05. General Linear List

dbserver.korea@gmail.com

Agenda

- List Problem
  - OrderedList ADT

OrderedList ADT

- Implement an OrderedList ADT

- List contains student information items.

  - Structure of a student infomation:

    - Id (int), name (char[]), email (char[])

- Items are automatically ordered in a List by student ID in ascending order.

OrderedList ADT

- Functions:
  - createList - create a list
  - destroyList - destroy a list
  - insertData - insert a node in ascending order of id
    - Duplicate keys are not allowed.
    - Return false if key is duplicated.
    - Initialize an Iterator when data is inserted.
  - removeData - erase an element with specified ID
    - Return false if there is no element that has specified ID
    - Initialize an Iterator when data is removed.
  - searchData - return an element with specified ID
  - listSize – return the number of elements in a list
  - isEmpty - return true if a list is empty
  - initIterator - initialize a position of an iterator
  - iterateList - traverses a list
  - printList - print all elements in a list

Common Mistakes

- To use boolean type and values in C:
  - Include <stdbool.h>
- Integer / Integer = Integer
  - Use type casting.
  - (double)integer / integer = double
- Be careful with dynamic memory allocation.
  - Avoid memory leaks
- Use the correct pair of dynamic memory allocation operators.
  - malloc - free

Output

####################
Insert dummy data
Inserted
Inserted
Inserted
Inserted
Inserted

####################
Iterate elements
STUDENT ID: 320001
NAME: yangbong
EMAIL: beebee@korea.ac.kr

STUDENT ID: 320002
NAME: hyoyong
EMAIL: utility@korea.ac.kr

STUDENT ID: 320003
NAME: daegi
EMAIL: waiting@korea.ac.kr

STUDENT ID: 320004
NAME: hyubjin
EMAIL: hyubjinlee@korea.ac.kr

STUDENT ID: 320005
NAME: minsoo
EMAIL: msdb@korea.ac.kr

####################
Search elements
Found a student (key: 320001)
STUDENT ID: 320001
NAME: yangbong
EMAIL: beebee@korea.ac.kr

Found a student (key: 320003)
STUDENT ID: 320003
NAME: daegi
EMAIL: waiting@korea.ac.kr

Search failed (key: 120001)

Output

```
####################
# Remove elements
Erase successed (key: 320001)
STUDENT ID: 320002
NAME: hyoyong
EMAIL: utility@korea.ac.kr
--------------------
STUDENT ID: 320003
NAME: daegi
EMAIL: waiting@korea.ac.kr
--------------------
STUDENT ID: 320004
NAME: hyubjin
EMAIL: hyubjinlee@korea.ac.kr
--------------------
STUDENT ID: 320005
NAME: minsoo
EMAIL: msdb@korea.ac.kr
--------------------
```

```
====================
Erase successed (key: 320005)
STUDENT ID: 320002
NAME: hyoyong
EMAIL: utility@korea.ac.kr
--------------------
STUDENT ID: 320003
NAME: daegi
EMAIL: waiting@korea.ac.kr
--------------------
STUDENT ID: 320004
NAME: hyubjin
EMAIL: hyubjinlee@korea.ac.kr
--------------------
```

```
====================
Erase successed (key: 320003)
STUDENT ID: 320002
NAME: hyoyong
EMAIL: utility@korea.ac.kr
--------------------
STUDENT ID: 320004
NAME: hyubjin
EMAIL: hyubjinlee@korea.ac.kr
--------------------
====================
Erase successed (key: 320004)
STUDENT ID: 320002
NAME: hyoyong
EMAIL: utility@korea.ac.kr
--------------------
====================
Erase successed (key: 320002)
====================
```

```
####################
# List empty check
Empty
```