System Programming
Lab #4

2020-04-14(15)

sp-tas

Lab Assignment #2 – Shell Lab

- Download skeleton code from eTL
  - `shlab.tar`

- Hand In
  - Upload your files **eTL**
  - A zip file should include
    your implementation (tsh.c) and a report

- PLEASE, READ the Hand-out!!!
  - Hints section provides helpful information to implement your shell

- Assigned: Apr. 8
- Deadline: Apr. 22, 11:59:59 PM

- Lab #4 (4/15) will be Q&A session

Shell Lab

- To become more familiar with the concepts of process control and signaling
- Writing a simple Unix shell program that supports job control

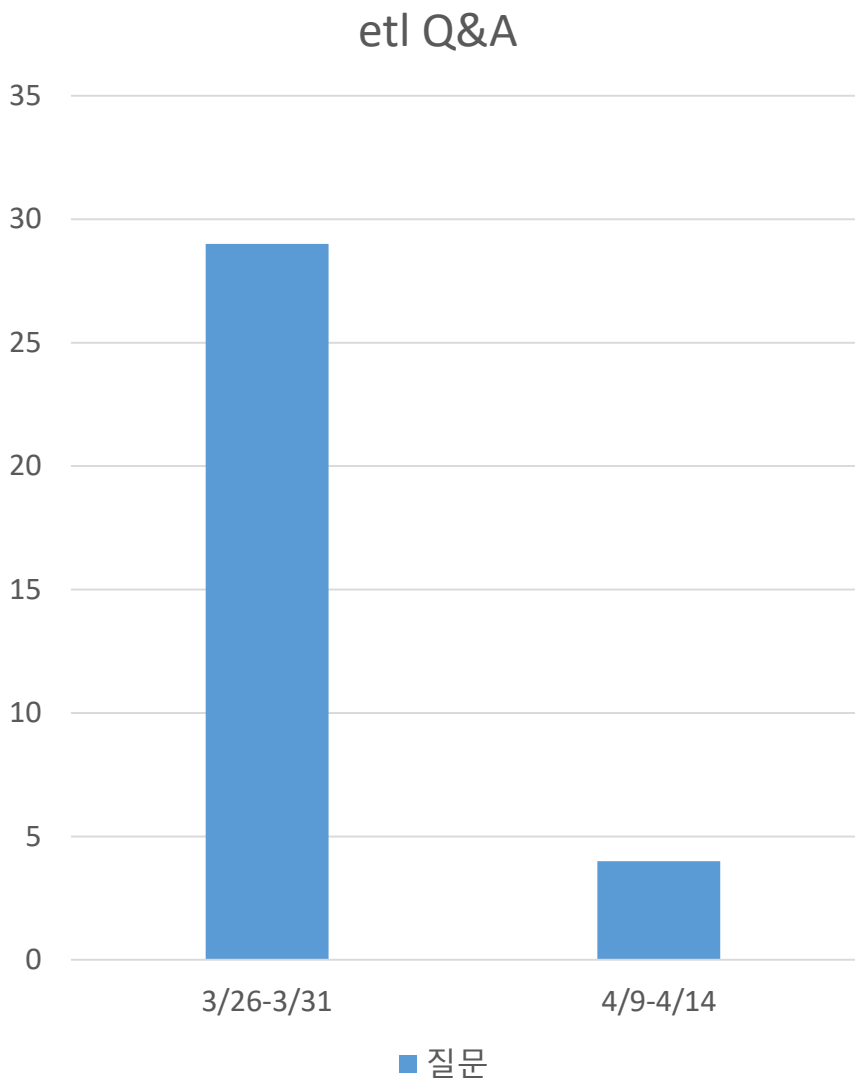
You will implement

```
/* Here are the functions that you will implement */
void eval(char *cmdline);
int builtin_cmd(char **argv);
void do_bgfg(char **argv);
void waitfg(pid_t pid);

void sigchld_handler(int sig);
void sigtstp_handler(int sig);
void sigint_handler(int sig);
```

- `eval`: Main routine that parses and interprets the command line. [70 lines]
- `builtin_cmd`: Recognizes and interprets the built-in commands: `quit`, `fg`, `bg`, and `jobs`. [25 lines]
- `do_bgfg`: Implements the `bg` and `fg` built-in commands. [50 lines]
- `waitfg`: Waits for a foreground job to complete. [20 lines]
- `sigchld_handler`: Catches SIGCHILD signals. 80 lines]
- `sigint_handler`: Catches SIGINT (`ctrl-c`) signals. [15 lines]
- `sigtstp_handler`: Catches SIGTSTP (`ctrl-z`) signals. [15 lines]

Q&A



숙제

- 제출 방식 – etl 과제
  - 직접 입력
  - 사진 제출
  - 문서 제출
  - …
- 풀이
  - 있어도 되고
  - 없어도 됨
- 답
  - 중요함

숙제

Carnegie Mellon

Fun with File Descriptors (1)

```
#include "csapp.h"
int main(int argc, char *argv[])
{
    int fd1, fd2, fd3;
    char c1, c2, c3;
    char *fname = argv[1];
    fd1 = Open(fname, O_RDONLY, 0);
    fd2 = Open(fname, O_RDONLY, 0);
    fd3 = Open(fname, O_RDONLY, 0);
    Dup2(fd2, fd3);
    Read(fd1, &c1, 1);
    Read(fd2, &c2, 1);
    Read(fd3, &c3, 1);
    printf("c1 = %c, c2 = %c, c3 = %c\n", c1, c2, c3);
    return 0;
}
```

ffiles1.c

- What would this program print for file containing “abcde”?

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- 문제를 잘 읽고 답을 잘 쓰기
- 문제에 주어진 부분은 지켜야 함
- 문제에 주어지지 않은 부분은 필요하다면 추가적인 가정, 조건 가능

끝

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