2023년 1학기 **시스템프로그래밍 & 시스템 프로그래밍 실습**

Assignment 1-3

System Software Laboratory
College of Software and Convergence
Kwangwoon Univ.

Assignment 1-3

- **Final ls**
  - Assignment 1-2 ("Advanced ls")

    + Wild card matching ('*', '?', '[seq]')

    + Passing arguments with quotes (e.g., ./spls_final '*')

    + implements -h, -r, -S option

- **Makefile Requirements**
  - 실행 파일이 "spls_final"로 생성되도록 Makefile 작성
  - 컴파일 도중 warning 발생 시 감점
  - "$ make" 를 통해 실행 파일이 생성 되지 않거나 문제가 발생하는 경우, 0점

Assignment 1-3

- **Code Requirements**
  - Assignment 1-1, 1-2 과제 부분에 문제가 있는 경우 감점
  - Wildcard를 이용해 디렉토리를 찾을 경우 디렉토리 내용 출력
  - 경로상에서 Wildcard 사용 시 경로의 끝에만 사용한다고 가정
  - Wildcard 사용 시 작은 따옴표(' ') 내부에서만 사용

    - Examples
      - $ ./spls_final '/home/2017000083/*'
      - $ ./spls_final '/home/text[0-9].c'
      - $ ./spls_final 's??c.?'
  - ls –h, -S, -r **옵션 추가 구현**   r , a,S , h, l   !!

  - **모든 옵션(–a, -r, -h 등)과 와일드 카드 동시 사용하는 경우는 고려할 필요 X**
  - **와일드 카드 사용 시 일치하는 파일 및 디렉토리가 없는 경우 고려할 필요 X**

  - 출력 형식에 맞지 않으면 감점
  - 소스코드의 50% 이상 주석을 달지 않은 경우 감점
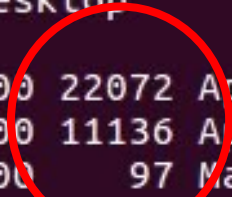
Assignment 1-3 (cont'd)

- **Final ls**
  - -h
    - Print sizes in human readable format (e.g., 1K, 234M, 2G)

```
sp2018722000@ubuntu:~/Desktop$ ./spls_final -lh
Directory path: /home/sp2018722000/Desktop
total 36
-rwxrw-rw- 1 sp2018722000 sp2018722000    11K Apr 2 04:08 final_ls.c
-rw-rw-r-- 1 sp2018722000 sp2018722000     97 Mar 29 22:35 Makefile
-rwxrwxr-x 1 sp2018722000 sp2018722000    22K Apr 2 04:08 spls_final
```

Assignment 1-3 (cont'd)

- **Final ls**
  - -S
    - sort by file size

```
sp2018722000@ubuntu:~/Desktop$ ./spls_final -lS
Directory path: /home/sp2018722000/Desktop
total 36
-rwxrwxr-x 1 sp2018722000 sp2018722000 22072 Apr 2 04:08 spls_final
-rwxrw-rw- 1 sp2018722000 sp2018722000 11136 Apr 2 04:08 final_ls.c
-rw-rw-r-- 1 sp2018722000 sp2018722000    97 Mar 29 22:35 Makefile
```

Assignment 1-3 (cont'd)

- **Final ls**
  - -r
    - Print reverse sort by string
    - **With –S option, sort files in reverse order of size.**
      - **For files with the same size, sort by string in reverse order.**

```
sp2018722000@ubuntu:~/Desktop$ ./spls_final -lr
Directory path: /home/sp2018722000/Desktop
total 36
-rwxrwxr-x 1 sp2018722000 sp2018722000 22072 Apr 2 04:08 spls_final
-rw-rw-r-- 1 sp2018722000 sp2018722000    97 Mar 29 22:35 Makefile
-rwxrw-rw- 1 sp2018722000 sp2018722000 11136 Apr 2 04:08 final_ls.c
```

< Using –r option >

```
sp2018722000@ubuntu:~/Desktop$ ./spls_final -larS
Directory path: /home/sp2018722000/Desktop
total 48
-rw-rw-r-- 1 sp2018722000 sp2018722000     0 Mar 29 23:01 .zzz
-rw-rw-r-- 1 sp2018722000 sp2018722000     0 Mar 29 23:01 .bbb
-rw-rw-r-- 1 sp2018722000 sp2018722000     0 Mar 29 23:01 .aaa
-rw-rw-r-- 1 sp2018722000 sp2018722000    97 Mar 29 22:35 Makefile
drwxr-xr-x 16 sp2018722000 sp2018722000 4096 Apr 2 03:58 ..
drwxr-xr-x 2 sp2018722000 sp2018722000  4096 Apr 2 04:08 .
-rwxrw-rw- 1 sp2018722000 sp2018722000 11136 Apr 2 04:08 final_ls.c
-rwxrwxr-x 1 sp2018722000 sp2018722000 22072 Apr 2 04:08 spls_final
```

< Using –r option with –S option >

Same size : String upside down

Assignment 1-3 (cont'd)

- **Final ls**
  - Results

Assignment 1-3 (cont'd)

- **Final ls**
  - Results

Assignment 1-3 (cont'd)

- **Final ls**
  - Results

Assignment 1-3 (cont'd)

- **Final ls**
  - Results


```
sp2018722000@ubuntu:~/Desktop$ ./spls_final '/home/sp2018722000/*'
Directory path: /home/sp2018722000/Desktop
final_ls.c
Makefile
spls_final

Directory path: /home/sp2018722000/Documents

Directory path: /home/sp2018722000/Downloads

Directory path: /home/sp2018722000/Music

Directory path: /home/sp2018722000/Pictures

Directory path: /home/sp2018722000/Public

Directory path: /home/sp2018722000/sslab
fnmatch
fnmatch.c
ls.c
ls.h
Makefile
```

- 파일과 디렉토리가 동시에 출력될 경우
  - 파일: 상단 출력 및 정렬
  - 디렉토리: 하단 출력 및 정렬

Appendix

보고서 작성 요령 (1/2)

- **Algorithm – Flow Chart (Each function)**
  - E.g.
  - 국문, 영문 모두 작성 가능
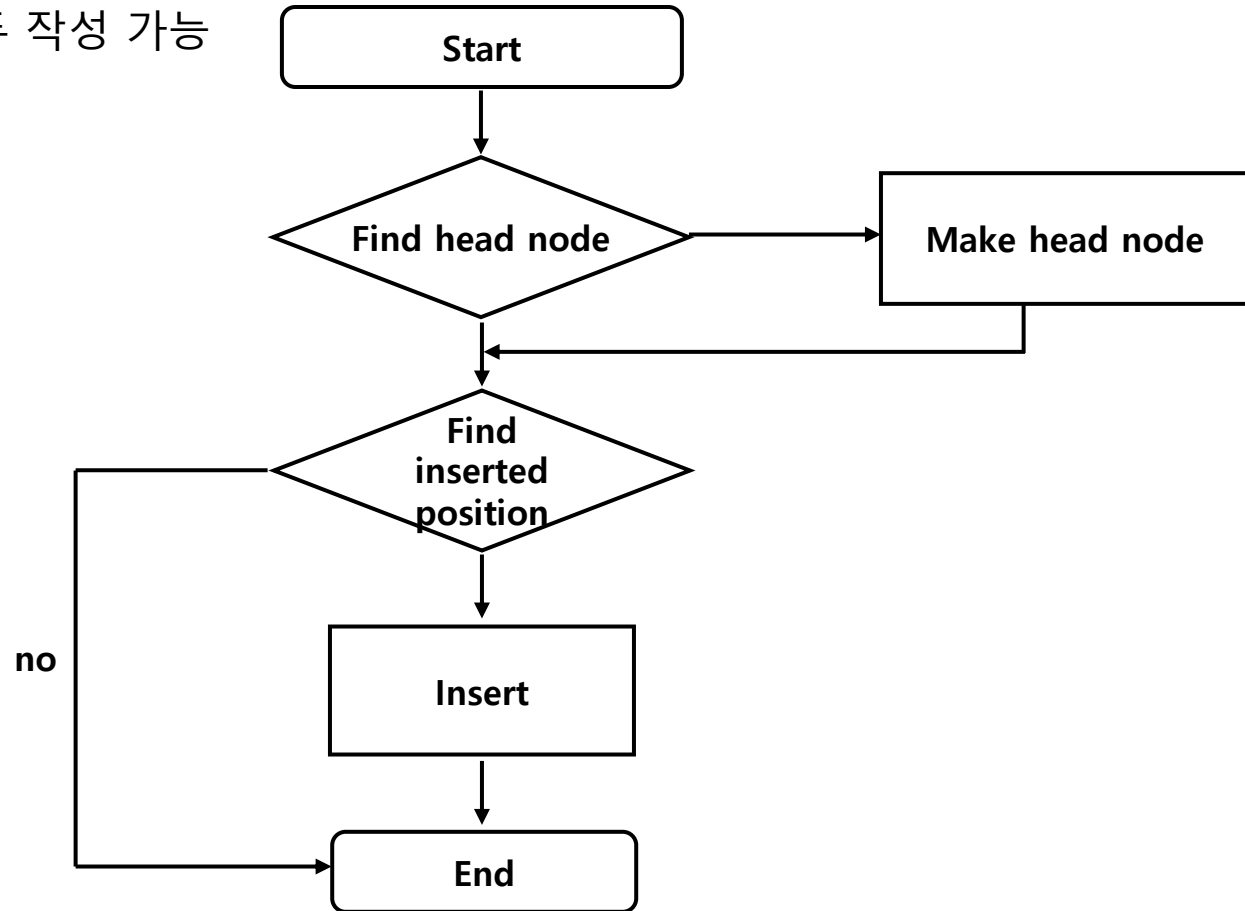
보고서 작성 요령 (2/2)

- **Algorithm – Pseudo Code**
  - E.g.
  - 국문, 영문 모두 작성 가능

```
FixHeap(Node *root, Key k)
{
        Node vacant, largerChild;
        vacant = root;
        while( vacant is not leaf ) {
                largerChild = the child of vacant with the larger key;
                if( k < largerChild's Key ) {
                        copy lagerChild's key to vacant;
                        vacant = largerChild;
                }
                else exit loop;
        }
}
```

```
Set grade counter to one

While grade counter is less than or equal to ten
        Input the next grade
        Add the grade into the total
Set the class average to the total divided by ten
Print the class average
```

Comment 작성 요령 (1/3)

- **File Head Comment**
  - E.g.
  - 국문, 영문 모두 작성 가능

```
///////////////////////////////////////////////////////////////////////
// File Name     : Main.c                                             //
// Date          : 2023/03/01                                         //
// Os            : Ubuntu 16.04 LTS 64bits                            //
// Author        : Hong Gil Dong                                      //
// Student ID    : 2023123456                                         //
// ----------------------------------------------------------------- //
// Title : System Programming Assignment #1-1 (proxy server)          //
// Description : ...                                                  //
///////////////////////////////////////////////////////////////////////
```

Comment 작성 요령 (2/3)

- **Function Head Comment**

  - E.g.
  - 국문, 영문 모두 작성 가능

```
//////////////////////////////////////////////////////////////////////
//  InsertNode                                                        //
//  ================================================================  //
//  Input: Node* -> Insert Node,                                      //
//          Node* -> Column node before insert node                   //
//          Node* -> Row node before insert node                      //
//         (Input parameter Description)                              //
//  Output: int  - 1 success                                          //
//                  0 fail                                            //
//         (Out parameter Description)                                //
//  Purpose: Inserting node                                           //
//////////////////////////////////////////////////////////////////////
```

Comment 작성 요령 (3/3)

- **In-line Comment**
  - e.g.
  - 국문, 영문 모두 작성 가능

```
if( pRowPos->pNextRow != pRowPos ) {
    pTemp->pNextRow = pRowPos->pNextRow;        // pTemp set next row
    if( !( pRowPos->pNextRow->bHead ) ){
            pRowPos->pNextRow->NodeItem.pPrevRow = pTemp;
    } // end of if
} // end of if
else {
    pTemp->pNextRow = pRowPos;          // pTemp set next row
} // end of else
pTemp->NodeItem.pPrevRow = pRowPos;      // pTemp set previous row
pRowPos->pNextRow = pTemp;
```