Gebze Technical University

Department Of Computer Engineering

CSE 222/505 - Spring 2023

Data Structures and Algorithms

Homework #3

Zeynep Çiğdem Parlatan

1901042705

1.PROBLEM SOLUTION APPROACH FOR LDLinkedList

✓ To implement LDlinkedlist, I made extends from AbstractList and implemented the functions I will use. In this part, there is no difference between the normal linkedlist and LDLinkedlist for the add, get, size functions. In the Add function, I iterated to the end and added an element to the end each time. There is a change in the remove function. We are expected to implement the lazy deletion strategy in LDLinkedList. In other words, when we call the remove function for the first time, it will not physically delete it from the list, it will only mark it, when we call the remove function for the second time, it will also mark it and this time, when the number of marked elements reaches two, it will delete these two elements at the same time. For this, I kept a variable called marked in the code and when the remove function was called, I changed the marked variable of the element in that index. I went through the entire linkedlist to see if there are any other marked elements and if there is one more element, that is, if there are 2 marked elements in total, I deleted both.

2.RUNNİG COMMAND AND RESULTS
a) ArrayList
1.TestClass1

```
        CSE222 - HW3
Welcome to Social Media Software

Step 1... 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.

Step 2... Logging into an account (username: sibelgulmez)
  sibelgulmez has logged into account

Step 3... Sharing two post
  sibelgulmez shared two posts.
    (PostId: 1) sibelgulmez: I like Java.
    (PostId: 2) sibelgulmez: Java the coffee...

 ***Control of adding post with not logged in account 'gokhankaya.addPost'
  ! You must be logged in to your account to share a post.

Step 4... Following gizemsungu and gokhankaya
  sibelgulmez followed gizemsungu
  sibelgulmez followed gokhankaya

 ***Control of another account in follow function 'gizemsungu.follow(sibelgulmez)'
  Before you can follow an account, you must log in to your account.

Step 5... Logging out from account 'sibelgulmez'
  sibelgulmez logged out of account

 ***Control of loggin out with not logged in account 'gizemsungu.logout'
  ! You are not already logged into your account

Step 6... Logging into another account (username: gokhankaya)
  gokhankaya has logged into account
```

```
Step 7... Viewing sibelgulmez's profile
  ----------------------------------------------------------
  UserId: 2
  Username: sibelgulmez
  Location: Istanbul
  Birthdate: 10.03.1995
  sibelgulmez is following 2 account(s) and has 0 follower(s).
  sibelgulmez is following: gizemsungu, gokhankaya.
  sibelgulmez has 2 posts.
  ----------------------------------------------------------

Step 8... Viewing sibelgulmez's posts
    (PostId: 1) sibelgulmez: I like Java.
    (PostId: 2) sibelgulmez: Java the coffee...

 ***Control of viewing posts with not view profile in account 'gokhankaya.viewPost(gizemsungu)'
  ! To view the posts, you must first view the user's profile

Step 9... Liking a post of sibelgulmez
  gokhankaya liked post1 of sibelgulmez

 ***Control of liking post which does not exist 'post4 of sibelgulmez'
  ! There is no such post

Step 10... Adding a comment on a post of sibelgulmez
  gokhankaya wrote a comment for post1 of sibelgulmez

Step 11... Following sibelgulmez and gizemsungu
  gokhankaya followed sibelgulmez
  gokhankaya followed gizemsungu

Step 12... Sending a message to gizemsungu
  gokhankaya sent message to gizemsungu
```

```
Step 13: Logging out from account 'gokhankaya'
  gokhankaya logged out of account

Step 14... Logging into another account (username: gizemsungu)
  gizemsungu has logged into account

Step 15... Checking number of messages in outbox
  There is/are 0 message(s) in outbox.

Step 16... Checking number of messages in inbox
  There is/are 1 message(s) in inbox.

Step 17... Viewing inbox
  ------------------------------------
  Message Id: 1
  From: gokhankaya
  To: gizemsungu
  Message: This homework is too easy!
  ------------------------------------

Step 18... Viewing sibelgulmez's profile
  ----------------------------------------------------------
  UserId: 2
  Username: sibelgulmez
  Location: Istanbul
  Birthdate: 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 posts.
  ----------------------------------------------------------

Step19... Viewing sibelgulmez's posts
  (PostId: 1) sibelgulmez: I like Java.
  (PostId: 2) sibelgulmez: Java the coffee...

Step 20... Viewing sibelgulmez's posts' interactions
  ----------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): gokhankaya,
  The post has 1 comment(s)...
      Comment 1 : 'gokhankaya' said 'me too!'
  ----------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post has no likes.
  The post has no comment.
  ----------------------------------------------------------------

Step 21... Liking sibelgulmez's posts
  gizemsungu liked post1 of sibelgulmez
  gizemsungu liked post2 of sibelgulmez

Step22... Viewing sibelgulmez's posts' interactions
  ----------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): gokhankaya, gizemsungu,
  The post has 1 comment(s)...
      Comment 1 : 'gokhankaya' said 'me too!'
  ----------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post was like by the following account(s): gizemsungu,
  The post has no comment.
  ----------------------------------------------------------------
```

2.TestClass2

```
Step 20... Viewing sibelgulmez's posts' interactions
   --------------------------------------------------------
   (PostId: 1) sibelgulmez: I like Java.
   The post was like by the following account(s): gokhankaya,
   The post has 1 comment(s)...
      Comment 1 : 'gokhankaya' said 'me too!'
   --------------------------------------------------------
   (PostId: 2) sibelgulmez: Java the coffee...
   The post has no likes.
   The post has no comment.
   --------------------------------------------------------

Step 21... Liking sibelgulmez's posts
   gizemsungu liked post1 of sibelgulmez
   gizemsungu liked post2 of sibelgulmez

Step 22... Viewing sibelgulmez's posts' interactions
   --------------------------------------------------------
   (PostId: 1) sibelgulmez: I like Java.
   The post was like by the following account(s): gokhankaya, gizemsungu,
   The post has 1 comment(s)...
      Comment 1 : 'gokhankaya' said 'me too!'
   --------------------------------------------------------
   (PostId: 2) sibelgulmez: Java the coffee...
   The post was like by the following account(s): gizemsungu,
   The post has no comment.
   --------------------------------------------------------

============================End of the actions in the test scenario 1==============================
```

```
============================End of the actions in the test scenario 1==============================

=======================================Test Scenario 2=============================================

Step 1... Logging into an account (username: gizemsungu)
   ! You are already logged into your account.

Step 2... Share a post
      (PostId: 1) gizemsungu: Life is good!

Step 3... Share another post
      (PostId: 2) gizemsungu: Java is the best

Step 4... Logging out from account 'gizemsungu'
   gizemsungu logged out of account

Step 5... Logging into an account (username: sibelgulmez
   sibelgulmez has logged into account

Step 6... Viewing gizemsungu's profile
   --------------------------------------------------------------
   UserId: 1
   Username: gizemsungu
   Location: Ankara
   Birthdate: 13.01.1993
   gizemsungu is following 0 account(s) and has 2 follower(s).
   The followers of gizemsungu are: sibelgulmez, gokhankaya.
   gizemsungu has 2 posts.
   --------------------------------------------------------------

Step 7... Liking a post of gizemsungu
   sibelgulmez liked post1 of gizemsungu

Step 8... Logging out from account 'sibelgulmez'
   sibelgulmez logged out of account
```

```
Step 9... Logging into an account (username: gokhankaya
  gokhankaya has logged into account

Step 10... Viewing gizemsungu's profile
  ---------------------------------------------------------------
  UserId: 1
  Username: gizemsungu
  Location: Ankara
  Birthdate: 13.01.1993
  gizemsungu is following 0 account(s) and has 2 follower(s).
  The followers of gizemsungu are: sibelgulmez, gokhankaya.
  gizemsungu has 2 posts.
  ---------------------------------------------------------------

Step 11... Adding a comment on a post of gizemsungu
  gokhankaya wrote a comment for post2 of gizemsungu

Step 12... Sending a message to gizemsungu
  gokhankaya sent message to gizemsungu

Step 13... Logging out from account 'gokhankaya'
  gokhankaya logged out of account

Step 14... Logging into an account (username: gizemsungu
  gizemsungu has logged into account

Step 15... Viewing gizemsungu's profile
  ---------------------------------------------------------------
  UserId: 1
  Username: gizemsungu
  Location: Ankara
  Birthdate: 13.01.1993
  gizemsungu is following 0 account(s) and has 2 follower(s).
  The followers of gizemsungu are: sibelgulmez, gokhankaya.
  gizemsungu has 2 posts.
  ---------------------------------------------------------------
```

```
Step 16... Reading the message from 'gokhankaya'
  ------------------------------------------
  Message Id: 1
  From: gokhankaya
  To: gizemsungu
  Message: This homework is too easy!
  ------------------------------------------
  ------------------------------------------
  Message Id: 2
  From: gokhankaya
  To: gizemsungu
  Message: Hello!
  ------------------------------------------
```

   3.TestClass3

```
Step 21... Liking sibelgulmez's posts
   gizemsungu liked post1 of sibelgulmez
   gizemsungu liked post2 of sibelgulmez

Step22... Viewing sibelgulmez's posts' interactions
   -----------------------------------------------------------------
   (PostId: 1) sibelgulmez: I like Java.
   The post was like by the following account(s): gokhankaya, gizemsungu,
   The post has 1 comment(s)...
      Comment 1 : 'gokhankaya' said 'me too!'
   -----------------------------------------------------------------
   (PostId: 2) sibelgulmez: Java the coffee...
   The post was like by the following account(s): gizemsungu,
   The post has no comment.
   -----------------------------------------------------------------

===========================End of the actions in the test scenario 1===========================

===================================Test Scenario 3=============================================

Step 1... Logging into an account (username: gizemsungu)
  ! You are already logged into your account.
```

```
========================================Test Scenario 3========================================

Step 1... Logging into an account (username: gizemsungu)
  ! You are already logged into your account.

Step2... Blocking to the account of sibelgulmez
  ------------------------------------------------------------
  UserId: 2
  Username: sibelgulmez
  Location: Istanbul
  Birthdate: 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 posts.
  ------------------------------------------------------------
  gizemsungu blocked sibelgulmez

Step 3... Logging out from account 'gizemsungu'
  gizemsungu logged out of account

Step 4... Logging into an account (username: sibelgulmez)
  sibelgulmez has logged into account

Step 5... Viewing gizemsungu's profile
  ! You have been blocked by gizemsungu

Step 6... Sending a message to gizemsungu
  ! You have been blocked by gizemsungu
```

4.TestClass4

```
|       CSE222 - HW3
Welcome to Social Media Software

Step 1... 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.
  An account with username defnekara has been created.
  An account with username alibatmaz has been created.
  An account with username ozanbudak has been created.
  An account with username mervedalan has been created.
  An account with username arasdevin has been created.
  An account with username cansuelzem has been created.
  An account with username umutmumcu has been created.

Step 2... Logging into an account (username: sibelgulmez)
  sibelgulmez has logged into account

Step 3... Sharing two post
  sibelgulmez shared two posts.
    (PostId: 1) sibelgulmez: I like Java.
    (PostId: 2) sibelgulmez: Java the coffee...

Step 4... Following other accounts
  sibelgulmez followed gizemsungu
  sibelgulmez followed gokhankaya
  sibelgulmez followed umutmumcu
  sibelgulmez followed mervedalan
  sibelgulmez followed cansuelzem

Step 5... Logging out from account 'sibelgulmez'
  sibelgulmez logged out of account

Step 6... Logging into an account (username: cansuelzem)
  cansuelzem has logged into account
```

```
Step 7... Following other accounts
  cansuelzem followed sibelgulmez
  cansuelzem followed defnekara
  cansuelzem followed ozanbudak

Step 8... Adding a comment on a post of sibelgulmez
  cansuelzem wrote a comment for post1 of sibelgulmez

Step 9... Viewing own profile
  ----------------------------------------------------------
  UserId: 9
  Username: cansuelzem
  Location: Antalya
  Birthdate: 04.10.1990
  cansuelzem is following 3 account(s) and has 1 follower(s).
  The followers of cansuelzem are: sibelgulmez.
  cansuelzem is following: sibelgulmez, defnekara, ozanbudak.
  cansuelzem has 0 posts.
  ----------------------------------------------------------

Step 10... Showing own history
  -------------Your action history-------------
  You followed sibelgulmez
  You followed defnekara
  You followed ozanbudak
  You commented sibelgulmez' post id: 1
  -------------------------------------------

Step 11... Unfollow accounts ozanbudak and sibelgulmez
  cansuelzem unfollow this account ozanbudak
  cansuelzem unfollow this account sibelgulmez
```

```
Step 12... Viewing own profile
  ----------------------------------------------------------
  UserId: 9
  Username: cansuelzem
  Location: Antalya
  Birthdate: 04.10.1990
  cansuelzem is following 1 account(s) and has 1 follower(s).
  The followers of cansuelzem are: sibelgulmez.
  cansuelzem is following: defnekara.
  cansuelzem has 0 posts.
  ----------------------------------------------------------

Step 13... Showing own history
  -------------Your action history-------------
  You followed sibelgulmez
  You followed defnekara
  You followed ozanbudak
  You commented sibelgulmez' post id: 1
  You unfollowed ozanbudak
  You unfollowed sibelgulmez
  -------------------------------------------

Step 14... Logging out from account 'cansuelzem'
  cansuelzem logged out of account

Step 15... Logging into an account (username: arasdevin)
  arasdevin has logged into account

Step 16... Following other accounts
  arasdevin followed sibelgulmez
  arasdevin followed ozanbudak
  arasdevin followed gokhankaya
  arasdevin followed mervedalan
```

```
Step 17... Liking a post of sibelgulmez
  arasdevin liked post1 of sibelgulmez

Step 18... Adding a comments on a post of sibelgulmez
  arasdevin wrote a comment for post1 of sibelgulmez
  arasdevin wrote a comment for post1 of sibelgulmez

Step 19... Viewing own profile
  -----------------------------------------------------------
  UserId: 8
  Username: arasdevin
  Location: Mersin
  Birthdate: 23.09.1994
  arasdevin is following 4 account(s) and has 0 follower(s).
  arasdevin is following: sibelgulmez, ozanbudak, gokhankaya, mervedalan.
  arasdevin has 0 posts.
  -----------------------------------------------------------

Step 20... Showing own history
  -------------Your action history-------------
  You followed sibelgulmez
  You followed ozanbudak
  You followed gokhankaya
  You followed mervedalan
  You liked sibelgulmez' post id : 1
  You commented sibelgulmez' post id: 1
  You commented sibelgulmez' post id: 1
  ---------------------------------------------
```

```
Step 21... Viewing post interactions of sibelgulmez
  ----------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): arasdevin,
  The post has 3 comment(s)...
     Comment 1 : 'cansuelzem' said 'Helloo'
     Comment 2 : 'arasdevin' said 'I don't like Java'
     Comment 3 : 'arasdevin' said 'But I like C'
  ----------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post has no likes.
  The post has no comment.
  ----------------------------------------------------------------

Step 22... Uncommenting to second comment of sibelgulmez's post 1
  arasdevin remove a comment for post1 of sibelgulmez

Step 23... Viewing post interactions of sibelgulmez
  ----------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): arasdevin,
  The post has 2 comment(s)...
     Comment 1 : 'cansuelzem' said 'Helloo'
     Comment 2 : 'arasdevin' said 'I don't like Java'
  ----------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post has no likes.
  The post has no comment.
  ----------------------------------------------------------------

Step 24... Unfollow account mervedalan
  arasdevin unfollow this account mervedalan
```

```
Step 25... Showing own history
   ------------Your action history------------
   You followed sibelgulmez
   You followed ozanbudak
   You followed gokhankaya
   You followed mervedalan
   You liked sibelgulmez' post id : 1
   You commented sibelgulmez' post id: 1
   You commented sibelgulmez' post id: 1
   You uncommented sibelgulmez' post id: 1
   You unfollowed mervedalan
   -------------------------------------------

Step 26... Logging out from account 'arasdevin'
   arasdevin logged out of account

Step 27... alibatmaz login and liking of sibelgulmez post 2
   alibatmaz has logged into account
   alibatmaz followed sibelgulmez
   alibatmaz liked post2 of sibelgulmez

Step 28... Viewing post interactions of sibelgulmez
   ----------------------------------------------------------------
   (PostId: 1) sibelgulmez: I like Java.
   The post was like by the following account(s): arasdevin,
   The post has 2 comment(s)...
      Comment 1 : 'cansuelzem' said 'Helloo'
      Comment 2 : 'arasdevin' said 'I don't like Java'
   ----------------------------------------------------------------
   (PostId: 2) sibelgulmez: Java the coffee...
   The post was like by the following account(s): alibatmaz,
   The post has no comment.
   ----------------------------------------------------------------

Step 29... alibatmaz unlike sibelgulmez's post id 2 and view post interactions
   alibatmaz unliked post2 of sibelgulmez
   ----------------------------------------------------------------
```

```
   (PostId: 1) sibelgulmez: I like Java.
   The post was like by the following account(s): arasdevin,
   The post has 2 comment(s)...
      Comment 1 : 'cansuelzem' said 'Helloo'
      Comment 2 : 'arasdevin' said 'I don't like Java'
   ----------------------------------------------------------------
   (PostId: 2) sibelgulmez: Java the coffee...
   The post has no likes.
   The post has no comment.
   ----------------------------------------------------------------
   alibatmaz logged out of account

Step 30... Loggin into an account 'umutmumcu'
   umutmumcu has logged into account

Step 31... Sharing two posts
   umutmumcu shared two posts.
      (PostId: 1) umutmumcu: I want a holidayy.
      (PostId: 2) umutmumcu: I don't want to work any more...

Step 32... Following other accounts
   umutmumcu followed gokhankaya
   umutmumcu followed ozanbudak
   umutmumcu followed mervedalan
   umutmumcu followed defnekara

Step 33... Logging out from account 'umutmumcu'
   umutmumcu logged out of account

Step 34... gizemsungu login and like umutmumcu's post id 1
   gizemsungu has logged into account
   gizemsungu liked post1 of umutmumcu
   gizemsungu logged out of account
```

```
Step 35... defnekara login and like, comment umutmumcu's post id 1
  defnekara has logged into account
  defnekara followed umutmumcu
  defnekara liked post1 of umutmumcu
  defnekara wrote a comment for post1 of umutmumcu
  defnekara logged out of account

Step 36... gokhankaya login and like umutmumcu's post id 1
  gokhankaya has logged into account
  gokhankaya liked post1 of umutmumcu

Step 37... gokhankaya viewing post interaction of umutmumcu
  ----------------------------------------------------------------
  (PostId: 1) umutmumcu: I want a holidayy.
  The post was like by the following account(s): gizemsungu, defnekara, gokhankaya,
  The post has 1 comment(s)...
    Comment 1 : 'defnekara' said 'Me too'
  ----------------------------------------------------------------
  (PostId: 2) umutmumcu: I don't want to work any more...
  The post has no likes.
  The post has no comment.
  ----------------------------------------------------------------

Step 38... gokhankaya unlike umutmumcu's post id 1
  gokhankaya unliked post1 of umutmumcu

Step 39... gokhankaya viewing post interaction of umutmumcu
  ----------------------------------------------------------------
  (PostId: 1) umutmumcu: I want a holidayy.
  The post was like by the following account(s): gizemsungu, defnekara,
  The post has 1 comment(s)...
    Comment 1 : 'defnekara' said 'Me too'
  ----------------------------------------------------------------
  (PostId: 2) umutmumcu: I don't want to work any more...
  The post has no likes.
  The post has no comment.
  ----------------------------------------------------------------
```

```
Step 40... umutmumcu login, view own profile and block defnekara
  umutmumcu has logged into account
  ----------------------------------------------------------------
  UserId: 10
  Username: umutmumcu
  Location: Ankara
  Birthdate: 08.12.1991
  umutmumcu is following 4 account(s) and has 2 follower(s).
  The followers of umutmumcu are: sibelgulmez, defnekara.
  umutmumcu is following: gokhankaya, ozanbudak, mervedalan, defnekara.
  umutmumcu has 2 posts.
  ----------------------------------------------------------------
  ----------------------------------------------------------------
  UserId: 4
  Username: defnekara
  Location: Ankara
  Birthdate: 15.08.1994
  defnekara is following 1 account(s) and has 2 follower(s).
  The followers of defnekara are: cansuelzem, umutmumcu.
  defnekara is following: umutmumcu.
  defnekara has 0 posts.
  ----------------------------------------------------------------
  umutmumcu blocked defnekara

Step 41... umutmumcu view own profile and posts interactions
  ----------------------------------------------------------------
  UserId: 10
  Username: umutmumcu
  Location: Ankara
  Birthdate: 08.12.1991
  umutmumcu is following 3 account(s) and has 1 follower(s).
  The followers of umutmumcu are: sibelgulmez.
  umutmumcu is following: gokhankaya, ozanbudak, mervedalan.
  umutmumcu has 2 posts.
  ----------------------------------------------------------------
```

```
   ----------------------------------------------------------
   (PostId: 1) umutmumcu: I want a holidayy.
   The post was like by the following account(s): gizemsungu,
   The post has no comment.
   ----------------------------------------------------------
   (PostId: 2) umutmumcu: I don't want to work any more...
   The post has no likes.
   The post has no comment.
   ----------------------------------------------------------
   umutmumcu logged out of account

Step 42... defnekara try viewing profile umutmumcu
   defnekara has logged into account
   ! You have been blocked by umutmumcu
   defnekara logged out of account

Step 43... umutmumcu enter defnekara profile and unblocked of defnekara
   umutmumcu has logged into account
   ----------------------------------------------------------
   UserId: 4
   Username: defnekara
   Location: Ankara
   Birthdate: 15.08.1994
   defnekara is following 0 account(s) and has 1 follower(s).
   The followers of defnekara are: cansuelzem.
   defnekara has 0 posts.
   ----------------------------------------------------------
   You are unblocked of defnekara
```

```
Step 44... umutmumcu show own history
   -------------Your action history-------------
   You added post (postId: 1)
   You added post (postId: 2)
   You followed gokhankaya
   You followed ozanbudak
   You followed mervedalan
   You followed defnekara
   You blocked defnekara
   You unblocked defnekara
   ----------------------------------------------
   umutmumcu logged out of account

Step 45... defnekara login, view own profile and try view umutmumcu profile
   defnekara has logged into account
   ----------------------------------------------------------
   UserId: 4
   Username: defnekara
   Location: Ankara
   Birthdate: 15.08.1994
   defnekara is following 0 account(s) and has 1 follower(s).
   The followers of defnekara are: cansuelzem.
   defnekara has 0 posts.
   ----------------------------------------------------------
   ----------------------------------------------------------
   UserId: 10
   Username: umutmumcu
   Location: Ankara
   Birthdate: 08.12.1991
   umutmumcu is following 3 account(s) and has 1 follower(s).
   The followers of umutmumcu are: sibelgulmez.
   umutmumcu is following: gokhankaya, ozanbudak, mervedalan.
   umutmumcu has 2 posts.
   ----------------------------------------------------------
   defnekara logged out of account
```

```
Step 46... arasdevin login and comments of sibelgulmez post 1
  arasdevin has logged into account
  arasdevin wrote a comment for post1 of sibelgulmez
  arasdevin wrote a comment for post1 of sibelgulmez
  arasdevin wrote a comment for post1 of sibelgulmez
  -----------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): arasdevin,
  The post has 5 comment(s)...
     Comment 1 : 'cansuelzem' said 'Helloo'
     Comment 2 : 'arasdevin' said 'I don't like Java'
     Comment 3 : 'arasdevin' said 'Hi'
     Comment 4 : 'arasdevin' said 'I don't'
     Comment 5 : 'arasdevin' said 'Yeap'
  -----------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post has no likes.
  The post has no comment.
  -----------------------------------------------------------------
  arasdevin remove a comment for post1 of sibelgulmez
  arasdevin remove a comment for post1 of sibelgulmez
  -----------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): arasdevin,
  The post has 3 comment(s)...
     Comment 1 : 'cansuelzem' said 'Helloo'
     Comment 2 : 'arasdevin' said 'I don't like Java'
     Comment 3 : 'arasdevin' said 'I don't'
  -----------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post has no likes.
  The post has no comment.
  -----------------------------------------------------------------
  arasdevin logged out of account
```

```
Step 47... alibatmaz login, follow and unfollow accounts
  alibatmaz has logged into account
  alibatmaz followed ozanbudak
  alibatmaz followed cansuelzem
  alibatmaz followed defnekara
  -----------------------------------------------------------------
  UserId: 5
  Username: alibatmaz
  Location: Edirne
  Birthdate: 12.04.1889
  alibatmaz is following 4 account(s) and has 0 follower(s).
  alibatmaz is following: sibelgulmez, ozanbudak, cansuelzem, defnekara.
  alibatmaz has 0 posts.
  -----------------------------------------------------------------
  alibatmaz unfollow this account ozanbudak
  -----------------------------------------------------------------
  UserId: 5
  Username: alibatmaz
  Location: Edirne
  Birthdate: 12.04.1889
  alibatmaz is following 3 account(s) and has 0 follower(s).
  alibatmaz is following: sibelgulmez, cansuelzem, defnekara.
  alibatmaz has 0 posts.
  -----------------------------------------------------------------
  alibatmaz unfollow this account cansuelzem
  -----------------------------------------------------------------
  UserId: 5
  Username: alibatmaz
  Location: Edirne
  Birthdate: 12.04.1889
  alibatmaz is following 2 account(s) and has 0 follower(s).
  alibatmaz is following: sibelgulmez, defnekara.
  alibatmaz has 0 posts.
  -----------------------------------------------------------------
```

b) LinkedList

1.TestClass1

```
Step19... Viewing sibelgulmez's posts
  (PostId: 1) sibelgulmez: I like Java.
  (PostId: 2) sibelgulmez: Java the coffee...

Step 20... Viewing sibelgulmez's posts' interactions
  ------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): gokhankaya,
  The post has 1 comment(s)...
     Comment 1 : 'gokhankaya' said 'me too!'
  ------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post has no likes.
  The post has no comment.
  ------------------------------------------------------------

Step 21... Liking sibelgulmez's posts
  gizemsungu liked post1 of sibelgulmez
  gizemsungu liked post2 of sibelgulmez

Step22... Viewing sibelgulmez's posts' interactions
  ------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): gokhankaya, gizemsungu,
  The post has 1 comment(s)...
     Comment 1 : 'gokhankaya' said 'me too!'
  ------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post was like by the following account(s): gizemsungu,
  The post has no comment.
  ------------------------------------------------------------
```

2.TestClass2

```
Step 12... Sending a message to gizemsungu
  gokhankaya sent message to gizemsungu

Step 13... Logging out from account 'gokhankaya'
  gokhankaya logged out of account

Step 14... Logging into an account (username: gizemsungu
  gizemsungu has logged into account

Step 15... Viewing gizemsungu's profile
  ------------------------------------------------------------
  UserId: 1
  Username: gizemsungu
  Location: Ankara
  Birthdate: 13.01.1993
  gizemsungu is following 0 account(s) and has 2 follower(s).
  The followers of gizemsungu are: sibelgulmez, gokhankaya.
  gizemsungu has 2 posts.
  ------------------------------------------------------------

Step 16... Reading the message from 'gokhankaya'
  -----------------------------------
  Message Id: 1
  From: gokhankaya
  To: gizemsungu
  Message: This homework is too easy!
  -----------------------------------
  -----------------------------------
  Message Id: 2
  From: gokhankaya
  To: gizemsungu
  Message: Hello!
  -----------------------------------
```

3.TestClass3

```
=====================================Test Scenario 3=====================================

Step 1... Logging into an account (username: gizemsungu)
  ! You are already logged into your account.

Step2... Blocking to the account of sibelgulmez
  ------------------------------------------------------------
  UserId: 2
  Username: sibelgulmez
  Location: Istanbul
  Birthdate: 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 posts.
  ------------------------------------------------------------
  gizemsungu blocked sibelgulmez

Step 3... Logging out from account 'gizemsungu'
  gizemsungu logged out of account

Step 4... Logging into an account (username: sibelgulmez)
  sibelgulmez has logged into account

Step 5... Viewing gizemsungu's profile
  ! You have been blocked by gizemsungu

Step 6... Sending a message to gizemsungu
  ! You have been blocked by gizemsungu
```

4.TestClass4

```
Step 7... Following other accounts
  cansuelzem followed sibelgulmez
  cansuelzem followed defnekara
  cansuelzem followed ozanbudak

Step 8... Adding a comment on a post of sibelgulmez
  cansuelzem wrote a comment for post1 of sibelgulmez

Step 9... Viewing own profile
  ------------------------------------------------------------
  UserId: 9
  Username: cansuelzem
  Location: Antalya
  Birthdate: 04.10.1990
  cansuelzem is following 3 account(s) and has 1 follower(s).
  The followers of cansuelzem are: sibelgulmez.
  cansuelzem is following: sibelgulmez, defnekara, ozanbudak.
  cansuelzem has 0 posts.
  ------------------------------------------------------------

Step 10... Showing own history
  ------------Your action history-------------
  You followed sibelgulmez
  You followed defnekara
  You followed ozanbudak
  You commented sibelgulmez' post id: 1
  --------------------------------------------
```

C) LDLinkedList

1.TestClass1

```
Step19... Viewing sibelgulmez's posts
  (PostId: 1) sibelgulmez: I like Java.
  (PostId: 2) sibelgulmez: Java the coffee...

Step 20... Viewing sibelgulmez's posts' interactions
  ----------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): gokhankaya,
  The post has 1 comment(s)...
      Comment 1 : 'gokhankaya' said 'me too!'
  ----------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post has no likes.
  The post has no comment.
  ----------------------------------------------------------------

Step 21... Liking sibelgulmez's posts
  gizemsungu liked post1 of sibelgulmez
  gizemsungu liked post2 of sibelgulmez

Step22... Viewing sibelgulmez's posts' interactions
  ----------------------------------------------------------------
  (PostId: 1) sibelgulmez: I like Java.
  The post was like by the following account(s): gokhankaya, gizemsungu,
  The post has 1 comment(s)...
      Comment 1 : 'gokhankaya' said 'me too!'
  ----------------------------------------------------------------
  (PostId: 2) sibelgulmez: Java the coffee...
  The post was like by the following account(s): gizemsungu,
  The post has no comment.
  ----------------------------------------------------------------
```

2.TestClass2

```
Step 13... Logging out from account 'gokhankaya'
  gokhankaya logged out of account

Step 14... Logging into an account (username: gizemsungu
  gizemsungu has logged into account

Step 15... Viewing gizemsungu's profile
  ----------------------------------------------------------------
  UserId: 1
  Username: gizemsungu
  Location: Ankara
  Birthdate: 13.01.1993
  gizemsungu is following 0 account(s) and has 2 follower(s).
  The followers of gizemsungu are: sibelgulmez, gokhankaya.
  gizemsungu has 2 posts.
  ----------------------------------------------------------------

Step 16... Reading the message from 'gokhankaya'
  ------------------------------------
  Message Id: 1
  From: gokhankaya
  To: gizemsungu
  Message: This homework is too easy!
  ------------------------------------
  ------------------------------------
  Message Id: 2
  From: gokhankaya
  To: gizemsungu
  Message: Hello!
  ------------------------------------
```

3.TestClass3

```
=====================================Test Scenario 3=========================================

Step 1... Logging into an account (username: gizemsungu)
  ! You are already logged into your account.

Step2... Blocking to the account of sibelgulmez
  ------------------------------------------------------------
  UserId: 2
  Username: sibelgulmez
  Location: Istanbul
  Birthdate: 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 posts.
  ------------------------------------------------------------
  gizemsungu blocked sibelgulmez

Step 3... Logging out from account 'gizemsungu'
  gizemsungu logged out of account

Step 4... Logging into an account (username: sibelgulmez)
  sibelgulmez has logged into account

Step 5... Viewing gizemsungu's profile
  ! You have been blocked by gizemsungu

Step 6... Sending a message to gizemsungu
  ! You have been blocked by gizemsungu
```

4.TestClass4

```
Step 47... alibatmaz login, follow and unfollow accounts
  alibatmaz has logged into account
  alibatmaz followed ozanbudak
  alibatmaz followed cansuelzem
  alibatmaz followed defnekara
  ------------------------------------------------------------
  UserId: 5
  Username: alibatmaz
  Location: Edirne
  Birthdate: 12.04.1889
  alibatmaz is following 4 account(s) and has 0 follower(s).
  alibatmaz is following: sibelgulmez, ozanbudak, cansuelzem, defnekara.
  alibatmaz has 0 posts.
  ------------------------------------------------------------
  alibatmaz unfollow this account ozanbudak
  Lazy deletion size: 4
  ------------------------------------------------------------
  UserId: 5
  Username: alibatmaz
  Location: Edirne
  Birthdate: 12.04.1889
  alibatmaz is following 3 account(s) and has 0 follower(s).
  alibatmaz is following: sibelgulmez, cansuelzem, defnekara.
  alibatmaz has 0 posts.
  ------------------------------------------------------------
  alibatmaz unfollow this account cansuelzem
  Lazy deletion size: 2
  ------------------------------------------------------------
  UserId: 5
  Username: alibatmaz
  Location: Edirne
  Birthdate: 12.04.1889
  alibatmaz is following 2 account(s) and has 0 follower(s).
  alibatmaz is following: sibelgulmez, defnekara.
  alibatmaz has 0 posts.
  ------------------------------------------------------------
```

3.Time Complexities

Implementation Type	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Basic Array Structure (HW1)	0.016	0.012	0.011	-
Array List Structure (a)	0.010	0.013	0.012	0.018
Linked List Structure (b)	0.025	0.029	0.026	0.028
LD Linked List Structure (c)	0.028	0.028	0.022	0.035

✓ Let's take a look at the time complexity analysis in the functions that I used for the ArrayList;
   1.Add(E e) = Adding the specified elements to end of the list ist O(1) time complexity. I used this in the functions I added, such as follow addPost.
   2.Get(int index) = I used for returning element at the specified position and this time complexity of O(1).
   3.Remove(int index)= I used for deleting the element at the specified position and this time complexity is O(n).
   4.Remove(Obj o) = I used for deleting specified element and it's time complexity is O(n)
   5.Size() = I used for returning the number of element in the list and it's time complexity is O(1)

✓ Now take a look at the time complexity analysis in the functions that I used fort he linkedlist;
   1.Add(E e) = Time complexity is O(1)
   2.Get(int index) = Time complexity is O(n)
   3.Remove(int index) = Time complexity is O(n)
   4.Remove(Obj O) = Time complexity is O(n)
   5.Size() = O(1)

Since I made all the additions to the end, the time complexity is the same for the arraylist and the linkedlist. The time complexity of the arraylist will be higher when insertion or subtraction is performed. But I only used it to add to the end.
   Let's take a look at the functions I wrote and use these functions;

Function	ArrayList	LinkedList	LDLinkedlist	Comment
addPost(int postId, String content)	O(1)	O(n)	O(n)	Since I added it to the end in the arraylist, the time complexity is O(1), the get method is O(1) . But in linkedlist the get method has a time complexity of O(n), which makes the total time complexity of the function is O(n).

follow(Account act)	O(n)	O(n^2)	O(n^2)	In the follow function, I used add and get function. For the linkedlist, I call get function in the loop n times, so time complexity is O(n^2)
unfollow(Account act)	O(n)	O(n^2)	O(n^3)	For LDLinkedList, I do lazy deletion with more loop and iteration, so it's time complexity is biggerthan others.
viewProfile(Account act)	O(n)	O(n^2)	O(n^2)	Because of get function in linkedlist
ViewPost(Account act)	O(n)	O(n^2)	O(n^2)	Because of get function in linkedlist
Like(int interactionId,Account act, int postId)	O(1)	O(n)	O(n)	Because of get function in linkedlist
Unlike(int interactionId,Account act, int postId)	O(n)	O(n^2)	O(n^2)	Because of get function in linkedlist
viewInteraction(Account act)	O(n^2)	O(n^3)	O(n^3)	Because of get function in linkedlist
Block(Account act)	O(n^2)	O(n^3)	O(n^3)	

In summary, since I always add it to the end of the list in the functions I add in, the arraylist has the same time complexity in the linkedlist, but when I try to access the element with get(), the time complexity of the linkedlist is higher. This results in greater time complexity in functions.