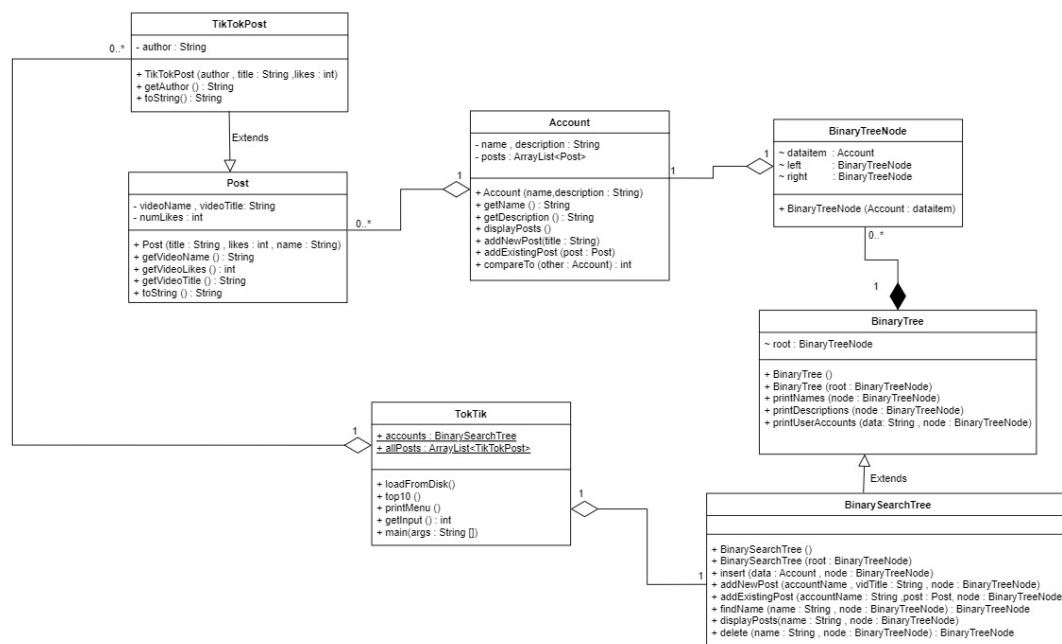## Object Oriented Programming Design

I created a **BinaryTreeNode** class which is an implementation of a binary tree node, it stores a dataitem of type Account and has a left child and right child (these are the attributes of this class). Every instance of this class creates an instance of the Account class as a component of this class. (composition)

I created the **Account** class to store details regarding a user account such as the username of the account, the description of the account as well as all the posts posted by this user. These are stored in the 3 attributes of this class which are name(String), description(String) and posts (ArrayList of Post objects). This class is a component of the BinaryTreeNode class hence they have a composition relationship.

I created the **Post** class so that it can store details regarding the post a user posted such as the number of likes of a video, the name of the video as well as the title of the video. These 3 are stored in the attributes of the Post class which are videoName (String), videoTitle (String) and numLikes (int).

I created the **TikTokPost** class which is a child class of the Post parent class, I created this class to store details regarding a post a user posted the same way as the Post class but what it does differently is also store the name of the author of the post. It stores this extra attribute in author (String), every instance of this class creates an instance of the parent Post class first(interaction).

I created a **BinaryTree** and a **BinarySearchTree** class, these two classes have an inheritance relationship as the BST class inherits from the BT class. The creation of the BinarySearchTree class was for the purpose of storing nodes that contain a dataitem of type Account which I would retrieve in the huge dataset. A BinarySearchTree is most suitable for storing these accounts because the dataset has thousands of accounts and I can store these easily and perform operations on the accounts in a quicker time complexity (a worst case of O(n)). An instance of this BST class requires the creation of an instance of a BinaryTree class as a parent. (interaction) This class also is composed of instances of the BinaryTreeNode class hence they have a composition relationship and every instance of this class creates an instance of the BinaryTreeNode class.

Lastly I created the **TokTik** class for the purpose of running the main method which presents a user with a list of options (menu) whose items correspond to functions and operations performed by this class. It has 2 static variables which store a BinarySearchTree as well as an ArrayList of posts. The BST variable is populated by a loadFromDisk () method which reads a dataset. Every instance of this TokTik class may lead to the creation of an instance of the BinarySearchTree class hence they have an aggregation relationship(interaction).

Testing

Trial 1

Aim: To show that finding the description for a given account function works.

Input set: **1, 9, 1, Greedo8, 1, Zuckuss9,1, Brakiss7,1, MrHusseinIsNotInDataSet,#,H,1, Greedo7**

Output:

```
lutho@lutho-VirtualBox:~/Assignment4$ make run
java -cp bin TokTik
Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 1

Load actions from disk first.

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 9

Actions loaded from disk succesfully!

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 1

Enter account name: Greedo8
The profile description is: Kishinev drip's transcendentally
```
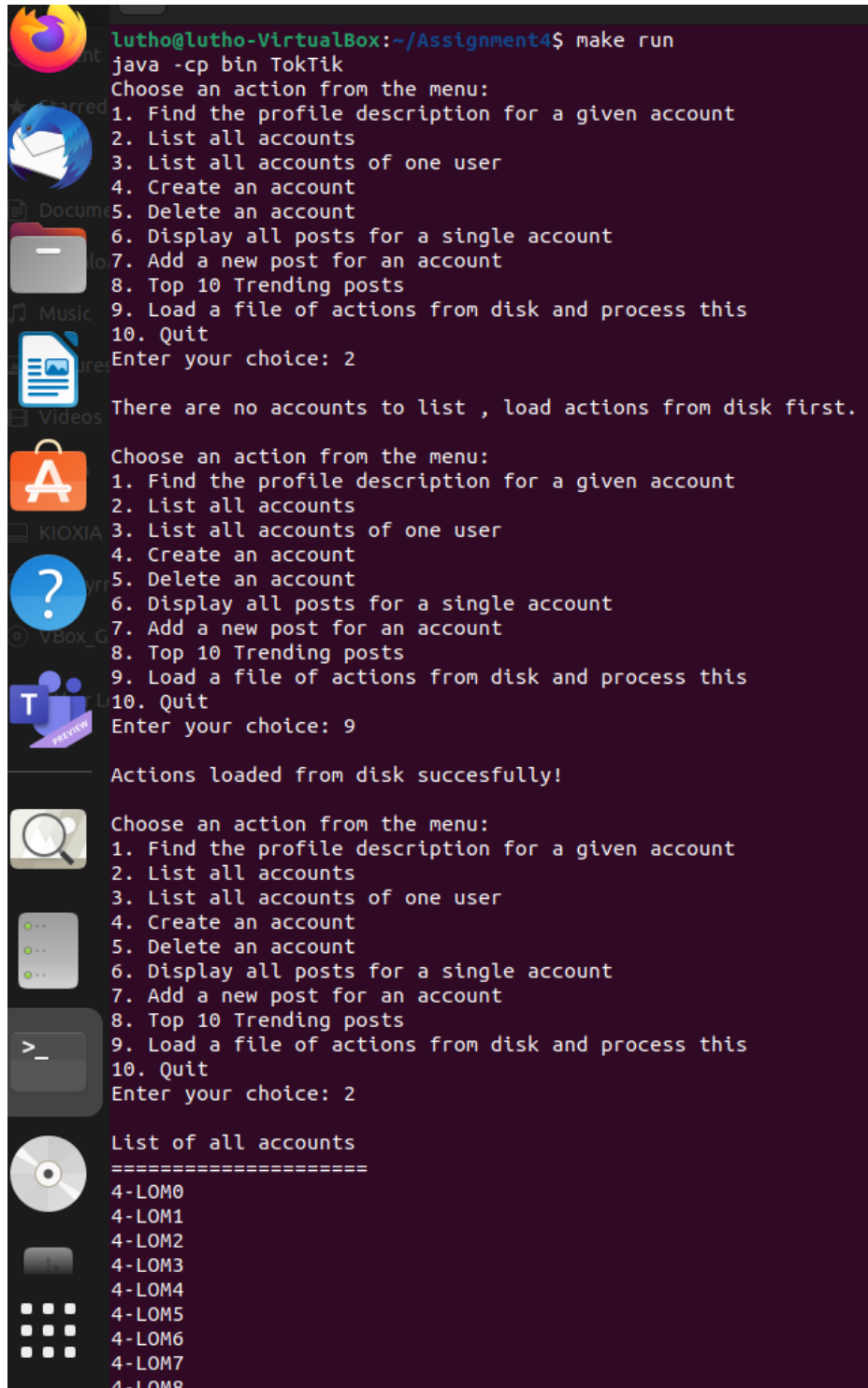
```
Enter your choice: 1

Enter account name: Zuckuss9
The profile description is: goldsmith's grape's locomotive's

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 1

Enter account name: Brakiss7
The profile description is: postmark paroling Ru's

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 1

Enter account name: MrHusseinIsNotInDataSet

Account name not found.

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: #
Enter valid choice: H
Enter valid choice: 1

Enter account name: Greedo7
The profile description is: sublimes nothing's tendency
```
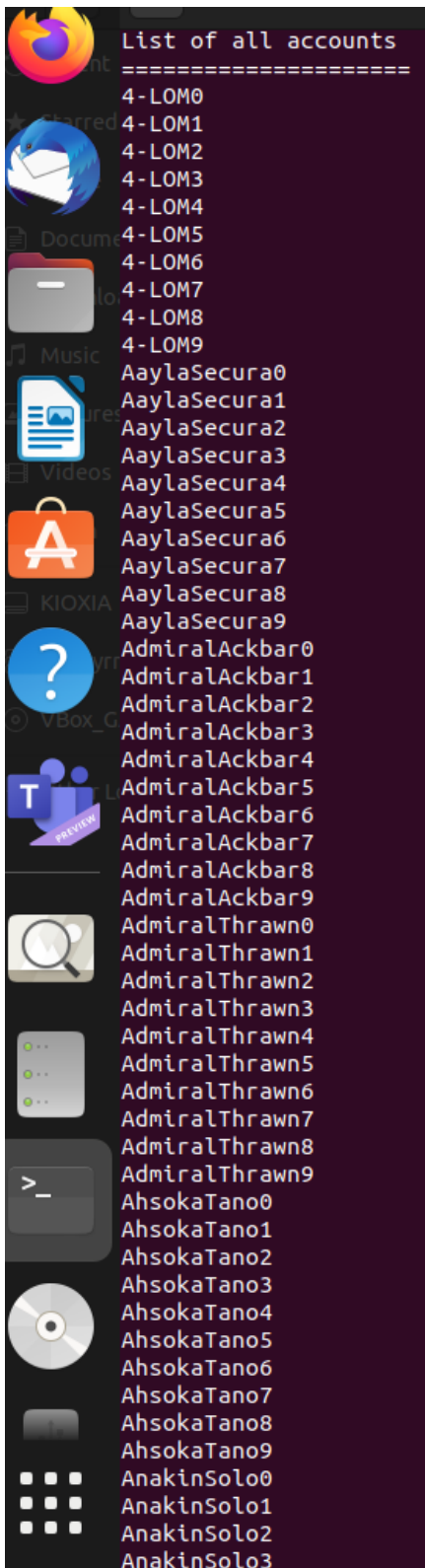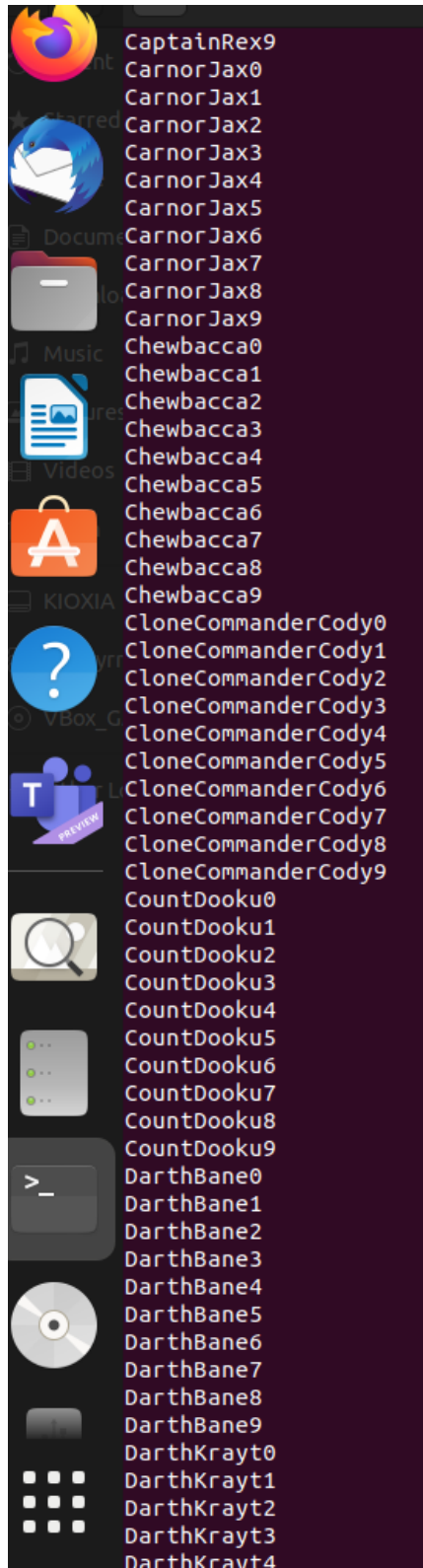
Trial 2

Aim: To show that listing all accounts function works.

Input set: **2,9,2**

Output:


```
lutho@lutho-VirtualBox:~/Assignment4$ make run
java -cp bin TokTik
Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 2

There are no accounts to list , load actions from disk first.

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 9

Actions loaded from disk succesfully!

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 2

List of all accounts
=====================
4-LOM0
4-LOM1
4-LOM2
4-LOM3
4-LOM4
4-LOM5
4-LOM6
4-LOM7
4-LOM8
```
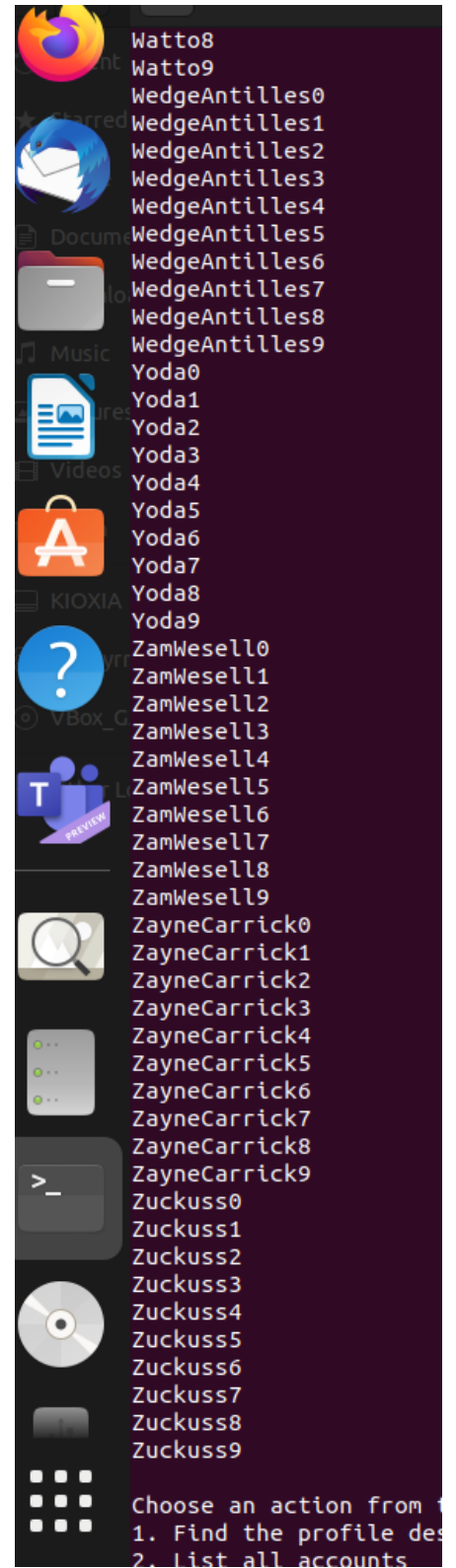
```
List of all accounts
====================
4-LOM0
4-LOM1
4-LOM2
4-LOM3
4-LOM4
4-LOM5
4-LOM6
4-LOM7
4-LOM8
4-LOM9
AaylaSecura0
AaylaSecura1
AaylaSecura2
AaylaSecura3
AaylaSecura4
AaylaSecura5
AaylaSecura6
AaylaSecura7
AaylaSecura8
AaylaSecura9
AdmiralAckbar0
AdmiralAckbar1
AdmiralAckbar2
AdmiralAckbar3
AdmiralAckbar4
AdmiralAckbar5
AdmiralAckbar6
AdmiralAckbar7
AdmiralAckbar8
AdmiralAckbar9
AdmiralThrawn0
AdmiralThrawn1
AdmiralThrawn2
AdmiralThrawn3
AdmiralThrawn4
AdmiralThrawn5
AdmiralThrawn6
AdmiralThrawn7
AdmiralThrawn8
AdmiralThrawn9
AhsokaTano0
AhsokaTano1
AhsokaTano2
AhsokaTano3
AhsokaTano4
AhsokaTano5
AhsokaTano6
AhsokaTano7
AhsokaTano8
AhsokaTano9
AnakinSolo0
AnakinSolo1
AnakinSolo2
AnakinSolo3

CaptainRex9
CarnorJax0
CarnorJax1
CarnorJax2
CarnorJax3
CarnorJax4
CarnorJax5
CarnorJax6
CarnorJax7
CarnorJax8
CarnorJax9
Chewbacca0
Chewbacca1
Chewbacca2
Chewbacca3
Chewbacca4
Chewbacca5
Chewbacca6
Chewbacca7
Chewbacca8
Chewbacca9
CloneCommanderCody0
CloneCommanderCody1
CloneCommanderCody2
CloneCommanderCody3
CloneCommanderCody4
CloneCommanderCody5
CloneCommanderCody6
CloneCommanderCody7
CloneCommanderCody8
CloneCommanderCody9
CountDooku0
CountDooku1
CountDooku2
CountDooku3
CountDooku4
CountDooku5
CountDooku6
CountDooku7
CountDooku8
CountDooku9
DarthBane0
DarthBane1
DarthBane2
DarthBane3
DarthBane4
DarthBane5
DarthBane6
DarthBane7
DarthBane8
DarthBane9
DarthKrayt0
DarthKrayt1
DarthKrayt2
DarthKrayt3
DarthKrayt4

Watto8
Watto9
WedgeAntilles0
WedgeAntilles1
WedgeAntilles2
WedgeAntilles3
WedgeAntilles4
WedgeAntilles5
WedgeAntilles6
WedgeAntilles7
WedgeAntilles8
WedgeAntilles9
Yoda0
Yoda1
Yoda2
Yoda3
Yoda4
Yoda5
Yoda6
Yoda7
Yoda8
Yoda9
ZamWesell0
ZamWesell1
ZamWesell2
ZamWesell3
ZamWesell4
ZamWesell5
ZamWesell6
ZamWesell7
ZamWesell8
ZamWesell9
ZayneCarrick0
ZayneCarrick1
ZayneCarrick2
ZayneCarrick3
ZayneCarrick4
ZayneCarrick5
ZayneCarrick6
ZayneCarrick7
ZayneCarrick8
ZayneCarrick9
Zuckuss0
Zuckuss1
Zuckuss2
Zuckuss3
Zuckuss4
Zuckuss5
Zuckuss6
Zuckuss7
Zuckuss8
Zuckuss9

Choose an action from
1. Find the profile des
2. List all accounts
```
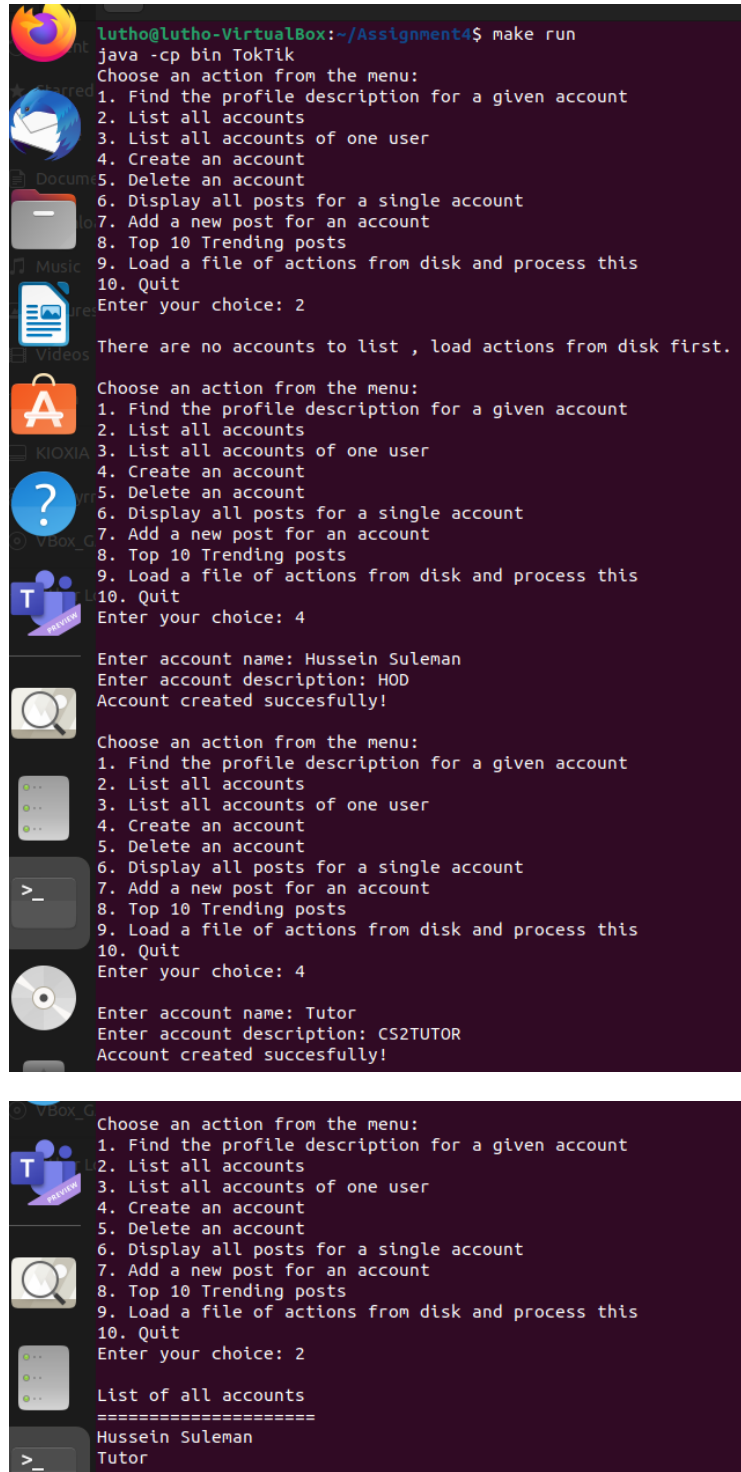
Trial 3

Aim: To show that create an account function works.

Input set**: 2, 4, Hussein Suleman, HOD, 4, Tutor, CS2TUTOR, 2**

Output:

Trial 4

Aim: To show that delete an account function works.

Input set: **5, 4, HUssein, IM the HOD, 2, 5, HUssein, 2, 4, Lutho, my first account :), 4, Lisa, Ghost, 2, 5, Chulu ,5, Lisa, 2**

Output :

Trial 5

Aim: To show that display all posts for a given account function works.

Input set: **6, 9, 6, Greedo8, 6, Zuckuss9, 6, Brakiss9**

Output:

```
lutho@lutho-VirtualBox:~/Assignment4$ make run
java -cp bin TokTik
Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 6

Load actions from disk first.

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 9

Actions loaded from disk succesfully!

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 6
```

```
Enter account name: Greedo8
List of Greedo8's posts
==========================================================
Title: cotes chunk inquisitiveness's salivation banister
Video: video5364.mpg
Number of likes: 2840

Title: ambitions clacks unison sadism remote's
Video: video5363.mpg
Number of likes: 5107

Title: walkout outclassing fingertip scholar Panama
Video: video5362.mpg
Number of likes: 7687

Title: offloaded boodle's ballpoint Wiemar's Drupal's
Video: video5361.mpg
Number of likes: 8873

Title: plackets Ganesha posters bassoon's bigotries
Video: video5360.mpg
Number of likes: 3076

Title: Cuzco's hemoglobin's donkeys Sandburg wavier
Video: video5359.mpg
Number of likes: 6617

Title: ascendants lasagnes unclaimed commiserate unkinder
Video: video5358.mpg
Number of likes: 3768

Title: plains flora's continuance rejoin takeoff's
Video: video5357.mpg
Number of likes: 2438

Title: Brewster's aggregating biologist miniaturization's refrigerant
Video: video5356.mpg
Number of likes: 7345

Title: bacterium Roger's cane overspecializing Serrano's
Video: video5355.mpg
Number of likes: 7147

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
```

```
Enter your choice: 6

Enter account name: Zuckuss9
Zuckuss9 has no posts yet.

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice: 6

Enter account name: Brakiss9
List of Brakiss9's posts
==========================================================
Title: Czerny's plaiting trainer unequalled cleavage
Video: video5814.mpg
Number of likes: 1368

Choose an action from the menu:
1. Find the profile description for a given account
2. List all accounts
3. List all accounts of one user
4. Create an account
5. Delete an account
6. Display all posts for a single account
7. Add a new post for an account
8. Top 10 Trending posts
9. Load a file of actions from disk and process this
10. Quit
Enter your choice:
```

<u>Trial 6</u>

Aim: To show that add a new post for a single account works.

Input set: **7, Zuckuss9, My First Post :), 7, Zuckuss9, My Second Post :), 6, Zuckuss9, 7, Brakiss9, I am quiting Tik Tok, 6, Brakiss9**

Output:

```
                     Enter your choice: 7

                     Enter account name: Zuckuss9
                     Enter video title: My First Post :)
                     New post added succesfully!

                     Choose an action from the menu:
                     1. Find the profile description for a given account
                     2. List all accounts
                     3. List all accounts of one user
                     4. Create an account
                     5. Delete an account
                     6. Display all posts for a single account
                     7. Add a new post for an account
                     8. Top 10 Trending posts
                     9. Load a file of actions from disk and process this
                     10. Quit
```

```
                     10. Quit
                     Enter your choice: 7

                     Enter account name: Zuckuss9
                     Enter video title: My Second Post :)
                     New post added succesfully!

                     Choose an action from the menu:
                     1. Find the profile description for a given account
                     2. List all accounts
                     3. List all accounts of one user
                     4. Create an account
                     5. Delete an account
                     6. Display all posts for a single account
                     7. Add a new post for an account
                     8. Top 10 Trending posts
                     9. Load a file of actions from disk and process this
                     10. Quit
                     Enter your choice: 6

                     Enter account name: Zuckuss9
                     List of Zuckuss9's posts
                     ================================================
                     Title: My Second Post :)
                     Video: video2.mpg
                     Number of likes: 0

                     Title: My First Post :)
                     Video: video1.mpg
                     Number of likes: 0

                     Choose an action from the menu:
                     1. Find the profile description for a given account
                     2. List all accounts
                     3. List all accounts of one user
                     4. Create an account
                     5. Delete an account
                     6. Display all posts for a single account
                     7. Add a new post for an account
                     8. Top 10 Trending posts
                     9. Load a file of actions from disk and process this
                     10. Quit
                     Enter your choice: 7

                     Enter account name: Brakiss9
                     Enter video title: I am quiting Tik Tok
                     New post added succesfully!

                     Choose an action from the menu:
                     1. Find the profile description for a given account
                     2. List all accounts
                     3. List all accounts of one user
                     4. Create an account
                     5. Delete an account
                     6. Display all posts for a single account
                     7. Add a new post for an account
```

```
                     10. Quit
                     Enter your choice: 6

                     Enter account name: Brakiss9
                     List of Brakiss9's posts
                     ================================================
                     Title: I am quiting Tik Tok
                     Video: video5815.mpg
                     Number of likes: 0

                     Title: Czerny's plaiting trainer unequalled cleavage
                     Video: video5814.mpg
                     Number of likes: 1368

                     Choose an action from the menu:
```

Creativity

(1) Top 10 Trending posts

In order to extend to what the assignment gave us I added a new list option called "Top 10 Trending posts" as I realised that users across all social medial platforms love to view "What's trending" due to the fear of missing out (FOMO). What this option does is store all the posts posted by the user accounts in the dataset and sorts the posts in descending order according to the number of likes a post has. After sorting the posts this option returns the top 10 most liked posts to the user as "Top 10 Trending posts".

In order to implement this idea, I imported two java utilities, an ArrayList and Collections. I created an ArrayList named allPosts that stores objects of type **TikTokPost** which has three attributes (author, vidtitle, numberOfLikes), every time I read the addition of a post to the BinarySearchTree node in the dataset.txt, I also stored the post object in this arraylist. After storing all the post objects, to generate the top 10 trending posts I used Collections and its sorting algorithm which takes 2 arguments (a list and a comparator) and sorts the list according to the Comparator argument (this is a function that takes two elements from the list and returns an integer value indicating which value comes before which value). I passed allPosts (arrayList of TikTokPost) as the first argument and as the Comparator I passed a lambda expression "**(post1, post2) -> post2.getNumLikes() – post1.getNumLikes()**" which determines which post has more likes between 2 posts and returns an integer, this lambda expression Comparator sorts the arrayList of TikTokPost objects by their number of likes in descending order.

After the sorting is done using Collections.sort(), I printed the first 10 posts in the sorted list to generate the top 10 trending posts. The nice part about all of this is even though the dataset has a large number of posts, this method sorts the posts in an **O(n log n)** time complexity in the average and worst cases which is very fast and efficient.

(2) Listing all accounts owned by a user

I also added another list option which takes in a name as userinput and then finds all the accounts owned by that user. To implement this when loading from disk, I also stored the name of all users using the names.txt file in an ArrayList and then used an inorder traversal like method to traverse through the binary search tree and then compare the name of the user to the substring of the name of the dataitem (Account) and then display it if they are equal.

(if inputname.compareTo(node.dataitem.getName().substring(0,inputname.length())) ==0)

Outputs of the creative features

Top10 Trending posts   List of all accounts owned by user

Git usage log

```
lutho@lutho-VirtualBox:~/Assignment4$ (ln=0; while read l; do echo $ln\: $l; ln=$((ln+1)); done) | (head -10 log.txt; echo ...; tail -10 log.txt)
0: commit 3b99146638fb847c8dfb475975014b5e4e890d5a
1: Author: Lutho Mngqibisa <luthoyrn@gmail.com>
2: Date: Sat Apr 15 02:42:57 2023 +0200
3:
4: added java documentation to all classes and functions
5:
6: commit a02692bb5478f3240ee763d333fbe7b5bbd35843
7: Author: Lutho Mngqibisa <luthoyrn@gmail.com>
8: Date: Fri Apr 14 23:49:42 2023 +0200
9:
...
97: Author: Lutho <luthoyrn@gmail.com>
98: Date: Sun Apr 2 07:26:02 2023 +0200
99:
100: Created an account class that implements the Comparable interface , it has 2 string attributes (name and description) and I then overrided the comparable method to enable objects of this class
be compared using the attribute name
101:
102: commit 7c27a10dcf30720c6516d392ee09262a0703c192
103: Author: Lutho <luthoyrn@gmail.com>
104: Date: Sun Apr 2 01:19:23 2023 +0200
105:
106: "Coded a menu"
```