Readme

The p2p.py file is implement by python 3.7.

Initialisation
There is a sample init file called test1 in the tar, you can use the file to open xterm windows and start peers. If you want to make any edition to the sample init file, please follow the following format:

```
xterm -hold -title "Peer 1" -e "python p2p.py init 1 3 6 30" &
xterm -hold -title "Peer 7" -e "python p2p.py init 7 1 3 30"
```

where “python p2p.py init 1 3 6 30” correspond to “command type”, “peer ID”, “First Successor”, “Second Successor”, “PING INTERVAL”.
30 is the default ping interval, some other command is build based on it.
After initialisation, the peer will automatically ping its successor, and the ping message will be print in the terminal. However, since the ping message is sent by UDP, some message may lost.

Peer Join
To join a new peer, you need to open a new terminal and type command in following format:

```
python p2p.py join 1 5 4 30
```

where “join 1 5 4 30” correspond to “command type”, “peer ID”, “known peer” and “PING INTERVAL”.
Then the join request will be sent to the known peer, and the if the joined peer should not be the first successor of the known peer, the request will be send to the first successor of the known peer. This will continue until the joined peer found its correct position.
During this process, the peers already joined will update their first successor and second successor.
After that, the predecessor of the joined peer will print the command used to join the new peer in the terminal of the predecessor.
You need to type the printed command in the xterm window you used to typed join command to finish the join.

Peer departure(graceful)
First you need to find the terminal which hold the peer you want to quit. Then you need to type the following command in the terminal to let the peer quit:
“Quit”
please be attention, the “” is required. Also, since the ping message keep showing, you command may be interrupted by the ping message. For example:
“QuiPing request received from…
while this happened, please keep type you command, the ping message will not be take as input. For example:
“QuPing request received from…it”
will also work.
After the you input the quit command, the peer will send the quit message and close all the sockets.
Other peers will update their successors based on the quit message.
You need to close the terminal by hand after you see “All sockets closed, please close the terminal”.
You may see some errors during this process, this is because although all the sockets is closed, some threads is still working, you can ignore them since they are no longer connect to other peers.

Peer departure(abrupt)
After a peer depart abruptly, other peers will automatically update their successor lists.

Data Insertion
You need to use any terminal that hold a peer to input command as following format:

“Store filename”
the filename must be a four-digits number, and the “” is required. After you input the command, the program will automatically find its correct position and print the stored message. However, if the file should be stored in a peer that is not exit now, the message will cause a loop. For example, file 0257 should be stored in peer 1, however, if peer 1 do not exist, the data insertion message will cause a loop.

Data Retrieval
You need to use any terminal that hold a peer to input command as following format:
“Request filename”
the filename must be a four-digits number, and the “” is required. After you input the command, the program will automatically find its correct position, and the peer stored the file will build a TCP connection to the peer you choose to input the date retrieval command. If the requested file do not exist, the error would be handle and print “no such file”. Otherwise the file will be sent to the peer requested it. Then a new file called “received_filename” will be create, the content of the new file will be same as the original one.