

Assignment 3 (programing)

system programming 2017

Introduction

- ❖ In this assignment, we will provide you a simple web server, you need to modify it to accept CGI requests.

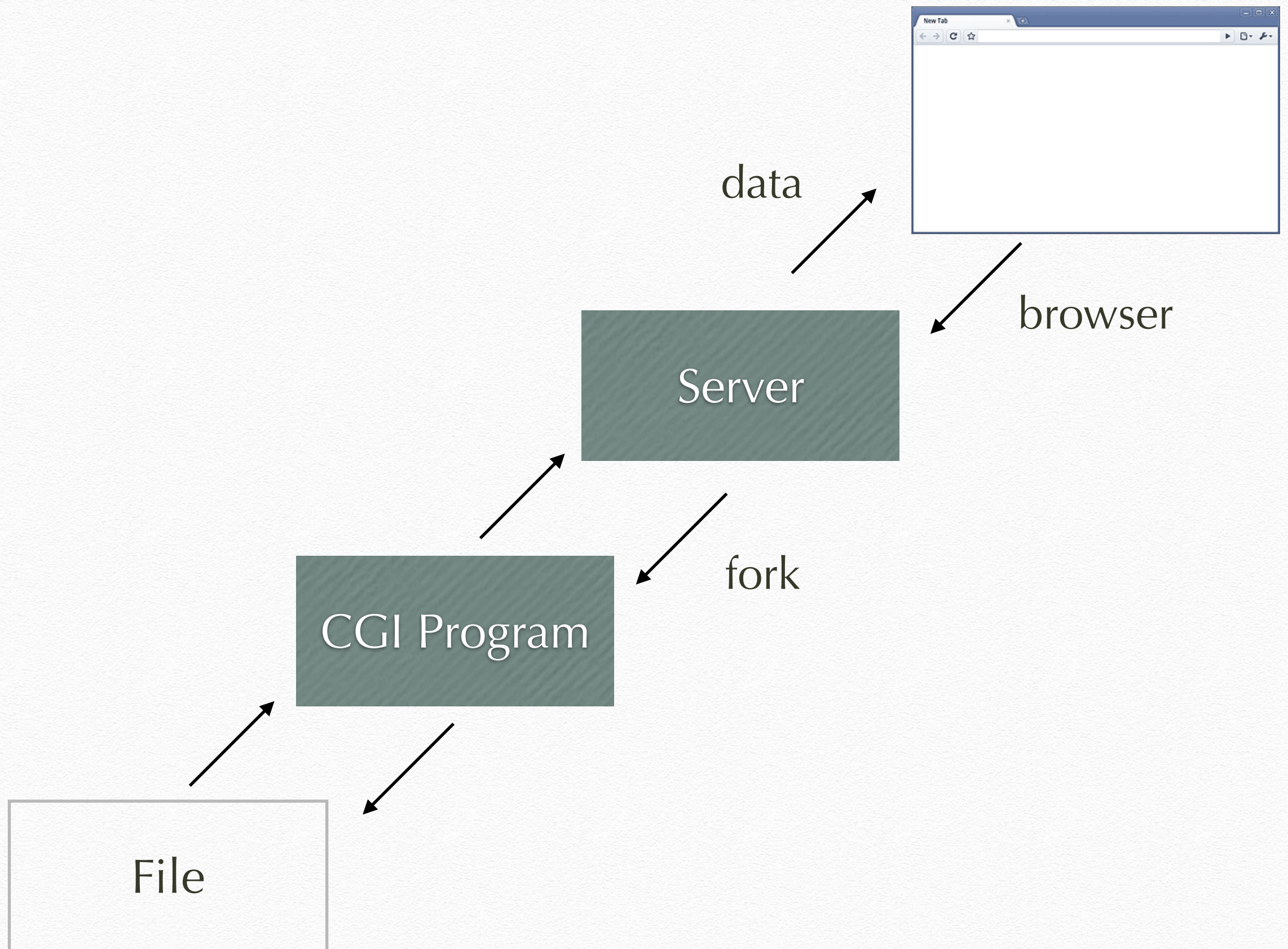
Introduction

- ❖ CGI program reads from STDIN and writes its result to STDOUT.
- ❖ You should write simple CGI programs
 - ❖ Read a filename
 - ❖ Write the content of the file if the file is accessible
 - ❖ Output appropriate error message and exit with a non-zero return code if the file is not accessible

Introduction

- ❖ The user can send the request to the web server via a URL
 - ❖ `http://yourip:port/cgi_program?filename=filename`
- ❖ Your server should properly write HTTP header to the client

❖ `http://yourip:port/cgi_program?filename=filename`



Your jobs

- ❖ Use your `cgi_program` program to read the data from filename and show on web browser.

Your jobs

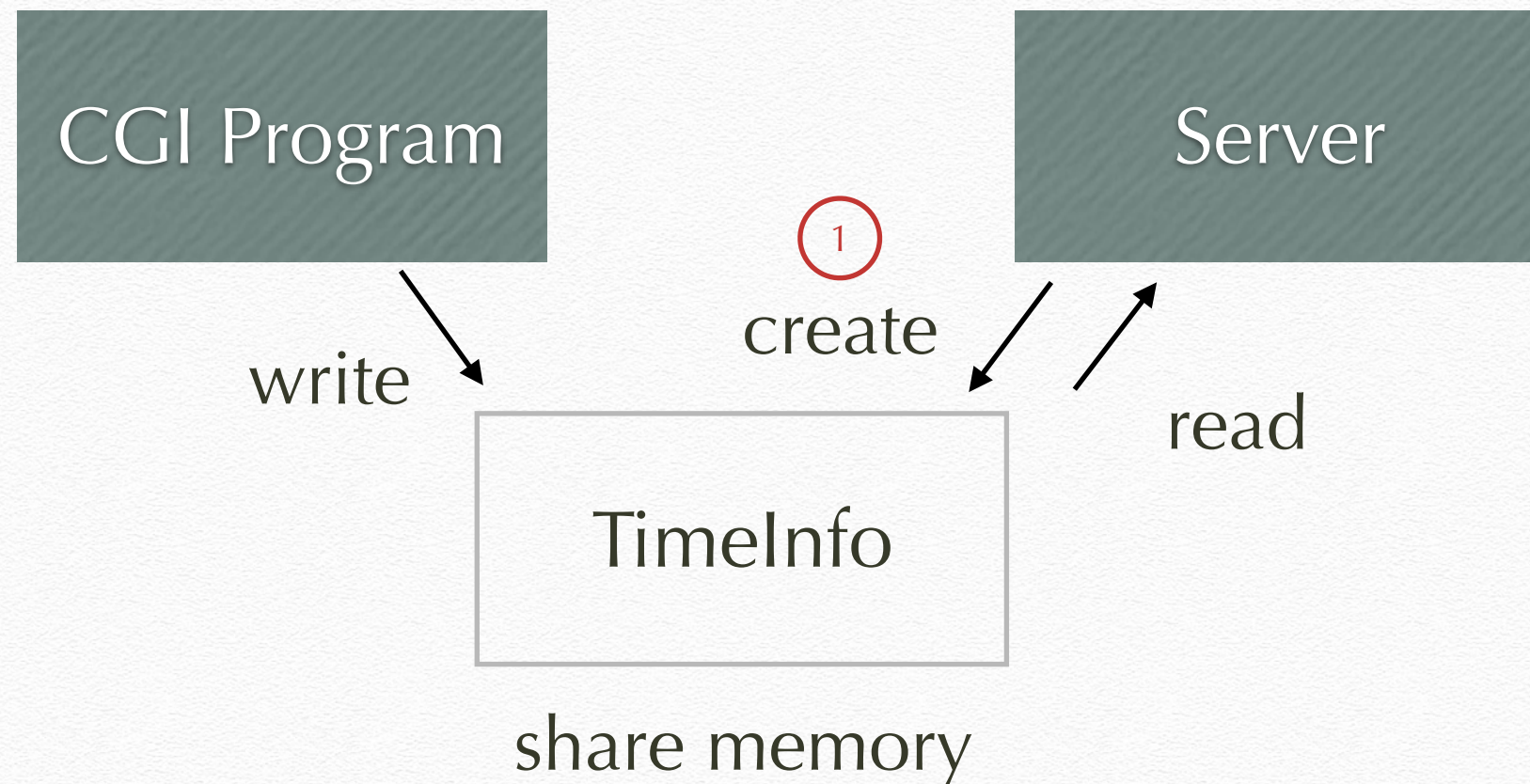
- ❖ If `cgi_program` or `filename` doesn't match the condition, notify the client by HTTP status code "400 Bad Request".
- ❖ Your child process should pass the CGI-program output to let the parent process add HTTP header, and output the result to the client.

Your jobs

- ❖ When a user requests a CGI program or filename which does NOT exist, notify the client by HTTP status code "404 Not Found"
- ❖ If the URL is: **http://your_ip:port/info** fork a child process and it sends SIGUSR1 signal to the server process to show the child processes' information.

Your jobs

- ❖ Use **mmap** to record the exit time and the filename of your CGI program and show the last exit time on **http://your_ip:port/info**



mmap

- ❖ `#include <unistd.h> #include <sys/mman.h>`
- ❖ `void *mmap(void *start, size_t length, int prot, int flags, int fd, off_t offsize);`
 - ❖ `PROT_EXEC` 映射區可被執行；
 - ❖ `PROT_READ` 映射區可被讀取；
 - ❖ `PROT_WRITE` 映射區可被寫入；
 - ❖ `PROT_NONE` 映射區不能存取。
- ❖ `int munmap(void *start, size_t length);`

Demo!

Not judge by a judge system

Note

- ❖ All output/error messages above do not need to be strictly as the same as described in the spec.
- ❖ However, when you demo, it should be easy to identify which message corresponds to which case.
- ❖ Feel free to add more functionality or make the output look better.

Note

- ❖ It would be beneficial to output some debug messages to console, so you can know what the server is doing better.
- ❖ To demo that you returned the correct HTTP status code, you can use inspector in Chrome or Firefox (ctrl+shift+i, Network) to show the status code.
- ❖ Feel free to add more functionality or make the output look better.

How can I get full scores

1. Successfully read data and show on web browser (1points)
2. I/O multiplexing (1 points)
3. Multi-process (1 points)
4. Show process info (4 points)
 1. 400 bad request
 2. 404 not found
 3. http://your_ip:port/info (**SIGCHLD** and **SIGUSR1**)
 4. Show the exit time and the filename of your last exit CGI program (**mmap**)

Submission

- ❖ At least 4 files should be included:
 - ❖ server.c
 - ❖ file_reader.c
 - ❖ makefile(as well as other *.c files)
 - ❖ README.txt

Submission

- ❖ Course Website: <http://www.csie.ntu.edu.tw/~pjcheng/course/sp2017/lastnews.html>
- ❖ Submit your program before 1/2(二) **23:59**
- ❖ Late policy :Your credits of this assignment will be deducted 20% for each day of delay submission (lose all your credits on this assignment after 5 days delaying)

Demo

- ❖ Please fill your available time and bring your computer at that day.
- ❖ Link: TBA
- ❖ Location: TBA