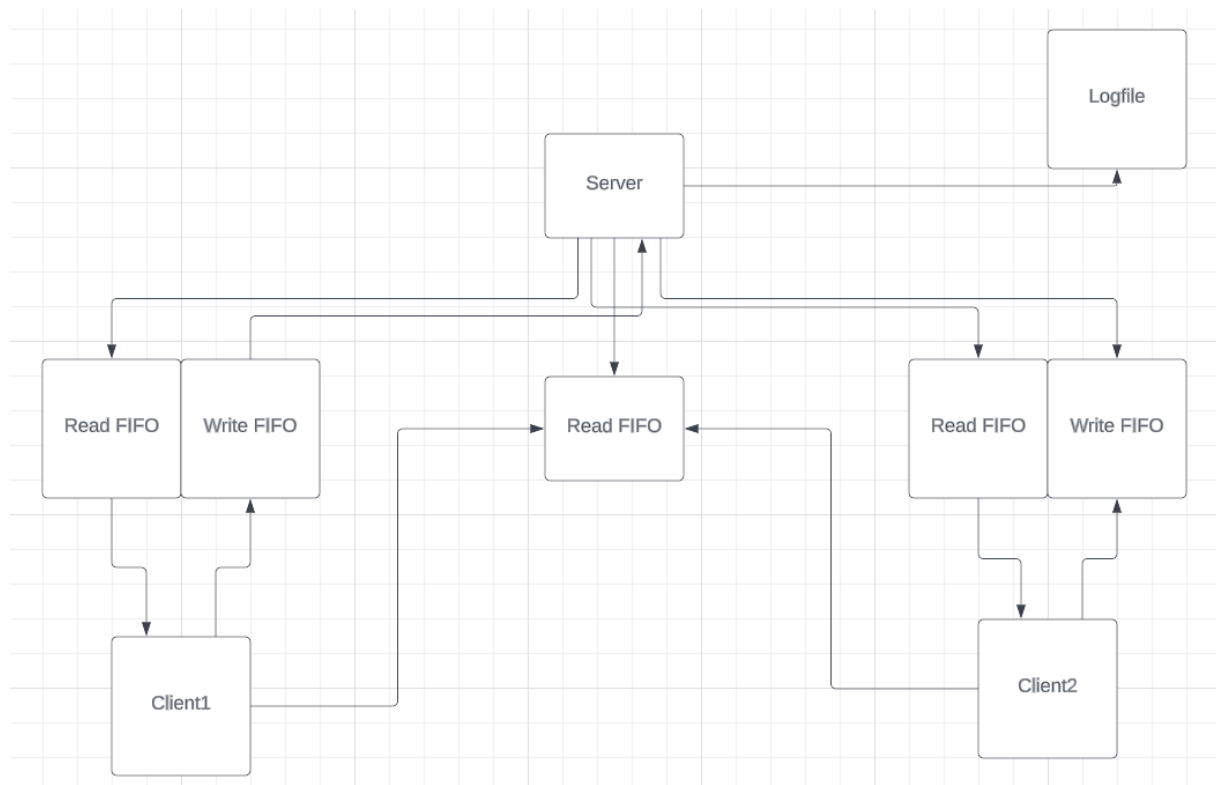# Ertugrul Kasikci 200104004097 CSE344 Midterm

The code consists of two files named server.c and client.c. The syntax is the same as it is shown in the midterm pdf. Semaphores are used to keep the number of the clients within a specified range.

The server makes FIFO named with its PID number and connects FIFO's read end.

Clients connect this FIFO's write end and send their PID and connection type(Connect or tryConnect). Then create two FIFO's. One of them is for reading and the other one is for writing. After that Server connects them (forks itself before connecting). Connections end other important events are saved in a logfile. This logfile is kept in the directory which is specified when creating the server.

So that the connection between client and server is done. The architecture can be visualized like this.

Implementation Details:

- FIFO's creations and connections

```
strcat(filename, "_w");
if (mkfifo (filename, 0777) == -1)
    printf("Couldn't create writing FIFO");
write(fd, connection_type, 20);
int fd_w = open(filename, O_WRONLY);
filename[strlen(filename) - 1 ] = 'r';
if (mkfifo (filename, 0777) == -1)
    printf("Couldn't create reading FIFO");
int fd_r = open(filename, O_RDONLY);
```

```
strcat(client_pid, "_w");
int fd_r = open(client_pid, O_RDONLY);
client_pid[strlen(client_pid) - 1 ] = 'r';
sleep(1); // waits for the client to open the second FIFO
int fd_w = open(client_pid, O_WRONLY);
```

The name of the FIFO's consist of the PID of the client plus '_r' or '_w' (indicates the purpose of the FIFO). Both of them are created in the client side.

Every child server connection start with this process.

- Communication Details:

After the two end connection is done, communication starts.

Clients send a command, the server reads it, generates responses for that command, and returns it to the client. If the client sends an invalid command, the server informs the client and continues taking the command process. The commands are as specified in the midterm pdf. These commands are recorded in the log file to keep the processes track.
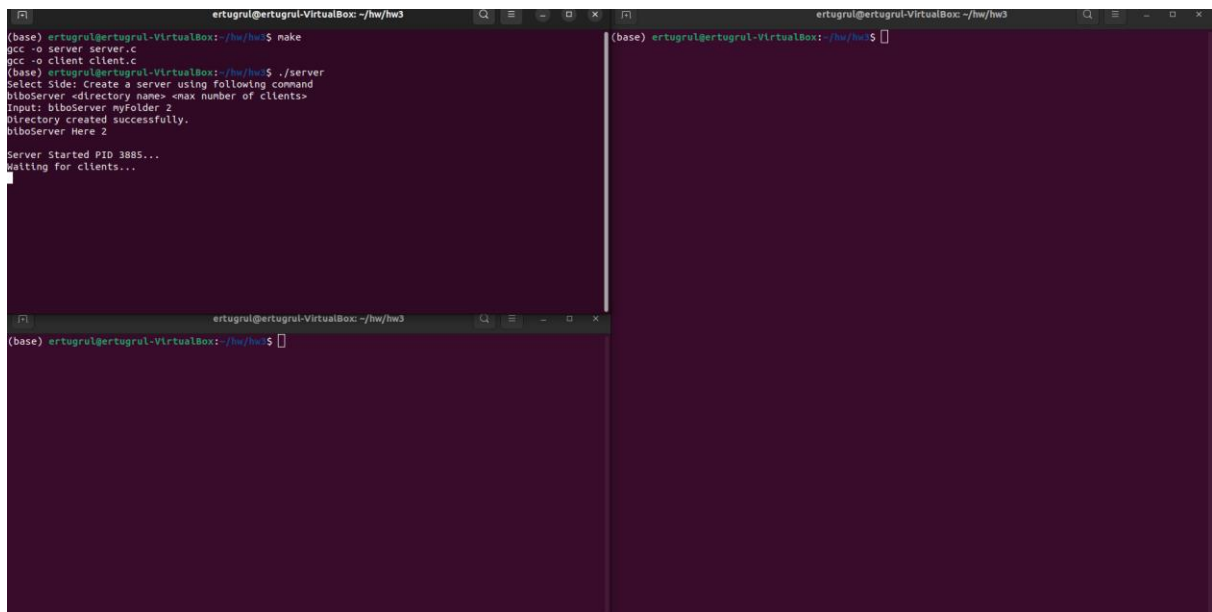
- Makefile:

make command compiles server.c and client.c files. make clean command deletes all FIFO's, folders and executables. The server can be run by using ./server and client can be run by using ./client in the terminal.

Testing:

To demonstrate how the program works properly the following steps will be implemented.

- Create a server (maximum number of clients will be 2)

- Connect a client to the server

- Implement some commands

- Connect another client to the server and implement commands together

- Try to connect another client and show that it cannot be connected (the maximum number of clients is 2)

- Disconnect one client and show that the waiting client is connected afterwards.
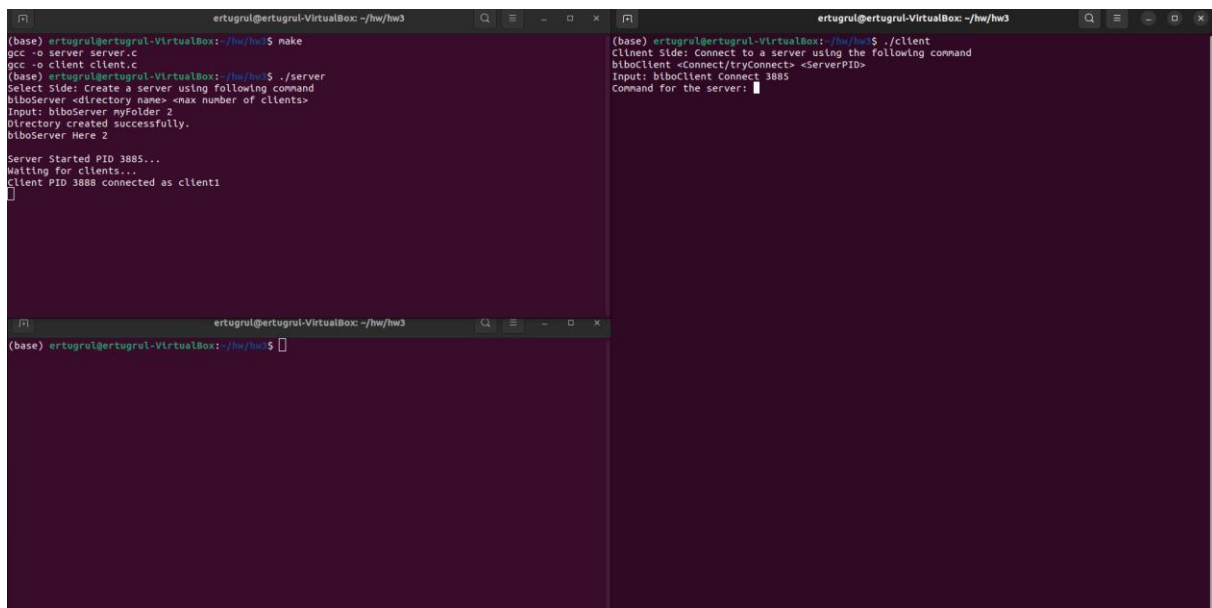
```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ make
gcc -o server server.c
gcc -o client client.c
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./server
Select Side: Create a server using following command
biboServer <directory name> <max number of clients>
Input: biboServer myFolder 2
Directory created successfully.
biboServer Here 2

Server Started PID 3885...
Waiting for clients...
Client PID 3888 connected as client1
Client PID 3891 connected as client2
```

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server:
```

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server:
```

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ make
gcc -o server server.c
gcc -o client client.c
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./server
Select Side: Create a server using following command
biboServer <directory name> <max number of clients>
Input: biboServer myFolder 2
Directory created successfully.
biboServer Here 2

Server Started PID 3885...
Waiting for clients...
Client PID 3888 connected as client1
Client PID 3891 connected as client2
```

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server: a useless command
Invalid Command!
Command for the server: Invalid Command!
Command for the server: Invalid Command!
Command for the server: help
Available comments are:

help, list, readF, writeT, upload, download, quit, killServer

Command for the server:
```

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server: help
Available comments are:

help, list, readF, writeT, upload, download, quit, killServer

Command for the server:
```

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ make
gcc -o server server.c
gcc -o client client.c
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./server
Select Side: Create a server using following command
biboServer <directory name> <max number of clients>
Input: biboServer myFolder 2
Directory created successfully.
biboServer Here 2

Server Started PID 3885...
Waiting for clients...
Client PID 3888 connected as client1
Client PID 3891 connected as client2
client3891 disconnected
Client PID 3944 connected as client3
```

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server: a useless command
Invalid Command!
Command for the server: Invalid Command!
Command for the server: Invalid Command!
Command for the server: help
Available comments are:

help, list, readF, writeT, upload, download, quit, killServer

Command for the server:
```

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server: help
Available comments are:

help, list, readF, writeT, upload, download, quit, killServer

Command for the server: ^C
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$
```

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server:
```

Top-left terminal:

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ make
gcc -o server server.c
gcc -o client client.c
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./server
Select Side: Create a server using following command
biboServer <directory name> <max number of clients>
Input: biboServer myFolder 2
Directory created successfully.
biboServer Here 2

Server Started PID 3885...
Waiting for clients...
Client PID 3888 connected as client1
Client PID 3891 connected as client2
client3891 disconnected
Client PID 3944 connected as client3
>> kill signal from client3..terminating...
bye
Killed
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ 
```

Top-right terminal:

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server: a useless command
Invalid Command!
Command for the server: Invalid Command!
Command for the server: Invalid Command!
Command for the server: help
Available comments are:

help, list, readF, writeT, upload, download, quit, killServer

Command for the server: 
```

Bottom-left terminal:

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server: help
Available comments are:

help, list, readF, writeT, upload, download, quit, killServer

Command for the server: ^C
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ 
```

Bottom-right terminal:

```
(base) ertugrul@ertugrul-VirtualBox:~/hw/hw3$ ./client
Clinent Side: Connect to a server using the following command
biboClient <Connect/tryConnect> <ServerPID>
Input: biboClient Connect 3885
Command for the server: killServer
```