# Lab 2 - Linked List

2019.03.12

# Lab 2 - LinkedList

In this lab session, we will implement **a simple program for course registration**.
Your program has four functions as listed below.

- Function
  1. Add student.
     a. Add one student at a time.
     b. Duplicate student ID should not be added to the list (you need to print an error message).
     c. Your list should be sorted by student ID.
  2. Delete student.
     a. Delete one student at a time.
     b. If a student ID is in the list, delete the student information. If the student ID is not in the list, print “No such student id.”
  3. Find the student name of the given student ID.
     a. Show student information if any. If the student ID is not in the list, print “No such student id.”
  4. Print all student id and name.

# Lab 2 - List ADT

- Data Specification for the objects

```
typedef struct Node *PtrToNode;
typedef PtrToNode List;
typedef PtrToNode Position;
typedef struct
{
    char*     studentID;
    char*     studentName;
}   ElementType;

struct Node
{
    ElementType                    element;

    PtrToNode                      next;
};
```

- Function specification
  - void Insert ( ElementType X, List L, Position P );
  - void Delete( ElementType X,  List L );
  - Position Find(ElementType X, List L);
  - void PrintList ( List L );
  - List MakeEmpty( List L );
  - int IsEmpty( List L );
  - int IsLast( Position P,  List L );
  - void DeleteList ( List L );

# Lab 2 - LinkedList

An input file and the corresponding result are shown below.

input.txt

```
i 201411 Brian Lee
i 201402 Susan Kim
i 201411 Brian Lee
i 201423 Nancy Park
d 201411
f 201402
f 201411
i 111111 Tyler Lee
d 111122
p
```

output.txt

```
Insertion Success : 201411
Current List > 201411 Brian Lee
Insertion Success : 201402
Current List > 201402 Susan Kim-201411 Brian Lee
Insertion Failed. ID 201411 already exists.
Insertion Success : 201423
Current List > 201402 Susan Kim-201411 Brian Lee-201423 Nancy Park
Deletion Success : 201411
Current List > 201402 Susan Kim-201423 Nancy Park
Find Success : 201402 Susan Kim
Find 201411 Failed. There is no student ID
Insertion Success : 111111
Current List > 111111 Tyler Lee-201402 Susan Kim-201423 Nancy Park
Deletion Failed : Student ID 111122 is not in the list.
-----LIST-----
11111 Tyler Lee
201402 Susan Kim
201423 Nancy Park
--------------
```

# Lab 2 - LinkedList

- Requirements
  - Execution file name : p2.out
  - Obtain a list of operations from the given input file, and execute the given operations in order. A detailed specification of each operation is provided below. Each line represents a single operation. Each operation and the necessary parameters are separated by a **space**.
    - **i <space> [Student ID] <space> [First Name] <space> [Last Name]**
      - Insert a new node with the student information.
      - Student name must be a combination of first and last name. (with space)
      - Show insertion result and print current list.
    - **d <space> [Student ID]**
      - delete the node with the student ID.
    - **f <space> [Student ID]**
      - print the student name of the given student ID.
    - **p** : print the entire list from the beginning to the end.
      - Format

```
-----LIST-----
11111 Tyler Lee
201402 Susan Kim
201423 Nancy Park
--------------
```



※ Please see the next page for all output formats.

# Lab 2 - LinkedList

Result is shown below.

```
daewook@daewook-VirtualBox:~/2019_CSE2010_123456789/lab2$ gcc p2.c -o p2.out
daewook@daewook-VirtualBox:~/2019_CSE2010_123456789/lab2$ ./p2.out
daewook@daewook-VirtualBox:~/2019_CSE2010_123456789/lab2$ cat output.txt
Insertion Success : 201411
Current List > 201411 Brian Lee
Insertion Success : 201402
Current List > 201402 Susan Kim-201411 Brian Lee
Insertion Failed. ID 201411 already exists.
Insertion Success : 201423
Current List > 201402 Susan Kim-201411 Brian Lee-201423 Nancy Park
Deletion Success : 201411
Current List > 201402 Susan Kim-201423 Nancy Park
Find Success : 201402 Susan Kim
Find 201411 Failed. There is no student ID
Insertion Success : 111111
Current List > 111111 Tyler Lee-201402 Susan Kim-201423 Nancy Park
Deletion Failed : Student ID 111122 is not in the list.
-----LIST-----
11111 Tyler Lee
201402 Susan Kim
201423 Nancy Park
--------------

daewook@daewook-VirtualBox:~/2019_CSE2010_123456789/lab2$ ls
input.txt  output.txt  p2.c  p2.out
```

# Lab 2 - LinkedList

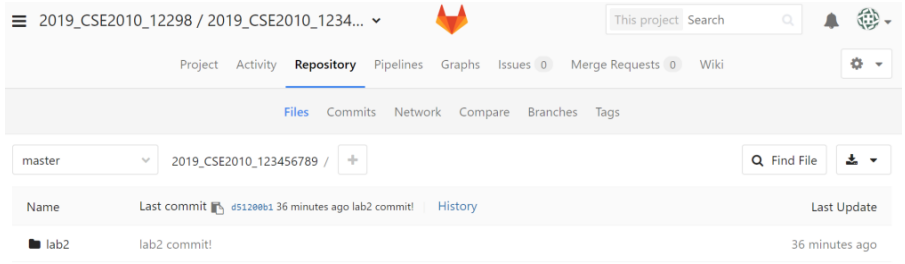
- Submission
  - Project directory name : lab2
  - Source file name : p2.c
  - Executable file name : p2.out
  - You should upload in the hconnect (Gitlab) server.
  - If you are not familiar with using git, please read the manual. (GitLab 사용법.pdf)

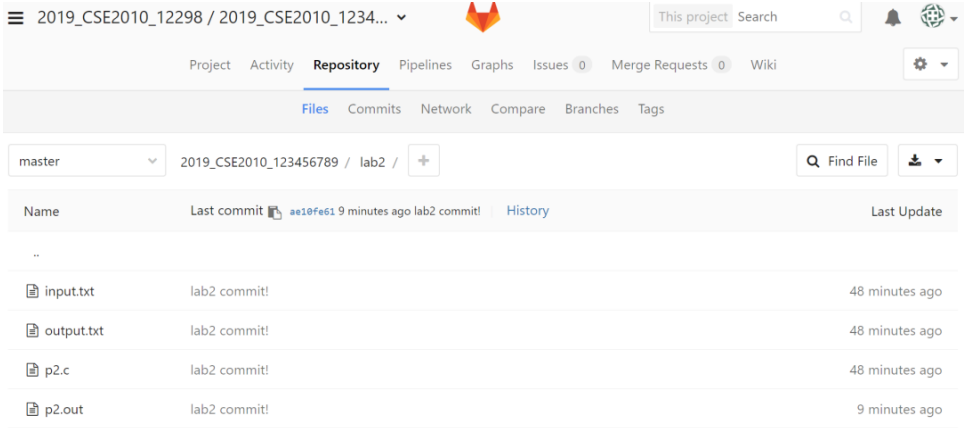
```
daewook@daewook-VirtualBox:~/2019_CSE2010_123456789/lab2$ git add .
daewook@daewook-VirtualBox:~/2019_CSE2010_123456789/lab2$ git status
현재 브랜치 master
현재 브랜치가 'origin/master' 기반이지만, 업스트림이 없어졌습니다.
  (바로잡으려면 "git branch --unset-upstream"을 사용하십시오)

커밋할 변경 사항:
  (스테이지 해제하려면 "git reset HEAD <파일>..."을 사용하십시오)

        수정됨:       p2.out
        new file:     input.txt
        new file:     output.txt
        수정됨:       p2.c
```

```
daewook@daewook-VirtualBox:~/2019_CSE2010_123456789/lab2$ git commit -m "lab2 commit!"
[master d51200b] lab2 commit!
 4 files changed, 35 insertions(+), 24 deletions(-)
 rewrite lab2/p2.out(85%)
 create mode 100644 lab2/input.txt
 create mode 100644 lab2/output.txt
 rewrite lab2/p2.c (95%)
daewook@daewook-VirtualBox:~/2019_CSE2010_123456789/lab2$ git push origin master
Username for 'https://hconnect.hanyang.ac.kr': 2018103219
Password for 'https://2018103219@hconnect.hanyang.ac.kr':
Counting objects: 12, done.
Compressing objects: 100% (9/9), done.
Writing objects: 100% (12/12), 4.79 KiB | 0 bytes/s, done.
Total 12 (delta 1), reused 0 (delta 0)
To https://hconnect.hanyang.ac.kr/2019_CSE2010_12298/2019_CSE2010_123456789.git
 * [new branch]      master -> master
```

# Lab 2 - LinkedList

- Submission
  - Your project needs to be shown in the hconnect webpage as below.



# DeadLine

Wednesday, 20 March, 11 : 59 pm