

Program Execution Guide

1. Make sure the message board "index.php" is stored inside the nginx_default directory

2. In a new terminal, ssh to your host server and navigate to the program source folder

```
C:\WINDOWS\system32>ssh dtl1@dtl1.host.cs.st-andrews.ac.uk
```

```
dtl1@klovio:~ $ cd Documents/cs2003/P3/src
```

3. In a different terminal, ssh to your host server.
Then again to a lab machine.
Then navigate again to the program source folder.

```
C:\WINDOWS\system32>ssh dtl1@dtl1.host.cs.st-andrews.ac.uk
```

```
dtl1@klovio:~ $ ssh dtl1@pc7-054-1.cs.st-andrews.ac.uk
```

```
dtl1@pc7-054-1:~ $ cd Documents/cs2003/P3/src
```

4. In the first terminal, run the server with **java DMBServer**

```
dtl1@klovio:~/Documents/cs2003/P3/src $ java DMBServer
```

5. In the second terminal, run the client with **java DMBClient**

```
dtl1@pc7-054-1:~/Documents/cs2003/P3/src $ java DMBClient
```

6. Now on the client you can send commands to the server, for example:

```
Input a command:
::to dtl1 hello

++ Connecting to dtl1.host.cs.st-andrews.ac.uk:21929 -> Socket[addr=dtl1.host.cs.st-andrews.ac.uk/138.251.22.78,port=21929,localport=32816]

++ Connection successful

Sending 17 bytes

++ Closing connection ... .. closed.
dtl1@pc7-054-1:~/Documents/cs2003/P3/src $
```

7. Provided index.php is correctly stored in nginx_default/cs2003-net2/ , navigate to

<https://<username>.host.cs.st-andrews.ac.uk/cs2003-net2/>

Where you should see the sent message

2020-11-11_17-38-21.922 from dtl1 hello

Design

Program Function Summary

My programs complete 9 out of the total 10 requirements from the specification. The requirement I did not complete was R10.

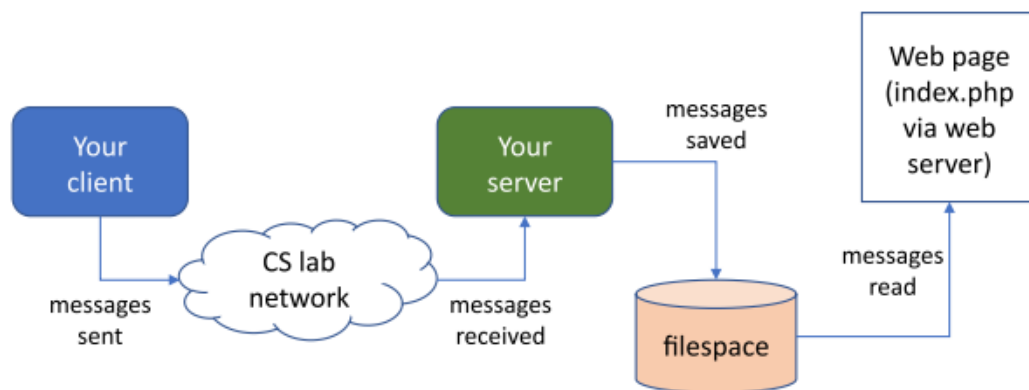
My programs reliably set up TCP connections between a client and server program, and the client (running on a lab machine) could send messages to the server (running on my host server) where they could then be stored to my file space and displayed on the message board php page. This completed R1-R7

Next my programs were extended to allow the client to specify which server to send a message to by specifying a username in the console before the message. This completed R8.

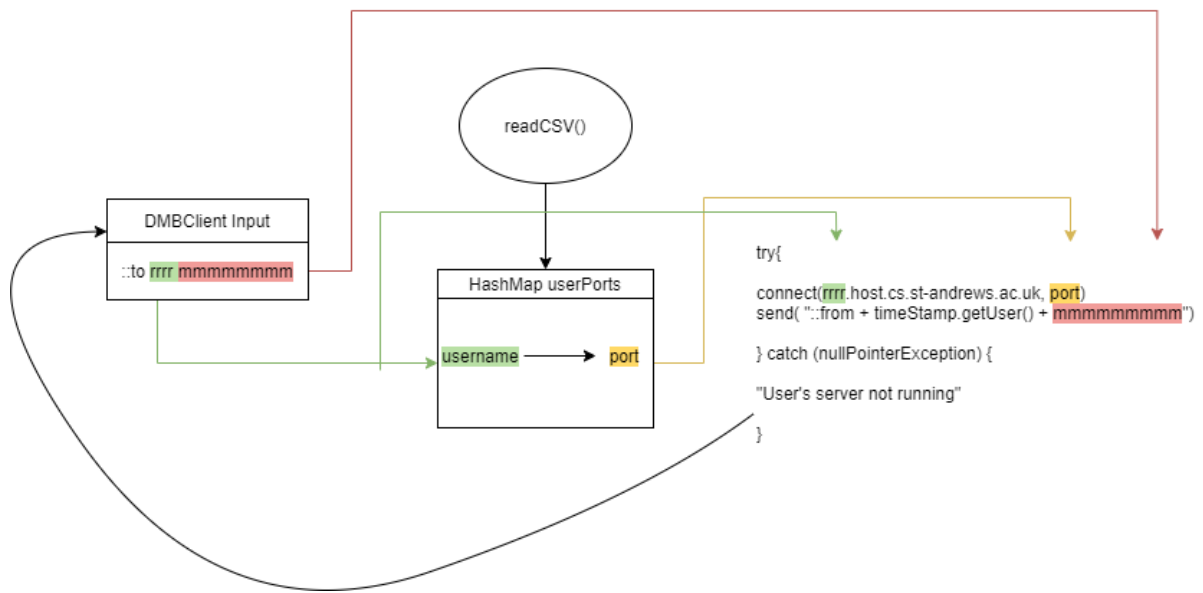
Finally, my programs were extended again to allow the client to send a “fetch” command to the server, where the client could send a date and the server could find and return all message timestamps and contents from this date back to the client. This completed R9.

Design Diagrams

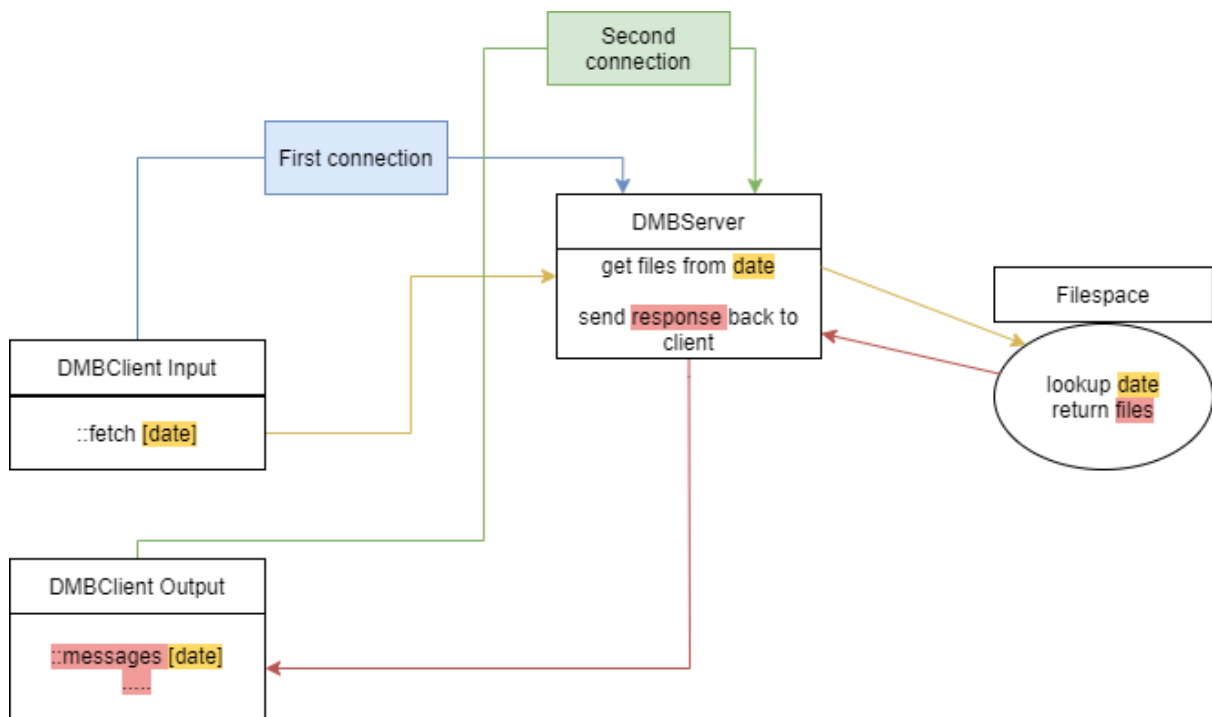
Basic program operation (as from specification):



R8 operation:



R9 operation:



<u>Test</u>	<u>Expected Result</u>	<u>Actual Result</u>	<u>Client Output</u>	<u>Server Output</u>
Connecting to server	A new connection is made and the client and server consoles display this	As expected	<pre> ++ Connecting to dt11.host.cs.st-andrews.ac.uk:21929 - > Socket[addr=dt11.host.cs.st-andrews.ac.uk/138.251.22.78,port=21929,localport=32950] ++ Connection successful </pre>	<pre> ++ waiting for client connection ++ Connection made </pre>
Sending “::to” command to the server	Server receives this command	As expected	<pre> Input a command: ::to dt11 ye </pre>	<pre> ++ Received data from client: ::from dt11 ye </pre>
Sending “::to” command to non existent user	Console outputs appropriate msg and user prompted to try again	As expected	<pre> Input a command: ::to test hello No user exists with this username Input a command: </pre>	
Sending “::to” command to an existent user but their server isn’t running	Console outputs appropriate message	As expected	<pre> Input a command: ::to dt11 hello IO Exception: Connection refused (Connection refused) ++ Connection unsuccessful </pre>	
Server creates message file from “to” request	Server successfully creates and writes to file	As expected	<pre> Input a command: ::to dt11 testing </pre>	<pre> ++ Received data from client: ::from dt11 testing ++ Connection closed </pre>

				<pre>++ Directory already exists: /cs/home/dtl1/nginx_default/cs2003- net2/2020-11-11 ++ Creating file in pre-existent directory... ++ Wrote "from dtl1 testing" to file: /cs/home/dtl1/nginx_default/cs2003- net2/2020-11-11/2020-11-11_19-16- 24.848</pre>
Check that the message is showing up on the board	Index.php shows the message	As expected	<div> <div>CS2003 2020/21 Net2 Practical - Daily Messages Board</div> <div> Please note: this PHP script is for demonstration purposes in the CS2003 Net2 coursework only -- it has very little checking of input so please use with care! Now it is - 2020-11-11 19:17:55. <div>2020-11-11_19-16-24.848 from dtl1 testing</div> </div> </div>	
Sending “::to” command to another classmate’s server	Program successfully connects and sends the message	As expected	<pre>Input a command: ::to asp20 I'm good mate ++ Connecting to asp20.host.cs.st-andrews.ac.uk:21890 -> Socket[addr=asp20.host.cs.st-andrews.ac.uk/138.251.22.76,port=21890,localport=46682] ++ Connection successful Sending 25 bytes ++ Closing connection closed.</pre>	<pre>^Casp20@palsin:~/Documents/CS2003/cs2003-net2 \$ nollimit java DMBServer cs2003-net2.properties serverAddress: To be configured -> asp20.host.cs.st-andrews.ac.uk cs2003-net2.properties serverPort: -1 -> 21890 cs2003-net2.properties boardDirectory: To be configured -> /cs/home/asp20/nginx_default/cs2003-net2/ cs2003-net2.properties logFile: To be configured -> cs2003-net2.log cs2003-net2.properties directoryFile: To be configured -> CS2003-usernames-2020.csv cs2003-net2.properties from: To be configured -> ::from cs2003-net2.properties to: To be configured -> ::to cs2003-net2.properties fetch: To be configured -> ::fetch cs2003-net2.properties messages: To be configured -> ::messages cs2003-net2.properties end: To be configured -> ::end cs2003-net2.properties none: To be configured -> ::none cs2003-net2.properties error: To be configured -> ::error Waiting for client connection... client connected! received message from client Waiting for client connection... ++ Wrote "from dtl1 I'm good mate" to file: /cs/home/asp20/nginx_default/cs2003-net2/2020-11-11/2020-11-11_17-00-34.993</pre>
Sending “::to” command with inappropriate syntax	Program displays correct syntax	As expected	<pre>Input a command: ::to Invalid input syntax Correct syntax: "::to <user> <message>" Input a command:</pre>	

Sending “::fetch” command with no specified date	Server receives command and returns messages from today	As expected	<pre> Input a command: ::fetch ++ Connecting to dtl1.host.cs.st-andrews.ac.uk:21929 - > Socket[addr=dtl1.host.cs.st-andrews.ac.uk/138.251.22.78,port=21929,localport=32996] ++ Connection successful Sending 23 bytes ++ Closing connection closed. ++ Connecting to dtl1.host.cs.st-andrews.ac.uk:21929 - > Socket[addr=dtl1.host.cs.st-andrews.ac.uk/138.251.22.78,port=21929,localport=32998] ++ Connection successful ++ Waiting for response ++ Received response from server ::messages 2020-11-11 2020-11-11_16-52-09.500 from wtr2 evening gamers 2020-11-11_18-55-57.003 from dtl1 ye 2020-11-11_13-34-52.767 from sn76 that was a compliment :) 2020-11-11_19-16-24.848 from dtl1 testing 2020-11-11_19-15-35.871 from dtl1 testing 2020-11-11_00-14-24.327 from sn76 onion boy 2020-11-11_16-44-55.181 from asp20 hi mate how are you 2020-11-11_17-02-53.941 from asp20 time to write the report gadj 2020-11-11_00-11-45.581 from dtl1 2020-11-11-00-11-38.147 2020-11-11_16-58-53.365 from dtl1 nullyooo </pre>	<pre> ++ Waiting for client connection ++ Connection made ++ Received data from client: ::fetch dtl1 2020-11-11 ++ Connection closed ++ Waiting for client connection ++ Connection made ++ Sending response... ..response sent ++ Connection closed ++ Waiting for client connection </pre>
-----------------------------------------------------------------	------------------------------------------------------------------------	----------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

			<pre> 2020-11-11_17-43-23.082 from mh317 hello 2020-11-11_17-38-21.922 from dtl1 hello 2020-11-11_17-31-13.130 from mh317 sting 2020-11-11_17-00-07.031 from dtl1 hey 2020-11-11_00-08-43.898 from dtl1 e 2020-11-11_00-18-23.943 from dtl1 1 ::end ++ Closing connection closed. </pre>	
Sending “::fetch” command with specified date	Server receives command and returns messages from that date	As expected	<pre> Input a command: ::fetch 2020-11-10 ++ Connecting to dtl1.host.cs.st-andrews.ac.uk:21929 - > Socket[addr=dtl1.host.cs.st- andrews.ac.uk/138.251.22.78,port=21929,localport=3300 4] ++ Connection successful Sending 23 bytes ++ Closing connection closed. ++ Connecting to dtl1.host.cs.st-andrews.ac.uk:21929 - > Socket[addr=dtl1.host.cs.st- andrews.ac.uk/138.251.22.78,port=21929,localport=3300 6] ++ Connection successful ++ Waiting for response ++ Received response from server ::messages 2020-11-10 2020-11-10_17-28-59.093 ::from dtl1 hi there 2020-11-10_17-34-58.306 ::from dtl1 jeff 2020-11-10_15-32-26.031 null 2020-11-10_15-33-58.392 5 2020-11-10_18-00-50.408 ::from asp20 sup 2020-11-10_18-13-21.045 from dtl1 sex </pre>	<pre> ++ Connection made ++ Received data from client: ::fetch dtl1 2020-11-10 ++ Connection closed ++ Waiting for client connection ++ Connection made ++ Sending response... ..response sent ++ Connection closed ++ Waiting for client connection </pre>

			<pre> 2020-11-10_15-34-07.331 6 2020-11-10_15-31-57.222 null 2020-11-10_23-23-28.917 from dt11 jeff 2020-11-10_17-15-27.432 :: from dt11 hello 2020-11-10_15-24-57.883 null 2020-11-10_18-56-35.060 from dt11 hey 2020-11-10_15-25-54.157 2 2020-11-10_15-30-36.789 3 2020-11-10_19-00-11.373 from dt11 2020-11- 10_19-00-09.286 2020-11-10_17-28-00.243 ::from dt11 nullhello there 2020-11-10_15-33-52.457 4 2020-11-10_13-40-11.334 jeff 2020-11-10_23-32-36.765 from dt11 2020-11- 10_23-32-32.963 2020-11-10_15-32-06.549 null 2020-11-10_17-18-22.094 null ::end ++ Closing connection closed. </pre>	
Sending “::fetch” command with incorrect syntax	Program prints correct syntax	As expected	<pre> Input a command: ::fetch 1 2 Invalid input syntax Correct syntax: "::fetch <date>" Or use: "::fetch" to use today's date Input a command: </pre>	
Sending “::fetch” command for date with no messages	Server returns “::none”	As expected	<pre> Input a command: ::fetch 2020-10-01 ++ Connecting to dt11.host.cs.st-andrews.ac.uk:21929 - > Socket[addr=dt11.host.cs.st- andrews.ac.uk/138.251.22.78,port=21929,localport=3301 0] ++ Connection successful Sending 23 bytes </pre>	<pre> ++ Connection made ++ Received data from client: ::fetch dt11 2020-10-01 ++ Connection closed ++ Waiting for client connection ++ Connection made </pre>

			<pre> ++ Closing connection closed. ++ Connecting to dtl1.host.cs.st-andrews.ac.uk:21929 - > Socket[addr=dtl1.host.cs.st-andrews.ac.uk/138.251.22.78,port=21929,localport=33012] ++ Connection successful ++ waiting for response ++ Received response from server ::none </pre>	<pre> ++ Sending response... ..response sent ++ Connection closed ++ Waiting for client connection </pre>
Sending unrecognised command	Program displays error	As expected	<pre> Input a command: test Error, unrecognised command </pre>	
Inputting invalid date with “::fetch” command	Program displays error	As Expected	<pre> Input a command: ::fetch 2020-10-1 ++Invalid date provided </pre>	

Code Ownership

File name	Own code	Sourced / Given code	Extra Comments
DMBClient.java	✓	✓	I used the basic DMBClient file provided and then added my own code such as validation checking and handling of to or fetch commands. Methods sendData() and startClient() were provided and others are my own
DMBServer.java	✓		Code was written by me.
DirAndFile.java		✓	File was taken off studres
TimeStamp.java	✓	✓	File was taken off studres and then I slightly modified it
Conifugration.java		✓	File was taken off studres and then I added one method for defaultUser
Cs2003-net2.properties		✓	File was taken off studres and then I added one field for defaultUser
CS2003-usernames-2020.csv		✓	File was taken off studres

Collaboration

For this practical I collaborated and tested my implementation with Amir Panahi (asp20)

Security and Privacy

For this program there are a few threats present, firstly, if the server doesn't validate the message then php injections are possible if the client puts php code in their message. This is bad as a code injection

attack could lead to other vulnerabilities or compromise of data and server integrity. Another security threat is a breach of personal data as the usernames and ports inside the csv file aren't encrypted, if this were a real-world application then any storage of personal data would have to follow the Data Protection Act.