

CSE 344 – SYSTEM PROGRAMMING – MIDTERM – REPORT

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1. System architecture, design decisions, and implementation

1.1 System architecture

In this client-server model implementation, I decided to use 1 SERVER FIFO and MULTIPLE CLIENT FIFOs unique to every client. I used 1 client fifo for requests and another client FIFO for responses from the server. I used SERVER FIFO to send connection requests from the clients.

1.2 Design Decisions and implementation

```
#define CLIENT_FIFO_REQ_TEMPLATE "client_fifo_req %d"
#define CLIENT_FIFO_RES_TEMPLATE "client_fifo_res %d"
#define CLIENT_FIFO_NAME_SIZE (sizeof(CLIENT_FIFO_REQ_TEMPLATE) + 20)

#define SERVER_FIFO_TEMPLATE "server_fifo %d"
#define SERVER_FIFO_NAME_SIZE (sizeof(SERVER_FIFO_TEMPLATE) + 20)

#define SERVER_LOG_TEMPLATE "log %d"
#define SERVER_LOG_NAME_SIZE (sizeof(SERVER_LOG_TEMPLATE) + 20)

#define MAX_RESPONSE_SIZE 1024 // 1KB

typedef struct request{
    char command[50];
    pid_t cl_pid;
} request;

typedef enum status_code {
    OK,
    WAIT,
    FAIL
} status_code;

typedef struct response{
    status_code code;
    char message[MAX_RESPONSE_SIZE];
} response;
```

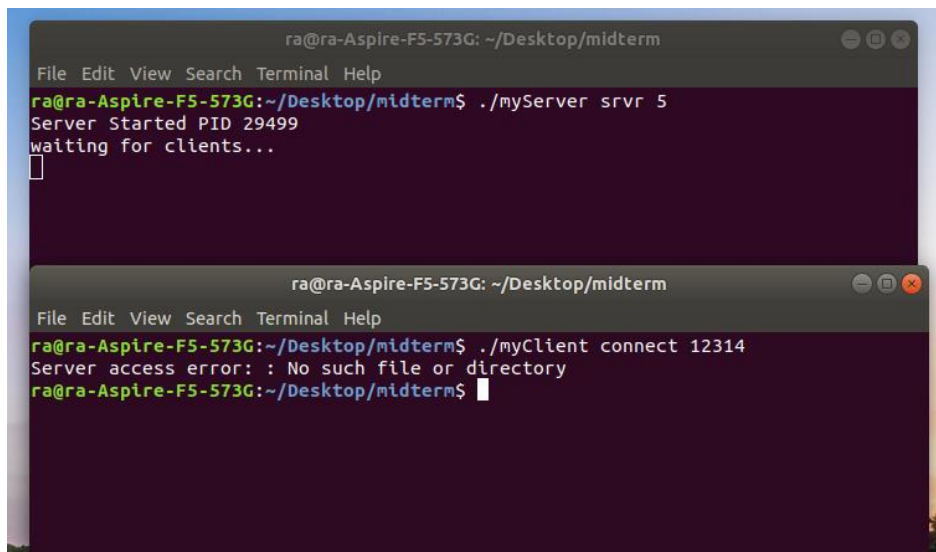
In my design:

- Client fifos are created uniquely using process_id of a specific client.
- Server fifo is created using the server_pid
- In request struct, command array is used to send requested command along with the client pid.
- Status_code enum is used to send status code to the client.
- In response struct, status code object is used to send status and char array message is used to return a message from server to a client.

2. Test Cases and Example Outputs

2.1 Connect/TryConnect Commands

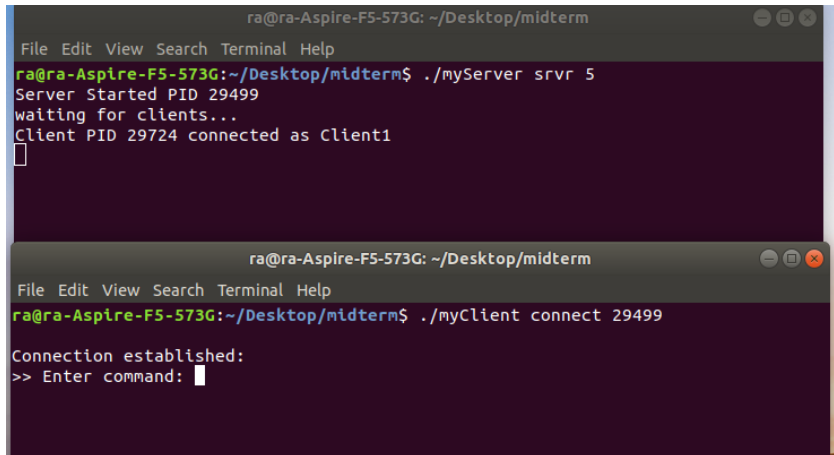
2.1.2 Incorrect server pid



```
ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myServer srvr 5
Server Started PID 29499
waiting for clients...
█

ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myClient connect 12314
Server access error: : No such file or directory
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ █
```

2.1.2 Correct server_pid connect

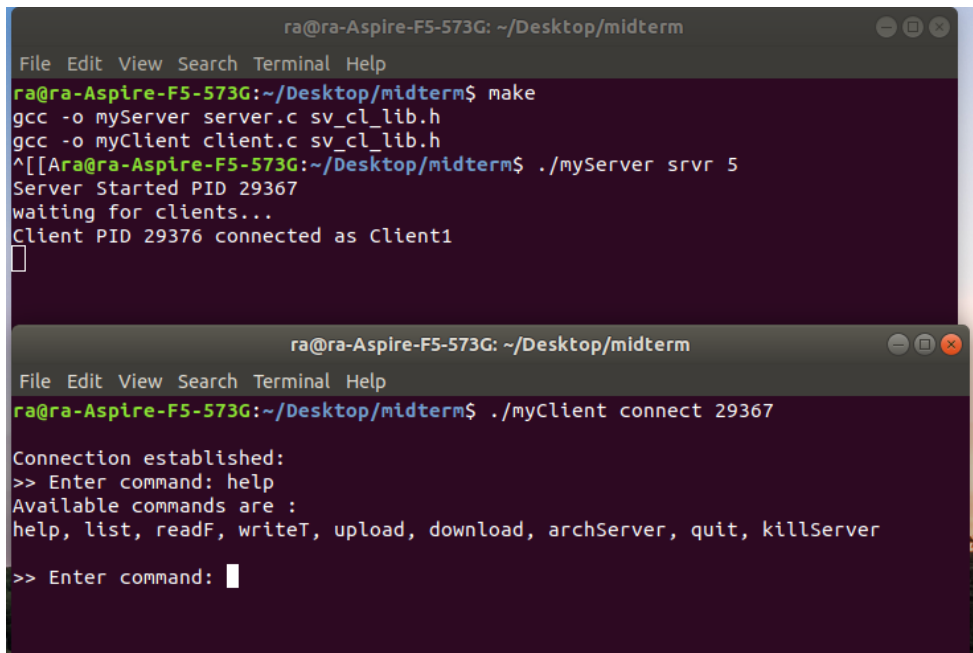


The image shows two terminal windows. The top window is titled 'ra@ra-Aspire-F5-573G: ~/Desktop/midterm' and contains the following text: 'File Edit View Search Terminal Help', 'ra@ra-Aspire-F5-573G:~/Desktop/midterm\$./myServer svr 5', 'Server Started PID 29499', 'waiting for clients...', and 'Client PID 29724 connected as Client1'. The bottom window is also titled 'ra@ra-Aspire-F5-573G: ~/Desktop/midterm' and contains: 'File Edit View Search Terminal Help', 'ra@ra-Aspire-F5-573G:~/Desktop/midterm\$./myClient connect 29499', 'Connection established:', and '>> Enter command: '.

```
ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myServer svr 5
Server Started PID 29499
waiting for clients...
Client PID 29724 connected as Client1
█

ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myClient connect 29499
Connection established:
>> Enter command: █
```

2.2 Help command

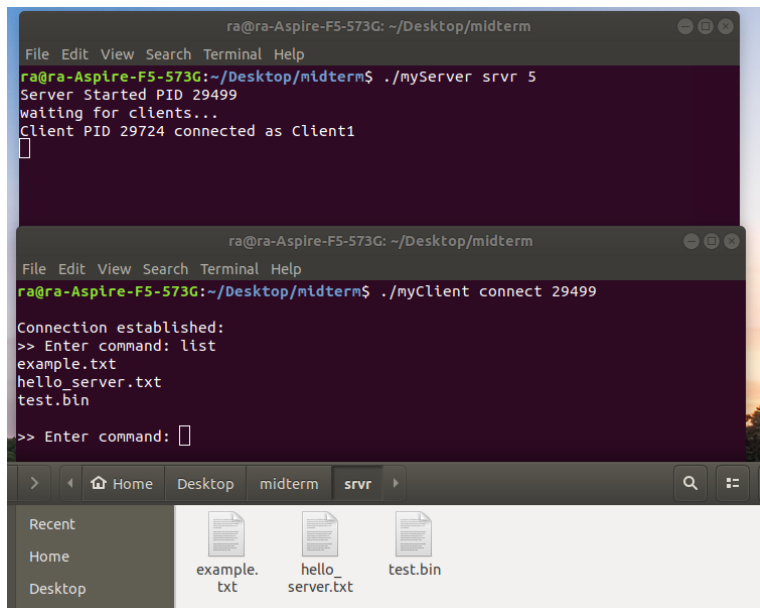


The image shows two terminal windows. The top window is titled 'ra@ra-Aspire-F5-573G: ~/Desktop/midterm' and contains: 'File Edit View Search Terminal Help', 'ra@ra-Aspire-F5-573G:~/Desktop/midterm\$ make', 'gcc -o myServer server.c sv_cl_lib.h', 'gcc -o myClient client.c sv_cl_lib.h', '^[[Ara@ra-Aspire-F5-573G:~/Desktop/midterm\$./myServer svr 5', 'Server Started PID 29367', 'waiting for clients...', and 'Client PID 29376 connected as Client1'. The bottom window is also titled 'ra@ra-Aspire-F5-573G: ~/Desktop/midterm' and contains: 'File Edit View Search Terminal Help', 'ra@ra-Aspire-F5-573G:~/Desktop/midterm\$./myClient connect 29367', 'Connection established:', '>> Enter command: help', 'Available commands are :', 'help, list, readF, writeT, upload, download, archServer, quit, killServer', and '>> Enter command: '.

```
ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ make
gcc -o myServer server.c sv_cl_lib.h
gcc -o myClient client.c sv_cl_lib.h
^[[Ara@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myServer svr 5
Server Started PID 29367
waiting for clients...
Client PID 29376 connected as Client1
█

ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myClient connect 29367
Connection established:
>> Enter command: help
Available commands are :
help, list, readF, writeT, upload, download, archServer, quit, killServer
>> Enter command: █
```

2.3 List Command

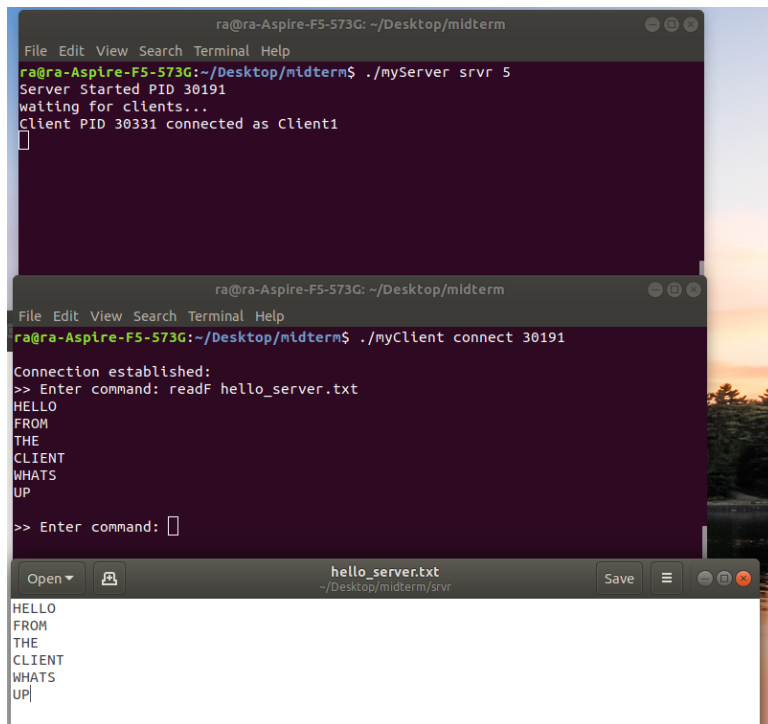


```
ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myServer srvr 5
Server Started PID 29499
waiting for clients...
Client PID 29724 connected as Client1
[]

ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myClient connect 29499
Connection established:
>> Enter command: list
example.txt
hello_server.txt
test.bin
>> Enter command: []
```

The screenshot displays two terminal windows from a Linux desktop environment. The top window shows a server process running `./myServer srvr 5`, which starts at PID 29499 and waits for clients. A client with PID 29724 connects as 'Client1'. The bottom window shows a client process running `./myClient connect 29499`, which establishes a connection. The client then enters the `list` command, and the server responds with a list of files: `example.txt`, `hello_server.txt`, and `test.bin`. The desktop environment includes a taskbar with 'Home', 'Desktop', 'midterm', and 'srvr' tabs, and a file manager showing the contents of the 'srvr' directory.

2.4 readF command



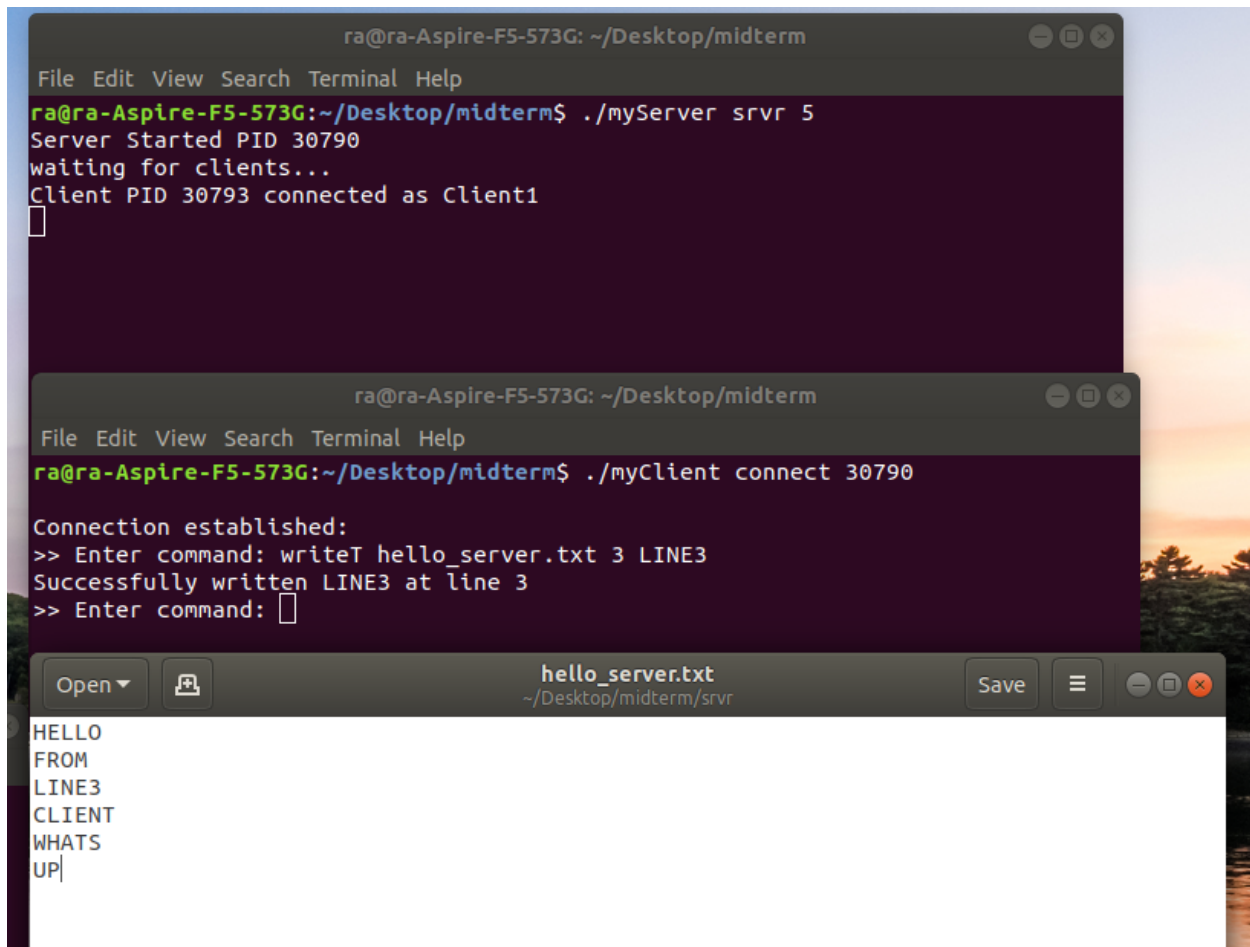
The image shows a screenshot of a computer screen with two windows. The top window is a terminal titled 'ra@ra-Aspire-F5-573G: ~/Desktop/midterm'. It shows the execution of a server program: `./myServer srvr 5`. The output indicates the server started with PID 30191, is waiting for clients, and a client with PID 30331 connected as 'Client1'. The bottom window is a text editor titled 'hello_server.txt' located at `~/Desktop/midterm/srvr`. It shows the command `./myClient connect 30191` being executed, which establishes a connection. The editor then displays the content of `hello_server.txt`, which is a multi-line message: 'HELLO FROM THE CLIENT WHATS UP'. The terminal window also shows the prompt '>> Enter command:' followed by the file's content.

```
ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myServer srvr 5
Server Started PID 30191
waiting for clients...
Client PID 30331 connected as Client1
[]

ra@ra-Aspire-F5-573G: ~/Desktop/midterm
File Edit View Search Terminal Help
ra@ra-Aspire-F5-573G:~/Desktop/midterm$ ./myClient connect 30191
Connection established:
>> Enter command: readF hello_server.txt
HELLO
FROM
THE
CLIENT
WHATS
UP
>> Enter command: []

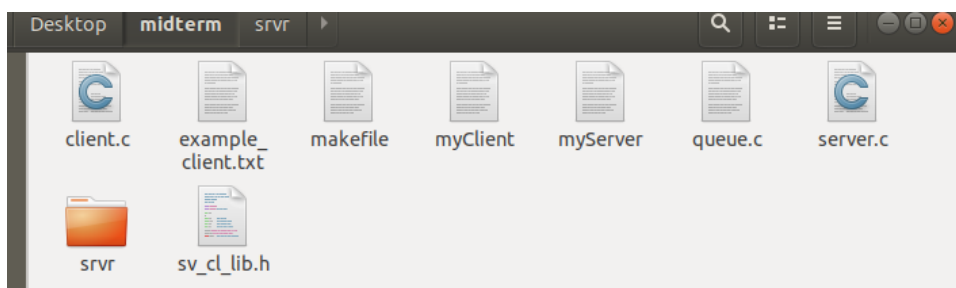
hello_server.txt
~/Desktop/midterm/srvr
Open Save
HELLO
FROM
THE
CLIENT
WHATS
UP|
```

2.5 writeT Command

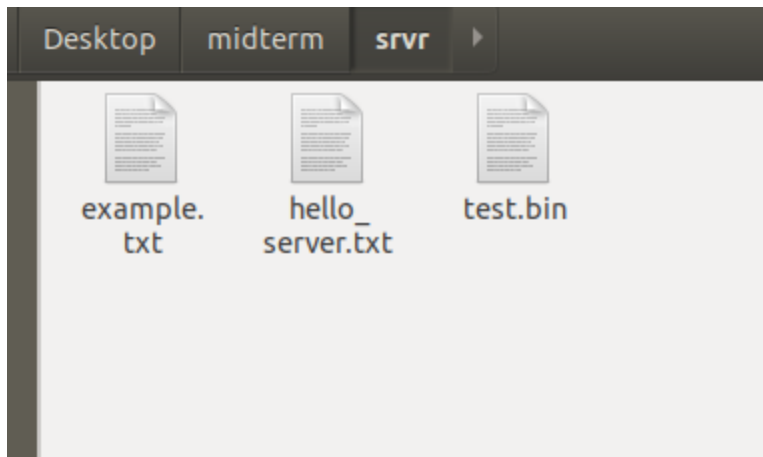


2.6 Upload Command

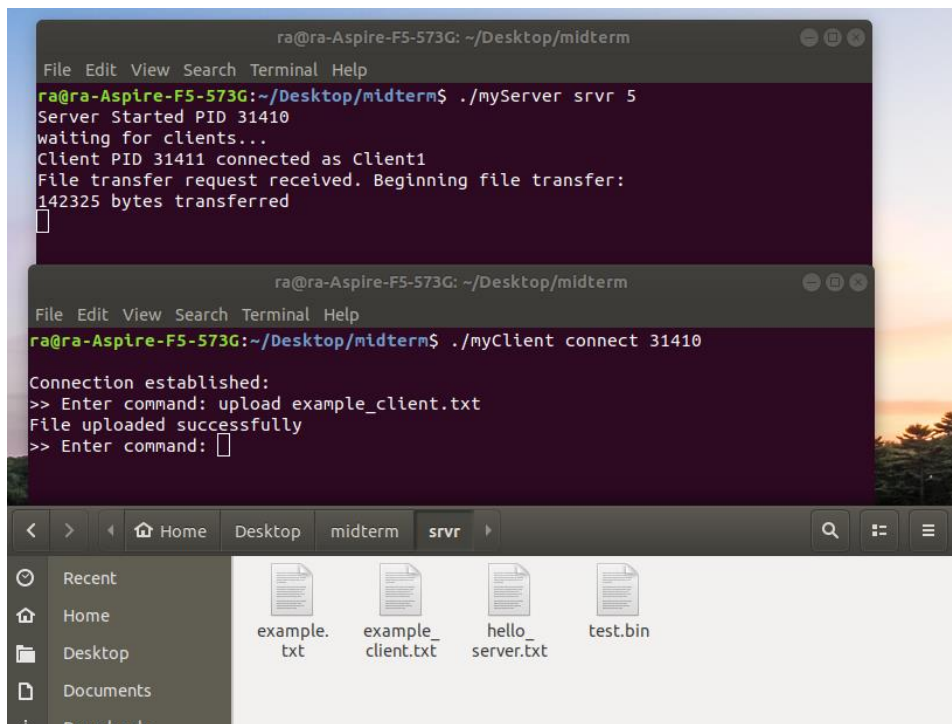
Client side



Server side before upload:

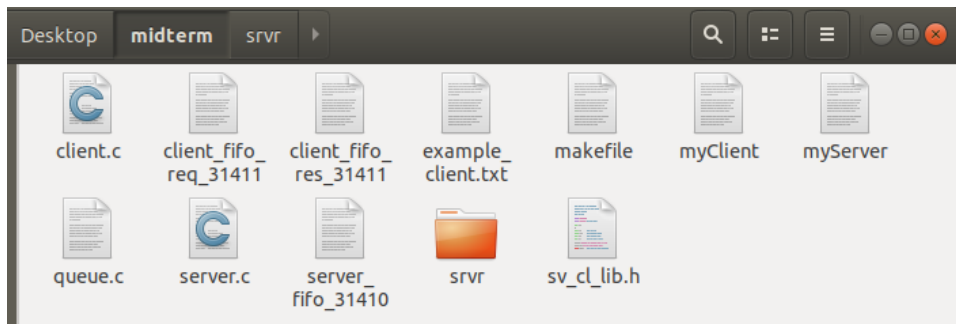


After upload:

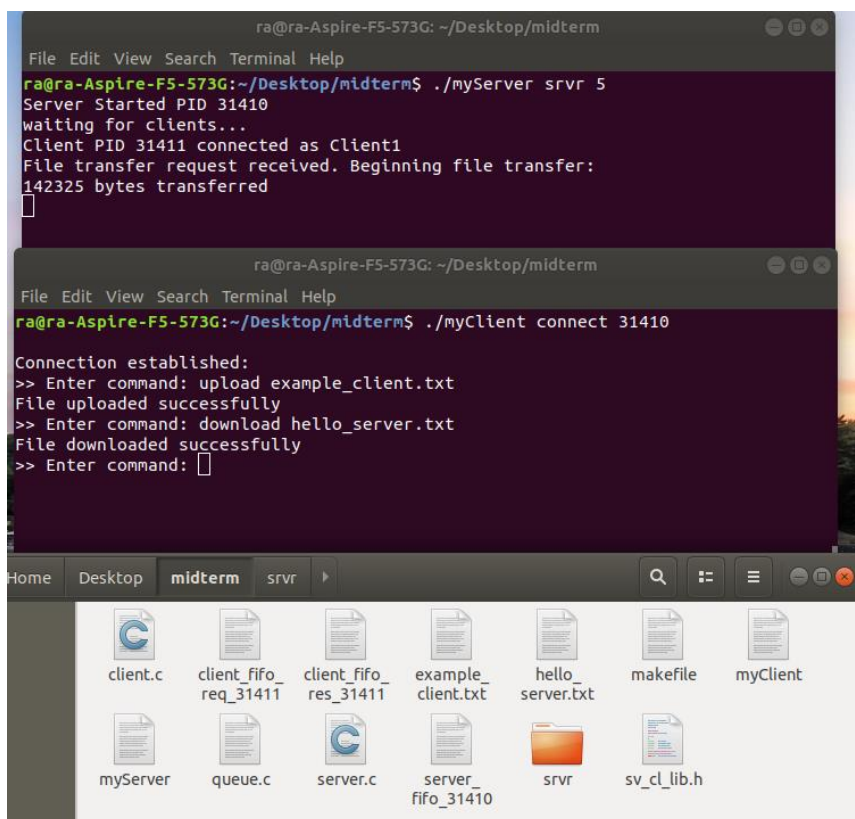


2.7 Download command

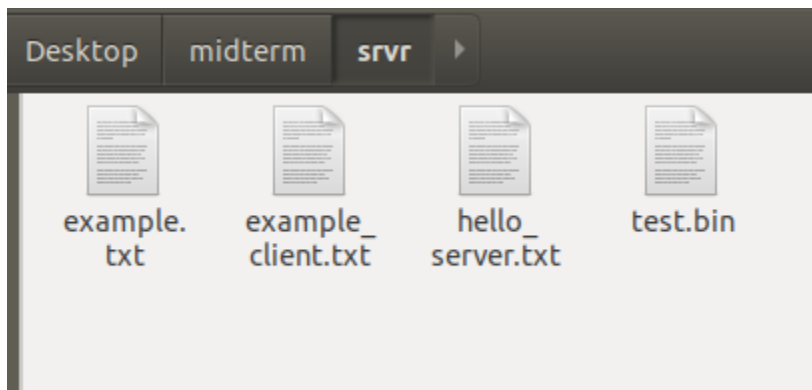
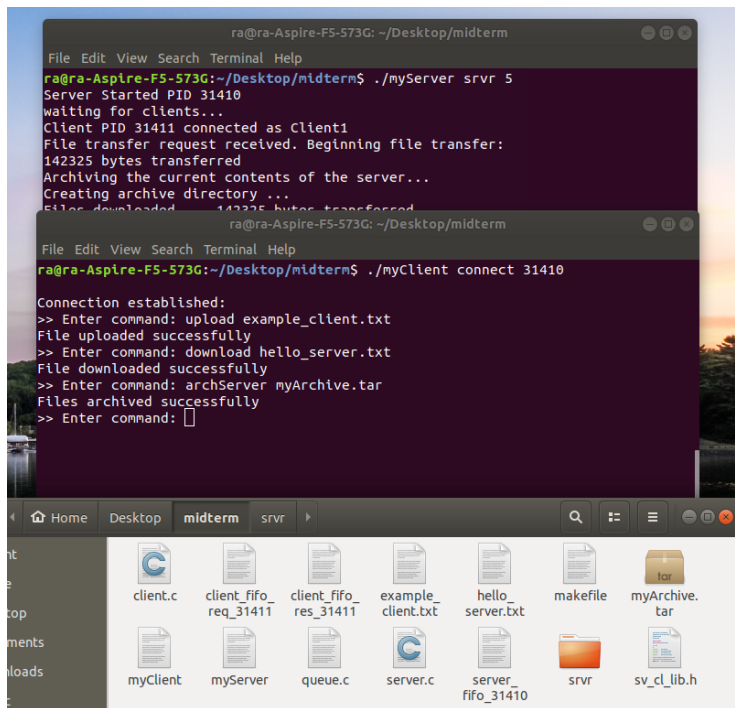
Client side before download:

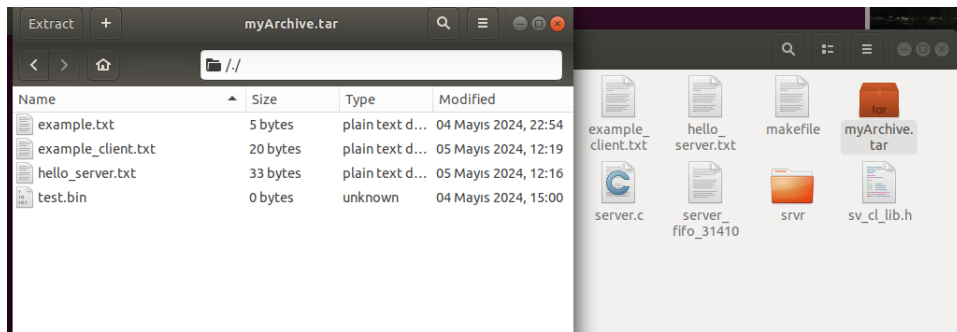


After download:



2.8 ArchServer command





2.9 Kill server

