System	Client/Server (C coursework)
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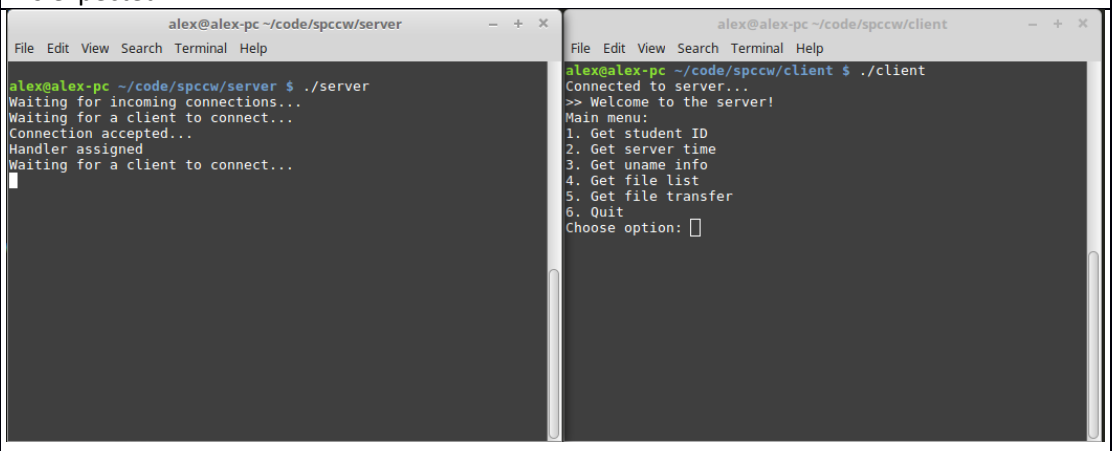
Before	It's required to run both server and client in different terminal windows, so you can see the results side-by-side.

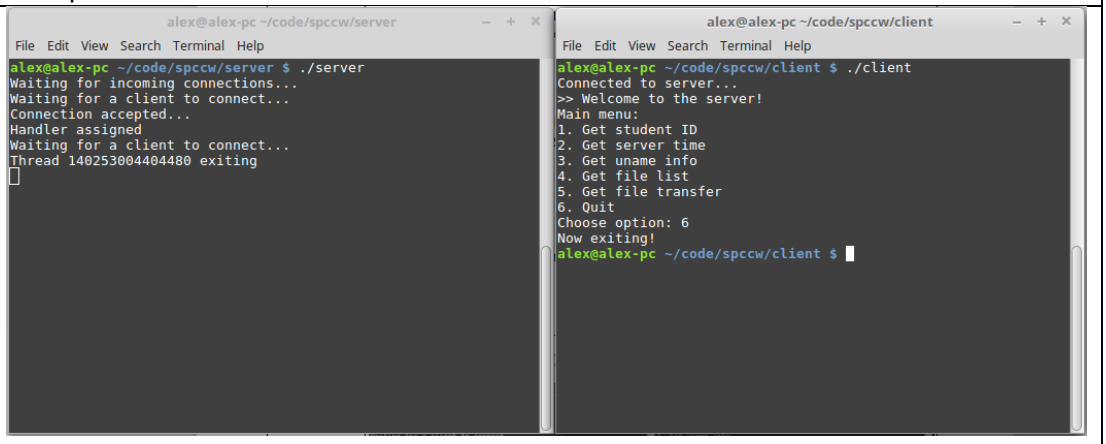
Test	001
Description	Client connects to server
Input	In first terminal start the server: `./server` In the second terminal start the client: `./client`

Expected	The server should display the following:
	
	`Waiting for incoming connections...`
	`Waiting for a client to connect...`
	`Connection accepted...`
	`Handler assigned`
	
	`The client should display:`
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option:`

Actual	As expected
Screen	

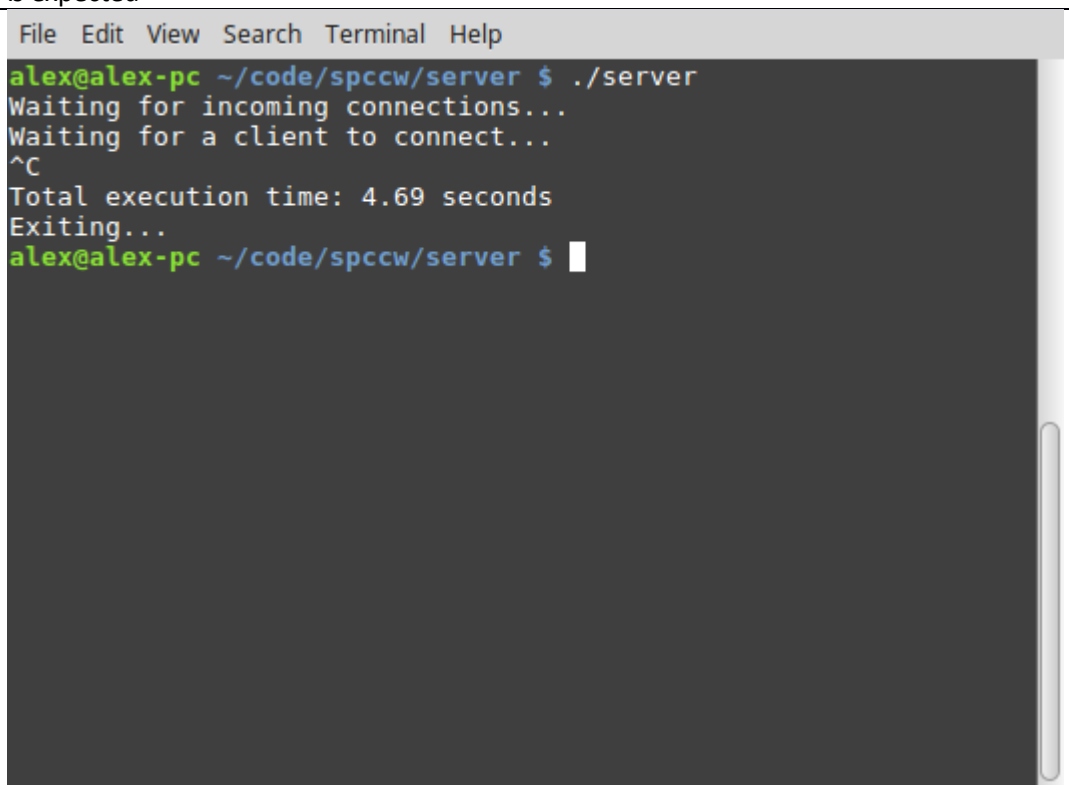
Test	002
Description	Client disconnects from server
Input	In first terminal start the server: `./server` In the second terminal start the client: `./client` Then press 6 in the client to select the menu option to quit.

Expected	The server should display the following (note the actual thread ID will vary):
	
	`Waiting for incoming connections...`
	`Waiting for a client to connect...`
	`Connection accepted...`
	`Handler assigned`
	`Waiting for a client to connect...`
	`Thread 140253004404480 exiting`
	
	The client should display:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 6`
	`Now exiting!`

Actual	As expected
Screen	

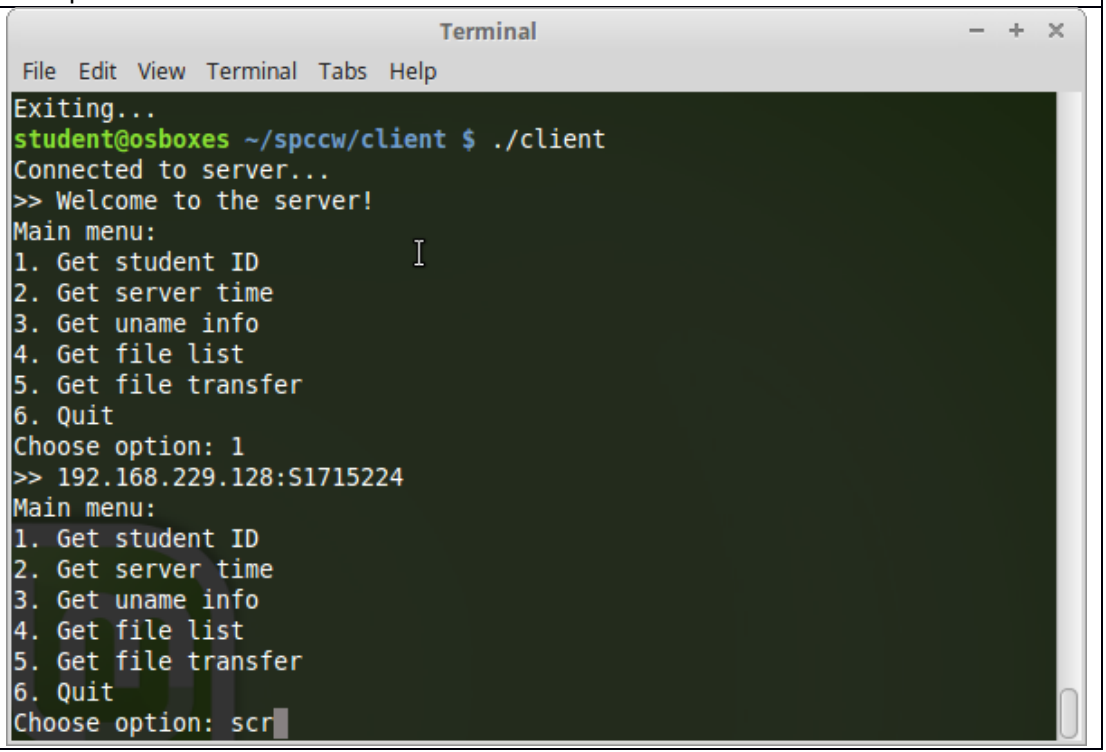
Test	003
Description	Server closes correctly on interrupt
Input	In first terminal start the server: `./server` Then press Ctrl+C to send SIGINT to the server process.

Expected	The server should display the following (note the actual execution time will vary):
	
	`Waiting for incoming connections...`
	`Waiting for a client to connect...`
	`^C`
	`Total execution time: 4.69 seconds`
	`Exiting...`

Actual	As expected
Screen	

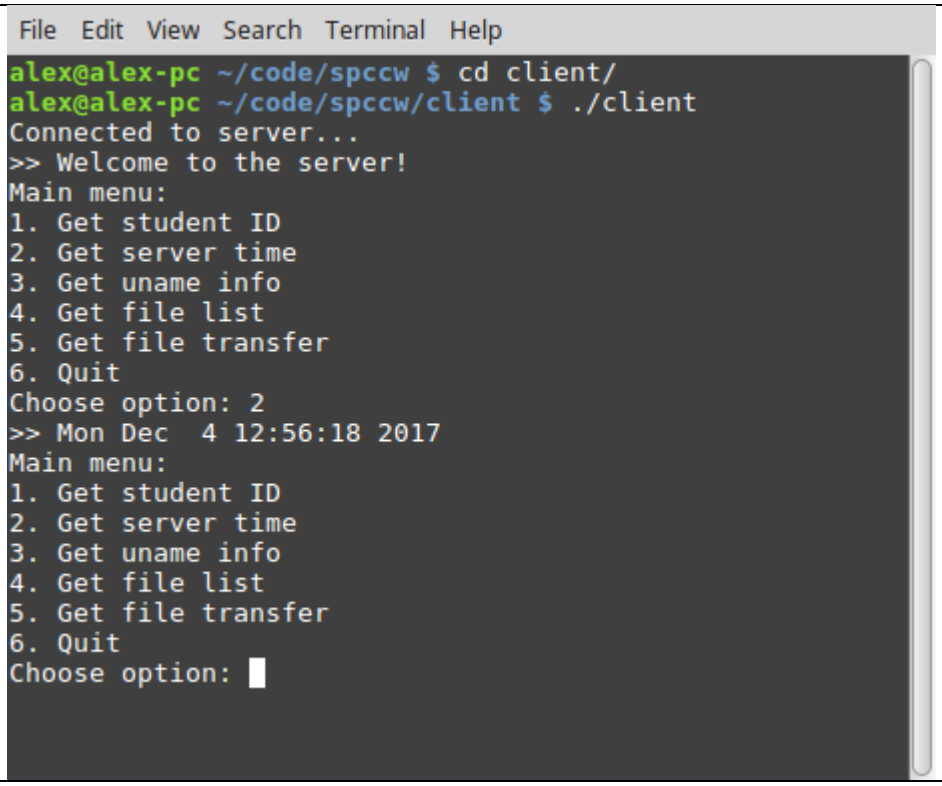
Test	004
Description	Get student ID works correctly
Input	In first terminal start the server: `./server` In the second terminal start the client: `./client` Then select option 1 from the client menu

Expected	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 1`
	`>> 192.168.229.128:S1715224`
	
	Before then displaying the menu again.

Actual	As expected
Screen	

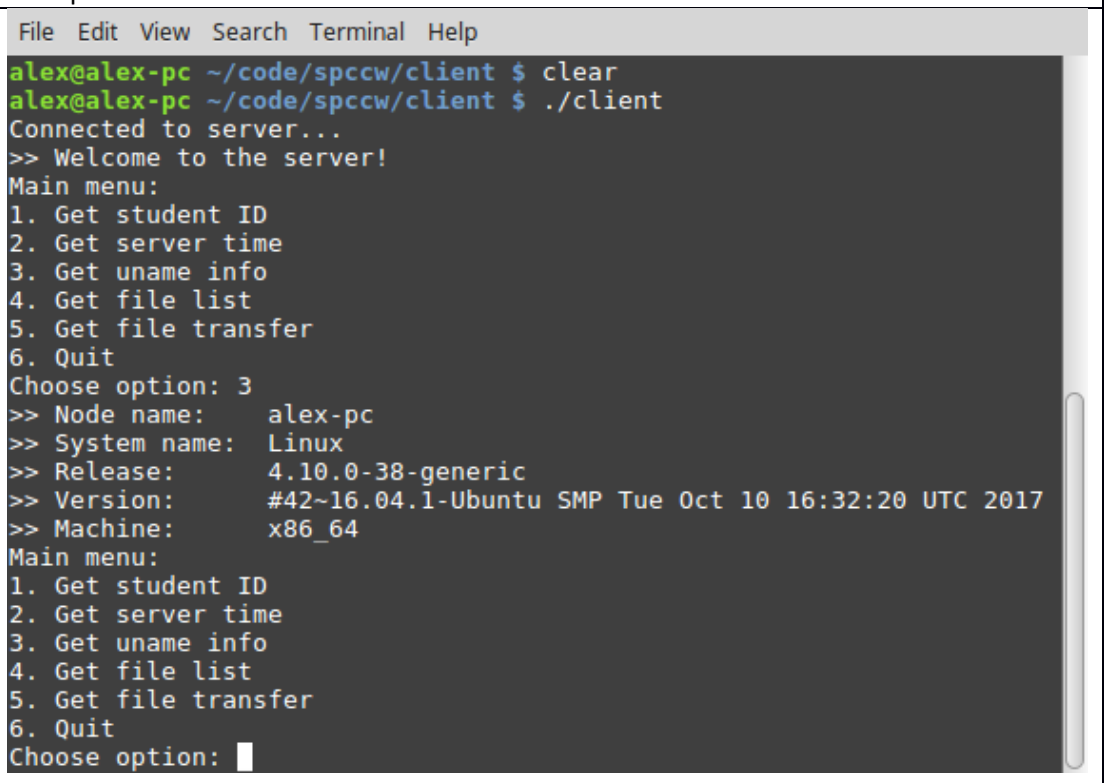
Test	005
Description	Get server time works correctly
Input	In first terminal start the server: `./server` In the second terminal start the client: `./client` Then select option 2 from the client menu

Expected	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 2`
	`>> Mon Dec  4 12:56:18 2017`
	
	Before then displaying the menu again. Note that the current date and time will vary depending on when the test was run.

Actual	As expected
Screen	

Test	006
Description	Get uname info works correctly
Input	In first terminal start the server: `./server` In the second terminal start the client: `./client` Then select option 3 from the client menu

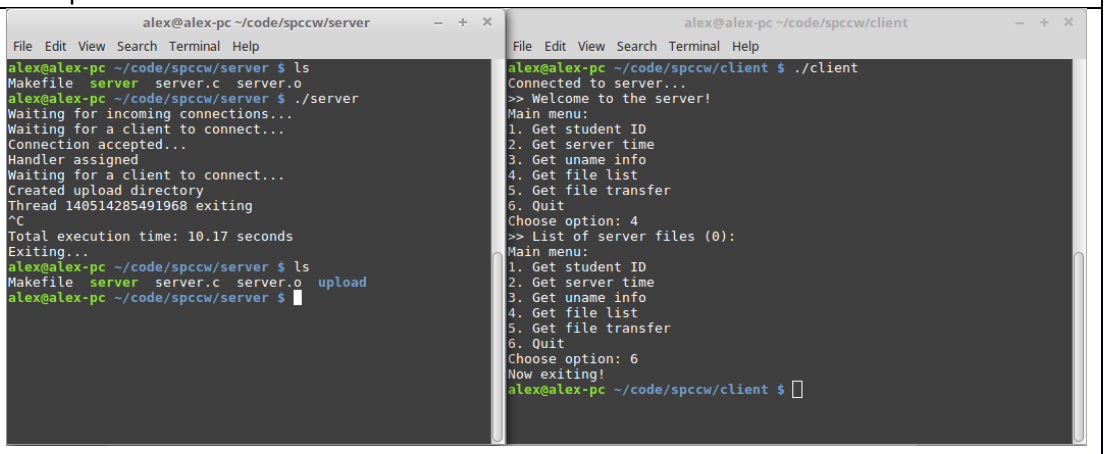
Expected	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 3`
	`>> Node name: alex-pc`
	`>> System name: Linux`
	`>> Release: 4.10.0-38-generic`
	`>> Version: #42~16.04.1-Ubuntu SMP Tue Oct 10 16:32:20 UTC 2017`
	`>> Machine: x86_64`
	
	Before then displaying the menu again. Note that the actual uname info provided will vary from machine to machine.

Actual	As expected
Screen	

Test	007
Description	Get file list creates upload directory
Input	Check that the upload directory does not exist for the server: `ls` In first terminal start the server: `./server` In the second terminal start the client: `./client` Then select option 4 from the client menu. Exit from the client by pressing 6 and the server by pressing CTRL+C. Enter `ls` to check that the upload directory has been created.

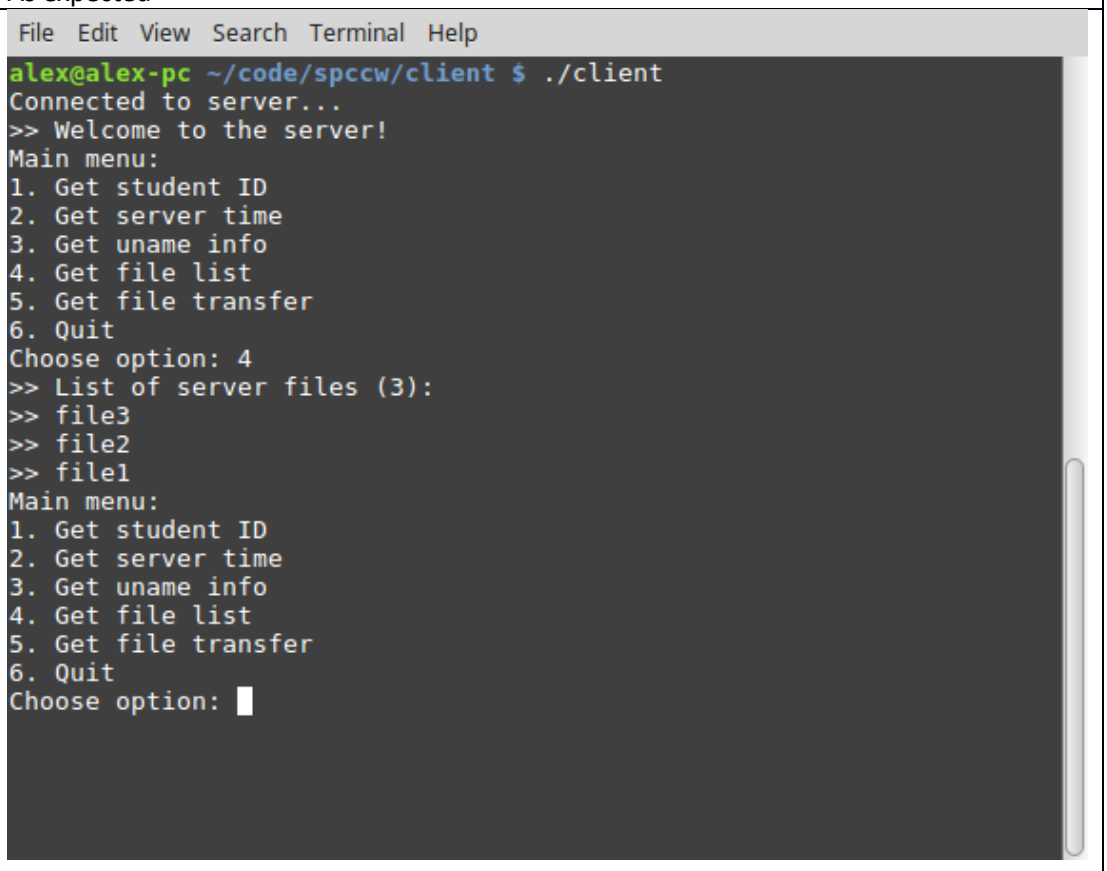
Expected	The upload directory should now exist in the server directory.
	
	The server should display the following:
	
	`alex@alex-pc ~/code/spccw/server $ ls`
	`Makefile  server  server.c  server.o`
	`alex@alex-pc ~/code/spccw/server $ ./server`
	`Waiting for incoming connections...`
	`Waiting for a client to connect...`
	`Connection accepted...`
	`Handler assigned`
	`Waiting for a client to connect...`
	`Created upload directory`
	`Thread 140514285491968 exiting`
	`^C`
	`Total execution time: 10.17 seconds`
	`Exiting...`
	`alex@alex-pc ~/code/spccw/server $ ls`
	`Makefile  server  server.c  server.o  upload`
	`alex@alex-pc ~/code/spccw/server $`
	
	The client should display:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 4`
	`>> List of server files (0):`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`

	`Choose option: 6`
	`Now exiting!`
	
	Note: the thread ID and execution times will vary depending on the test.

Actual	As expected
Screen	

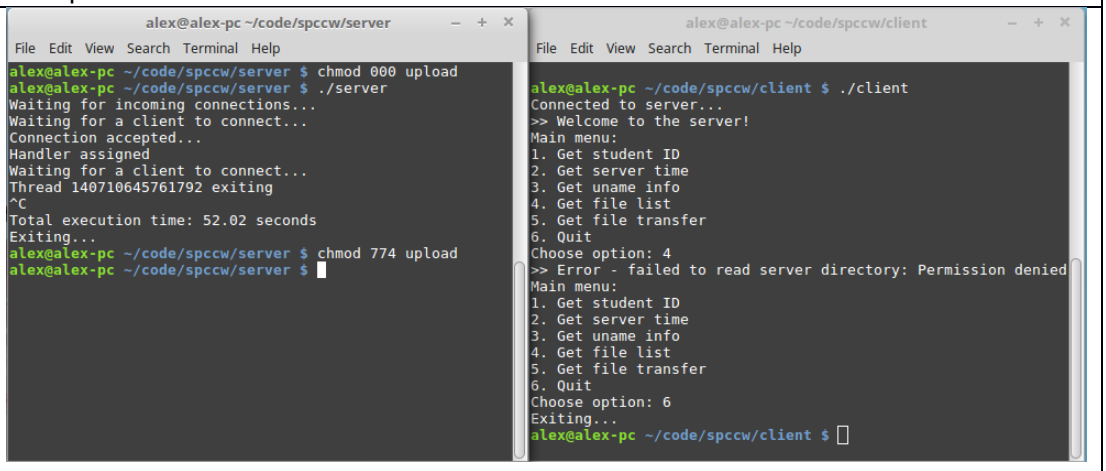
Test	008
Description	Get file list correctly lists files in upload directory
Input	Add some files to the upload directory named file1, file2, and file3: `ls > upload/file1` In first terminal start the server: `./server` In the second terminal start the client: `./client` Then select option 4 from the client menu.

Expected	The upload directory should now exist in the server directory.
	
	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 4`
	`>> List of server files (3):`
	`>> file3`
	`>> file2`
	`>> file1`

Actual	As expected
Screen	

Test	009
Description	Get file list shows error if upload directory permissions not set
Input	Set the upload directory to have restrictive permissions: `chmod 000 upload` In first terminal start the server: `./server` In the second terminal start the client: `./client` Then select option 4 from the client menu. Set the permissions back to something more sensible: `chmod 774 upload`

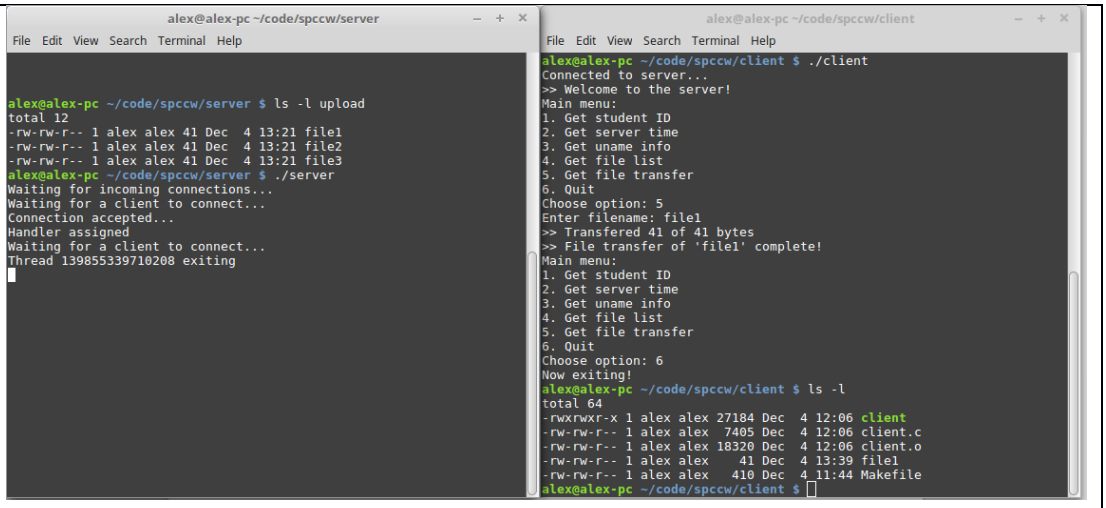
Expected	The upload directory should now exist in the server directory.
	
	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 4`
	`>> Error - failed to read server directory: Permission denied`

Actual	As expected
Screen	

Test	010
Description	Get file transfer works correctly
Input	In first terminal start the server: `./server` In the second terminal get a list of current files to make sure directory does not contain file1, then start the client: `./client` Then select option 5 from the client menu and enter 'file1' and press enter. Exit the menu (option 6) and run ls again to check that 'file1' has been transferred.

Expected	The server should display the following:
	
	`Waiting for incoming connections...`
	`Waiting for a client to connect...`
	`Connection accepted...`
	`Handler assigned`
	`Waiting for a client to connect...`
	`Thread 139786179524352 exiting`
	
	Before then displaying the menu again. Note that the actual uname info provided will vary from machine to machine. The client should display:
	
	`alex@alex-pc ~/code/spccw/client $ ls`
	`client  client.c  client.o  Makefile`
	`alex@alex-pc ~/code/spccw/client $ ./client`
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 5`
	`Enter filename: file1`
	`>> Transfered 41 of 41 bytes`
	`>> File transfer of 'file1' complete!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 6`
	`Now exiting!`
	`alex@alex-pc ~/code/spccw/client $ ls`
	`client  client.c  client.o  file1  Makefile`
	
	Note: the exact contents of the server and client directories may vary.

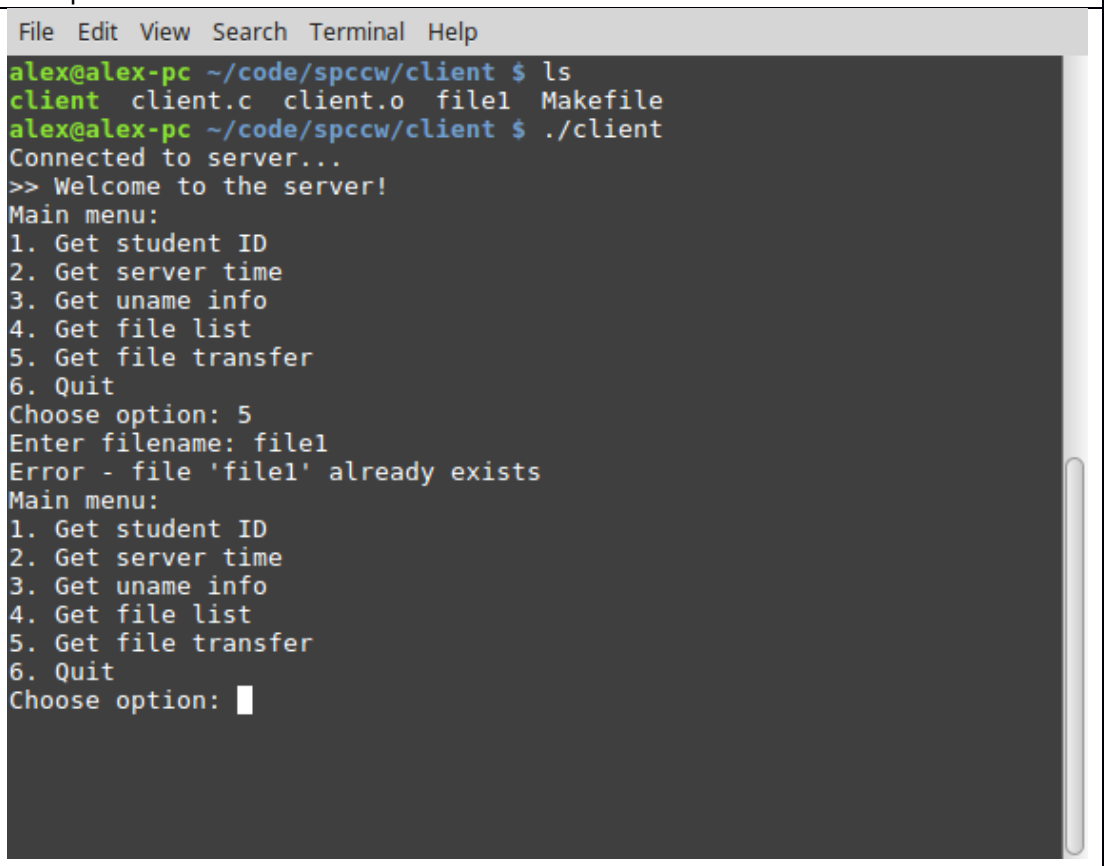
Actual	As expected

Screen	

alex@alex-pc ~/code/spccw/server
File Edit View Search Terminal Help
alex@alex-pc ~/code/spccw/server $ ls -l upload
total 12
-rw-rw-r-- 1 alex alex 41 Dec 4 13:21 file1
-rw-rw-r-- 1 alex alex 41 Dec 4 13:21 file2
-rw-rw-r-- 1 alex alex 41 Dec 4 13:21 file3
alex@alex-pc ~/code/spccw/server $ ./server
Waiting for incoming connections...
Waiting for a client to connect...
Connection accepted...
Handler assigned
Waiting for a client to connect...
Thread 139855339710208 exiting
alex@alex-pc ~/code/spccw/client
File Edit View Search Terminal Help
alex@alex-pc ~/code/spccw/client $ ./client
Connected to server...
>> Welcome to the server!
Main menu:
1. Get student ID
2. Get server time
3. Get uname info
4. Get file list
5. Get file transfer
6. Quit
Choose option: 5
Enter filename: file1
>> Transfered 41 of 41 bytes
>> File transfer of 'file1' complete!
Main menu:
1. Get student ID
2. Get server time
3. Get uname info
4. Get file list
5. Get file transfer
6. Quit
Choose option: 6
Now exiting!
alex@alex-pc ~/code/spccw/client $ ls -l
total 64
-rwxrwxr-x 1 alex alex 27184 Dec 4 12:06 client
-rw-rw-r-- 1 alex alex 7405 Dec 4 12:06 client.c
-rw-rw-r-- 1 alex alex 18320 Dec 4 12:06 client.o
-rw-rw-r-- 1 alex alex 41 Dec 4 13:39 file1
-rw-rw-r-- 1 alex alex 410 Dec 4 11:44 Makefile
alex@alex-pc ~/code/spccw/client $

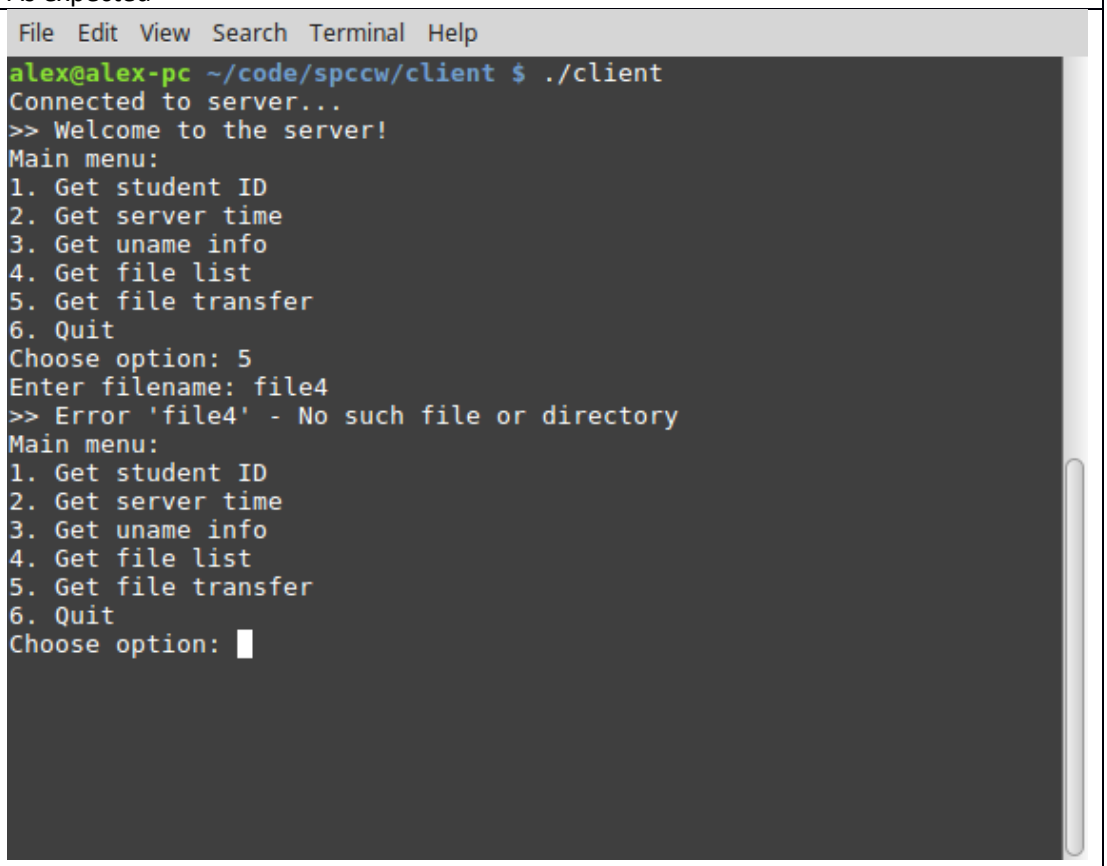
Test	011
Description	Get file transfer shows file already exists error to transfer file that is already present in client directory
Input	In first terminal start the server: `./server` In the second terminal, run `ls` to check that the file 'file1' exists, then start the client: `./client` Then select option 5 from the client menu, enter 'file1' and press enter.

Expected	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 5`
	`Enter filename: file1`
	`Error - file 'file1' already exists`
	
	Before then displaying the menu again.

Actual	As expected
Screen	

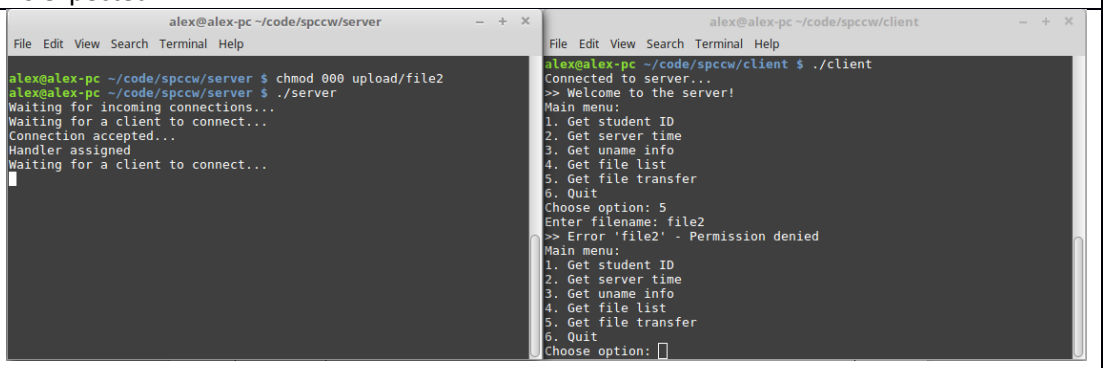
Test	012
Description	Get file transfer shows file not found error when asked to transfer file not in upload directory
Input	In first terminal start the server: `./server` In the second terminal start the client: `./client` Then select option 5 from the client menu, enter 'file4' and press enter.

Expected	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 5`
	`Enter filename: file4`
	`>> Error 'file4' - No such file or directory`
	
	Before then displaying the menu again.

Actual	As expected
Screen	

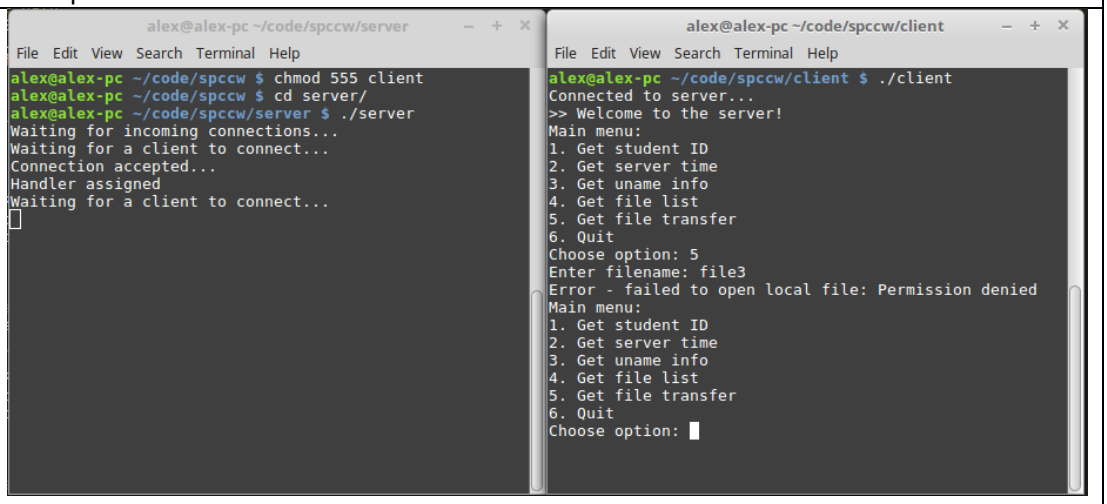
Test	013
Description	Get file transfer shows permission error when asked to transfer file with restricted permissions
Input	Set permission on 'file3' in the upload directory to prevent reading: `chmod 000 upload/file2` In first terminal start the server: `./server` In the second terminal start the client: `./client` Then select option 5 from the client menu, enter 'file1' and press enter.

Expected	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 5`
	`Enter filename: file2`
	`>> Error 'file2' - Permission denied`

Actual	As expected
Screen	

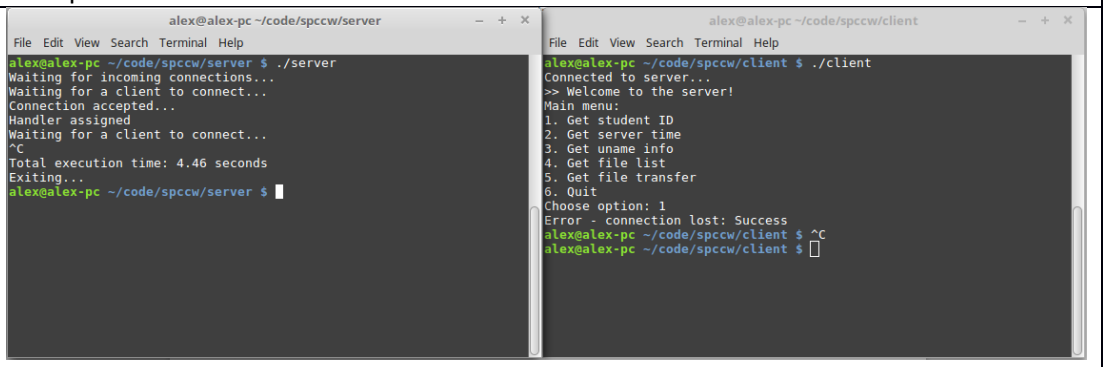
Test	014
Description	Get file transfer shows suitable error if client local directory not writable
Input	Set permission on the 'client' directory to prevent writing: `chmod 555 client` In first terminal start the server: `./server` In the second terminal start the client: `./client` Then select option 5 from the client menu, enter 'file3' and press enter. After test is complete set client folder back to `chmod 775 client`.

Expected	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 5`
	`Enter filename: file3`
	`Error - failed to open local file: Permission denied`

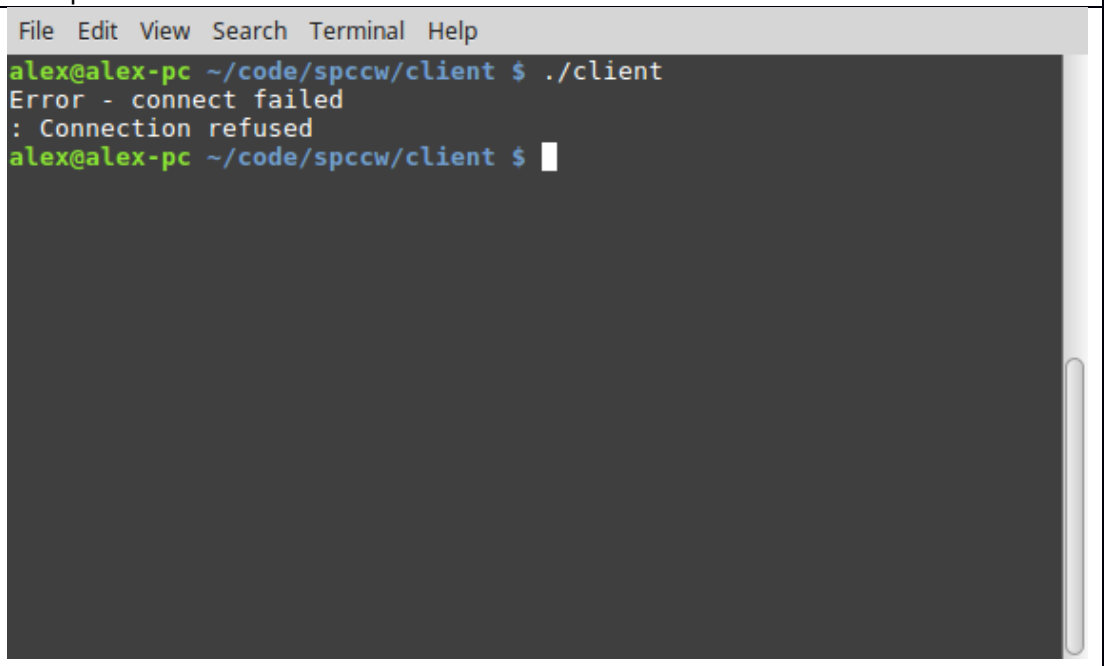
Actual	As expected
Screen	

Test	015
Description	Client deals with losing server connection gracefully
Input	In first terminal start the server: `./server` In the second terminal start the client: `./client` Kill the server with CTRL+C and then select option 1 from client menu.

Expected	The client should display the following:
	
	`Connected to server...`
	`>> Welcome to the server!`
	`Main menu:`
	`1. Get student ID`
	`2. Get server time`
	`3. Get uname info`
	`4. Get file list`
	`5. Get file transfer`
	`6. Quit`
	`Choose option: 1`
	`Error - connection lost: Success`

Actual	As expected
Screen	

Test	016
Description	Client deals gracefully with not being able to connect to server
Input	In the second terminal start the client, without the server being active: `./client`

Expected	The client should display the following:
	
	`Error - connect failed`
	`: Connection refused`

Actual	As expected
Screen