CS550 Programming Assignment 2 (PA#2)
A Hierarchical Gnutella-style P2P File Sharing System

User Manual

Configuring the Network topology in the config.properties file:

As we are not implementing a dynamic Gnutella network, we initialize and define the topology structure in the config properties file.

There are two types of peers in the system:

1. A Super Peer which is acting like a proxy index server for the leaf nodes.
2. A leaf node is the peer which has only one connection which is connected to the super peer.

Step 1: To initialize peers in the network

Leaf node:

A leaf node has the following details.
One needs to configure the IP address, a unique port number and a path to a shared directory.

```
peerid.2.ip=127.0.0.1
peerid.2.port=2000
peerid.2.shareDir=\\src\\peer2
peerid.3.ip=127.0.0.1
peerid.3.port=3000
peerid.3.shareDir=\\src\\peer3
peerid.4.ip=127.0.0.1
peerid.4.port=4000
peerid.4.shareDir=\\src\\peer4
```

Super Peer:

A super peer has the same details as the leaf node, except there is no shared directory.

```
peerid.1.ip=127.0.0.1
peerid.1.port=1000
```

Step 2: To initialize the network topology

We need to set the neighbours of the peers.

In the below example, peer2, peer3 and peer4 have only one connection to peer1,

i.e. Peer1 is a super peer and the rest peer2 3 and 4 are the leaf nodes.

Peer 1 has multiple connections, i.e. it is connected to its leaf nodes as well as other super peers in the network.

```
peerid.1.neighbors=peerid.3,peerid.2,peerid.4,peerid.5,peerid.37
peerid.2.neighbors=peerid.1
peerid.3.neighbors=peerid.1
peerid.4.neighbors=peerid.1
peerid.5.neighbors=peerid.6,peerid.7,peerid.8,peerid.1,peerid.9
peerid.6.neighbors=peerid.5
peerid.7.neighbors=peerid.5
peerid.8.neighbors=peerid.5
```

Please follow the following steps to execute the Assignment:

Step 1: Configure the configuration properties file as per the network requirements.

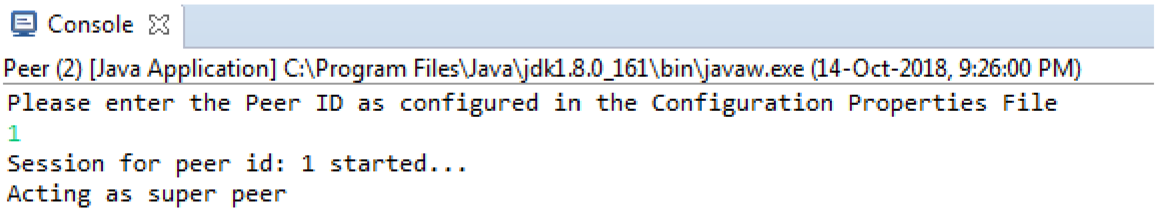
Step 2: Open command prompt and navigate to the directory which contains all the source files of the server. Execute the following command.

```
javac *.java
```

Step 3: Execute the following command

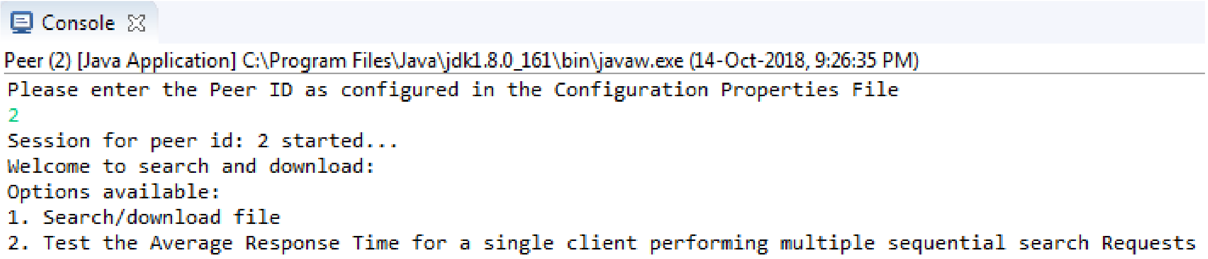
```
java Peer
```

Step 3a: In the Peer window Enter the peer id as mentioned in the configuration file.



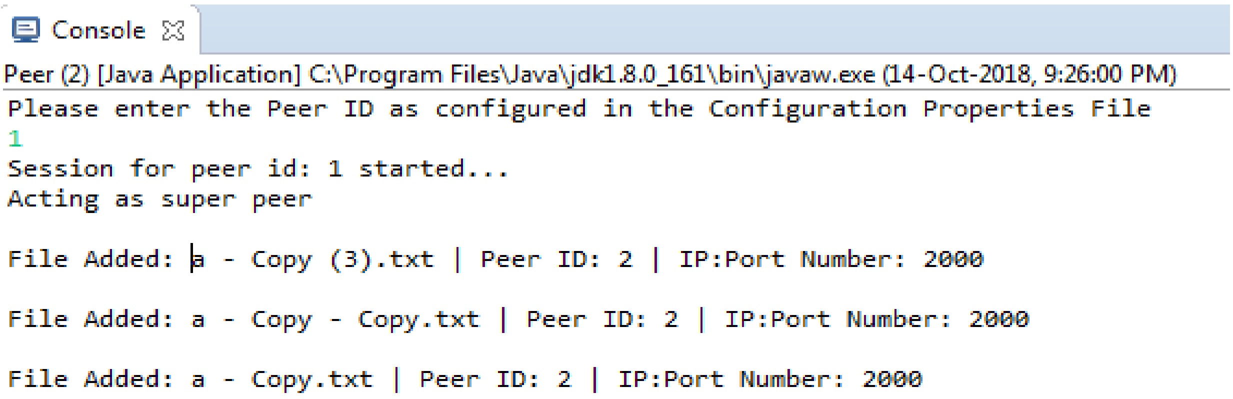
```
Peer (2) [Java Application] C:\Program Files\Java\jdk1.8.0_161\bin\javaw.exe (14-Oct-2018, 9:26:00 PM)
Please enter the Peer ID as configured in the Configuration Properties File
1
Session for peer id: 1 started...
Acting as super peer
```

Figure 1: Screenshot of the Super Peer



```
Peer (2) [Java Application] C:\Program Files\Java\jdk1.8.0_161\bin\javaw.exe (14-Oct-2018, 9:26:35 PM)
Please enter the Peer ID as configured in the Configuration Properties File
2
Session for peer id: 2 started...
Welcome to search and download:
Options available:
1. Search/download file
2. Test the Average Response Time for a single client performing multiple sequential search Requests
```

Figure 2: Screenshot of a Leaf node



```
Peer (2) [Java Application] C:\Program Files\Java\jdk1.8.0_161\bin\javaw.exe (14-Oct-2018, 9:26:00 PM)
Please enter the Peer ID as configured in the Configuration Properties File
1
Session for peer id: 1 started...
Acting as super peer

File Added: a - Copy (3).txt | Peer ID: 2 | IP:Port Number: 2000

File Added: a - Copy - Copy.txt | Peer ID: 2 | IP:Port Number: 2000

File Added: a - Copy.txt | Peer ID: 2 | IP:Port Number: 2000
```

Figure 3: Screenshot of Super Peer after the leaf node is registered.

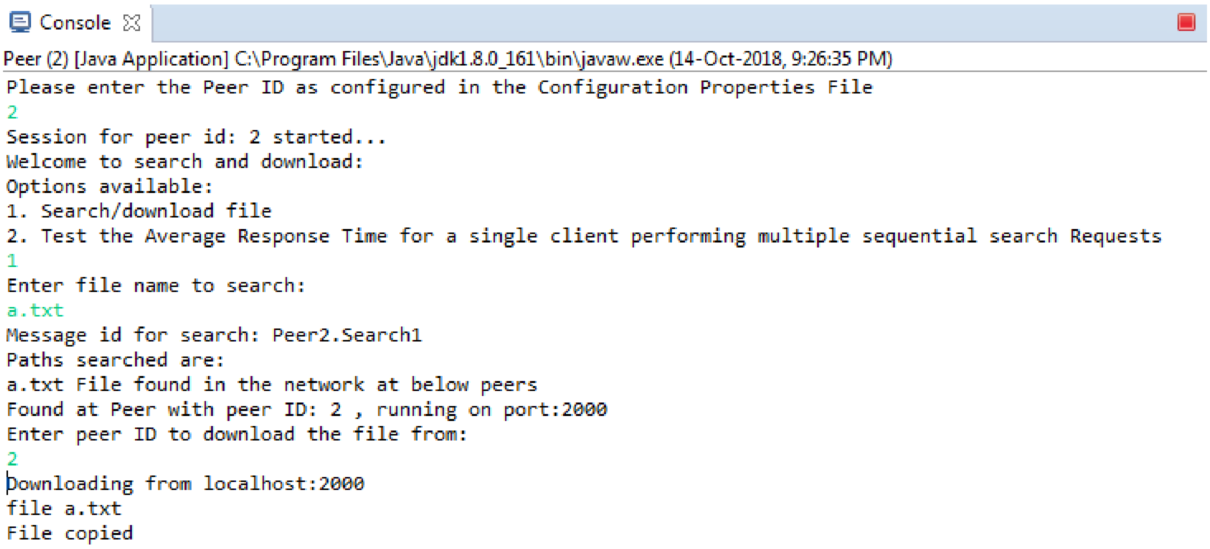
Repeat Step 3 for all the peers initialized in the configuration in different command prompts.

To download a file:

Precondition: The network should be initialized and super peers and leaf nodes should be running.

In the Leaf node window,

a. Press 1 to Start search and Download a file
b. Enter the file name which the other client has in its shared directory. Eg.: file1.txt
c. The program will display the traversed path used to get the peer information.
d. The program will give a list of peers that contain the searched file.
e. Enter the peer id.
f. The file has been downloaded.



```
Peer (2) [Java Application] C:\Program Files\Java\jdk1.8.0_161\bin\javaw.exe (14-Oct-2018, 9:26:35 PM)
Please enter the Peer ID as configured in the Configuration Properties File
2
Session for peer id: 2 started...
Welcome to search and download:
Options available:
1. Search/download file
2. Test the Average Response Time for a single client performing multiple sequential search Requests
1
Enter file name to search:
a.txt
Message id for search: Peer2.Search1
Paths searched are:
a.txt File found in the network at below peers
Found at Peer with peer ID: 2 , running on port:2000
Enter peer ID to download the file from:
2
Downloading from localhost:2000
file a.txt
File copied
```

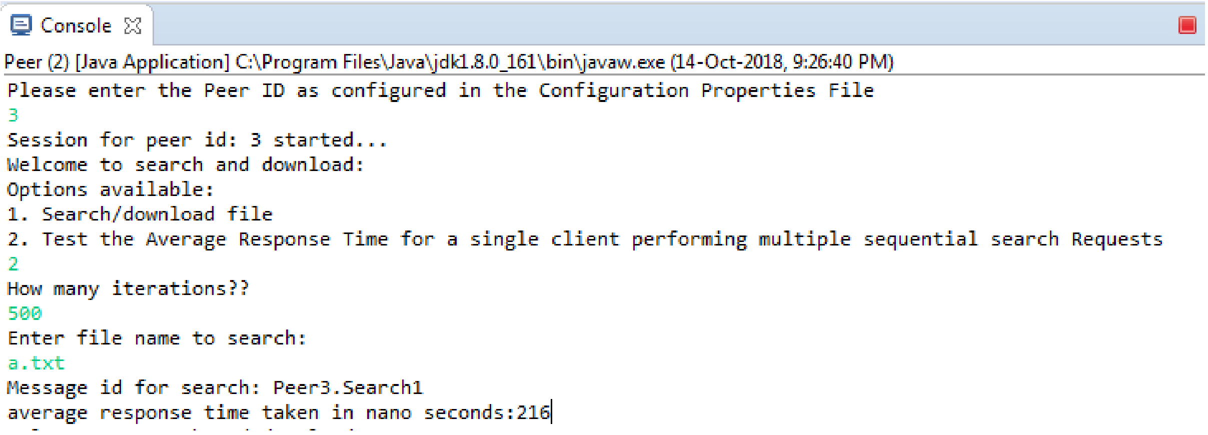
Figure 4: Screenshot of the leaf node demonstrating file download

To Test Average response time for multiple sequential search:

Precondition: The server should be running. And at least two clients should be registered.

In the Leaf node window,

a. Press 2 to Start the test
b. Enter the number of sequential search requests. Eg: 500
c. Enter File name to be searched Eg: file2.txt
d. The average response time for 500 sequential requests is displayed.



```
Peer (2) [Java Application] C:\Program Files\Java\jdk1.8.0_161\bin\javaw.exe (14-Oct-2018, 9:26:40 PM)
Please enter the Peer ID as configured in the Configuration Properties File
3
Session for peer id: 3 started...
Welcome to search and download:
Options available:
1. Search/download file
2. Test the Average Response Time for a single client performing multiple sequential search Requests
2
How many iterations??
500
Enter file name to search:
a.txt
Message id for search: Peer3.Search1
average response time taken in nano seconds:216
```

Figure 5: Screenshot of the leaf node demonstrating the calculation of average response time for a single client performing multiple sequential search requests