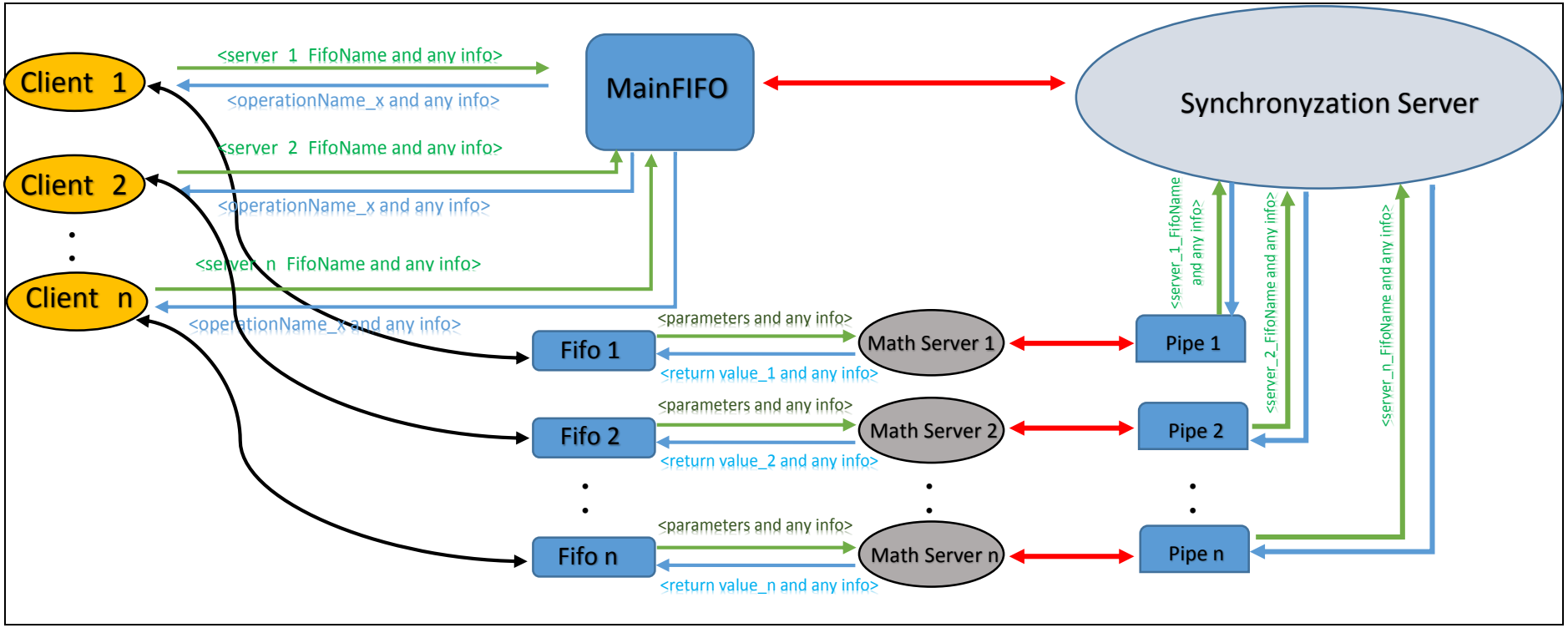
CSE 244 System Programming

Midterm Project

In this project you will implement a sort of server-client architecture of which details are given as follows:

- Look at basic illustration of the system presented at below. Note that <any info> can be any necessary data except for parameters.



- Synchronyzation Server (SS) generates a math server for each client that requests a particular result of a calculation of a mathematical operation. Read carefully how this request mechanism should work for each client:

    - A client sends a name of one of four operations below to SS via MainFIFO created by SS. The client knows apriori the name of the MainFIFO.

      `Operation1:` $\frac{\sqrt{a^2+b^2}}{|c|}$, related exception: `"division by zero",`
      `Operation2:` $\sqrt{a+b}$, related exception: `"sum of parameters is negative",`
      `Operation3:` ax^2 `+bx+c=0` calculation of roots (two return values), related exception: `"delta is negative"`
      `Operation4:` $\frac{ax+b}{cx+d}$, related exception: `"inverse of the function is undefined".`

    - SS creates a server process (math server x: x is an integer) which is exepected to handle request(related to the function) of corresponding client. The math server creates a FIFO having a random name and sends this name back to SS via a pipe. Finally, SS delivers the acquired name to corresponding client which is the owner of corresponding request. You must ensure that appropriate client-server pairs are syncrohized: client1-server1, client2-server2 etc.
    - Then, the client sends parameters of the operation to the math server via the Fifo x (x is an appropriate integer).
    - In addition to those parameters, the client sends an integer number which represents the duration (in terms of seconds) of waiting of the math server before starting the calculation. If the math server dies in this duration, SS creates a new server and this server uses the old FIFO to communicate to the client. Math server calculates the result if it can and returns the result of calculation back to the client immediately. The math server waits 30 seconds for a new parameter list, if no list arrives then removes the fifo and exits.
    - If a client is killed with <CTRL+C> signal or voluntarily exits, corresponding math server must die. Additionally, if exceptions defined below occur, math server must inform this to SS and to the client and exit in a controlled manner.
    - Each client should maintain a log file which stores:request id, id of each server with whom communicate (including failed server connections), result and status (exception type, connection error(situation of killed math server without returning a valid result) or success) of each request .
    - SS must maintain aforementioned log for each client. In addition it must hold separate data entry for killed servers killed by a <CTRL+C> signal.

- When SS killed with <CTRL+C> signal it removes MainFIFO, kills all of the clients and exits. It says in the log file:"<CTRL+C> signal has arrived, all processes are terminated!"

- Command line entry for each process should like as follows:

```
./syncrohyzationServer -<mainFifoName>;
./clientX -<mainFifoName> -<waitingTime> -<operationName> -<parametre_1> …-<parametre_k>;
```

Good Luck!