

GTU Department of Computer Engineering

CSE 222/505 - Spring 2023

Homework #3 Report

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1- Problem Definition

We were supposed to design and implement a basic social media software that provides sharing posts with people. In addition to the features in HW1, we also have new features such as unliking a post we liked, unblocking a blocked account, uncommenting a post we commented, unfollowing an account we followed and showing our action history.

2- Problem Solution Approach for LDLinkedList

We are asked to design and implement a social media software that provides people to interact each other.

The biggest problem was of course, creating LDLinkedList class from scratch. For that, I needed to implement various functions to use linked-list structure in my software. I tried to keep my functions as time efficient as possible.

Second problem was about lazy deletion in that class. We were supposed to implement the remove method using lazy deletion strategy. I designed an algorithm to implement that method in my method. Firstly, I keep the data of a node if it's lazily deleted or not (Boolean), and a counter that keeps the number of lazilyDeleted nodes.

If there is just one node that is marked as lazily deleted, I didn't delete this node but in other case, if there are more than one node that are marked as lazily deleted, I deleted these items.

3-Experimental Running Time Analysis

Implementation Type	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Basic Array Structure (HW1)	0,078s	0,106s	0,062s	Not available
Array List Structure (a)	0,109s	0,112s	0,104s	0,125s
Linked List Structure (b)	0,108s	0,121s	0,120s	0,111s
LD Linked List Structure (c)	0,108s	0,108s	0,116s	0,093s

4-Time Complexity Analysis

Methods/ Structures	Basic Array Structure (HW1)	Array List Structure (a)	Linked List Structure (b)	LD Linked List Structure (c)
get () – () []	O (1)	O (1)	O (n)	O (n)
add ()	O (1)	O (1)	O (n)	O (n)
remove ()	O (n)	O (n)	O (n)	O (n)
search ()	O (n)	O (n)	O (n)	O (n)
follow ()	O (n)	O (n)	O (n)	O (n)
unfollow ()	Not available	O (n)	O (n)	O (n)
like ()	O (n)	O (n)	O (n+m)	O (n+m)
unlike ()	Not available	O (n)	O (n)	O (n)
comment ()	O (1)	O (1)	O (n +m)	O (n +m)
uncomment ()	Not available	O (n)	O (n)	O (n)
addPost ()	O (1)	O (1)	O (n)	O (n)
message ()	O(m+n)	O(m+n)	O (n)	O (n)

- m is the number of accounts in a class.

6. Running Command and Results

6.1.1 Running Commands for ArrayList structure

```
resitaga@resitaga:~/Desktop$ cd HW3
resitaga@resitaga:~/Desktop/HW3$ cd vArrayList/
resitaga@resitaga:~/Desktop/HW3/vArrayList$ javac *.java
resitaga@resitaga:~/Desktop/HW3/vArrayList$ cd ..
resitaga@resitaga:~/Desktop/HW3$ java vArrayList.TestClass1
```

```
resitaga@resitaga:~/Desktop/HW3$ java vArrayList.TestClass2
```

```
resitaga@resitaga:~/Desktop/HW3$ java vArrayList.TestClass3
```

```
resitaga@resitaga:~/Desktop/HW3$ java vArrayList.TestClass4
```

6.1.2 Running Commands for LinkedList structure

```
resitaga@resitaga:~/Desktop$ cd HW3
resitaga@resitaga:~/Desktop/HW3$ cd vLinkedList/
resitaga@resitaga:~/Desktop/HW3/vLinkedList$ javac *.java
resitaga@resitaga:~/Desktop/HW3/vLinkedList$ cd ..
resitaga@resitaga:~/Desktop/HW3$ java vLinkedList.TestClass1
```

```
resitaga@resitaga:~/Desktop/HW3$ java vLinkedList.TestClass2
```

```
resitaga@resitaga:~/Desktop/HW3$ java vLinkedList.TestClass3
```

```
resitaga@resitaga:~/Desktop/HW3$ java vLinkedList.TestClass4
```

6.1.3 Running Commands for LDLinkedList structure

```
resitaga@resitaga:~/Desktop$ cd HW3
resitaga@resitaga:~/Desktop/HW3$ cd vLDLinkedList
resitaga@resitaga:~/Desktop/HW3/vLDLinkedList$ javac *.java
resitaga@resitaga:~/Desktop/HW3/vLDLinkedList$ cd ..
resitaga@resitaga:~/Desktop/HW3$ java vLDLinkedList.TestClass1
```

```
resitaga@resitaga:~/Desktop/HW3$ java vLDLinkedList.TestClass2
```

```
resitaga@resitaga:~/Desktop/HW3$ java vLDLinkedList.TestClass3
```

```
resitaga@resitaga:~/Desktop/HW3$ java vLDLinkedList.TestClass4
```

6.2 Results (Outputs)

6.2.1 Scenario 1 (Same for all the structures)

```
resitaga@resitaga:~/Desktop/HW3$ java vArrayList.TestClass1
-----SCENARIO 1 STARTS-----

Creating accounts...
An account with username gizemsungu has been created.
An account with username sibelgulmez has been created.
An account with username gokhankaya has been created.

Logging into an account (username: sibelgulmez)...
Sharing two posts...
Following gizemsungu and gokhankaya...
Logging out from account 'sibelgulmez'...

Logging into another account (username: gokhankaya)...

Viewing sibelgulmez's profile...
User ID: 2
Username: sibelgulmez
Location: Istanbul
Birth Date: 10.03.1995
sibelgulmez is following 2 account(s) and has 0 follower(s)
sibelgulmez is following: gizemsungu, gokhankaya,
sibelgulmez has 2 post(s).

Viewing sibelgulmez's posts...
(PostID: 1) sibelgulmez: I like Java.
(PostID: 2) sibelgulmez: Java the coffee...
Liking a post of sibelgulmez..
Adding a comment on a post of sibelgulmez...

Following sibelgulmez and gizemsungu...

Sending a message to gizemsungu...
Logging out from account 'gokhankaya'..

Logging into another account (username: gizemsungu) ...
Checking Outbox...
There is/are 0 message(s) in the outbox.

Checking Inbox...
There is/are 1 message(s) in the inbox.

Viewing inbox...
-----
Message ID: 0
To: gizemsungu
From: gokhankaya
Message: This homework is too easy!
-----
```

s)

Viewing sibelgulmez's profile...

User ID: 2

Username: sibelgulmez

Location: Istanbul

Birth Date: 10.03.1995

sibelgulmez is following 2 account(s) and has 1 follower(s)

The followers of sibelgulmez are: gokhankaya, sibelgulmez is following: gizemsungu, gokhankaya, sibelgulmez has 2 post(s).

Viewing sibelgulmez's posts...

(PostID: 1) sibelgulmez: I like Java.

(PostID: 2) sibelgulmez: Java the coffee...

Viewing sibelgulmez's posts' interactions...

(Post ID: 1): I like Java.

The post was liked by the following account(s): gokhankaya,

The post has 1 comment(s)...

Comment 0: 'gokhankaya' said 'me too!'

(Post ID: 2): Java the coffee...

The post has no likes.

The post has no comments.

Liking sibelgulmez's posts...

Viewing sibelgulmez's posts' interactions...

(Post ID: 1): I like Java.

The post was liked by the following account(s): gokhankaya, gizemsungu,

The post has 1 comment(s)...

Comment 0: 'gokhankaya' said 'me too!'

(Post ID: 2): Java the coffee...

The post was liked by the following account(s): gizemsungu,

The post has no comments.

-----SCENARIO 1 ENDS-----

6.2.2 Scenario 2 (Same for all the structures)

```
-----SCENARIO 2 STARTS-----

'gizemsungu' logs in.
Someone is already logged in!

Sharing two posts...
'gizemsungu' logs out.

'sibelgulmez' logs in.

Viewing gizemsungu's profile...
User ID: 1
Username: gizemsungu
Location: Istanbul
Birth Date: 13.01.1993
gizemsungu is following 0 account(s) and has 2 follower(s)
The followers of gizemsungu are: sibelgulmez, gokhankaya,
gizemsungu has 2 post(s).

liking Post1...
You need to view posts before liking a post!
'sibelgulmez' logs out.

'gokhankaya' logs in.

Viewing gizemsungu's profile...
User ID: 1
Username: gizemsungu
Location: Istanbul
Birth Date: 13.01.1993
gizemsungu is following 0 account(s) and has 2 follower(s)
The followers of gizemsungu are: sibelgulmez, gokhankaya,
gizemsungu has 2 post(s).

Commenting on Post2..
Sending a message to 'gizemsungu' .
'gokhankaya' logs out.

'gizemsungu' logs in.
Viewing her own profile...

Viewing gizemsungu's profile...
User ID: 1
Username: gizemsungu
Location: Istanbul
Birth Date: 13.01.1993
gizemsungu is following 0 account(s) and has 2 follower(s)
The followers of gizemsungu are: sibelgulmez, gokhankaya,
gizemsungu has 2 post(s).
```

```
Checking Inbox...
There is/are 2 message(s) in the inbox.

Viewing inbox...
-----
Message ID: 0
To: gizemsungu
From: gokhankaya
Message: This homework is too easy!

Message ID: 1
To: gizemsungu
From: gokhankaya
Message: Hello

-----SCENARIO 2 ENDS-----
```


6.2.3 Scenario 3 (Same for all the structures)

```
-----SCENARIO 3 STARTS-----  
  
'gizemsungu' logs in.  
Someone is already logged in!  
  
Blocking 'sibelgulmez'  
  
'sibelgulmez' logs in.  
'sibelgulmez' tries to view the profile of 'gizemsungu'  
Oops! Looks like you've been blocked by that account! You cannot view the profile!  
  
'sibelgulmez' tries to send a message to 'gizemsungu'  
Oops! Looks like you've been blocked by that account! You cannot message to this account!  
  
-----SCENARIO 3 ENDS-----
```

6.2.4 Scenario 4 (Same for all the structures)

```
-----SCENARIO 4 STARTS-----  
  
Creating accounts...  
aaltan logs in  
Sharing three posts  
Following gizemsungu, sibelgulmez, gokhankaya and ercanogan ...  
  
Sending a message to ercanogan...  
Showing your history actions:  
You followed ercanogan  
You followed gokhankaya  
You followed sibelgulmez  
You followed gizemsungu  
You shared a post (id: 3)  
You shared a post (id: 2)  
You shared a post (id: 1)  
  
Logging out from account 'aaltan'  
  
-----  
Logging into another account (username: ercanogan)  
  
Viewing aaltan's profile...  
User ID: 3  
Username: aaltan  
Location: Eskişehir  
Birth Date: 21.07.2000  
aaltan is following 4 account(s) and has 0 follower(s)  
aaltan is following: gizemsungu, sibelgulmez, gokhankaya, ercanogan,  
aaltan has 3 post(s).  
  
Viewing aaltan's posts...  
(PostID: 1) aaltan: I love OOP.  
(PostID: 2) aaltan: Java the coffee...  
(PostID: 3) aaltan: I like AIs.  
  
Liking a post of aaltan..  
Liking another post of aaltan..  
Adding a comment on a post of aaltan...  
Adding another comment on a post of aaltan...  
Sharing a post  
  
Following sibelgulmez and aaltan..  
Checking Inbox...  
There is/are 1 message(s) in the inbox.
```

There is/are 1 message(s) in the inbox.

Viewing inbox...

Message ID: 0

From: aaltan

To: ercanogan

Message: Hey man, it's been a lot since we met!

Sending a reply message to aaltan...

Unliking a post of aaltan

Unfollowing sibelgulmez...

Blocking aaltan

Trying to send a message to aaltan

To be able to message to this user, try unblocking the user!

Uncommenting a post of aaltan

Unblocking aaltan

Showing your history actions:

You unfollowed sibelgulmez

You followed aaltan

You followed sibelgulmez

You shared a post (id: 1)

You commented on aaltan's post id: 2

You commented on aaltan's post id: 3

You liked aaltan's post id: 2

You liked aaltan's post id: 3

Logging out from account 'ercanogan'

Logging into another account (username: egesoylemmez)

egesoylemmez follows different accounts....

egesoylemmez is viewing his own profile

Viewing egesoylemmez's profile...

User ID: 9

Username: egesoylemmez

Location: Afyon

Birth Date: 15.02.2000

egesoylemmez is following 9 account(s) and has 0 follower(s)

egesoylemmez is following: gizemsungu, sibelgulmez, gokhankaya, aaltan, deniz35, cicekpala, fatmakaya, ercanogan, husnuyasar,

egesoylemmez has 0 post(s).

```
Unfollowing an account...

Viewing egesoylomez's profile...
User ID: 9
Username: egesoylomez
Location: Afyon
Birth Date: 15.02.2000
egesoylomez is following 9 account(s) and has 0 follower(s)
egesoylomez is following: gizemsungu, sibelgulmez, gokhankaya, aaltan, deniz35, cicekpala, fatmakaya, ercanogan, husnuyasar,
egesoylomez has 0 post(s).

Unfollowing another account...

egesoylomez is viewing his own profile

Viewing egesoylomez's profile...
User ID: 9
Username: egesoylomez
Location: Afyon
Birth Date: 15.02.2000
egesoylomez is following 7 account(s) and has 0 follower(s)
egesoylomez is following: gokhankaya, aaltan, deniz35, cicekpala, fatmakaya, ercanogan, husnuyasar,
egesoylomez has 0 post(s).

egesoylomez views ercanogan's profile

Viewing ercanogan's profile...
User ID: 7
Username: ercanogan
Location: Mardin
Birth Date: 31.12.2001
ercanogan is following 2 account(s) and has 2 follower(s)
The followers of ercanogan are: aaltan, egesoylomez, ercanogan is following: sibelgulmez, aaltan,
ercanogan has 1 post(s).

Viewing ercanogan's posts...
(PostID: 1) ercanogan: I love coding!

Viewing ercanogan's posts' interactions...
-----
(Post ID: 1): I love coding!
The post was liked by the following account(s): egesoylomez,
The post has no comments.

-----SCENARIO 4 ENDS-----
```