COMP 4981 ASSIGNMENT 2

Robin Hsieh, A00657820

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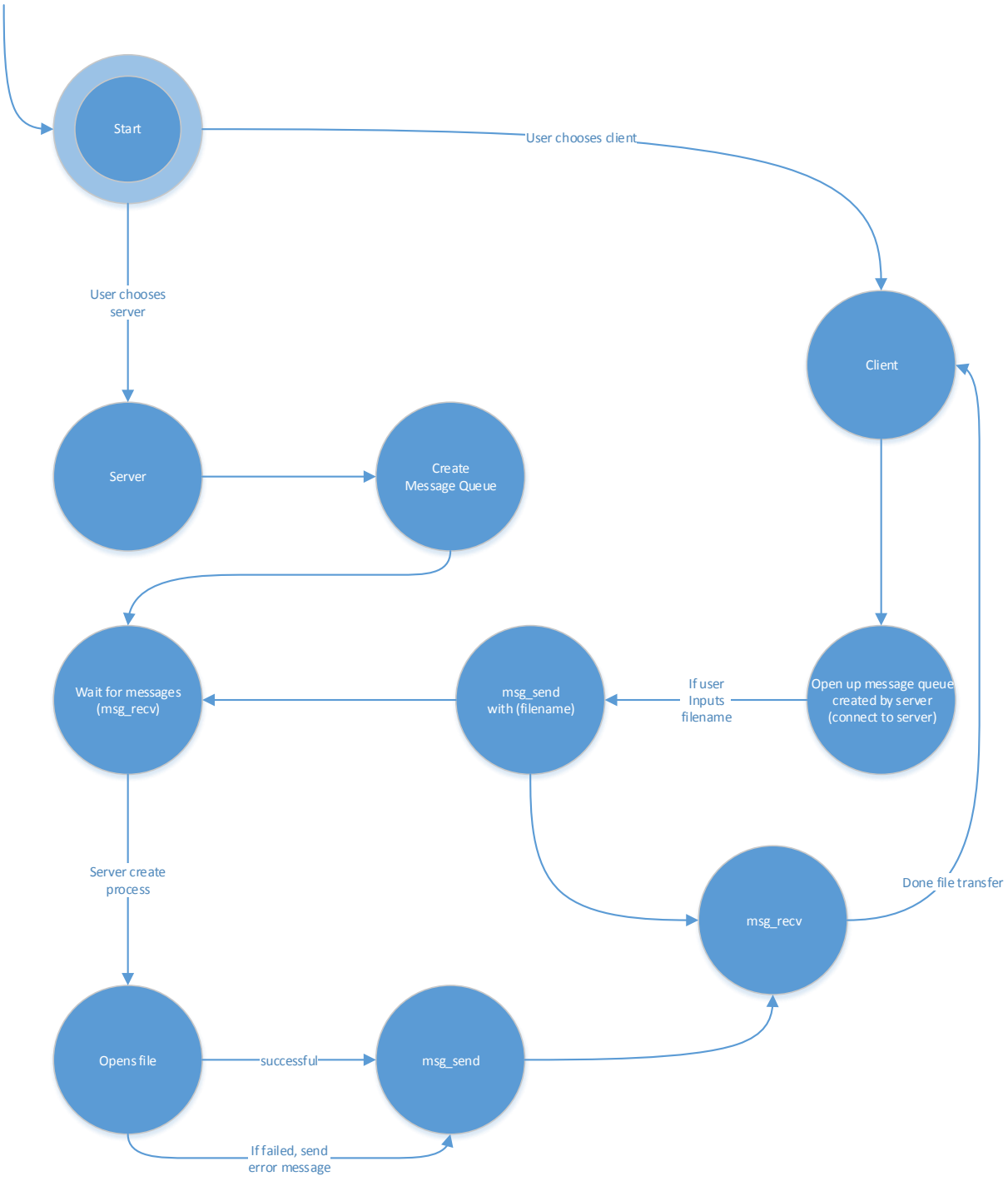
Design


Start
User chooses client
User chooses server
Client
Server
Create Message Queue
Wait for messages (msg_recv)
msg_send with (filename)
If user Inputs filename
Open up message queue created by server (connect to server)
Server create process
msg_recv
Done file transfer
Opens file
successful
msg_send
If failed, send error message

Function Prototypes

Client Prototypes

```
void startClient(char*, int);

void *client_thread(void * id);

void exit_message();

int OpenMessageQueue();
```

Server Prototypes

```
void startServer();

void catch_int(int signo);

void catch_cleanup(int signo);
```

Read/Write Prototypes

```
void mqstat_print (key_t mkey, int mqid, struct msqid_ds *mstat);

int read_message (int qid, long type, Mesg *qbuf );

int send_message( int msg_qid, Mesg *qbuf ) ;
```

Pseudo Code

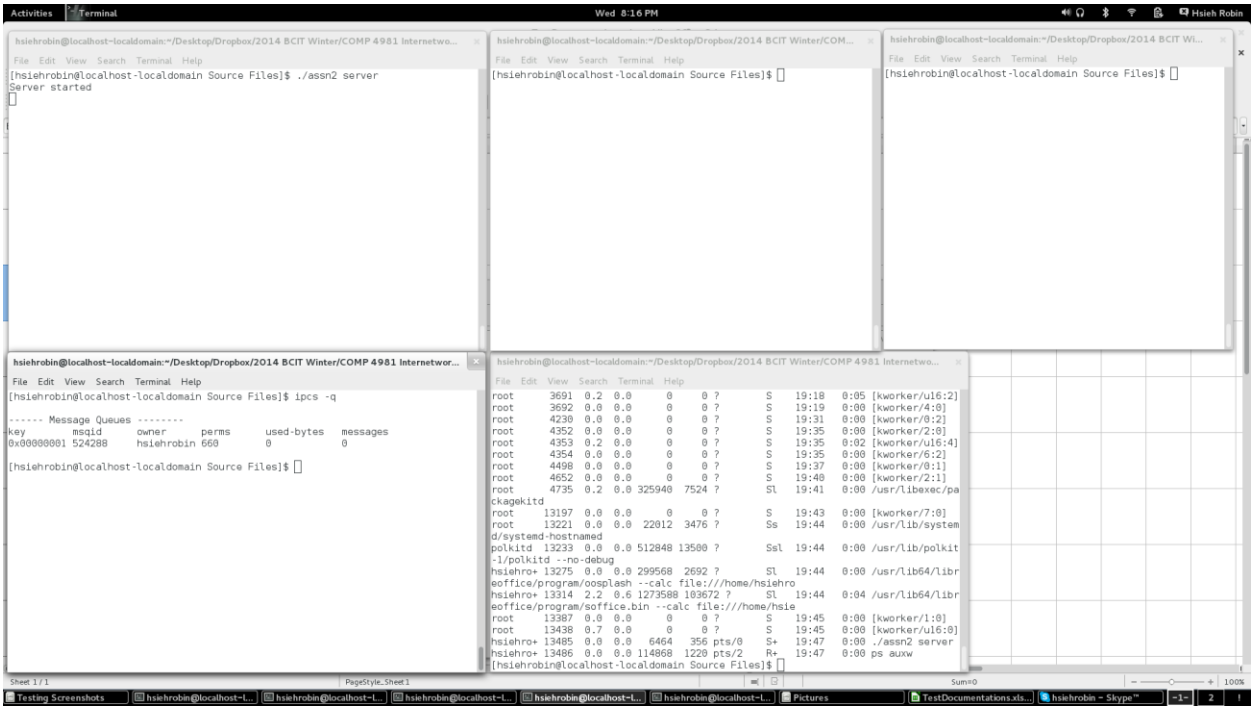
```
Main()
{
   check for argument passed into program
   if server
      Server()

   if client
      Client(filename)
}

Server()
{
   start server by using msgget

   while loop
   {
      initialize the readermsg, and writermsg buffer

      msg_recv on the message queue waiting on clients
      if client is connected
      {
         start new process fork()
         get info on readermsg and fill into writermsg
         set mtype to client's pid

         open file to read
         if successful
         {
            read file into writermsg buffer
            msg_send to message queue
         }
         else if fails
         {
            send error message
         }
         once done with this file, close file
         close process
      }
      free(writermsg)
      free(readermsg)
   }
```

```
}

Client(filename)
{
   initialize msg queue doing msgget

   msg_send with the filename to server

   msg_recv while file is not completely sent from server
   free(msg)
}
```

Test Documents

Test	Test Description	Expected Result	Pass/Fail	Screen Shot
1	Start server	Server started properly (ipcs -q to check if message queue has been opened	Pass	Figure 1
2	Server can write to message queue	Server is able to write messages to the queue	Pass	Figure 2
3	Client connect to server	Client properly connected, being able to take messages off the queue	Pass	Figure 2
4	Client can read from message queue	Client able to get messages off queue	Pass	Figure 2
5	Server being able to handle multiple users	Server being able to handle multiple users	Pass	Figure 3a, 3b
6	Server starts new process each time client connects	New process is created, shown in ps auxw	Pass	Figure 4
7	Priority system working	Not ordered by FIFO, but by the priority given	Pass	Figure 5
8	Message queue gets removed once server stops	ipcs -q to show it being removed after server gets terminated by user	Pass	Figure 6a, 6b

Figure 1


Activities
Terminal
Wed 8:16 PM
Hsieh Robin
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 server
Server started
[hsiehrobin@localhost-localdomain Source Files]$
[hsiehrobin@localhost-localdomain Source Files]$
[hsiehrobin@localhost-localdomain Source Files]$ ipcs -q
------ Message Queues --------
key msqid owner perms used-bytes messages
0x00000001 524288 hsiehrobin 660 0 0
[hsiehrobin@localhost-localdomain Source Files]$
root 3691 0.2 0.0 0 0 ? S 19:18 0:05 [kworker/u16:2]
root 3692 0.0 0.0 0 0 ? S 19:19 0:00 [kworker/4:0]
root 4230 0.0 0.0 0 0 ? S 19:31 0:00 [kworker/0:2]
root 4352 0.0 0.0 0 0 ? S 19:35 0:00 [kworker/2:0]
root 4353 0.2 0.0 0 0 ? S 19:35 0:02 [kworker/u16:4]
root 4354 0.0 0.0 0 0 ? S 19:35 0:00 [kworker/6:2]
root 4498 0.0 0.0 0 0 ? S 19:37 0:00 [kworker/0:1]
root 4652 0.0 0.0 0 0 ? S 19:40 0:00 [kworker/2:1]
root 4735 0.2 0.0 325940 7524 ? Sl 19:41 0:00 /usr/libexec/packagekitd
root 13197 0.0 0.0 0 0 ? S 19:43 0:00 [kworker/7:0]
root 13221 0.0 0.0 22012 3476 ? Ss 19:44 0:00 /usr/lib/systemd/systemd-hostnamed
polkitd 13233 0.0 0.0 512848 13500 ? Ssl 19:44 0:00 /usr/lib/polkit-1/polkitd --no-debug
hsiehro+ 13275 0.0 0.0 299568 2692 ? Sl 19:44 0:00 /usr/lib64/libreoffice/program/oosplash --calc file:///home/hsiehro
hsiehro+ 13314 2.2 0.6 1273588 103672 ? Sl 19:44 0:04 /usr/lib64/libreoffice/program/soffice.bin --calc file:///home/hsie
root 13387 0.0 0.0 0 0 ? S 19:45 0:00 [kworker/1:0]
root 13438 0.7 0.0 0 0 ? S 19:45 0:00 [kworker/u16:0]
hsiehro+ 13485 0.0 0.0 6464 356 pts/0 S+ 19:47 0:00 ./assn2 server
hsiehro+ 13486 0.0 0.0 114868 1220 pts/2 R+ 19:47 0:00 ps auxw
[hsiehrobin@localhost-localdomain Source Files]$
Testing Screenshots
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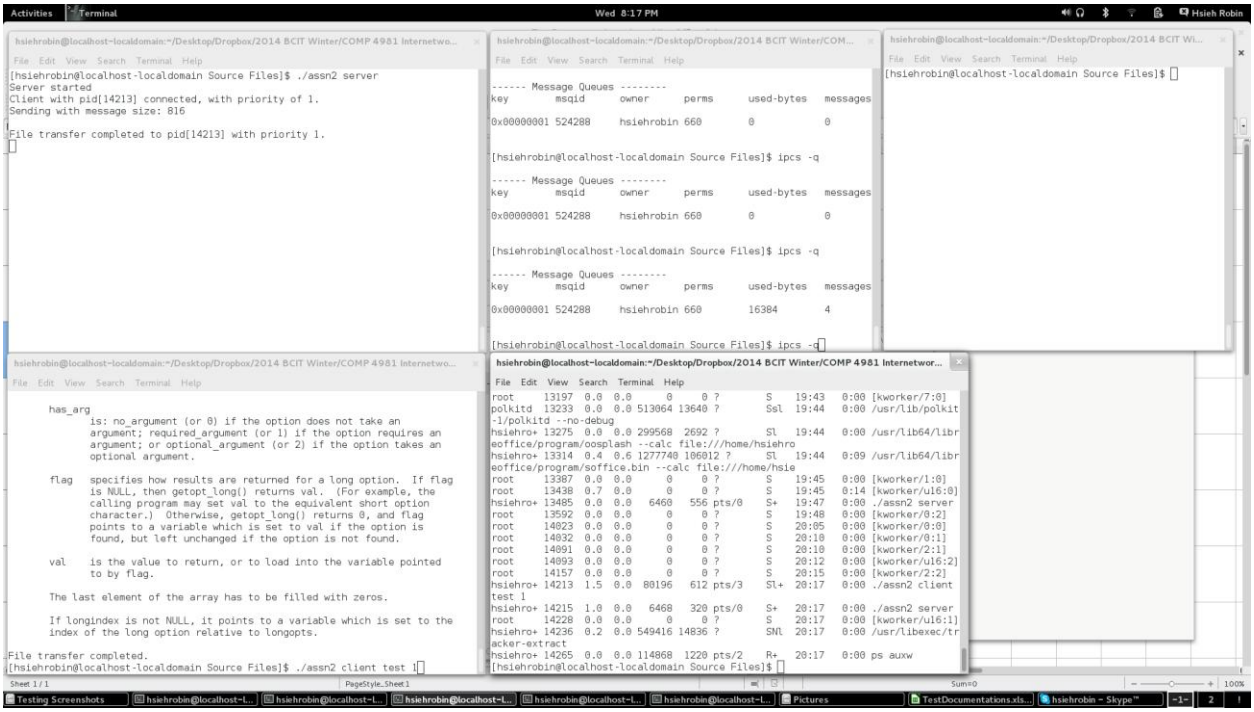
hsiehrobin ~ Skype™

Figure 2


Activities
Terminal
Wed 8:17 PM
Hsieh Robin
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 server
Server started
Client with pid[14213] connected, with priority of 1.
Sending with message size: 816
File transfer completed to pid[14213] with priority 1.
------ Message Queues --------
key msqid owner perms used-bytes messages
0x00000001 524288 hsiehrobin 660 0 0
[hsiehrobin@localhost-localdomain Source Files]$ ipcs -q
------ Message Queues --------
key msqid owner perms used-bytes messages
0x00000001 524288 hsiehrobin 660 0 0
[hsiehrobin@localhost-localdomain Source Files]$ ipcs -q
------ Message Queues --------
key msqid owner perms used-bytes messages
0x00000001 524288 hsiehrobin 660 16384 4
[hsiehrobin@localhost-localdomain Source Files]$ ipcs -q
[hsiehrobin@localhost-localdomain Source Files]$
has_arg
is: no_argument (or 0) if the option does not take an argument; required_argument (or 1) if the option requires an argument; or optional_argument (or 2) if the option takes an optional argument.
flag specifies how results are returned for a long option. If flag is NULL, then getopt_long() returns val. (For example, the calling program may set val to the equivalent short option character.) Otherwise, getopt_long() returns 0, and flag points to a variable which is set to val if the option is found, but left unchanged if the option is not found.
val is the value to return, or to load into the variable pointed to by flag.
The last element of the array has to be filled with zeros.
If longindex is not NULL, it points to a variable which is set to the index of the long option relative to longopts.
File transfer completed.
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 client test 1
root 13197 0.0 0.0 0 0 ? S 19:43 0:00 [kworker/7:0]
polkitd 13233 0.0 0.0 513064 13640 ? Ssl 19:44 0:00 /usr/lib/polkit-1/polkitd --no-debug
hsiehro+ 13275 0.0 0.0 299568 2692 ? Sl 19:44 0:00 /usr/lib64/libreoffice/program/oosplash --calc file:///home/hsiehro
hsiehro+ 13314 0.4 0.6 1277740 106012 ? Sl 19:44 0:09 /usr/lib64/libreoffice/program/soffice.bin --calc file:///home/hsie
root 13387 0.0 0.0 0 0 ? S 19:45 0:00 [kworker/1:0]
root 13438 0.7 0.0 0 0 ? S 19:45 0:14 [kworker/u16:0]
hsiehro+ 13485 0.0 0.0 6460 556 pts/0 S+ 19:47 0:00 ./assn2 server
root 13592 0.0 0.0 0 0 ? S 19:48 0:00 [kworker/0:2]
root 14023 0.0 0.0 0 0 ? S 20:05 0:00 [kworker/0:0]
root 14032 0.0 0.0 0 0 ? S 20:10 0:00 [kworker/0:1]
root 14091 0.0 0.0 0 0 ? S 20:10 0:00 [kworker/2:1]
root 14093 0.0 0.0 0 0 ? S 20:12 0:00 [kworker/u16:2]
root 14157 0.0 0.0 0 0 ? S 20:15 0:00 [kworker/2:2]
hsiehro+ 14213 1.5 0.0 80196 612 pts/3 Sl+ 20:17 0:00 ./assn2 client test 1
hsiehro+ 14215 1.0 0.0 6468 320 pts/0 S+ 20:17 0:00 ./assn2 server
root 14228 0.0 0.0 0 0 ? S 20:17 0:00 [kworker/u16:1]
hsiehro+ 14236 0.2 0.0 549416 14836 ? SNl 20:17 0:00 /usr/libexec/tracker-extract
hsiehro+ 14265 0.0 0.0 114868 1220 pts/2 R+ 20:17 0:00 ps auxw
[hsiehrobin@localhost-localdomain Source Files]$
Testing Screenshots
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hsiehrobin - Skype™

Figure 3a

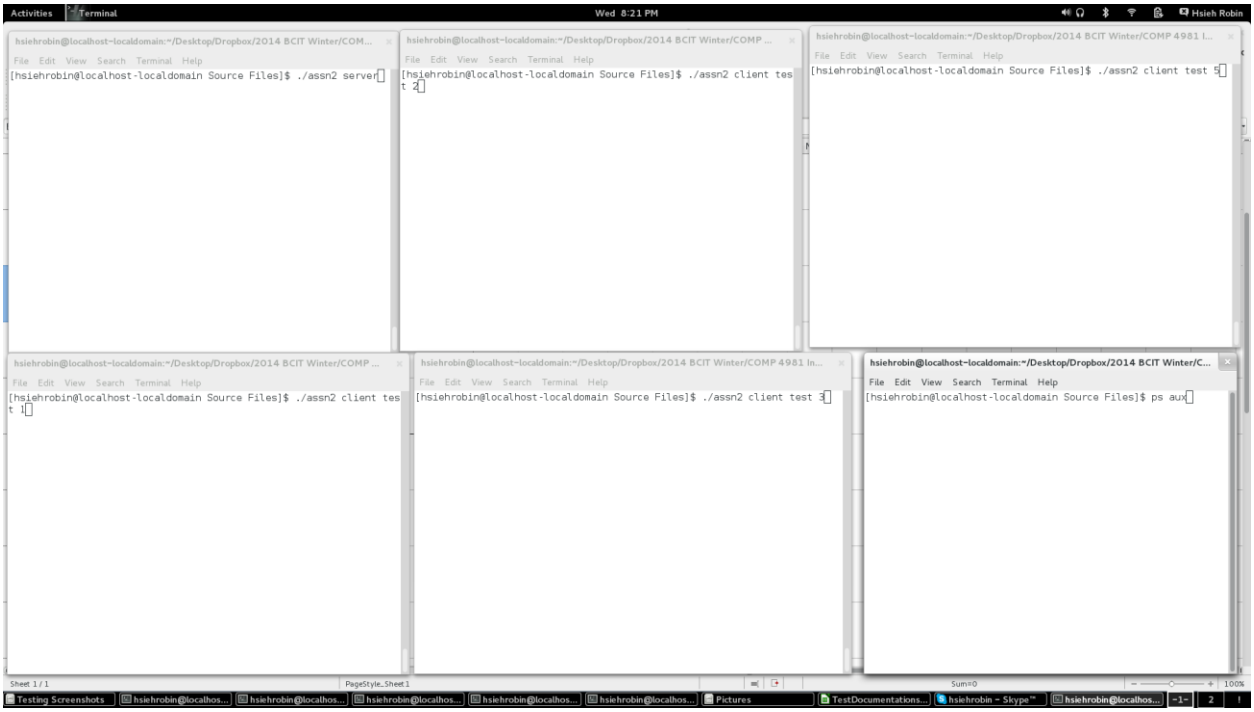

Activities
Terminal
Wed 8:21 PM
Hsieh Robin
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 server
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 client test 2
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 client test 5
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 client test 1
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 client test 3
[hsiehrobin@localhost-localdomain Source Files]$ ps aux
Testing Screenshots
Pictures
TestDocumentations...
hsiehrobin - Skype™

Figure 3b

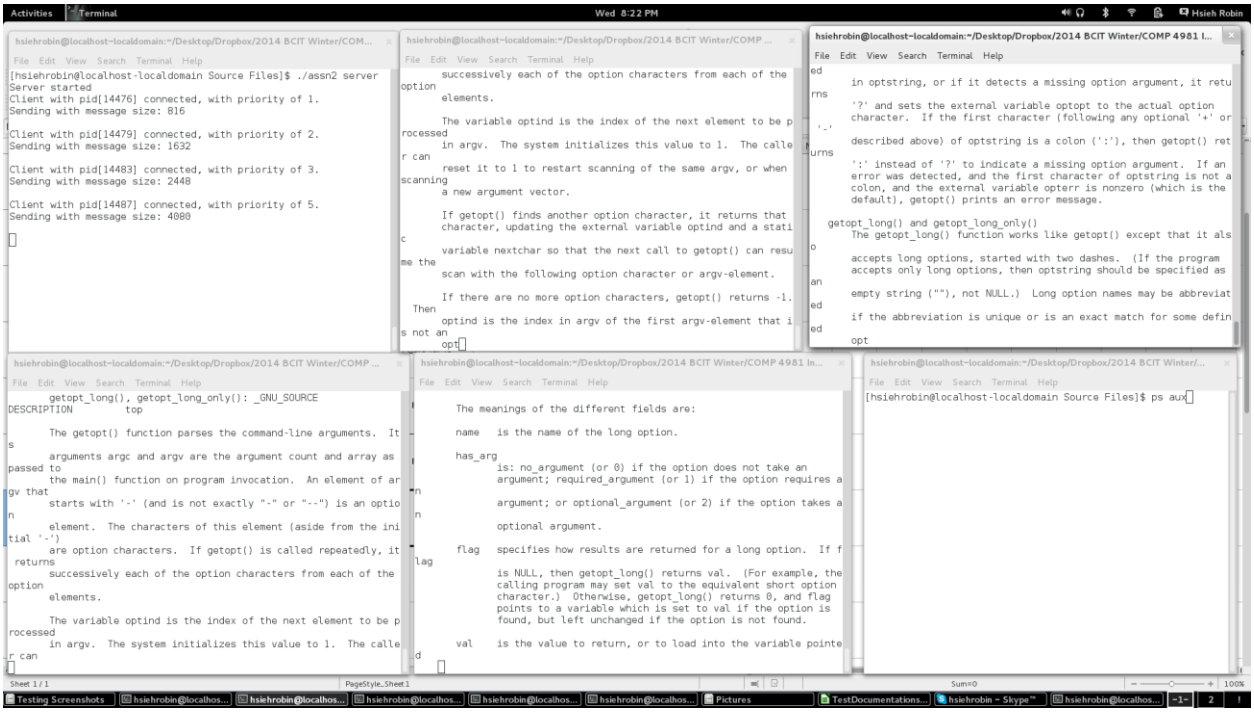
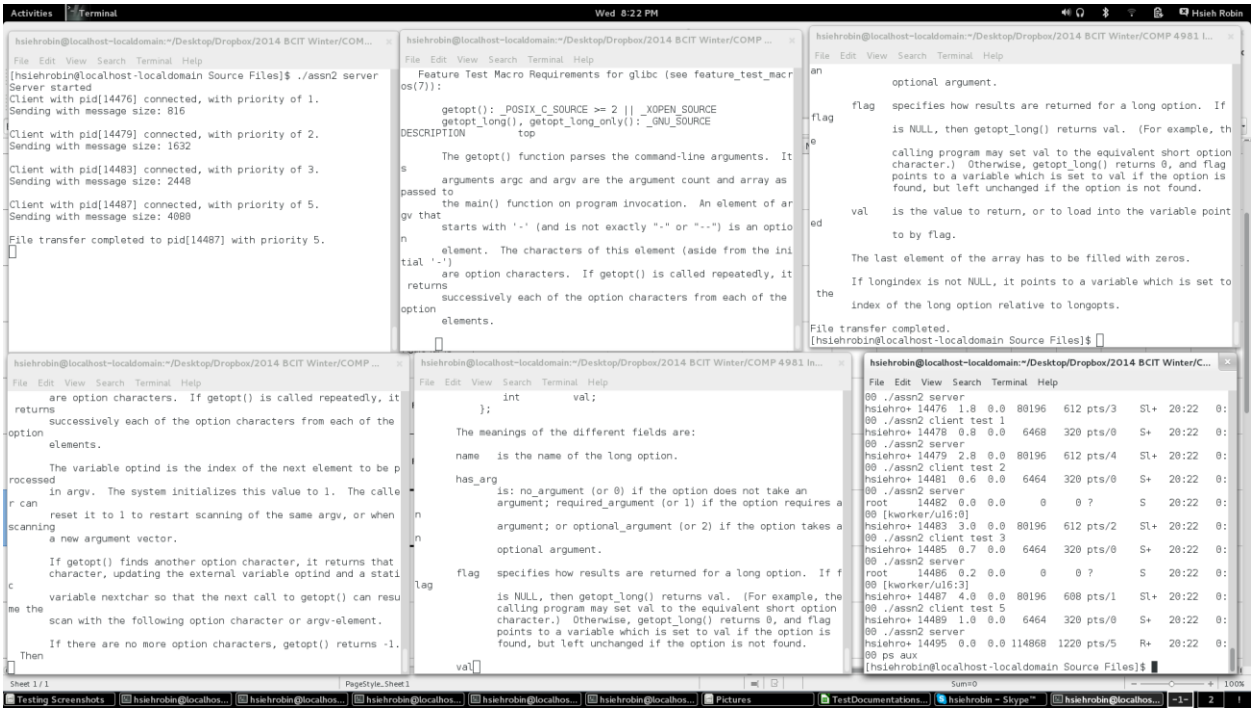

Activities
Terminal
Wed 8:22 PM
Hsieh Robin
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 server
Server started
Client with pid[14476] connected, with priority of 1.
Sending with message size: 816
Client with pid[14479] connected, with priority of 2.
Sending with message size: 1632
Client with pid[14483] connected, with priority of 3.
Sending with message size: 2448
Client with pid[14487] connected, with priority of 5.
Sending with message size: 4080
[hsiehrobin@localhost-localdomain Source Files]$ ps aux

Figure 4


Activities
Terminal
Wed 8:22 PM
Hsieh Robin
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 server
Server started
Client with pid[14476] connected, with priority of 1.
Sending with message size: 816
Client with pid[14479] connected, with priority of 2.
Sending with message size: 1632
Client with pid[14483] connected, with priority of 3.
Sending with message size: 2448
Client with pid[14487] connected, with priority of 5.
Sending with message size: 4080
File transfer completed to pid[14487] with priority 5.
File transfer completed.
[hsiehrobin@localhost-localdomain Source Files]$
[hsiehrobin@localhost-localdomain Source Files]$ ps aux
Testing Screenshots
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TestDocumentations...
hsiehrobin - Skype™

Figure 5

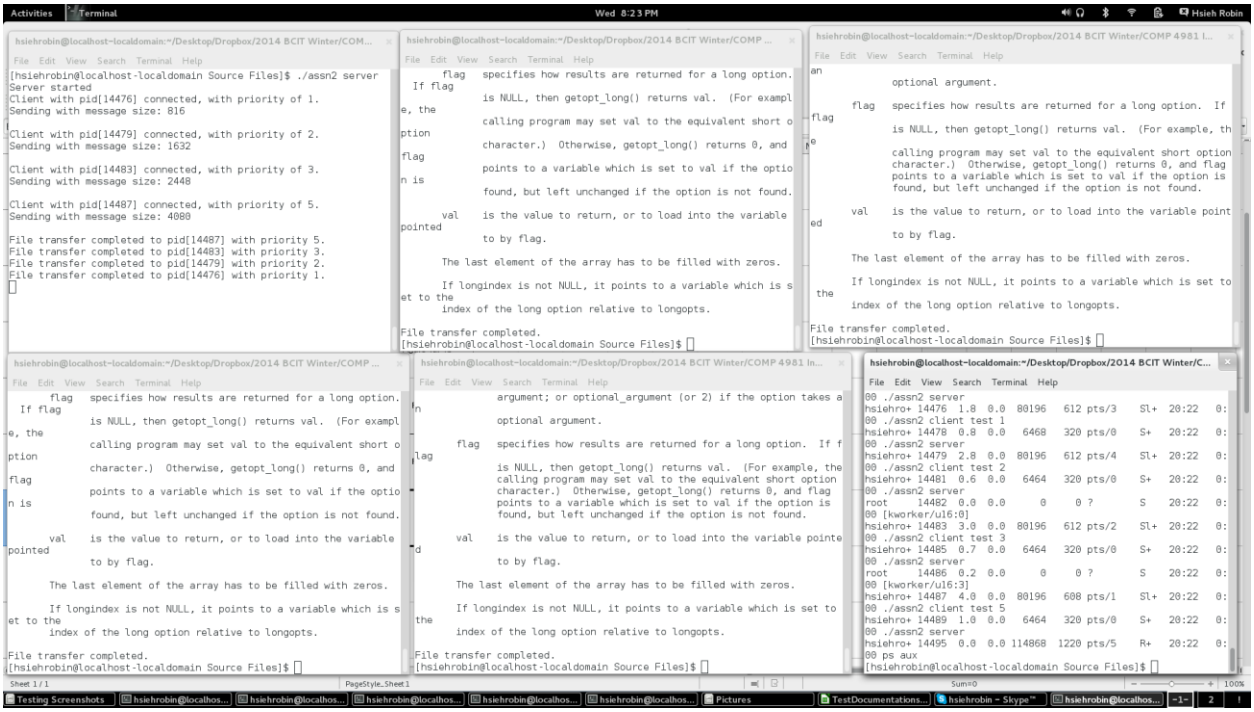

Activities
Terminal
Wed 8:23 PM
Hsieh Robin
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 server
Server started
Client with pid[14476] connected, with priority of 1.
Sending with message size: 816
Client with pid[14479] connected, with priority of 2.
Sending with message size: 1632
Client with pid[14483] connected, with priority of 3.
Sending with message size: 2448
Client with pid[14487] connected, with priority of 5.
Sending with message size: 4080
File transfer completed to pid[14487] with priority 5.
File transfer completed to pid[14483] with priority 3.
File transfer completed to pid[14479] with priority 2.
File transfer completed to pid[14476] with priority 1.
[hsiehrobin@localhost-localdomain Source Files]$
00 ./assn2 server
hsiehro+ 14476 1.8 0.0 80196 612 pts/3 Sl+ 20:22 0:
00 ./assn2 client test 1
hsiehro+ 14478 0.8 0.0 6468 320 pts/0 S+ 20:22 0:
00 ./assn2 server
hsiehro+ 14479 2.8 0.0 80196 612 pts/4 Sl+ 20:22 0:
00 ./assn2 client test 2
hsiehro+ 14481 0.6 0.0 6464 320 pts/0 S+ 20:22 0:
00 ./assn2 server
root 14482 0.0 0.0 0 0 ? S 20:22 0:
00 [kworker/u16:0]
hsiehro+ 14483 3.0 0.0 80196 612 pts/2 Sl+ 20:22 0:
00 ./assn2 client test 3
hsiehro+ 14485 0.7 0.0 6464 320 pts/0 S+ 20:22 0:
00 ./assn2 server
root 14486 0.2 0.0 0 0 ? S 20:22 0:
00 [kworker/u16:3]
hsiehro+ 14487 4.0 0.0 80196 608 pts/1 Sl+ 20:22 0:
00 ./assn2 client test 5
hsiehro+ 14489 1.0 0.0 6464 320 pts/0 S+ 20:22 0:
00 ./assn2 server
hsiehro+ 14495 0.0 0.0 114868 1220 pts/5 R+ 20:22 0:
00 ps aux
[hsiehrobin@localhost-localdomain Source Files]$

Figure 6a

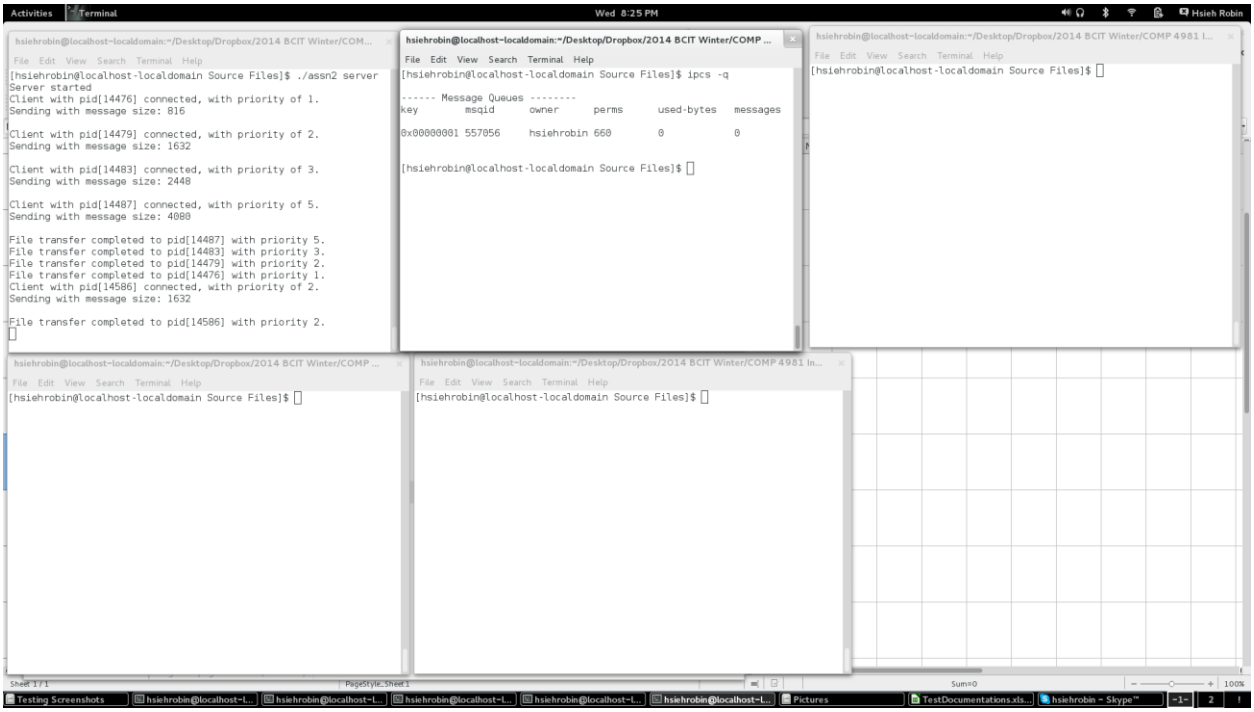
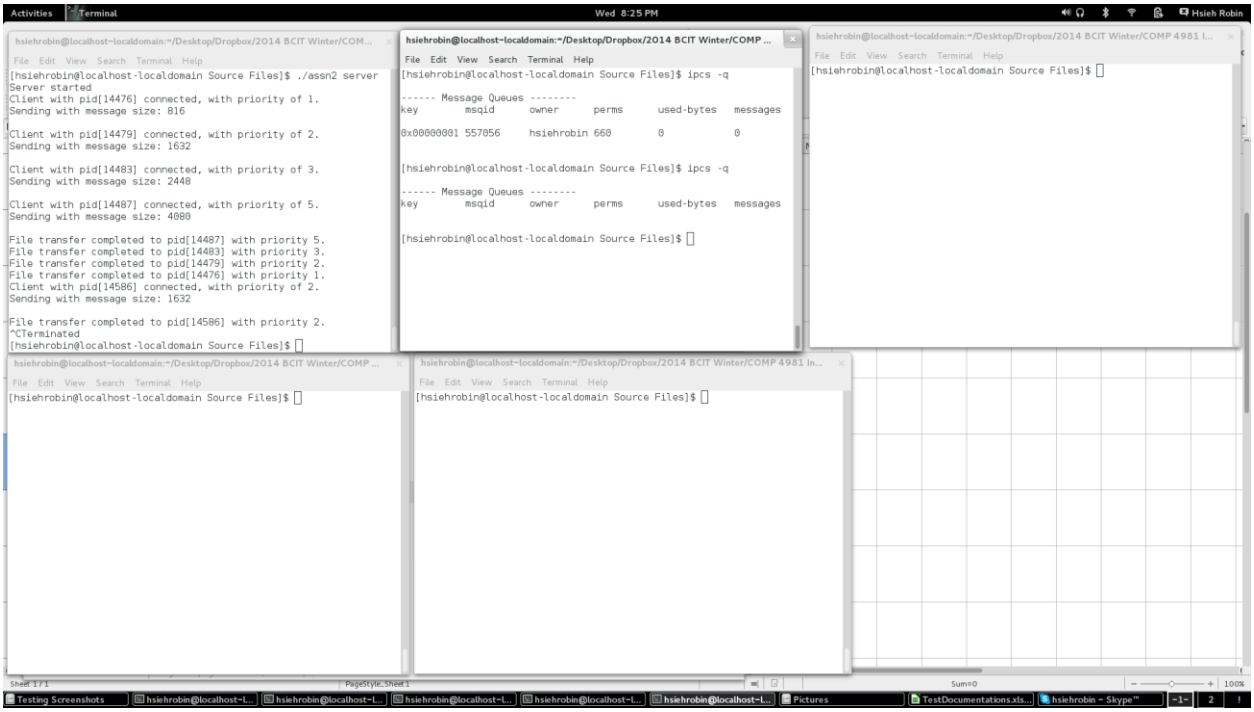

Activities
Terminal
Wed 8:25 PM
Hsieh Robin
hsiehrobin@localhost-localdomain:~/Desktop/Dropbox/2014 BCIT Winter/COM...
File Edit View Search Terminal Help
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 server
Server started
Client with pid[14476] connected, with priority of 1.
Sending with message size: 816
Client with pid[14479] connected, with priority of 2.
Sending with message size: 1632
Client with pid[14483] connected, with priority of 3.
Sending with message size: 2448
Client with pid[14487] connected, with priority of 5.
Sending with message size: 4080
File transfer completed to pid[14487] with priority 5.
File transfer completed to pid[14483] with priority 3.
File transfer completed to pid[14479] with priority 2.
File transfer completed to pid[14476] with priority 1.
Client with pid[14586] connected, with priority of 2.
Sending with message size: 1632
File transfer completed to pid[14586] with priority 2.
hsiehrobin@localhost-localdomain:~/Desktop/Dropbox/2014 BCIT Winter/COMP ...
File Edit View Search Terminal Help
[hsiehrobin@localhost-localdomain Source Files]$ ipcs -q
------ Message Queues --------
key msqid owner perms used-bytes messages
0x00000001 557056 hsiehrobin 660 0 0
[hsiehrobin@localhost-localdomain Source Files]$
hsiehrobin@localhost-localdomain:~/Desktop/Dropbox/2014 BCIT Winter/COMP 4981 I...
File Edit View Search Terminal Help
[hsiehrobin@localhost-localdomain Source Files]$
hsiehrobin@localhost-localdomain:~/Desktop/Dropbox/2014 BCIT Winter/COMP ...
File Edit View Search Terminal Help
[hsiehrobin@localhost-localdomain Source Files]$
hsiehrobin@localhost-localdomain:~/Desktop/Dropbox/2014 BCIT Winter/COMP 4981 In...
File Edit View Search Terminal Help
[hsiehrobin@localhost-localdomain Source Files]$
Testing Screenshots
hsiehrobin@localhost-L...
Pictures
TestDocumentations.xls...
hsiehrobin - Skype™

Figure 6b


Activities
Terminal
Wed 8:25 PM
Hsieh Robin
[hsiehrobin@localhost-localdomain Source Files]$ ./assn2 server
Server started
Client with pid[14476] connected, with priority of 1.
Sending with message size: 816
Client with pid[14479] connected, with priority of 2.
Sending with message size: 1632
Client with pid[14483] connected, with priority of 3.
Sending with message size: 2448
Client with pid[14487] connected, with priority of 5.
Sending with message size: 4080
File transfer completed to pid[14487] with priority 5.
File transfer completed to pid[14483] with priority 3.
File transfer completed to pid[14479] with priority 2.
File transfer completed to pid[14476] with priority 1.
Client with pid[14586] connected, with priority of 2.
Sending with message size: 1632
File transfer completed to pid[14586] with priority 2.
^CTerminated
[hsiehrobin@localhost-localdomain Source Files]$
[hsiehrobin@localhost-localdomain Source Files]$ ipcs -q
------ Message Queues --------
key msqid owner perms used-bytes messages
0x00000001 557056 hsiehrobin 660 0 0
[hsiehrobin@localhost-localdomain Source Files]$ ipcs -q
------ Message Queues --------
key msqid owner perms used-bytes messages
[hsiehrobin@localhost-localdomain Source Files]$
[hsiehrobin@localhost-localdomain Source Files]$
[hsiehrobin@localhost-localdomain Source Files]$
Testing Screenshots
Pictures
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