Once the file is created we create three sessions on which we run the peers to form the token ring. The command to run the peers is ./bbclient localhost <serverport> <peerport> file1.txt.

In the above **Figure1** you see the I have invoked three peers which connected to the server port. In this implementation once each peer is started, they send a message to the server and you see the acknowledgement on the server side. After three peers are started, the server creates the ring and exits gracefully.

Figure2 shows how the token is getting passed in the ring.


sj45@cs-ssh:~/TokenRing/SolutionDe

```
[sj45@cs-ssh SolutionDe]$ ./bbserver 60006 3
IP Address: 127.0.0.1
Port: 60004
Received a datagram: hwy
IP Address: 127.0.0.1
Port: 60007
Received a datagram: hello
IP Address: 127.0.0.1
Port: 60015
Received a datagram: i am third
Lets create a ring since we have got 3 peers
Will send the next peer information to the peers
finished setting the ring ...Exitting !!!!
[sj45@cs-ssh SolutionDe]$
```

sj45@cs-ssh:~/TokenRing/SolutionDe

```
[sj45@cs-ssh SolutionDe]$ ./bbclient localhost 60006 60004  file1.txt
Please enter a message
hwy
The present number of peers is 3
Got an ack: hwy
Next Host Info:
IP address : 127.0.0.1
Port :60007
Prev Host Info:
IP address : 127.0.0.1
Port :60015
**********************Token received*************************************
 *****************************************************************************************
->>Enter w for Write operation!!  Appends a new message to the end of the message board
->>Enter r for Read operation!!  Reads a particular message from the message board
->>Enter l for List operation!!  Display the range of sequence number of messages
->>Enter e for Exit  operation !!  Exits from the message board
The message format is <message n=seq.no >
 <body>
 </message>
*****************************************************************************************
Please choose the correct option!!!Sequence Number 1, Total bytes 32
**********************Token received*************************************
 Sequence Number 1, Total bytes 32
```

```
[sj45@cs-ssh SolutionDe]$ ./bbclient localhost 60006 60015 file1.txt
Please enter a message
i am third
The present number of peers is 3
Got an ack: i amNext Host Info:
IP address : 127.0.0.1
Port :60004
Prev Host Info:
IP address : 127.0.0.1
Port :60007
Winner
*****************************************************************************************
->>Enter w for Write operation!!  Appends a new message to the end of the message board
->>Enter r for Read operation!!  Reads a particular message from the message board
->>Enter l for List operation!!  Display the range of sequence number of messages
->>Enter e for Exit  operation !!  Exits from the message board
The message format is <message n=seq.no >
 <body>
 </message>
*****************************************************************************************
Please choose the correct option!!!**********************Token received************************
***************
 Sequence Number 1, Total bytes 32
```

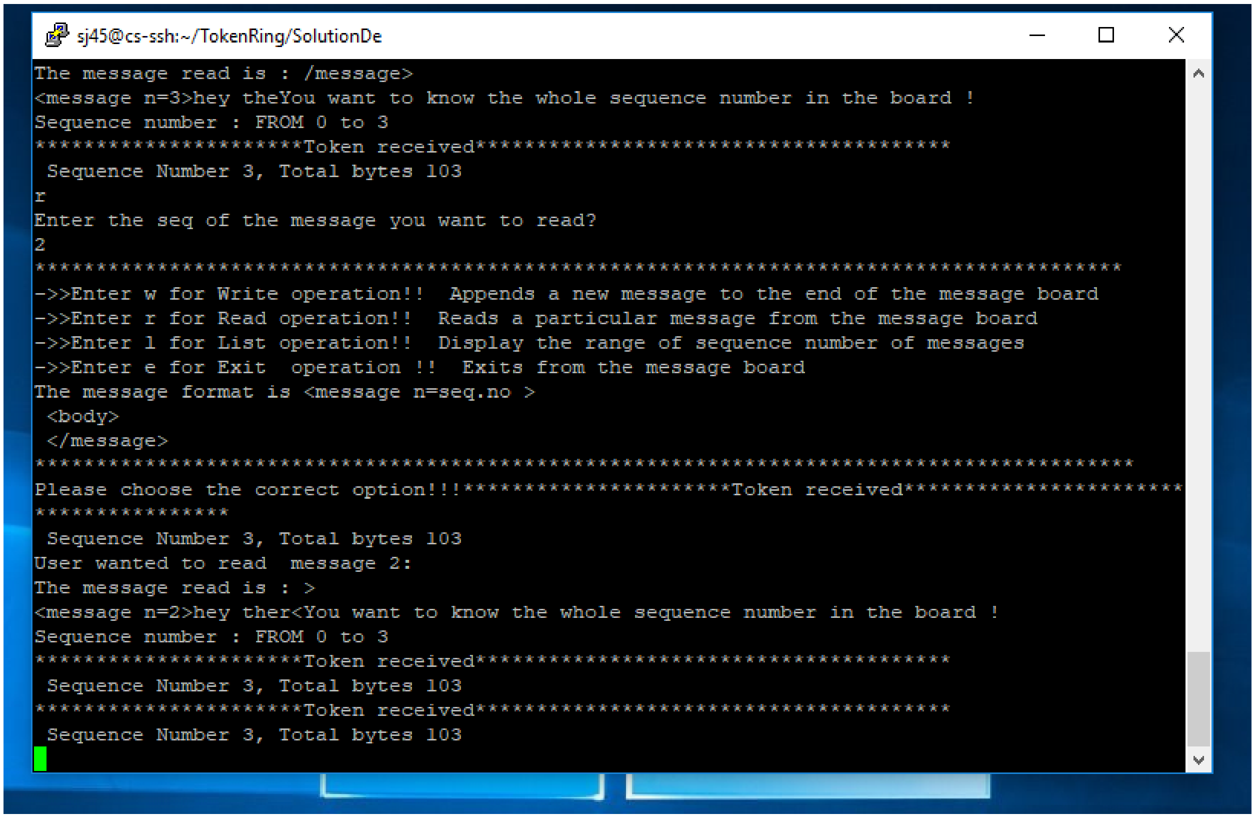
```
[sj45@cs-ssh SolutionDe]$ ./bbclient localhost 60006 60007 file1.txt
Please enter a message
hello
The present number of peers is 3
Got an ack: hellNext Host Info:
IP address : 127.0.0.1
Port :60015
Prev Host Info:
IP address : 127.0.0.1
Port :60004
*****************************************************************************************
*
->>Enter w for Write operation!!  Appends a new message to the end of the message board
->>Enter r for Read operation!!  Reads a particular message from the message board
->>Enter l for List operation!!  Display the range of sequence number of messages
->>Enter e for Exit  operation !!  Exits from the message board
The message format is <message n=seq.no >
 <body>
 </message>
*****************************************************************************************
**
Please choose the correct option!!!**********************Token received*****************
**********************
 Sequence Number 1, Total bytes 32
```

Figure 2: Token Passing

In the bottom left window (i,e., peer 2) is the first to get the token (Winner!) that proceeds to display the options. The logic to choose the winner among the three peers it totally your choice. In this implementation the peer whose port is divisible by 5 is chosen the Winner. After which you can see the token is getting passed among the peers (Notice the Token Received phrase in the other windows namely top right and bottom right, denoted which peer currently has the token).

Each of the peer can now choose to do the following:

- Read
- Write
- List
- Exit

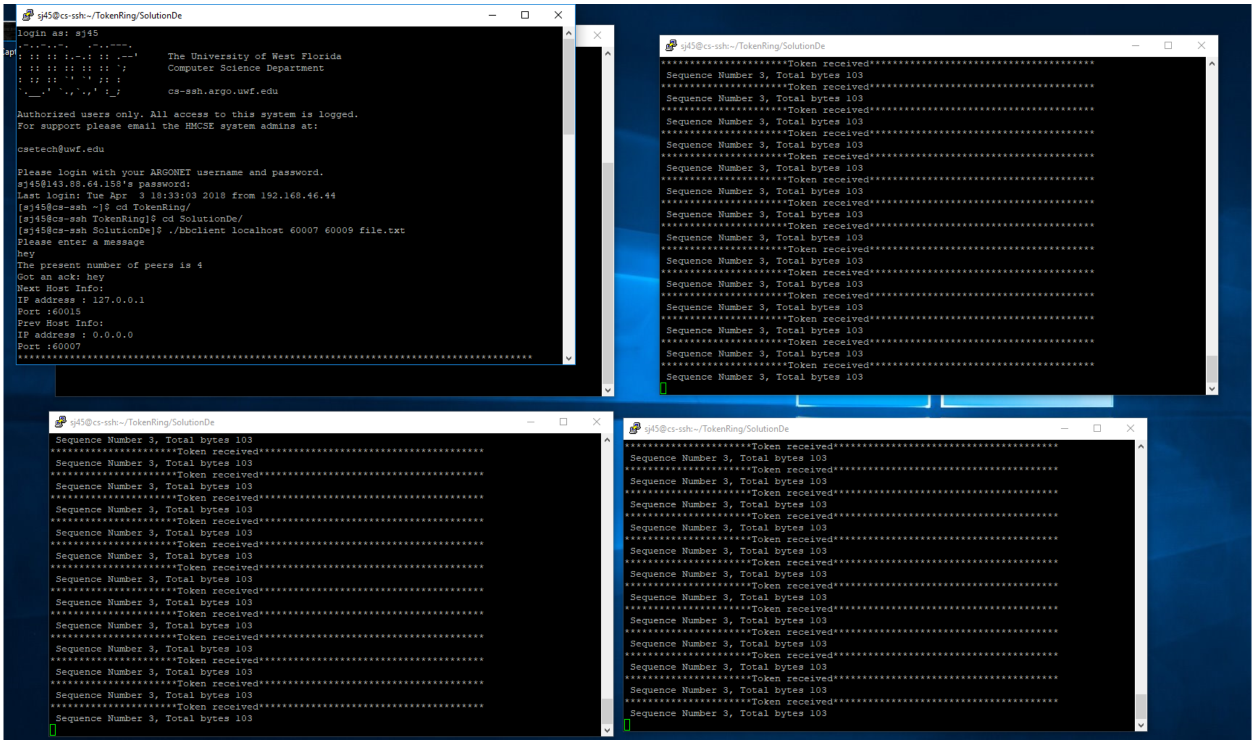


```
The message read is : /message>
<message n=3>hey theYou want to know the whole sequence number in the board !
Sequence number : FROM 0 to 3
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
r
Enter the seq of the message you want to read?
2
*****************************************************************************************
->>Enter w for Write operation!!  Appends a new message to the end of the message board
->>Enter r for Read operation!!  Reads a particular message from the message board
->>Enter l for List operation!!  Display the range of sequence number of messages
->>Enter e for Exit  operation !!  Exits from the message board
The message format is <message n=seq.no >
 <body>
 </message>
******************************************************************************************
Please choose the correct option!!!**********************Token received***********************
****************
 Sequence Number 3, Total bytes 103
User wanted to read  message 2:
The message read is : >
<message n=2>hey ther<You want to know the whole sequence number in the board !
Sequence number : FROM 0 to 3
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
```

Figure 3: a scenario where a peer reads a message that was posted in the bulletinboard (file1.txt)

In Figure 3 the Sequence Number denote the number of messages that was written into the bulletin board. In Figure 3 you can see that the peer issues a read request, the program the prompts the peer to enter the sequence number. Once the peer the peer specifies the number the message (“hey ther”) is displayed.

Similarly writes can also be performed when a peer receives a token.



```
login as: sj45
.-..-..-.   .-..---.
: :: :: :.-.: :: .--'      The University of West Florida
: :: :: :: :: :: `;        Computer Science Department
: :; :: `' `' ;: :
`.__.' `.,`.,' :_;         cs-ssh.argo.uwf.edu

Authorized users only. All access to this system is logged.
For support please email the HMCSE system admins at:

csetech@uwf.edu

Please login with your ARGONET username and password.
sj45@143.88.64.158's password:
Last login: Tue Apr  3 18:33:03 2018 from 192.168.46.44
[sj45@cs-ssh ~]$ cd TokenRing/
[sj45@cs-ssh TokenRing]$ cd SolutionDe/
[sj45@cs-ssh SolutionDe]$ ./bbclient localhost 60007 60009 file.txt
Please enter a message
hey
The present number of peers is 4
Got an ack: hey
Next Host Info:
IP address : 127.0.0.1
Port :60015
Prev Host Info:
IP address : 0.0.0.0
Port :60007
****************************************************************************************
```

```
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
```

```
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
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**********************Token received***************************************
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**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
```

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**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
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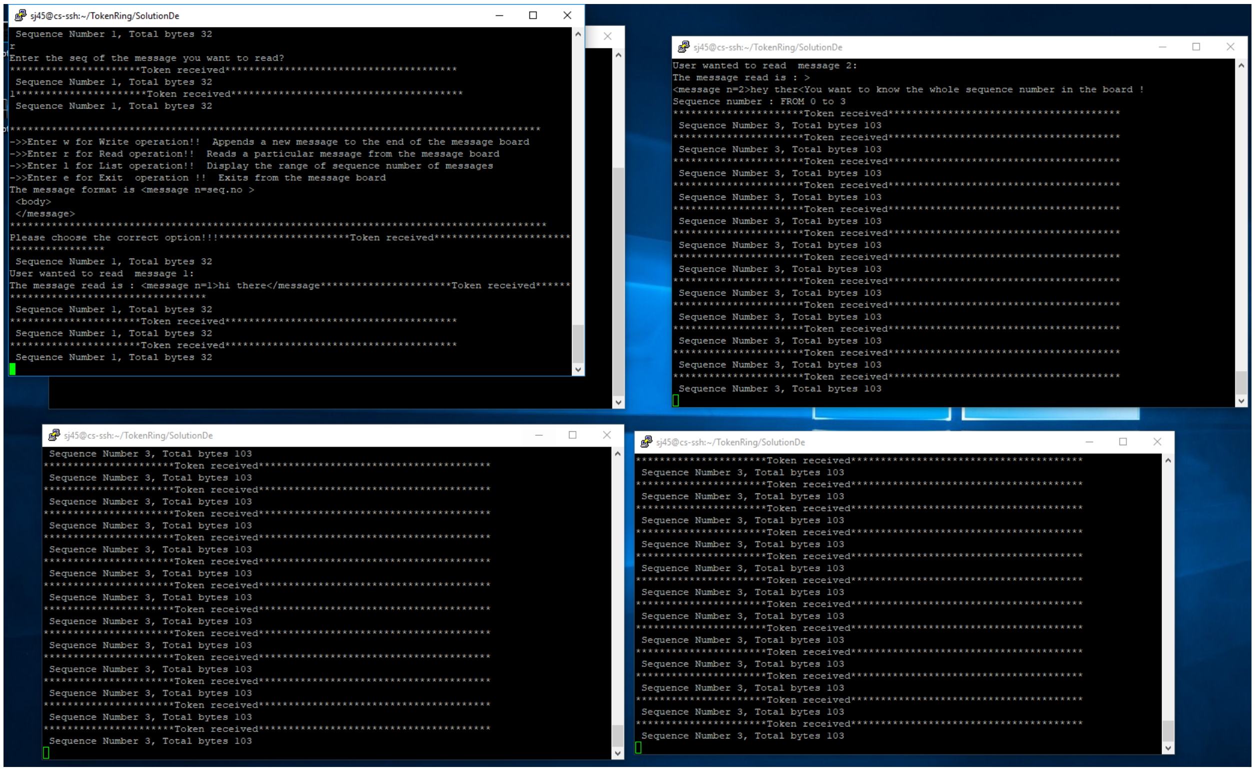
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
```

Figure 4: Joining a Ring

Figure 4 shows the scenario when a new peer enters the already existing ring. If you see the top right window, it connects to one of the already existing peers. Once the request is acknowledged, it is recognized as peer 4 thus successfully joining the ring.

Figure 5 depicts the scenario of peer 4 reading message from the bulletin board (file1.txt)



```
 Sequence Number 1, Total bytes 32
r
Enter the seq of the message you want to read?
**********************Token received***************************************
 Sequence Number 1, Total bytes 32
1**********************Token received***************************************
 Sequence Number 1, Total bytes 32

******************************************************************************************
->>Enter w for Write operation!!  Appends a new message to the end of the message board
->>Enter r for Read operation!!  Reads a particular message from the message board
->>Enter l for List operation!!  Display the range of sequence number of messages
->>Enter e for Exit  operation !!  Exits from the message board
The message format is <message n=seq.no >
 <body>
 </message>
*******************************************************************************************
Please choose the correct option!!!**********************Token received***********************
****************
 Sequence Number 1, Total bytes 32
User wanted to read  message 1:
The message read is : <message n=1>hi there</message**********************Token received******
*********************************
 Sequence Number 1, Total bytes 32
**********************Token received***************************************
 Sequence Number 1, Total bytes 32
**********************Token received***************************************
 Sequence Number 1, Total bytes 32
```

```
User wanted to read  message 2:
The message read is : >
<message n=2>hey ther<You want to know the whole sequence number in the board !
Sequence number : FROM 0 to 3
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
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**********************Token received***************************************
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**********************Token received***************************************
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**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
```

```
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
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**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
```

```
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
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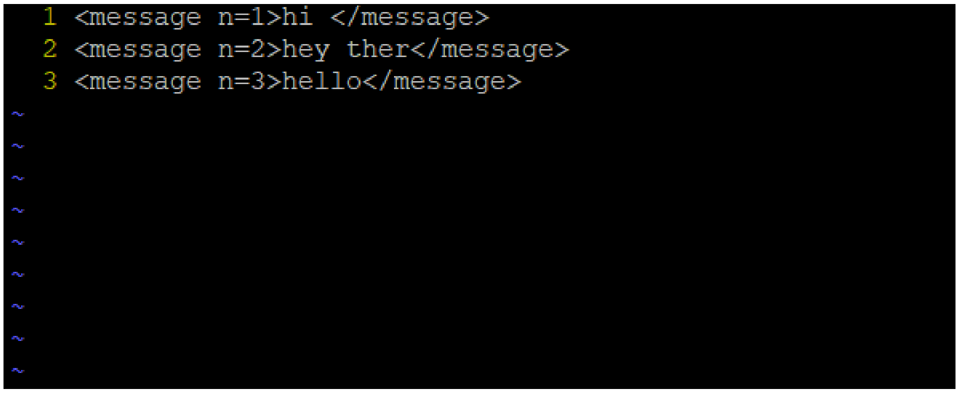
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
**********************Token received***************************************
 Sequence Number 3, Total bytes 103
```

Figure 5: Peer 4 reading messages

Figure 6 shows how the messages written to the bulletin board is stored.



```
<message n=1>hi </message>
<message n=2>hey ther</message>
<message n=3>hello</message>
~
~
~
~
~
~
~
~
~
```

Figure 6: Message Format