

Task 1: Client Server Communication

Objectives Completed:

- Created a server process and one or multiple client processes.
- Server maintains a list of all available clients.
- Server is able to execute a shell commands on any specified client.
- Server and client communication are done using FIFO.

Pseudocode (Server):

- ❖ Create a FIFO with FIFO file name server.
- ❖ Keep reading its own FIFO for available clients and prints them.
- ❖ Wait for user's input (command and client Id).
- ❖ Open client's FIFO from client Id.
- ❖ Write the command in the client's FIFO.

Pseudocode (Client):

- Open server's FIFO.
- Create a FIFO with name client concatenated with its process id.
- Write the name of its FIFO in the server's FIFO.
- Keep reading FIFO for any data that is entered.
- Execute the entered data as a shell command.

List of methods in the program (Server):

1. **Multithreading:** Multithreading is used in this program to maintain list of clients and execute commands on them simultaneously.
2. **void *Message(void *vargp):** This method takes user input two times. First it asks for the command you want to run at the client and the second input is the client name. Then it opens the FIFO of specified client and writes the first input(command) in that FIFO.
3. **int main():** This method creates a FIFO with name "server123". After this a thread is started which runs **void *Message(void *vargp)** method and parallel with the thread there is a loop that updates the list of clients by reading from FIFO.

List of methods in the program (Client):

1. **int main():** All work in client program is done in the main method. The client creates a FIFO with its process Id and prints the name of its FIFO, then client program opens the server FIFO file and writes its FIFO name in there. This tells the server that a new client has connected. Then server FIFO file is closed and client FIFO is opened and it is read in a loop and when server writes in the FIFO the client executes it using `System()` function.

Sample Execution:

1. Starting the server:

Note: `gcc -o server server.c -pthread` to compile server code.

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-
master/Code$ ./server
Enter Command, Press Enter, then Clientname
█
```

2. Starting first client:

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-
master/Code$ ./client
client3461
█
```

3. Client appears in server's list

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-
master/Code$ ./server
Enter Command, Press Enter, then Clientname
Client Available: client3461
█
```

4. Running more clients:

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-
master/Code$ ./client
client3518
█
```

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-
master/Code$ ./client
client3543
```

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-
master/Code$ ./server
Enter Command, Press Enter, then Clientname
Client Available: client3461
Client Available: client3518
Client Available: client3543
```

5. Running a shell commands on the clients:

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-
master/Code$ ./server
Enter Command, Press Enter, then Clientname
Client Available: client3461
Client Available: client3518
Client Available: client3543
ls
client3461
```

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-
master/Code$ ./client
client3461
ls
```

client	client3273	client3543	server	Task2
client3253	client3461	client.c	server123	Task2.c
client3256	client3518	Readme.md	server.c	Task2-split-method

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-
master/Code$ ./server
Enter Command, Press Enter, then Clientname
Client Available: client3461
Client Available: client3518
Client Available: client3543
ls
client3461
pwd
client3518
```

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-  
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-  
master/Code$ ./client  
client3518  
pwd  
  
/home/glab/Downloads/assignment-2-fall-2019-102539-62722_62462-maste  
r/Code  
█
```

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-  
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-  
master/Code$ ./server  
Enter Command, Press Enter, then Clientname  
Client Available: client3461  
Client Available: client3518  
Client Available: client3543  
ls  
client3461  
pwd  
client3518  
echo "hello"  
client3543  
█
```

```
glab@linux-pc: ~/Downloads/assignment-2-fall-2019-102539-62722_62462-  
glab@linux-pc:~/Downloads/assignment-2-fall-2019-102539-62722_62462-  
master/Code$ ./client  
client3543  
echo "hello"  
  
hello  
█
```