Assignment 3 (programing)

system programming 2016

Introduction

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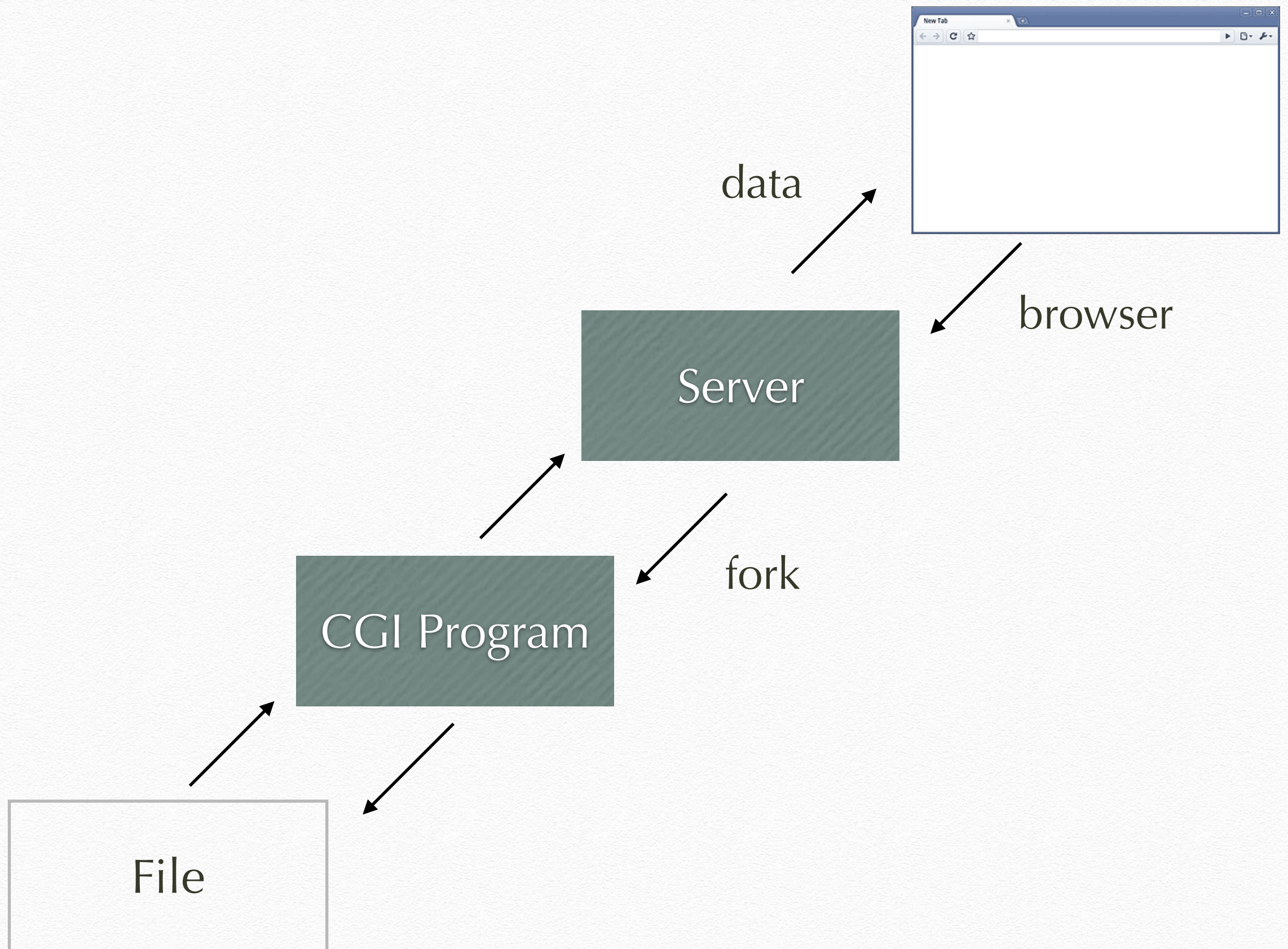
Introduction

- 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

data

browser

Server

fork

CGI Program

File

Your jobs

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

Your jobs
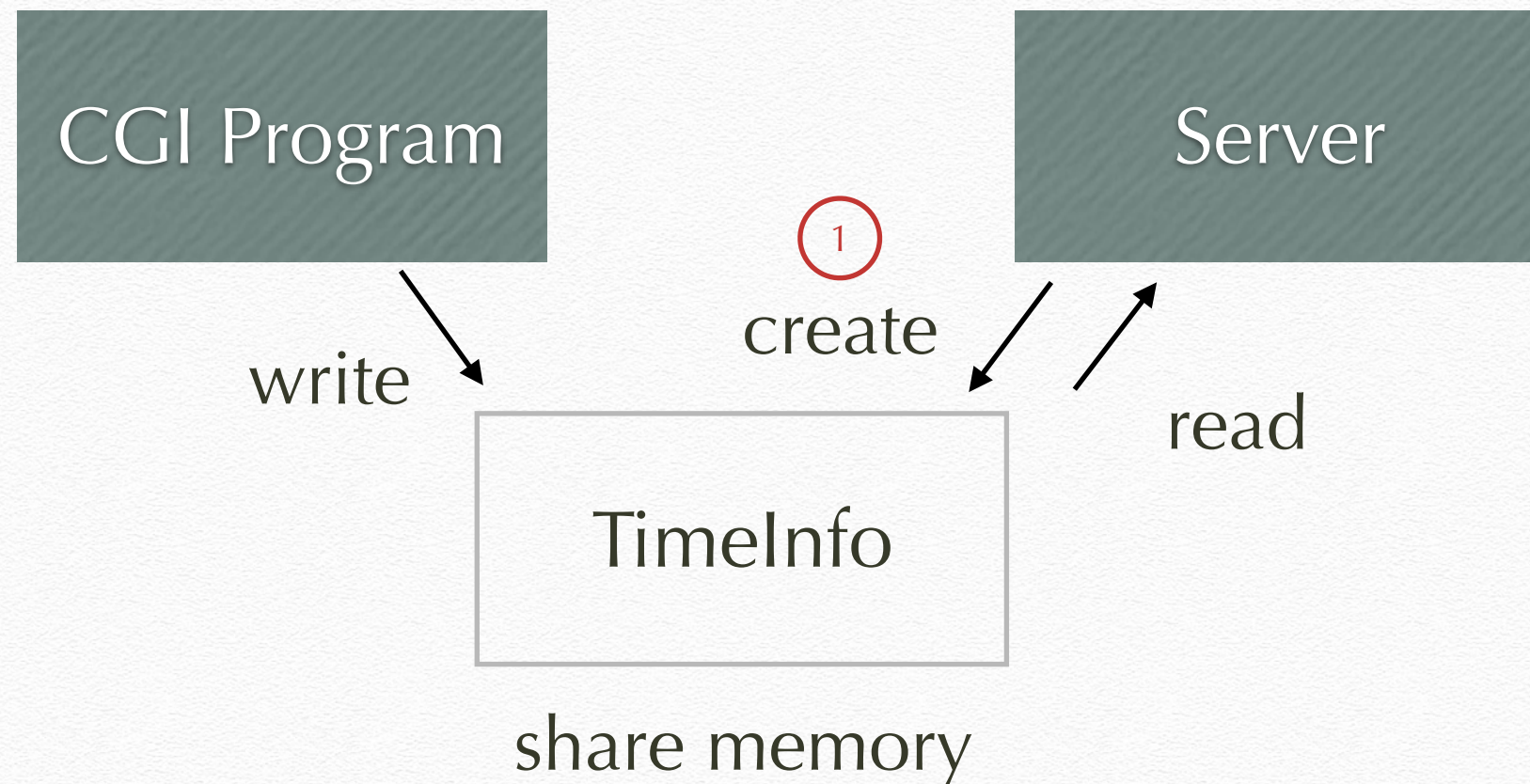
- If cgi_program or filename doesn't match the condition, notify the client by HTTP status code "400 Bad Request".

- 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**

CGI Program

Server

(1)

create

write

read

TimeInfo

share memory

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/
sp2016/lastnews.html

❖ Submit your program before **12/20(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: https://goo.gl/Cjnlco

- Location: To be decided