

Test Case 1: All peers running locally on student machine

Description: In this test all nodes are started on a single student machine(non edlab machine).

Parameters: N=6, hop = 3, stock = 5

Result: Peers 3,4,5,6 are sellers. Peers 1 and 2 are buyers
Buying and selling happening successfully.

Sample Output:

Peer 1

```
cmd Select Command Prompt - java Peer 1
4 warnings

C:\Users\swaru\OneDrive\Documents\UMass\677\lab-1-sp\src>java Peer 1
Server ready
Added neighbor 2
Added neighbor 6
I am a buyer

Product chosen : Salt

lookup called by 1 at {SysUpTime = 179599 days 12:51:6} {Timestamp = Mon Mar 04 17:53:06 EST 2019}
Got reply from nodeID : 6
Buying from 6
Succeeded buying from 6  TimeStamp = {SysUpTime = 179599 days 12:51:7} {Timestamp = Mon Mar 04 17:53:06 EST 2019}
Waiting for 2 seconds

Product chosen : Fish

lookup called by 1 at {SysUpTime = 179599 days 12:51:17} {Timestamp = Mon Mar 04 17:53:07 EST 2019}
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5  TimeStamp = {SysUpTime = 179599 days 12:51:18} {Timestamp = Mon Mar 04 17:53:07 EST 2019}
Waiting for 3 seconds

Product chosen : Salt

lookup called by 1 at {SysUpTime = 179599 days 12:51:38} {Timestamp = Mon Mar 04 17:53:09 EST 2019}
Got reply from nodeID : 6
Buying from 6
Succeeded buying from 6  TimeStamp = {SysUpTime = 179599 days 12:51:38} {Timestamp = Mon Mar 04 17:53:09 EST 2019}
```

Peer 2

```
cmd Command Prompt - java Peer 2
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5  TimeStamp = {SysUpTime = 179599 days 13:17:1} {Timestamp = Mon Mar 04 17:55:42 EST 2019}
Waiting for 3 seconds

Product chosen : Fish

lookup called by 2 at {SysUpTime = 179599 days 13:17:22} {Timestamp = Mon Mar 04 17:55:44 EST 2019}
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5  TimeStamp = {SysUpTime = 179599 days 13:17:22} {Timestamp = Mon Mar 04 17:55:44 EST 2019}
Waiting for 7 seconds

Product chosen : Fish

lookup called by 2 at {SysUpTime = 179599 days 13:18:22} {Timestamp = Mon Mar 04 17:55:50 EST 2019}
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5  TimeStamp = {SysUpTime = 179599 days 13:18:23} {Timestamp = Mon Mar 04 17:55:50 EST 2019}
Waiting for 1 seconds

Product chosen : Boar

lookup called by 2 at {SysUpTime = 179599 days 13:18:23} {Timestamp = Mon Mar 04 17:55:50 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3  TimeStamp = {SysUpTime = 179599 days 13:18:23} {Timestamp = Mon Mar 04 17:55:50 EST 2019}
Waiting for 5 seconds
```

Peer 3

```
Command Prompt - java Peer 3
Received a buy request for Boar from 2
Sold item Boar to node 2
Remaining stock : 4    TimeStamp: {SysUpTime = 179599 days 12:59:0} {Timestamp = Mon Mar 04 17:53:54 EST 2019}
Received a buy request for Boar from 2
Sold item Boar to node 2
Remaining stock : 3    TimeStamp: {SysUpTime = 179599 days 13:0:1} {Timestamp = Mon Mar 04 17:54:00 EST 2019}
Received a buy request for Boar from 2
Sold item Boar to node 2
Remaining stock : 2    TimeStamp: {SysUpTime = 179599 days 13:3:23} {Timestamp = Mon Mar 04 17:54:20 EST 2019}
Received a buy request for Boar from 2
Sold item Boar to node 2
Remaining stock : 1    TimeStamp: {SysUpTime = 179599 days 13:3:43} {Timestamp = Mon Mar 04 17:54:22 EST 2019}
Received a buy request for Boar from 2
Sold item Boar to node 2
Remaining stock : 0    TimeStamp: {SysUpTime = 179599 days 13:4:54} {Timestamp = Mon Mar 04 17:54:29 EST 2019}
Product chosen : Salt

Received a buy request for Boar from 2
Sold item Boar to node 2
Remaining stock : 4    TimeStamp: {SysUpTime = 179599 days 13:7:26} {Timestamp = Mon Mar 04 17:54:44 EST 2019}
Received a buy request for Boar from 2
Sold item Boar to node 2
Remaining stock : 3    TimeStamp: {SysUpTime = 179599 days 13:13:49} {Timestamp = Mon Mar 04 17:55:22 EST 2019}
Received a buy request for Boar from 2
Sold item Boar to node 2
Remaining stock : 2    TimeStamp: {SysUpTime = 179599 days 13:18:23} {Timestamp = Mon Mar 04 17:55:50 EST 2019}
Received a buy request for Boar from 2
Sold item Boar to node 2
Remaining stock : 1    TimeStamp: {SysUpTime = 179599 days 13:20:45} {Timestamp = Mon Mar 04 17:56:04 EST 2019}
```

Peer 4

```
Command Prompt - java Peer 4
C:\Users\swaru\OneDrive\Documents\UMass\677\lab-1-sp\src>java Peer 4
Server ready
Added neighbor 3
Added neighbor 5
I am a seller

Product chosen : Salt

Received a buy request for Salt from 2
Sold item Salt to node 2
Remaining stock : 4    TimeStamp: {SysUpTime = 179599 days 12:55:27} {Timestamp = Mon Mar 04 17:53:32 EST 2019}
Received a buy request for Salt from 2
Sold item Salt to node 2
Remaining stock : 3    TimeStamp: {SysUpTime = 179599 days 12:56:28} {Timestamp = Mon Mar 04 17:53:38 EST 2019}
Received a buy request for Salt from 2
Sold item Salt to node 2
Remaining stock : 2    TimeStamp: {SysUpTime = 179599 days 13:2:53} {Timestamp = Mon Mar 04 17:54:17 EST 2019}
Received a buy request for Salt from 2
Sold item Salt to node 2
Remaining stock : 1    TimeStamp: {SysUpTime = 179599 days 13:15:50} {Timestamp = Mon Mar 04 17:55:35 EST 2019}
Received a buy request for Salt from 2
Sold item Salt to node 2
Remaining stock : 0    TimeStamp: {SysUpTime = 179599 days 13:16:31} {Timestamp = Mon Mar 04 17:55:39 EST 2019}
Product chosen : Fish

Received a buy request for Salt from 2
Sold item Salt to node 2
Remaining stock : 4    TimeStamp: {SysUpTime = 179599 days 13:23:48} {Timestamp = Mon Mar 04 17:56:22 EST 2019}
```

Peer 5

```
Command Prompt - java Peer 5
Remaining stock : 3      TimeStamp: {SysUpTime = 179599 days 13:9:37} {Timestamp = Mon Mar 04 17:54:57 EST 2019}
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 2      TimeStamp: {SysUpTime = 179599 days 13:17:1} {Timestamp = Mon Mar 04 17:55:42 EST 2019}
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 1      TimeStamp: {SysUpTime = 179599 days 13:17:22} {Timestamp = Mon Mar 04 17:55:44 EST 2019}
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 0      TimeStamp: {SysUpTime = 179599 days 13:18:22} {Timestamp = Mon Mar 04 17:55:50 EST 2019}
Product chosen : Salt

Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 4      TimeStamp: {SysUpTime = 179599 days 13:19:4} {Timestamp = Mon Mar 04 17:55:54 EST 2019}
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 3      TimeStamp: {SysUpTime = 179599 days 13:19:34} {Timestamp = Mon Mar 04 17:55:57 EST 2019}
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 2      TimeStamp: {SysUpTime = 179599 days 13:20:55} {Timestamp = Mon Mar 04 17:56:05 EST 2019}
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 1      TimeStamp: {SysUpTime = 179599 days 13:26:31} {Timestamp = Mon Mar 04 17:56:39 EST 2019}
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 0      TimeStamp: {SysUpTime = 179599 days 13:26:41} {Timestamp = Mon Mar 04 17:56:40 EST 2019}
Product chosen : Salt
```

Peer 6

```
Command Prompt - java Peer 6
Added neighbor 5
Added neighbor 1
I am a seller

Product chosen : Salt

Received a buy request for Salt from 1
Sold item Salt to node 1
Remaining stock : 4      TimeStamp: {SysUpTime = 179599 days 12:51:7} {Timestamp = Mon Mar 04 17:53:06 EST 2019}
Received a buy request for Salt from 1
Sold item Salt to node 1
Remaining stock : 3      TimeStamp: {SysUpTime = 179599 days 12:51:38} {Timestamp = Mon Mar 04 17:53:09 EST 2019}
Received a buy request for Salt from 1
Sold item Salt to node 1
Remaining stock : 2      TimeStamp: {SysUpTime = 179599 days 12:52:48} {Timestamp = Mon Mar 04 17:53:16 EST 2019}
Received a buy request for Salt from 1
Sold item Salt to node 1
Remaining stock : 1      TimeStamp: {SysUpTime = 179599 days 12:54:0} {Timestamp = Mon Mar 04 17:53:24 EST 2019}
Received a buy request for Salt from 2
Sold item Salt to node 2
Remaining stock : 0      TimeStamp: {SysUpTime = 179599 days 13:8:37} {Timestamp = Mon Mar 04 17:54:51 EST 2019}
Product chosen : Fish

Received a buy request for Salt from 2
Sold item Salt to node 2
Remaining stock : 4      TimeStamp: {SysUpTime = 179599 days 13:10:58} {Timestamp = Mon Mar 04 17:55:05 EST 2019}
Received a buy request for Salt from 2
Sold item Salt to node 2
Remaining stock : 3      TimeStamp: {SysUpTime = 179599 days 13:12:28} {Timestamp = Mon Mar 04 17:55:14 EST 2019}
```

Test Case 2: Peers distributed across 2 student machines

Description: In this test 3 nodes were placed on one student machine and 3 on another. Nodes 1,2,3 are running on one machine, nodes 4,5,6 on the other.

Parameters: N=6, hop = 3, stock = 5

Sample Output:

Peer 1 is a seller

```
OpenSSH SSH client
elinux3 src) > java Peer 2 | more
Server ready
Added neighbor 1
Added neighbor 3
I am a seller

Product chosen : Salt

Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 4      TimeStamp: 2019-03-04 20:15:01.857
Received a buy request for Salt from 3
Sold item Salt to node 3
Remaining stock : 3      TimeStamp: 2019-03-04 20:15:27.452
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 2      TimeStamp: 2019-03-04 20:15:30.987
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 1      TimeStamp: 2019-03-04 20:15:33.029
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 0      TimeStamp: 2019-03-04 20:15:41.054
Product chosen : Fish

Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 4      TimeStamp: 2019-03-04 20:15:46.064
Received a buy request for Salt from 3
Sold item Salt to node 3
```

Peer 2 is a buyer

```
Command Prompt
lookup called by 2 at 2019-03-04 21:18:25.460
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5  TimeStamp = 2019-03-04 21:18:25.632
Waiting for 3 seconds

Product chosen : Salt

lookup called by 2 at 2019-03-04 21:18:27.653
No sellers available. Choosing product again

Product chosen : Boar

lookup called by 2 at 2019-03-04 21:18:27.778
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1  TimeStamp = 2019-03-04 21:18:27.919
Waiting for 5 seconds

Product chosen : Fish

lookup called by 2 at 2019-03-04 21:18:31.923
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5  TimeStamp = 2019-03-04 21:18:32.126
Waiting for 2 seconds

Product chosen : Salt
```

Peer 3 is a buyer

```
cmd Select Command Prompt
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 3 at 2019-03-04 21:18:01.471
No sellers available. Choosing product again

Product chosen : Fish

lookup called by 3 at 2019-03-04 21:18:26.591
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:18:27.028
Waiting for 2 seconds

Product chosen : Boar

lookup called by 3 at 2019-03-04 21:18:28.044
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 21:18:28.153
Waiting for 6 seconds

Product chosen : Fish

lookup called by 3 at 2019-03-04 21:18:33.158
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:18:33.298
Waiting for 3 seconds
```

Peer 4 is a buyer

```
vatsal@vatsal-OMEN ~/lab-1-sp-test/src
File Edit View Search Terminal Tabs Help
vatsal@vatsal-OMEN ~/lab-1-sp-test/src
vatsal@vatsal-OMEN ~/lab-1-sp-test/src
vatsal@vatsal-OMEN ~/lab-1-sp-test/src

Product chosen : Boar
lookup called by 4 at 2019-03-04 21:19:08.523
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 21:19:08.829
Waiting for 7 seconds

Product chosen : Fish
lookup called by 4 at 2019-03-04 21:19:14.830
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:19:14.877
Waiting for 3 seconds

Product chosen : Boar
lookup called by 4 at 2019-03-04 21:19:16.077
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 21:19:17.251
Waiting for 5 seconds

Product chosen : Fish
lookup called by 4 at 2019-03-04 21:19:21.251
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:19:21.304
Waiting for 1 seconds

Product chosen : Salt
lookup called by 4 at 2019-03-04 21:19:21.304
No sellers available. Choosing product again

Product chosen : Salt
lookup called by 4 at 2019-03-04 21:19:21.342
No sellers available. Choosing product again

Product chosen : Salt
lookup called by 4 at 2019-03-04 21:19:21.395
No sellers available. Choosing product again

Product chosen : Fish
lookup called by 4 at 2019-03-04 21:19:21.421
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:19:21.524
Waiting for 4 seconds

Product chosen : Salt
lookup called by 4 at 2019-03-04 21:19:24.524
No sellers available. Choosing product again

Product chosen : Fish
lookup called by 4 at 2019-03-04 21:19:24.564
Got reply from nodeID : 5

Test Case 3: All users are buyers
```

Peer 5 is a seller

```
vatsal@vatsal-OMEN ~$ cd lab-1-sp-test/src
vatsal@vatsal-OMEN ~$ java Peer 5
Server ready
Added neighbor 4
Added neighbor 6
I am a seller
Product chosen : Fish
Received a buy request for Fish from 4
Sold item Fish to node 4
Remaining stock : 4 TimeStamp: 2019-03-04 21:18:38.699
Received a buy request for Fish from 6
Sold item Fish to node 6
Remaining stock : 3 TimeStamp: 2019-03-04 21:18:38.785
Received a buy request for Fish from 4
Sold item Fish to node 4
Remaining stock : 3 TimeStamp: 2019-03-04 21:18:43.946
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 2 TimeStamp: 2019-03-04 21:18:49.216
Received a buy request for Fish from 4
Sold item Fish to node 4
Remaining stock : 0 TimeStamp: 2019-03-04 21:18:52.037
Product chosen : Fish
Received a buy request for Fish from 6
Sold item Fish to node 6
Remaining stock : 4 TimeStamp: 2019-03-04 21:18:53.273
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 3 TimeStamp: 2019-03-04 21:18:56.395
Received a buy request for Fish from 3
Sold item Fish to node 3
Remaining stock : 2 TimeStamp: 2019-03-04 21:18:57.788
Received a buy request for Fish from 6
Sold item Fish to node 6
Remaining stock : 1 TimeStamp: 2019-03-04 21:18:59.350
Received a buy request for Fish from 4
Sold item Fish to node 4
Remaining stock : 0 TimeStamp: 2019-03-04 21:19:00.209
Product chosen : Fish
Received a buy request for Fish from 4
Sold item Fish to node 4
Remaining stock : 4 TimeStamp: 2019-03-04 21:19:02.485
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 3 TimeStamp: 2019-03-04 21:19:02.983
Received a buy request for Fish from 3
Sold item Fish to node 3
Remaining stock : 2 TimeStamp: 2019-03-04 21:19:04.072
Received a buy request for Fish from 3
Sold item Fish to node 3
Remaining stock : 1 TimeStamp: 2019-03-04 21:19:06.392
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 0 TimeStamp: 2019-03-04 21:19:08.713
Product chosen : Fish
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 4 TimeStamp: 2019-03-04 21:19:14.094
Received a buy request for Fish from 6
Sold item Fish to node 6
Sample Output
Peer 6 is a buyer
```

Peer 6 is a buyer

```
vatsal@vatsal-OMEN ~$ cd lab-1-sp-test/src
vatsal@vatsal-OMEN ~$ java Peer 6
Server ready
Added neighbor 5
Added neighbor 1
I am a buyer
Product chosen : Fish
Lookup called by 6 at 2019-03-04 21:18:36.702
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:18:38.786
Waiting for 8 seconds
Product chosen : Boar
Lookup called by 6 at 2019-03-04 21:18:45.787
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 21:18:46.057
Waiting for 2 seconds
Product chosen : Boar
Lookup called by 6 at 2019-03-04 21:18:47.058
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 21:18:47.198
Waiting for 7 seconds
Product chosen : Fish
Lookup called by 6 at 2019-03-04 21:18:53.199
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:18:53.274
Waiting for 8 seconds
Product chosen : Fish
Lookup called by 6 at 2019-03-04 21:18:59.274
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:18:59.351
Waiting for 8 seconds
Product chosen : Salt
Lookup called by 6 at 2019-03-04 21:19:06.351
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 21:19:06.466
Waiting for 9 seconds
Product chosen : Fish
Lookup called by 6 at 2019-03-04 21:19:14.467
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:19:14.532
Waiting for 5 seconds
Product chosen : Salt
```

Test Case 3: All peers are buyers

Description: In this test, all nodes choose buyer roles

Parameters: N=6, hop = 3, stock = 5

Result: Peers 1,2,3,4,5,6 are all buyers

All nodes continuously lookup for their product but are unable to find sellers. This continues indefinitely. The sample output below illustrates how all nodes behave.

Sample output:

```
cmd Command Prompt
C:\Users\swaru\OneDrive\Documents\UMass\677\lab-1-sp\src>java Peer 1 | MORE
Server ready
Added neighbor 2
Added neighbor 6
Product chosen : Fish

lookup called by 1 at {SysUpTime = 179599 days 17:10:47} {Timestamp = Mon Mar 04 18:19:04 EST 2019}
No sellers available. Choosing product again

Product chosen : Fish

lookup called by 1 at {SysUpTime = 179599 days 17:10:48} {Timestamp = Mon Mar 04 18:19:04 EST 2019}
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 1 at {SysUpTime = 179599 days 17:10:48} {Timestamp = Mon Mar 04 18:19:04 EST 2019}
No sellers available. Choosing product again

Product chosen : Boar

lookup called by 1 at {SysUpTime = 179599 days 17:10:48} {Timestamp = Mon Mar 04 18:19:04 EST 2019}
No sellers available. Choosing product again

Product chosen : Boar

lookup called by 1 at {SysUpTime = 179599 days 17:10:48} {Timestamp = Mon Mar 04 18:19:04 EST 2019}
No sellers available. Choosing product again
```

Test Case 4: All peers are sellers

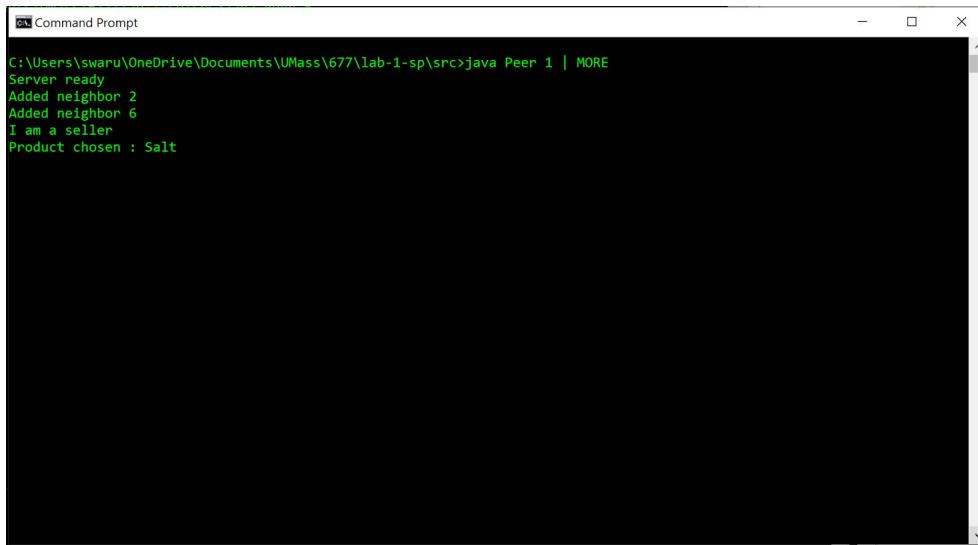
Description: All nodes choose seller roles with a certain product

Parameters: N=6, hop = 3, stock = 5

Result: Peers 1,2,3,4,5,6 are all buyers

All nodes choose to be sellers and pick a particular product to sell. Since there are no buyers in the system, the network continues to remain as is without any further transactions. The sample output below illustrates how all nodes behave.

Sample output:



```
C:\Users\swaru\OneDrive\Documents\UMass\677\lab-1-sp\src>java Peer 1 | MORE
Server ready
Added neighbor 2
Added neighbor 6
I am a seller
Product chosen : Salt
```

Test Case 5: All peers running on the same edlab machine

Description: A single edlab machine is used to create all the nodes

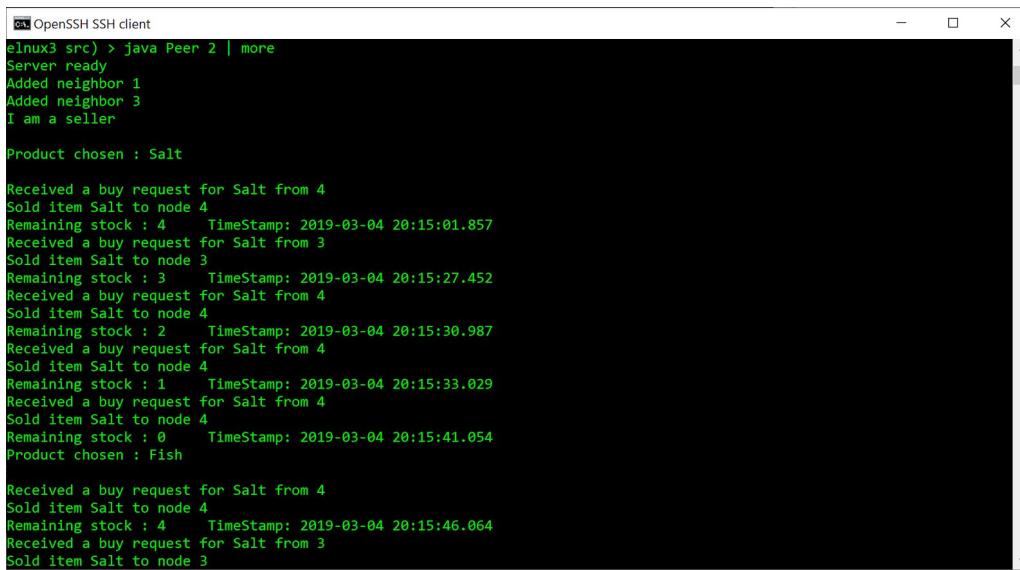
Parameters: N=6, hop = 3, stock = 5

Result: Peers 1, 2,6 were sellers and peers 3,4,5 were buyers

Transactions were made accordingly

Sample output: Here is a sample output to show seller and buyer screens

Peer 2 was a seller



```
OpenSSH SSH client
elinux3 src) > java Peer 2 | more
Server ready
Added neighbor 1
Added neighbor 3
I am a seller

Product chosen : Salt

Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 4      TimeStamp: 2019-03-04 20:15:01.857
Received a buy request for Salt from 3
Sold item Salt to node 3
Remaining stock : 3      TimeStamp: 2019-03-04 20:15:27.452
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 2      TimeStamp: 2019-03-04 20:15:30.987
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 1      TimeStamp: 2019-03-04 20:15:33.029
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 0      TimeStamp: 2019-03-04 20:15:41.054
Product chosen : Fish

Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 4      TimeStamp: 2019-03-04 20:15:46.064
Received a buy request for Salt from 3
Sold item Salt to node 3
```

Peer 3 was a buyer

```
OpenSSH SSH client
elnux3 src) > java Peer 3 | more
Server ready
Added neighbor 2
Added neighbor 4
I am a buyer

Product chosen : Salt

lookup called by 3 at 2019-03-04 20:14:53.335
Got reply from nodeID : 6
Buying from 6
Succeeded buying from 6 TimeStamp = 2019-03-04 20:14:53.359
Waiting for 9 seconds

Product chosen : Salt

lookup called by 3 at 2019-03-04 20:15:01.360
Got reply from nodeID : 1
Got reply from nodeID : 2
Got reply from nodeID : 6
Buying from 6
Succeeded buying from 6 TimeStamp = 2019-03-04 20:15:01.374
Waiting for 4 seconds

Product chosen : Salt

lookup called by 3 at 2019-03-04 20:15:04.375
Got reply from nodeID : 1
Got reply from nodeID : 2
Got reply from nodeID : 6
```

Test Case 6: Peers distributed across 2 edlab machines

Description: 3 nodes are created on one edlab machine and 3 on another. Nodes 1,2,3 are running on elinux7, and nodes 4,5,6 are running on elinux1.

Parameters: N=6, hop = 3, stock = 5

Result: Peer 5 was a seller, and peers 1,2,3,4,6 were buyers

Transactions were made accordingly

Sample Output:

Peer 1 was a buyer on elinux7

```
OpenSSH SSH client
elinux3 src) > java Peer 2 | more
Server ready
Added neighbor 1
Added neighbor 3
I am a seller

Product chosen : Salt

Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 4      TimeStamp: 2019-03-04 20:15:01.857
Received a buy request for Salt from 3
Sold item Salt to node 3
Remaining stock : 3      TimeStamp: 2019-03-04 20:15:27.452
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 2      TimeStamp: 2019-03-04 20:15:30.987
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 1      TimeStamp: 2019-03-04 20:15:33.029
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 0      TimeStamp: 2019-03-04 20:15:41.054
Product chosen : Fish

Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 4      TimeStamp: 2019-03-04 20:15:46.064
Received a buy request for Salt from 3
Sold item Salt to node 3
```

Peer 2 was a buyer on elinux7

```
Command Prompt
lookup called by 2 at 2019-03-04 21:18:25.460
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5  TimeStamp = 2019-03-04 21:18:25.632
Waiting for 3 seconds

Product chosen : Salt

lookup called by 2 at 2019-03-04 21:18:27.653
No sellers available. Choosing product again

Product chosen : Boar

lookup called by 2 at 2019-03-04 21:18:27.778
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1  TimeStamp = 2019-03-04 21:18:27.919
Waiting for 5 seconds

Product chosen : Fish

lookup called by 2 at 2019-03-04 21:18:31.923
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5  TimeStamp = 2019-03-04 21:18:32.126
Waiting for 2 seconds

Product chosen : Salt
```

Peer 3 was a buyer on elnux7

```
ca Select Command Prompt
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 3 at 2019-03-04 21:18:01.471
No sellers available. Choosing product again

Product chosen : Fish

lookup called by 3 at 2019-03-04 21:18:26.591
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:18:27.028
Waiting for 2 seconds

Product chosen : Boar

lookup called by 3 at 2019-03-04 21:18:28.044
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 21:18:28.153
Waiting for 6 seconds

Product chosen : Fish

lookup called by 3 at 2019-03-04 21:18:33.158
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:18:33.298
Waiting for 3 seconds
```

Peer 4 was a buyer on elnux1

```
vatsal@vatsal-OMEN ~/fab-1-sp-test/src
File Edit View Search Terminal Tabs Help
vatsal@vatsal-OMEN ~/fab-1-sp-test/src x vatsal@vatsal-OMEN ~/fab-1-sp-test/src x vatsal@vatsal-OMEN ~/fab-1-sp-test/src x
lookup called by 4 at 2019-03-04 21:36:35.636
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:36:35.640
Waiting for 10 seconds

Product chosen : Fish

lookup called by 4 at 2019-03-04 21:36:44.641
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 4 at 2019-03-04 21:36:44.645
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:36:44.650
Waiting for 7 seconds

Product chosen : Salt

lookup called by 4 at 2019-03-04 21:36:50.650
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:36:50.656
Waiting for 2 seconds

Product chosen : Fish

lookup called by 4 at 2019-03-04 21:36:51.656
No sellers available. Choosing product again

Product chosen : Bear

lookup called by 4 at 2019-03-04 21:36:51.660
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 4 at 2019-03-04 21:36:51.664
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:36:51.669
Waiting for 4 seconds

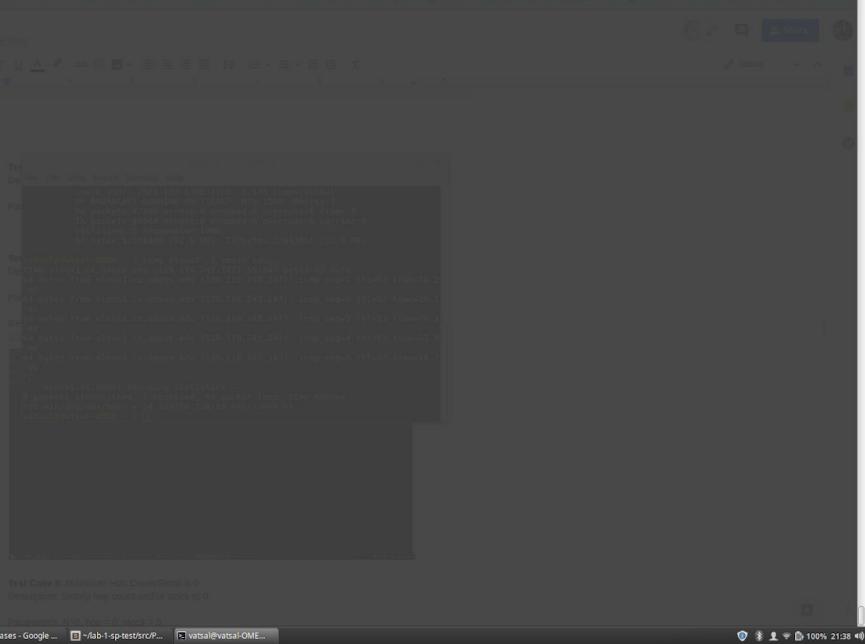
Product chosen : Salt

lookup called by 4 at 2019-03-04 21:36:54.669
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:36:54.675
Waiting for 2 seconds

Product chosen : Salt

lookup called by 4 at 2019-03-04 21:36:55.675
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:36:55.680
Waiting for 4 seconds

~Celnux1 src) ~
elnux1 src) > [ ]
```



Peer 5 was a buyer on elnu1

Peer 6 was a buyer on elnu1

```
vatsal@vatsal-OMEN ~$ab-1-sp-test/src
lookup called by 6 at 2019-03-04 21:36:47.866
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:36:47.865
Waiting for 3 seconds
Product chosen : Salt

lookup called by 6 at 2019-03-04 21:36:49.866
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:36:49.871
Waiting for 4 seconds
Product chosen : Fish

lookup called by 6 at 2019-03-04 21:36:52.871
No sellers available. Choosing product again
Product chosen : Bear

lookup called by 6 at 2019-03-04 21:36:52.876
No sellers available. Choosing product again
Product chosen : Bear

lookup called by 6 at 2019-03-04 21:36:52.880
No sellers available. Choosing product again
Product chosen : Bear

lookup called by 6 at 2019-03-04 21:36:52.884
No sellers available. Choosing product again
Product chosen : Fish

lookup called by 6 at 2019-03-04 21:36:52.888
No sellers available. Choosing product again
Product chosen : Fish

lookup called by 6 at 2019-03-04 21:36:52.892
No sellers available. Choosing product again
Product chosen : Fish

lookup called by 6 at 2019-03-04 21:36:52.896
No sellers available. Choosing product again
Product chosen : Fish

lookup called by 6 at 2019-03-04 21:36:52.900
No sellers available. Choosing product again
Product chosen : Salt

lookup called by 6 at 2019-03-04 21:36:52.904
Got reply from nodeID : 5
Buying from 5
Succeeded buying from 5 TimeStamp = 2019-03-04 21:36:52.900
Waiting for 7 seconds
$telnet src
elinux1 src> [ ]
```

Test Case 7: Invalid peer id given as input argument to a node on startup

Description: Giving a 0 / negative / >N input Id as input argument

Parameters: N=6, hop = 2, stock = 5

Result: In all cases, the appropriate error message is displayed and the peer exits.

The screenshot shows three terminal windows side-by-side, all running on the same host (vatsal@vatsal-OMEN). Each window has a title bar indicating the path: ~/lab-1-sp-test/src. The first terminal window contains the command "java Peer 0" followed by the error message "Invalid peer ID. Peer ID should be an integer in the interval [1,N]". The second terminal window contains the command "java Peer -1" followed by the same error message. The third terminal window contains the command "java Peer 10" followed by the same error message. All three windows show the same error message and exit immediately.

Test Case 8: Maximum Hop Count/Stock is 0

Description: Setting hop count and/or stock to 0

Parameters: N=6, hop = 0, stock = 5

N=6, hop = 3, stock = 0

Result: In both cases, the appropriate error message is displayed and the peer exits.

```
vatsal@vatsal-OMEN:~/lab-1-sp-test/src
```

```
vatsal@vatsal-OMEN:~/lab-1-sp-test/src$ java Peer 1
hopcount should be > 0. Please check config file
vatsal@vatsal-OMEN:~/lab-1-sp-test/src$ [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
```



```
vatsal@vatsal-OMEN:~/lab-1-sp-test/src
```

```
vatsal@vatsal-OMEN:~/lab-1-sp-test/src$ java Peer 1
Starting stock for a peer should be > 0. Please check config file
vatsal@vatsal-OMEN:~/lab-1-sp-test/src$ [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
```

Test Case 5: All peers running on the same eden machine

Test Case 6: Peers distributed across 2 eden machines

Test Case 7: Invalid peer id given as input argument to a node on startup

Test Case 8: Maximum Hop Count is 0

Test Case 9: insufficient hop count to reach sender

Test Case 10: Number of nodes in network less than 0


```
vatsal@vatsal-OMEN:~/lab-1-sp-test/src
```

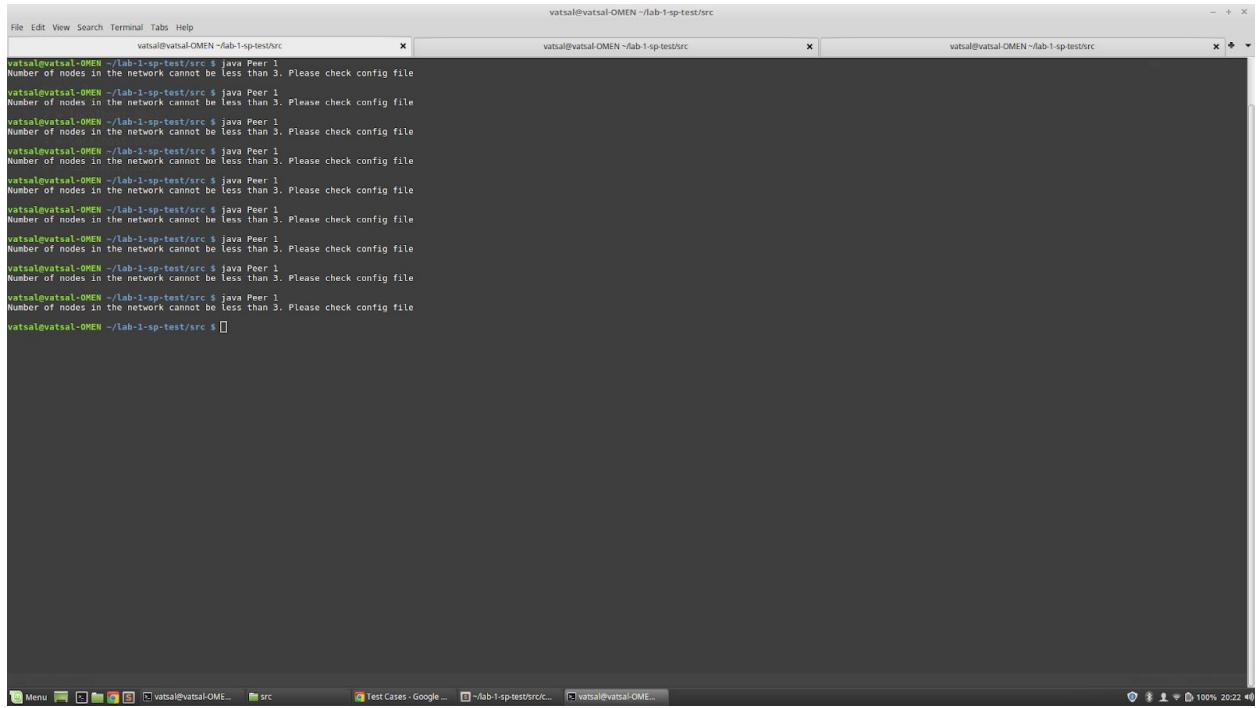
```
vatsal@vatsal-OMEN:~/lab-1-sp-test/src$ [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
```

Test Case 9: Number of nodes in network less than 3

Parameters: N=2, hop = 3, stock = 5

N=1, hop = 3, stock = 5

Result: In both cases, the appropriate error message is displayed and the peer exits.



```
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1  
Number of nodes in the network cannot be less than 3. Please check config file  
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $
```

Test Case 10: 5 buyers and 1 seller

Description: In this test only 1 node is a seller and all other nodes are buyers. In the current scenario peer 3 is the only seller and peers 1,2,4,5,6 are buyers.

Parameters: N=6, hop = 3, stock = 5

Result: All buyers buy from 3. In case of product being unavailable buyer chooses product again and restarts lookup for that product.

Sample Output:

Peer 1 is a buyer

```
cmd Command Prompt - java Peer 1
lookup called by 1 at {SysUpTime = 179599 days 5:40:20} {Timestamp = Mon Mar 04 17:10:02 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3  TimeStamp = {SysUpTime = 179599 days 5:40:21} {Timestamp = Mon Mar 04 17:10:02 EST 2019}
Waiting for 8 seconds

Product chosen : Salt

lookup called by 1 at {SysUpTime = 179599 days 5:41:31} {Timestamp = Mon Mar 04 17:10:09 EST 2019}
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 1 at {SysUpTime = 179599 days 5:41:32} {Timestamp = Mon Mar 04 17:10:09 EST 2019}
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 1 at {SysUpTime = 179599 days 5:41:32} {Timestamp = Mon Mar 04 17:10:09 EST 2019}
No sellers available. Choosing product again

Product chosen : Fish

lookup called by 1 at {SysUpTime = 179599 days 5:41:32} {Timestamp = Mon Mar 04 17:10:09 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3  TimeStamp = {SysUpTime = 179599 days 5:41:33} {Timestamp = Mon Mar 04 17:10:09 EST 2019}
Waiting for 9 seconds
```

Peer 2 is a buyer

```
cmd Command Prompt - java Peer 2
lookup called by 2 at {SysUpTime = 179599 days 5:57:36} {Timestamp = Mon Mar 04 17:11:45 EST 2019}
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 2 at {SysUpTime = 179599 days 5:57:36} {Timestamp = Mon Mar 04 17:11:45 EST 2019}
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 2 at {SysUpTime = 179599 days 5:57:37} {Timestamp = Mon Mar 04 17:11:45 EST 2019}
No sellers available. Choosing product again

Product chosen : Fish

lookup called by 2 at {SysUpTime = 179599 days 5:57:37} {Timestamp = Mon Mar 04 17:11:45 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3  TimeStamp = {SysUpTime = 179599 days 5:57:37} {Timestamp = Mon Mar 04 17:11:45 EST 2019}
Waiting for 1 seconds

Product chosen : Fish

lookup called by 2 at {SysUpTime = 179599 days 5:57:37} {Timestamp = Mon Mar 04 17:11:45 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3  TimeStamp = {SysUpTime = 179599 days 5:57:37} {Timestamp = Mon Mar 04 17:11:45 EST 2019}
Waiting for 6 seconds
```

Peer 3 is a seller

```
cmd|Command Prompt - java Peer 3
Remaining stock : 2      TimeStamp: {SysUpTime = 179599 days 6:2:12} {Timestamp = Mon Mar 04 17:12:13 EST 2019}
Received a buy request for Fish from 6
Sold item Fish to node 6
Remaining stock : 1      TimeStamp: {SysUpTime = 179599 days 6:2:18} {Timestamp = Mon Mar 04 17:12:13 EST 2019}
Received a buy request for Fish from 1
Sold item Fish to node 1
Remaining stock : 0      TimeStamp: {SysUpTime = 179599 days 6:2:27} {Timestamp = Mon Mar 04 17:12:14 EST 2019}
Product chosen : Boar

Received a buy request for Fish from 4
Sold item Fish to node 4
Remaining stock : 4      TimeStamp: {SysUpTime = 179599 days 6:2:31} {Timestamp = Mon Mar 04 17:12:15 EST 2019}
Received a buy request for Fish from 4
Sold item Fish to node 4
Remaining stock : 3      TimeStamp: {SysUpTime = 179599 days 6:2:33} {Timestamp = Mon Mar 04 17:12:15 EST 2019}
Received a buy request for Fish from 4
Sold item Fish to node 4
Remaining stock : 2      TimeStamp: {SysUpTime = 179599 days 6:2:43} {Timestamp = Mon Mar 04 17:12:16 EST 2019}
Received a buy request for Fish from 2
Sold item Fish to node 2
Remaining stock : 1      TimeStamp: {SysUpTime = 179599 days 6:3:12} {Timestamp = Mon Mar 04 17:12:19 EST 2019}
Received a buy request for Fish from 6
Sold item Fish to node 6
Remaining stock : 0      TimeStamp: {SysUpTime = 179599 days 6:3:19} {Timestamp = Mon Mar 04 17:12:19 EST 2019}
Product chosen : Salt

Received a buy request for Fish from 1
Sold item Fish to node 1
Remaining stock : 4      TimeStamp: {SysUpTime = 179599 days 6:3:41} {Timestamp = Mon Mar 04 17:12:22 EST 2019}
```

Peer 4 is a buyer

```
cmd|Command Prompt - java Peer 4
Product chosen : Salt

lookup called by 4 at {SysUpTime = 179599 days 6:7:48} {Timestamp = Mon Mar 04 17:12:46 EST 2019}
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 4 at {SysUpTime = 179599 days 6:7:48} {Timestamp = Mon Mar 04 17:12:46 EST 2019}
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 4 at {SysUpTime = 179599 days 6:7:48} {Timestamp = Mon Mar 04 17:12:46 EST 2019}
No sellers available. Choosing product again

Product chosen : Salt

lookup called by 4 at {SysUpTime = 179599 days 6:7:49} {Timestamp = Mon Mar 04 17:12:46 EST 2019}
No sellers available. Choosing product again

Product chosen : Fish

lookup called by 4 at {SysUpTime = 179599 days 6:7:50} {Timestamp = Mon Mar 04 17:12:47 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3  TimeStamp = {SysUpTime = 179599 days 6:7:50} {Timestamp = Mon Mar 04 17:12:47 EST 2019}
Waiting for 9 seconds
```

Peer 5 is a buyer

```
C:\ Select Command Prompt - java Peer 5
Succeeded buying from 3 TimeStamp = {SysUpTime = 179599 days 5:20:7} {Timestamp = Mon Mar 04 17:08:00 EST 2019}
Waiting for 10 seconds

Product chosen : Fish

lookup called by 5 at {SysUpTime = 179599 days 5:21:38} {Timestamp = Mon Mar 04 17:08:09 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3 TimeStamp = {SysUpTime = 179599 days 5:21:38} {Timestamp = Mon Mar 04 17:08:09 EST 2019}
Waiting for 4 seconds

Product chosen : Salt

lookup called by 5 at {SysUpTime = 179599 days 5:22:8} {Timestamp = Mon Mar 04 17:08:12 EST 2019}
No sellers available. Choosing product again

Product chosen : Boar

lookup called by 5 at {SysUpTime = 179599 days 5:22:9} {Timestamp = Mon Mar 04 17:08:12 EST 2019}
No sellers available. Choosing product again

Product chosen : Fish

lookup called by 5 at {SysUpTime = 179599 days 5:22:9} {Timestamp = Mon Mar 04 17:08:12 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3 TimeStamp = {SysUpTime = 179599 days 5:22:9} {Timestamp = Mon Mar 04 17:08:12 EST 2019}
Waiting for 7 seconds
```

Peer 6 is a buyer:

```
C:\ Command Prompt - java Peer 6
lookup called by 6 at {SysUpTime = 179599 days 6:15:32} {Timestamp = Mon Mar 04 17:13:33 EST 2019}
No sellers available. Choosing product again

Product chosen : Fish

lookup called by 6 at {SysUpTime = 179599 days 6:15:33} {Timestamp = Mon Mar 04 17:13:33 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3 TimeStamp = {SysUpTime = 179599 days 6:15:33} {Timestamp = Mon Mar 04 17:13:33 EST 2019}
Waiting for 10 seconds

Product chosen : Boar

lookup called by 6 at {SysUpTime = 179599 days 6:17:4} {Timestamp = Mon Mar 04 17:13:42 EST 2019}
No sellers available. Choosing product again

Product chosen : Boar

lookup called by 6 at {SysUpTime = 179599 days 6:17:4} {Timestamp = Mon Mar 04 17:13:42 EST 2019}
No sellers available. Choosing product again

Product chosen : Fish

lookup called by 6 at {SysUpTime = 179599 days 6:17:4} {Timestamp = Mon Mar 04 17:13:42 EST 2019}
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3 TimeStamp = {SysUpTime = 179599 days 6:17:5} {Timestamp = Mon Mar 04 17:13:42 EST 2019}
Waiting for 2 seconds
```

Test Case 11: 5 sellers and 1 buyer

Description: In this test only 1 node is a buyer and all other nodes are sellers. In the current scenario peer 4 is the only buyer and peers 1,2,3,5,6 are sellers.

Parameters: N=6, hop = 3, stock = 5

Result: All sellers sell to only 4. Peer 4 buys from any of the sellers.

Sample Output:

Peer 1 is a seller

```
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 1
Server ready
Added neighbor 2
Added neighbor 3
Added neighbor 5
Product chosen : Salt
Received a buy request for Salt from 4
Sold item Salt to node 4
Received a buy request for Salt from 4
Timestamp : 2019-03-04 20:53:08.386
Received a buy request for Salt from 4
Sold item Salt to node 4
Timestamp : 2019-03-04 20:53:08.410
Remaining stock : 3
Received a buy request for Salt from 4
Sold item Salt to node 4
Timestamp : 2019-03-04 20:53:08.427
Received a buy request for Salt from 4
Sold item Salt to node 4
Timestamp : 2019-03-04 20:53:08.455
Received a buy request for Salt from 4
Sold item Salt to node 4
Timestamp : 2019-03-04 20:53:08.482
Remaining stock : 0
Product chosen : Fish
Received a buy request for Salt from 4
Received a buy request for Salt from 4
Remaining stock : 4
Received a buy request for Salt from 4
Sold item Salt to node 4
Timestamp : 2019-03-04 20:53:27.545
Received a buy request for Salt from 4
Sold item Salt to node 4
Timestamp : 2019-03-04 20:53:41.615
Received a buy request for Salt from 4
Sold item Salt to node 4
Received a buy request for Salt from 4
Timestamp : 2019-03-04 20:54:02.677
Received a buy request for Salt from 4
Sold item Salt to node 4
Timestamp : 2019-03-04 20:54:25.722
Received a buy request for Salt from 4
Sold item Salt to node 4
Timestamp : 2019-03-04 20:54:39.784
Remaining stock : 0
Product chosen : Beer
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 4
Received a buy request for Salt from 4
Timestamp : 2019-03-04 20:55:05.878
Received a buy request for Salt from 4
Sold item Salt to node 4
Received a buy request for Salt from 4
Timestamp : 2019-03-04 20:55:14.885
Received a buy request for Salt from 4
Sold item Salt to node 4
Received a buy request for Salt from 4
Timestamp : 2019-03-04 20:55:26.995
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 1
Received a buy request for Salt from 4
Timestamp : 2019-03-04 20:55:38.017
Received a buy request for Salt from 4
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 0
Timestamp : 2019-03-04 20:55:47.001
Product chosen : Salt
Received a buy request for Salt from 4
Sold item Salt to node 4
Received a buy request for Salt from 4
Timestamp : 2019-03-04 20:55:54.094
Received a buy request for Salt from 4
Sold item Salt to node 4
Remaining stock : 0
Timestamp : 2019-03-04 20:55:56.113
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $
```

Peer 2 is a seller

```
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 2
Server ready
Added neighbor 1
Added neighbor 3
Added neighbor 5
Product chosen : Boar
Received a buy request for Boar from 4
Remaining stock : 4
Received a buy request for Boar from 4
Timestamp : 2019-03-04 20:54:59.854
Received a buy request for Boar from 4
Sold item Boar to node 4
Timestamp : 2019-03-04 20:55:15.893
Remaining stock : 3
Received a buy request for Boar from 4
Timestamp : 2019-03-04 20:55:26.942
Received a buy request for Boar from 4
Sold item Boar to node 4
Timestamp : 2019-03-04 20:55:22.055
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ clear
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $
```

Peer 3 is a seller

Peer 4 is a buyer

Peer 4 continued

```
vatsal@vatsal-OMEN ~$ ./lab-1-sp-test/src

Product chosen : Salt
lookup called by 4 at 2019-03-04 20:53:18.429
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 20:53:18.455
Waiting for 2 seconds

Product chosen : Salt
lookup called by 4 at 2019-03-04 20:53:19.456
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 20:53:19.483
Waiting for 1 seconds

Product chosen : Boar
lookup called by 4 at 2019-03-04 20:53:19.484
Got reply from nodeID : 5
Got reply from nodeID : 5
Got reply from nodeID : 6
Buying from 6
Succeeded buying from 6 TimeStamp = 2019-03-04 20:53:19.507
Waiting for 3 seconds

Product chosen : Fish
lookup called by 4 at 2019-03-04 20:53:21.508
Got reply from nodeID : 3
Buying from 3
Succeeded buying from 3 TimeStamp = 2019-03-04 20:53:21.532
Waiting for 7 seconds

Product chosen : Salt
lookup called by 4 at 2019-03-04 20:53:27.533
Got reply from nodeID : 1
Buying from 1
Succeeded buying from 1 TimeStamp = 2019-03-04 20:53:27.545
Waiting for 4 seconds

Product chosen : Boar
lookup called by 4 at 2019-03-04 20:53:30.546
Got reply from nodeID : 2
Got reply from nodeID : 5
Got reply from nodeID : 6
Succeeded buying from 5 TimeStamp = 2019-03-04 20:53:30.583
Waiting for 10 seconds

Product chosen : Boar
lookup called by 4 at 2019-03-04 20:53:39.584
Got reply from nodeID : 2
Got reply from nodeID : 5
Got reply from nodeID : 6
Buying from 6
Succeeded buying from 6 TimeStamp = 2019-03-04 20:53:39.606
Waiting for 3 seconds

Product chosen : Salt
```

Peer 5 is a seller

Peer 6 is a seller

```
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 6
Server ready
Added neighbor 5
Added neighbor 1
I am a seller
Received buy request for Boar from 4
Produced chosen : Boar
Received a buy request for Boar From 4
Remaining stock : 5 TimeStamp: 2019-03-04 20:52:53.340
Received a buy request for Boar From 4
Sold item Boar to node 4
Remaining stock : 4 TimeStamp: 2019-03-04 20:53:19.506
Received a buy request for Boar From 4
Sold item Boar to node 4
Remaining stock : 3 TimeStamp: 2019-03-04 20:53:39.599
Received a buy request for Boar From 4
Sold item Boar to node 4
Remaining stock : 2 TimeStamp: 2019-03-04 20:54:19.783
Received a buy request for Boar From 4
Sold item Boar to node 4
Remaining stock : 1 TimeStamp: 2019-03-04 20:54:19.783
Received a buy request for Boar From 4
Sold item Boar to node 4
Remaining stock : 0 TimeStamp: 2019-03-04 20:54:32.733
Product chosen : Boar

Received a buy request for Boar from 4
Sold item Boar to node 4
Remaining stock : 5 TimeStamp: 2019-03-04 20:54:59.836
Received a buy request for Boar from 4
Sold item Boar to node 4
Received a buy request for Boar From 4
Received a buy request for Boar From 4
Sold item Boar to node 4
Remaining stock : 2 TimeStamp: 2019-03-04 20:55:16.914
Received a buy request for Boar From 4
Sold item Boar to node 4
Remaining stock : 1 TimeStamp: 2019-03-04 20:56:38.246
Product chosen : Boar

vatsal@vatsal-OMEN ~/Lab-1-sp-test/src $ clear
```

Test Case 12: Insufficient hop count to reach seller

Description: In this case, we focus on a scenario where the specified hop count is insufficient to reach a seller, even though one is present in the network. To simulate this, we run 5 buyers and 1 seller, with a hop count of 2. Node 4 is a seller, while all other nodes are buyers.

Parameters: N=6, hop = 2, stock = 5

Result: Since hop count is 2, node 1 will never get a reply from node 4. Hence, node 1 will keep trying to buy, and fail, despite node 4 being a seller. We have attached the outputs of nodes 1 and 4 below. In the output for node 1, we can see that it is never successfully able to buy. In node 4, we can see it never sells to 1.

Sample Output :

Peer 1

Peer 4 :

```
vatsal@vatsal-OMEN ~/lab-1-sp-test/src $ java Peer 4
Server ready
Added neighbor 3
Added neighbor 5
I am seller
Product chosen : Salt
Received a buy request for Salt From 5
Sold item Salt to mode 5
Remaining stock : 4 TimeStamp: 2019-03-04 20:31:12.660
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 3 TimeStamp: 2019-03-04 20:31:12.661
Received a buy request for Salt From 3
Sold item Salt to mode 3
Remaining stock : 2 TimeStamp: 2019-03-04 20:31:12.661
Received a buy request for Salt From 2
Sold item Salt to mode 2
Remaining stock : 1 TimeStamp: 2019-03-04 20:31:12.684
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:15.674
Product chosen : Boar
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:16.688
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:16.682
Received a buy request for Salt From 3
Sold item Salt to mode 3
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:20.666
Received a buy request for Salt From 3
Sold item Salt to mode 5
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:20.670
Received a buy request for Salt From 2
Sold item Salt to mode 2
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:20.687
Product chosen : Fish
Received a buy request for Salt From 3
Sold item Salt to mode 3
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:22.669
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:22.668
Received a buy request for Salt From 2
Sold item Salt to mode 3
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:23.698
Received a buy request for Salt From 2
Sold item Salt to mode 2
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:26.696
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:27.689
Product chosen : Fish
Received a buy request for Salt From 3
Sold item Salt to mode 3
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:28.677
Received a buy request for Salt From 3
Sold item Salt to mode 3
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:30.672
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:30.695
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:31.701
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:31.703
Product chosen : Salt
Received a buy request for Salt From 2
Sold item Salt to mode 2
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:31.705
Received a buy request for Salt From 5
Sold item Salt to mode 5
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:32.680
Received a buy request for Salt From 2
Sold item Salt to mode 2
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:33.707
Received a buy request for Salt From 2
Sold item Salt to mode 2
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:36.799
Received a buy request for Salt From 3
Sold item Salt to mode 3
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:37.674
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:37.705
Product chosen : Salt
Received a buy request for Salt From 2
Sold item Salt to mode 2
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:37.711
Received a buy request for Salt From 5
Sold item Salt to mode 5
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:38.683
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:38.716
Received a buy request for Salt From 2
Sold item Salt to mode 2
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:40.714
Received a buy request for Salt From 2
Sold item Salt to mode 2
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:40.716
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:46.714
Received a buy request for Salt From 6
Sold item Salt to mode 6
Remaining stock : 0 TimeStamp: 2019-03-04 20:31:47.724
Received a buy request for Salt From 3
Sold item Salt to mode 3
```

Drawbacks of the system:

- Although the system is functional with multiple peers distributed across multiple machines it requires all the machines to be on the same local network. This is because our system requires IP and port number to connect to a machine. If the machines are on different networks we can only identify their public IPs which are not unique across different machines in the network. This causes the network to be incomplete.
- The network is a fixed ring topology and all service requests flow in a bidirectional manner across the ring. This means that two nodes at opposite ends of the network always experience maximum latency when contacting each other.