ESTRUCTURA DE DATOS 1
Código ST0245

Laboratory practice No. 3: LinkedList and ArrayList

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3) Practice for final project defense presentation

3.1

	ArrayList	LinkedList
Exercise 1.1	O(n log K)	O(n log K + m)

n : Represents the query, the time required to show each data, because it is necessary to iterate over the STL Map.

log K : Represents the time required to access a value on STL Map with K size, referring to the Map that was accessed.

m: Represents the amount to search the semester on the LinkedList.

In the ArrayList version, it is proposed an ArrayList with size p, where p > k, such that k represents a big number that has to be defined, meaning that each semester will be accessible by its number on the ArrayList, this will allow the access in constant time to the semester that contain the STL's Maps.

3.2 Once taken the string a for each will iterate over it, we are going to insert again every element on some new char list 'listChar' except for '[' & ']', these will establish the rules, when a '[' is found the program will start to write at the beginning of 'listChar', and if a ']' the program will start to write at the end of 'listChar', accessing each point with listChar.begin() and listChar.end() iterators for each function respectively.

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3.3

Time Complexity	
Exercise 2.1	**O(n)**

Note that is O(n) because the iterator is already obtained once that is detected a '[', also it is remarkable to say that STL list is double link listed.

3.4 n : represents string length.

4) Practice for midterms

4.1 *a*
4.2 *c*
4.3 *a. q.size() > 1*
  b. <
  c. q.add(q.remove());
  d. q.remove();

4.4 a. lista.size()
  b. lista.addFirst(auxiliar.peek());
   auxiliar.pop();

4.5
  4.5.a auxiliar1.size() > 0   auxiliar2.size() > 0
  4.5.b personas.offer(edad);
4.6 a
4.8 c
4.8.1 a
4.8.2 c
4.8.3 c
4.9
  4.9.1 d
  4.9.2 a
  4.9.3 b
4.10
  4.10.1 a
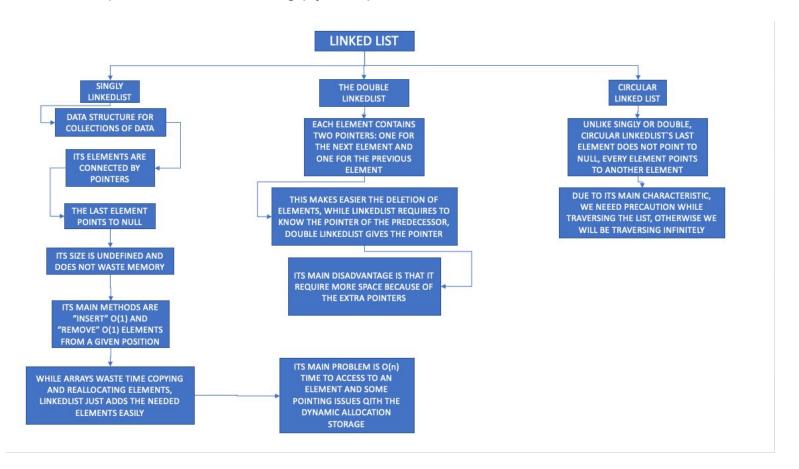 *4.10.2 b*
4.11
  4.11.1 s1.size() > 1

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4.11.2 *s2.push(s1.pop());*
4.11.3 *return s1.pop();*
4.12
4.12.1 iv
4.12.2 i
4.13
4.13.1 iii
4.13.2 iii
4.14 iii

5) Recommended reading (optional)


```
                         ┌──────────────┐
                         │ LINKED LIST  │
                         └──────────────┘
```

SINGLY LINKEDLIST

DATA STRUCTURE FOR COLLECTIONS OF DATA

ITS ELEMENTS ARE CONNECTED BY POINTERS

THE LAST ELEMENT POINTS TO NULL

ITS SIZE IS UNDEFINED AND DOES NOT WASTE MEMORY

ITS MAIN METHODS ARE "INSERT" O(1) AND "REMOVE" O(1) ELEMENTS FROM A GIVEN POSITION

WHILE ARRAYS WASTE TIME COPYING AND REALLOCATING ELEMENTS, LINKEDLIST JUST ADDS THE NEEDED ELEMENTS EASILY

THE DOUBLE LINKEDLIST

EACH ELEMENT CONTAINS TWO POINTERS: ONE FOR THE NEXT ELEMENT AND ONE FOR THE PREVIOUS ELEMENT

THIS MAKES EASIER THE DELETION OF ELEMENTS, WHILE LINKEDLIST REQUIRES TO KNOW THE POINTER OF THE PREDECESSOR, DOUBLE LINKEDLIST GIVES THE POINTER

ITS MAIN DISADVANTAGE IS THAT IT REQUIRE MORE SPACE BECAUSE OF THE EXTRA POINTERS

ITS MAIN PROBLEM IS O(n) TIME TO ACCESS TO AN ELEMENT AND SOME POINTING ISSUES QITH THE DYNAMIC ALLOCATION STORAGE

CIRCULAR LINKED LIST

UNLIKE SINGLY OR DOUBLE, CIRCULAR LINKEDLIST`S LAST ELEMENT DOES NOT POINT TO NULL, EVERY ELEMENT POINTS TO ANOTHER ELEMENT

DUE TO ITS MAIN CHARACTERISTIC, WE NEEED PRECAUTION WHILE TRAVERSING THE LIST, OTHERWISE WE WILL BE TRAVERSING INFINITELY

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6) Team work and gradual progress (optional)

6.1 Meeting minutes

Member	Date	Done	Doing	To do
Miguel	2019/09/05		Exercise 2.2 on C++. Exercise 2.1 on C++.	Worksheet 1,2,3,6.
Miguel	2019/09/08	Exercise 2.1 on C++ Exercise 2.2 on C++	Worksheet point 1.	Worksheet points 1, 3, 6.
Miguel	2019/09/08	Exercise 1.1 on C++		Worksheet point 6.
Pablo	2019/09/10			Worksheet points 4, 5.
Pablo Miguel	2019/09/10		Worksheet point 4.	
Miguel	2019/09/14		Optional points worksheet point 2.	Worksheet point 3, 6.
Miguel	2019/09/14	Optional worksheet point 2.		Worksheet point 3, 6. Read CSV file and use queries.
Miguel	2019/09/15	Read CSV file and use queries.	Worksheet point 3.	Worksheet point 3, 6.

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Pablo	2019/09/15	Worksheet point 4.	Worksheet point 5.	
Miguel	2019/09/15	Worksheet point 3.	Worksheet point 6.	
Pablo	2019/09/15	Worksheet point 5.		
Miguel	2019/05/15	Worksheet point 6.		

6.2 History of changes of the code

```
*    commit    c02fe2ebe6fa1864a94538d926984accf872d93f    (HEAD    ->    master,
        origin/master, origin/HEAD)
| Author: miguelmque <macorream@eafit.edu.co>
| Date:   Sun Sep 15 22:45:43 2019 -0500
|
|    documented}
|
* commit 5dac28e5ddd8440f54b66e4541cf9d8e8f3f1740
| Author: miguelmque <macorream@eafit.edu.co>
| Date:   Sun Sep 15 22:13:15 2019 -0500
|
|    a lot of files finished
|
* commit 4af2f28d347bae58ff96082dcadaa8cdd08e48ba
| Author: miguelmque <macorream@eafit.edu.co>
| Date:   Sun Sep 15 11:39:15 2019 -0500
|
|    problem version v2, now better with piles
|
* commit 663bb2dcf10d8e8f353aafb151f483b9a57d4a58
| Author: miguelmque <macorream@eafit.edu.co>
| Date:   Sun Sep 8 23:24:15 2019 -0500
|
|    point 1 solved
|
* commit 3aa41d03465ea14956d17051cfd3afe4a52c751e
| Author: miguelmque <macorream@eafit.edu.co>
```

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| Date: Sun Sep 8 19:39:01 2019 -0500
|
| point2_1 solved, correction to segmentation fault
|
* commit 1b417bcf5f064dfb9468cdd644ae783f2aa5fbdb
| Author: miguelmque <macorream@eafit.edu.co>
| Date: Sun Sep 8 19:14:26 2019 -0500
|
| point 2_2 solved, useless methods removed
|
* commit ae390cb80e53454a35586419aa86e814a73ba101
| Author: miguelmque <macorream@eafit.edu.co>
| Date: Sun Sep 8 19:05:56 2019 -0500
|
| point 2_2 solved
|
* commit 65d6cfd77b05a5577937a523575a44d260bfd141
| Author: miguelmque <macorream@eafit.edu.co>
| Date: Sun Sep 8 17:00:43 2019 -0500
|
| moveOnto successful
|
* commit 35213da5c7d89b7e54cf41e781eeda6d4e5b3198
| Author: miguelmque <macorream@eafit.edu.co>
| Date: Sun Sep 8 19:14:26 2019 -0500
|
| point 2_2 solved, useless methods removed
|
* commit ae390cb80e53454a35586419aa86e814a73ba101
| Author: miguelmque <macorream@eafit.edu.co>
| Date: Sun Sep 8 19:05:56 2019 -0500
|
| point 2_2 solved
|
* commit 65d6cfd77b05a5577937a523575a44d260bfd141
| Author: miguelmque <macorream@eafit.edu.co>
| Date: Sun Sep 8 17:00:43 2019 -0500
|
| moveOnto successful
|
* commit 35213da5c7d89b7e54cf41e781eeda6d4e5b3198
| Author: miguelmque <macorream@eafit.edu.co>

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| Date: Thu Sep 5 12:16:34 2019 -0500
|
| advanced on point2_2
|
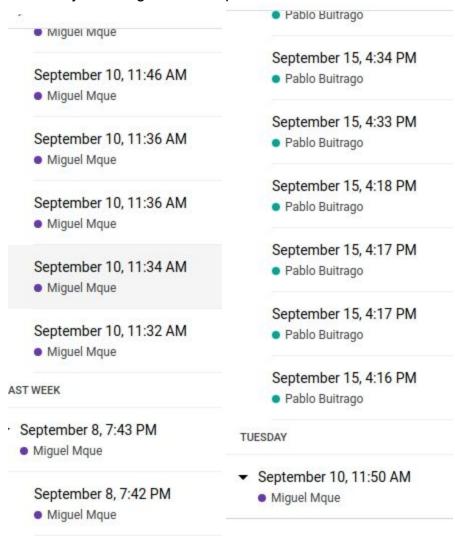* commit 5a6cbd7f3bcf9260da8cb82eed789fba4480d5f1
| Author: miguelmque <macorream@eafit.edu.co>
| Date: Thu Sep 5 01:20:03 2019 -0500
|
| point 2_1 solved c++

6.3 History of changes of the report

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Pablo Buitrago

September 15, 4:34 PM
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Pablo Buitrago

TUESDAY

September 10, 11:50 AM
Miguel Mque

September 15, 6:00 PM
Miguel Mque

September 15, 6:00 PM
Miguel Mque

September 15, 5:57 PM
Miguel Mque

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Miguel Mque

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Pablo Buitrago

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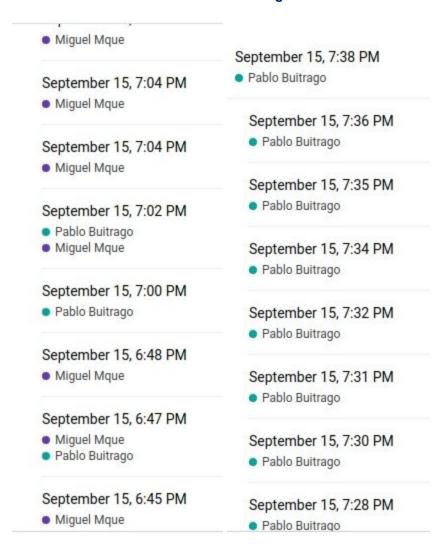● Miguel Mque

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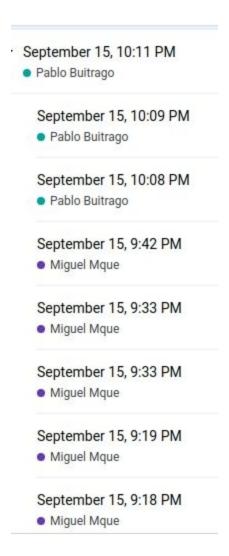● Pablo Buitrago

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