Programming Assignment 3: Gnutella P2P Network with Consistency

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Peer Files

Peer files are provided for 16 peers with 10 files each. There are **no** duplicates across peers. Files are generated using Gensort and are **not actual mp4 files**. I know the instructions said to generate text files, these have text in them and are not binary files. These files are located in the `files/` directory and are numbered by port number 6001-6016.

Install

The code was developed and tested on an Ubuntu 20.04 machine using OpenJDK 17. Ubuntu can be easily installed on a Virtual Machine, or use WSL if on Windows. OpenJDK-17 can be installed on Ubuntu using the following command:

```
$ sudo apt install openjdk-17-jdk
```

Build

A `Makefile` has been provided. Running `make` will compile all the code and running `make clean` will remove any `.class` files.

Examples:

```
$ make # compiles
$ make clean # cleans the auxiliary files
```

Screenshot:

Running

Topology Config file

Please define a single topology config file which defines the network. The syntax for this topology is as follows:

```
c <push-pull> <ttr (pull only)> # e.g., 'c push' or 'c pull 1' for 1 minute TTR

s <address1:port1> <address2:port2> # defines the SuperPeer neighbor
s 127.0.0.1:5000 127.0.0.1:5001 # e.g., SuperPeer 5001 is neighbor to SuperPeer 5000
s 127.0.0.1:5001 127.0.0.1:5000 # e.g., SuperPeer 5000 is neighbor to SuperPeer 5001
```

```
p <address1:port1> <address2:port2> # defines the leaf peer of a SuperPeer
p 127.0.0.1:5000 127.0.0.1:6001 # e.g., Leaf Peer 6001 is under SuperPeer 5000
p 127.0.0.1:5001 127.0.0.1:6003 # e.g., Leaf Peer 6003 is under SuperPeer 5001
```

There are topology files already included. The `*.simple.*.config` files contain a smaller network of 3 SuperPeers, each with 1 Leaf Peer. The `*.full.*.config` files contain the network requested in the instructions: 8 SuperPeers with 1-3 Leaf Peers each.

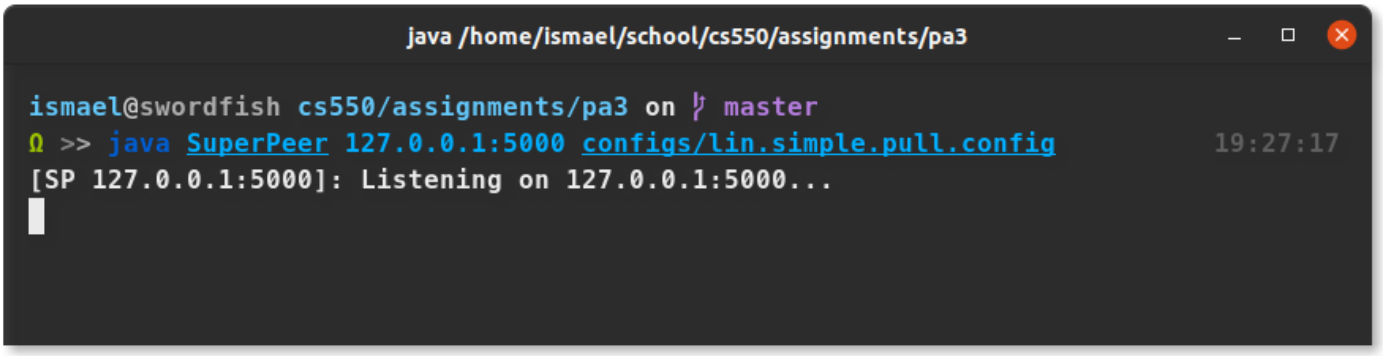
Launching SuperPeers

To launch a SuperPeer, run the program while passing in the IPv4 address and port, and the config file containing the static topology of the network.

Example(s):

```
$ java SuperPeer 127.0.0.1:5000 configs/all.simple.pull.config
$ java SuperPeer 127.0.0.1:5000 configs/lin.full.push.config
```

Screenshot:



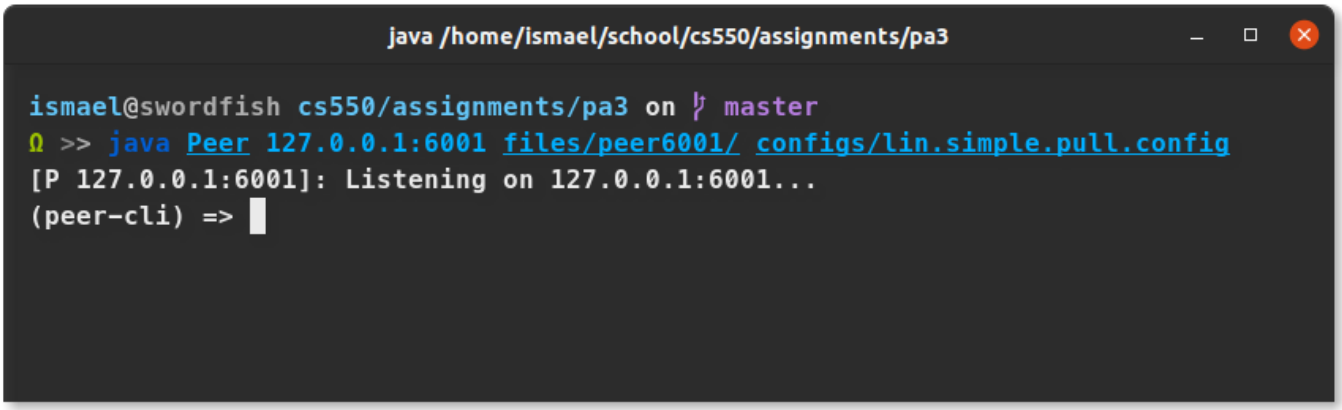
Launching Peers

To launch a Peer, or leaf peer, run the program while passing in similar arguments to the SuperPeer, with the addition of a file directory containing the Peer's files. See below:

Example(s):

```
$ java Peer 127.0.0.1:6001 files/peer6001 configs/all.simple.pull.config
$ java Peer 127.0.0.1:6001 files/peer6001 configs/lin.full.push.config
```

Screenshot:



Things you should know

- If the files/peer60XX directory does not have nested `owned/` and `downloads/` subdirectories, they will be created.
- The `owned/` directory contains master files, that the given peer uniquely owns.

- The `downloads/` directory contains any downloaded files from other peers. This directory is not watched by the EventListener class for file modifications, given the assumption that only origin servers can modify their master copies.
- The communication messages in this network can be described as follows:

```
# fileinfo syntax is: filename,owner,version

register:   "register 0;0;fileinfo;sender"

deregister: "deregister 0;0;fileinfo;sender"

query:      "query msgid;ttl;fileinfo;sender"

queryhit:   "queryhit msgid;ttl;fileinfo;sender peerWhoHasFile"

invalidate: "invalidate msgid;ttl;fileinfo;sender"

# (pull model)
# request for file status
status:  "status fileinfo"

# responses
deleted:  "deleted"
uptodate: "uptodate"
outdated: "outdated"
```