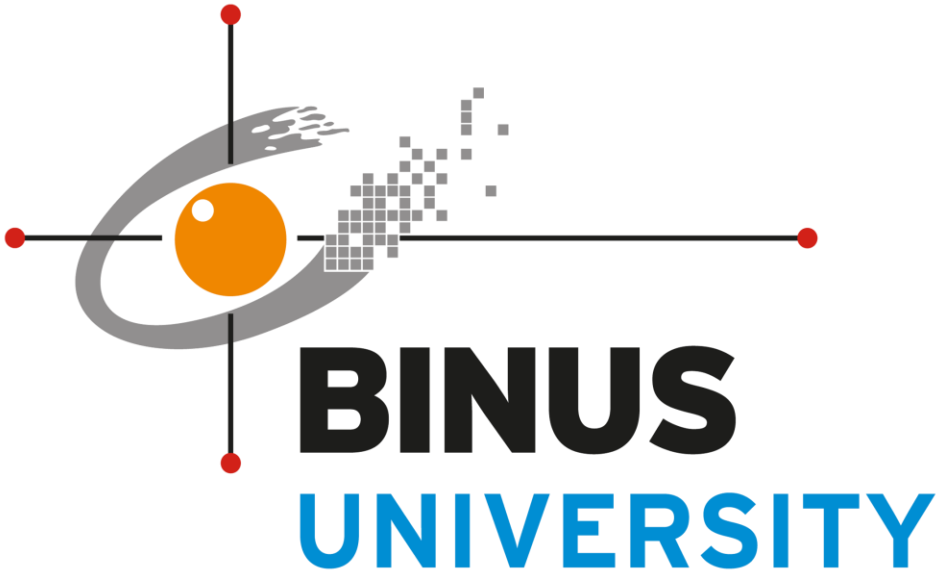
OBJECT ORIENTED PROGRAMMING FINAL PROJECT REPORT



BY: ARVIN YUWONO (2502009721)

Project Specification

The application is a digitalized version of *Buku Kas*, a physical book that records the income, expense and balance per each transaction made by a household or company. Its purpose is to monitor the flow of money within the household or company. This application was created to make it easier for everyone to be able to do so without going through the troublesome effort of writing formulas in Excel. The access a User has to the application depends on the level of authorization they have been granted.

UML Class Diagram

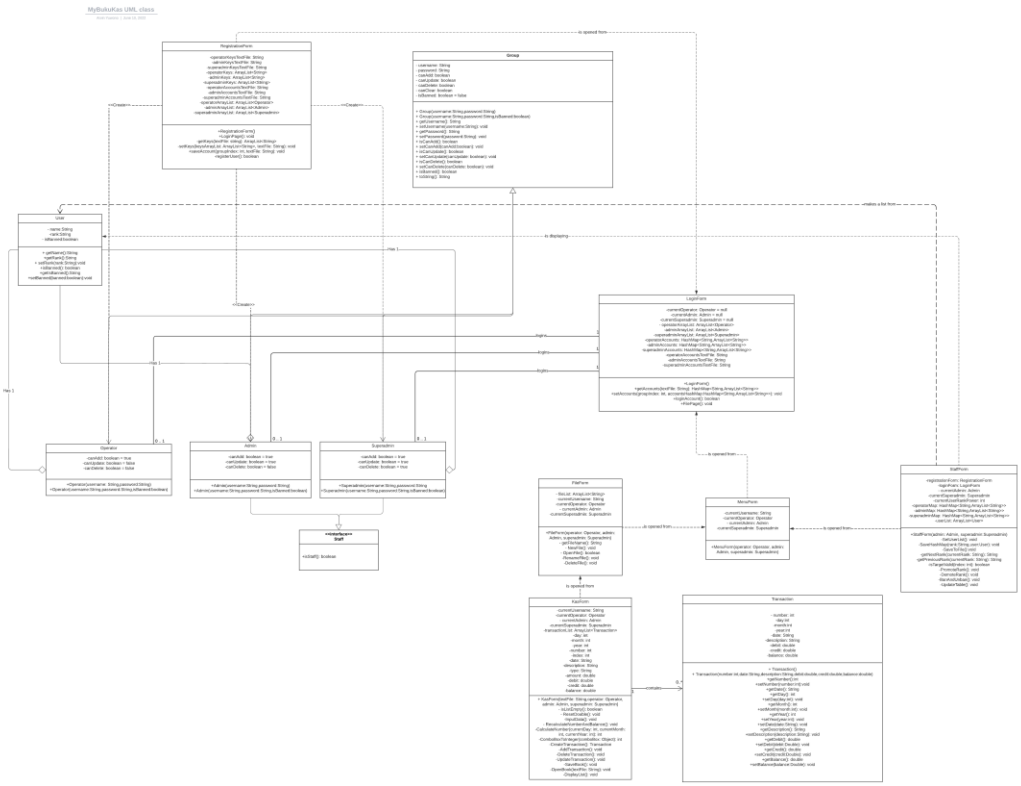


Image 1.1 UML Class Diagram

Solution Design

Visualization of all the forms below is made possible thanks to Swing GUI. Data storing and reading is done using Text Files.

<u>Transaction Class</u>

```java
public class Transaction {
    int number,day,month,year;
    String date,description;
    double debit,credit,balance;
    public Transaction(){}
    public Transaction(int day, int month, int year, String date, String description, double debit, double credit) {...}
    public Transaction(int number, String date, String description, double debit, double credit, double balance) {...}
    public int getNumber() { return number; }
    public void setNumber(int number) { this.number = number; }
    public String getDate() { return date; }
    public int getDay() { return day; }
    public void setDay(int day) { this.day = day; }
    public int getMonth() { return month; }
    public void setMonth(int month) { this.month = month; }
    public int getYear() { return year; }
    public void setYear(int year) { this.year = year; }
    public void setDate(String date) { this.date = date; }
    public String getDescription() { return description; }
    public void setDescription(String description) { this.description = description; }
    public double getDebit() { return debit; }
    public void setDebit(double debit) { this.debit = debit; }
    public double getCredit() { return credit; }
    public void setCredit(double credit) { this.credit = credit; }
    public double getBalance() { return balance; }
    public void setBalance(double balance) { this.balance = balance; }
    @Override
    public String toString() {...}
```

Image 2.1 Transaction Class

This class contains data types which can store details of a transaction such as the number, date, description, debit, credit, and balance. A Constructor with and without parameter is available to be used. Getter and Setter methods are also there to access the private datas. A to String method is given for testing on console.

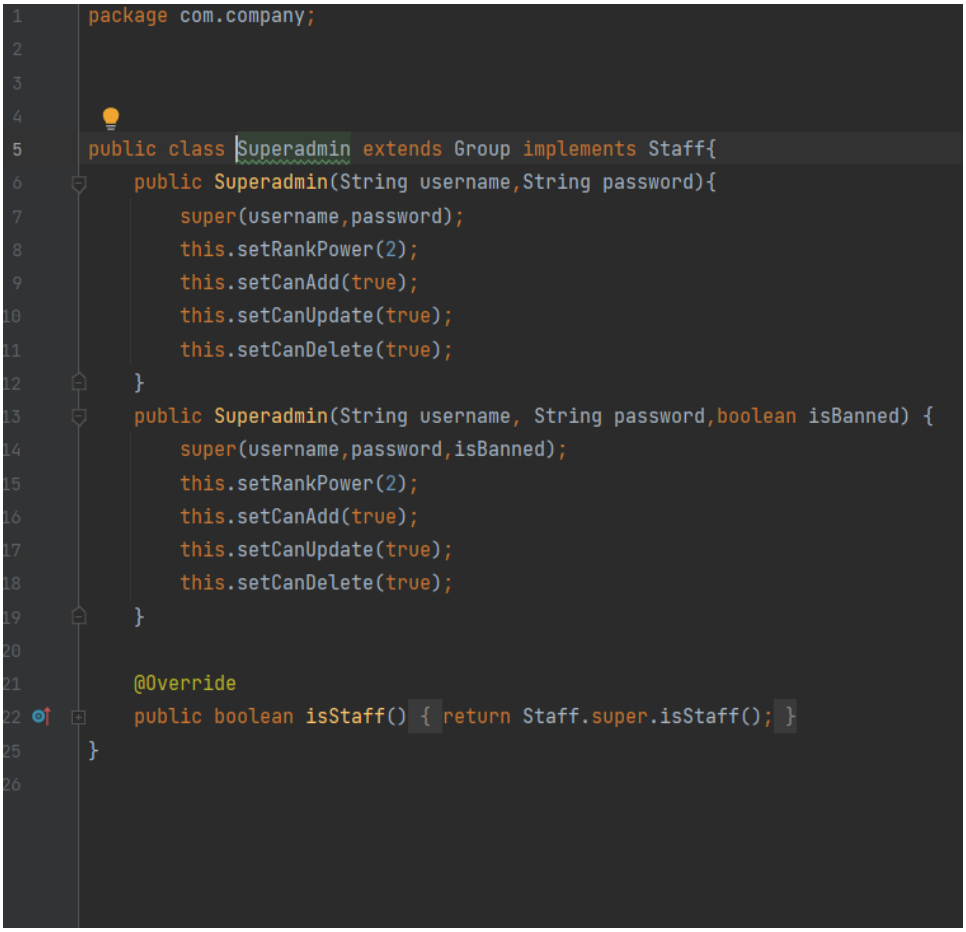
Group Class

```java
package com.company;

public class Group {
    private String username,password;
    private int rankPower;
    private boolean canAdd,canUpdate,canDelete;
    private boolean isBanned = false;
    public Group(String username,String password){...}
    public Group(String username,String password,boolean isBanned){...}
    public String getUsername() { return username; }
    public void setUsername(String username) {this.username = username;}
    public String getPassword() { return password; }
    public void setPassword(String password) { this.password = password; }
    public int getRankPower() { return rankPower; }
    public void setRankPower(int rankPower) { this.rankPower = rankPower; }
    public boolean isBanned() { return isBanned; }
    public void setBanned(boolean banned) { isBanned = banned; }
    public boolean isCanAdd() { return canAdd; }
    public void setCanAdd(boolean canAdd) { this.canAdd = canAdd; }
    public boolean isCanUpdate() { return canUpdate; }
    public void setCanUpdate(boolean canUpdate) { this.canUpdate = canUpdate; }
    public boolean isCanDelete() { return canDelete; }
    public void setCanDelete(boolean canDelete) { this.canDelete = canDelete; }
    @Override
    public String toString() { return  username + "," + password +","+isBanned; }
}
```

Image 2.2 Group Class

Act as the parent of actual user groups. It holds data type for the name, password, rank, right of accesses, and ban status.

Superadmin Subclass

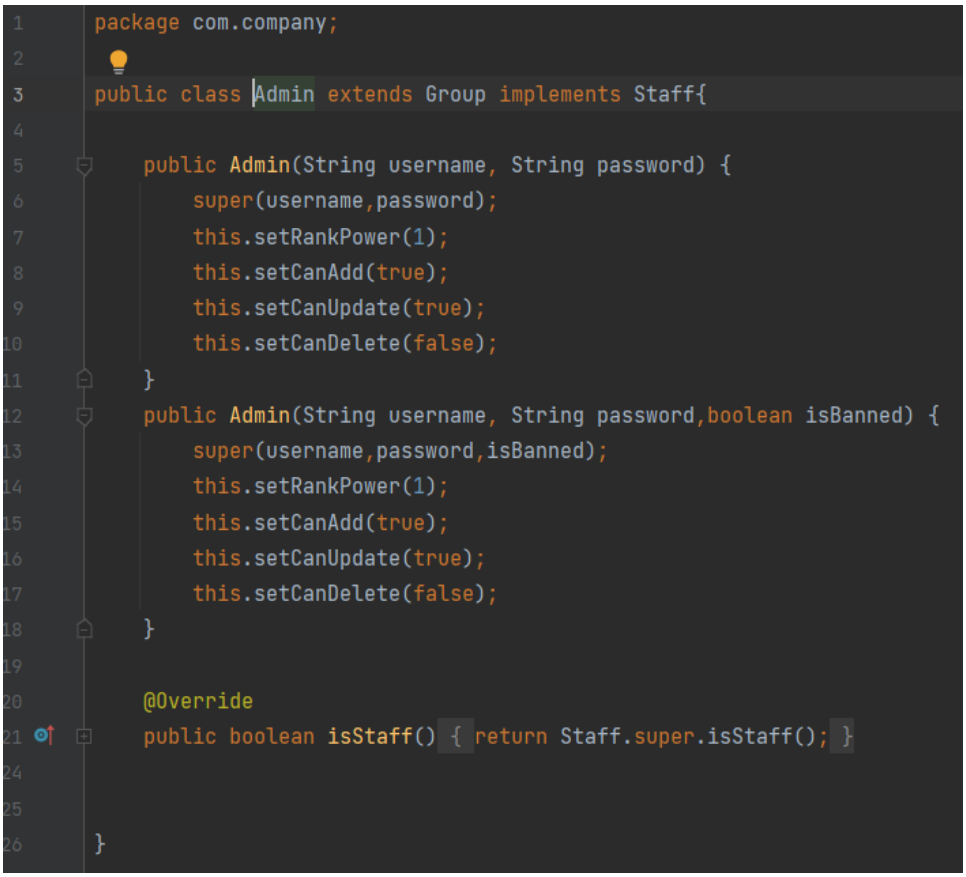


```
package com.company;



public class Superadmin extends Group implements Staff{
    public Superadmin(String username,String password){
        super(username,password);
        this.setRankPower(2);
        this.setCanAdd(true);
        this.setCanUpdate(true);
        this.setCanDelete(true);
    }
    public Superadmin(String username, String password,boolean isBanned) {
        super(username,password,isBanned);
        this.setRankPower(2);
        this.setCanAdd(true);
        this.setCanUpdate(true);
        this.setCanDelete(true);
    }

    @Override
    public boolean isStaff() { return Staff.super.isStaff(); }
}
```

Image 2.3 Superadmin Subclass

The group's child with the highest authority of access rights, which means it can access every form and button. This class can access the Staff Panel.

Admin Subclass

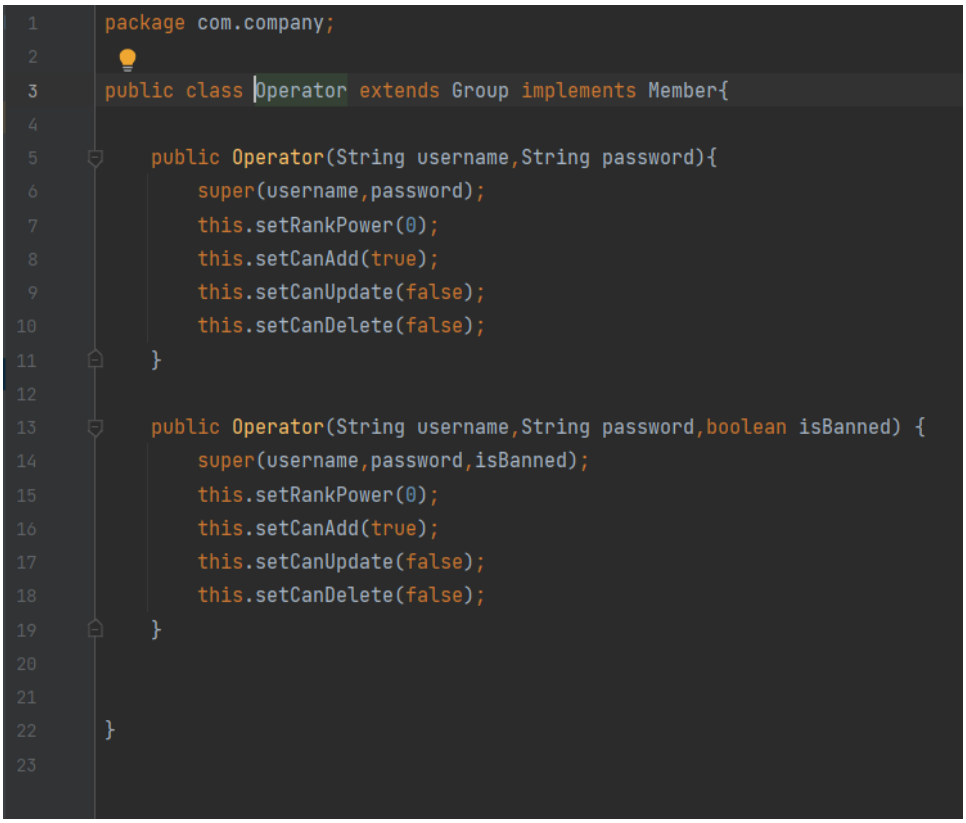


```java
package com.company;

public class Admin extends Group implements Staff{

    public Admin(String username, String password) {
        super(username,password);
        this.setRankPower(1);
        this.setCanAdd(true);
        this.setCanUpdate(true);
        this.setCanDelete(false);
    }
    public Admin(String username, String password,boolean isBanned) {
        super(username,password,isBanned);
        this.setRankPower(1);
        this.setCanAdd(true);
        this.setCanUpdate(true);
        this.setCanDelete(false);
    }

    @Override
    public boolean isStaff() { return Staff.super.isStaff(); }


}
```

Image 2.4 Admin Subclass

The Group's child with a medium authority of access rights, with the only restricted access of being unable to delete or clear items. This class can access the Staff Panel.

Operator Subclass



```java
package com.company;

public class Operator extends Group implements Member{

    public Operator(String username,String password){
        super(username,password);
        this.setRankPower(0);
        this.setCanAdd(true);
        this.setCanUpdate(false);
        this.setCanDelete(false);
    }

    public Operator(String username,String password,boolean isBanned) {
        super(username,password,isBanned);
        this.setRankPower(0);
        this.setCanAdd(true);
        this.setCanUpdate(false);
        this.setCanDelete(false);
    }


}
```

Image 2.5 Operator Subclass

Group's child with the lowest authority of access rights. This subclass is only able to add items.

User Class

```java
public class User {
    private String name,rank,password;
    private int rankPower;
    private boolean isBanned;

    public User(String name, String rank,boolean isBanned,String password,int rankPower) {...}

    public String getName() { return name; }

    public void setName(String name) { this.name = name; }

    public String getRank() { return rank; }

    public void setRank(String rank) { this.rank = rank; }

    public boolean isBanned() { return isBanned; }
    public String getIsBanned() { return String.valueOf(isBanned); }

    public void setBanned(boolean banned) { isBanned = banned; }

    public String getPassword() { return password; }

    public int getRankPower() { return rankPower; }

    public void setRankPower(int rankPower) { this.rankPower = rankPower; }
}
```

Image 2.6 User Class

Used to help group all separate user groups into a new class to be able to display all available accounts on a single table.

Staff Interface

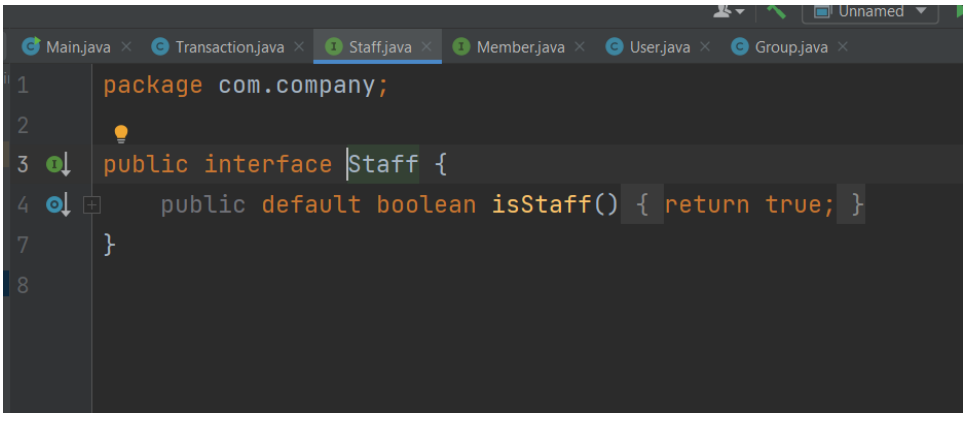


Image 2.7 Staff Interface

This interface contains a default Boolean method, which returns true. Used by subclasses such as Admin and Superadmin to recognize it is considered a staff and should be able to access the staff panel.

Member Interface

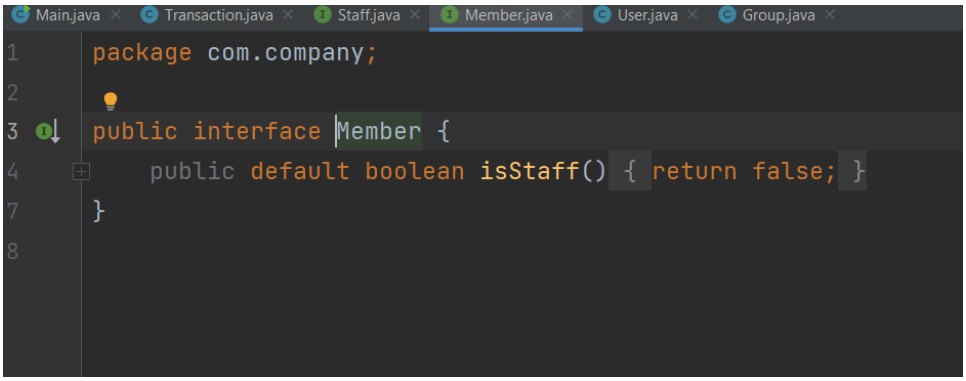


Image 2.8 Member Interface

This interface contains a default Boolean method, which returns false. Used by subclasses such as Operator to recognize it is a member and not a Staff.

Main Form

Image 2.9 Main Screen

This form contains the main function which opens the Login Form (Screen) upon execution of the application.

Registration Form

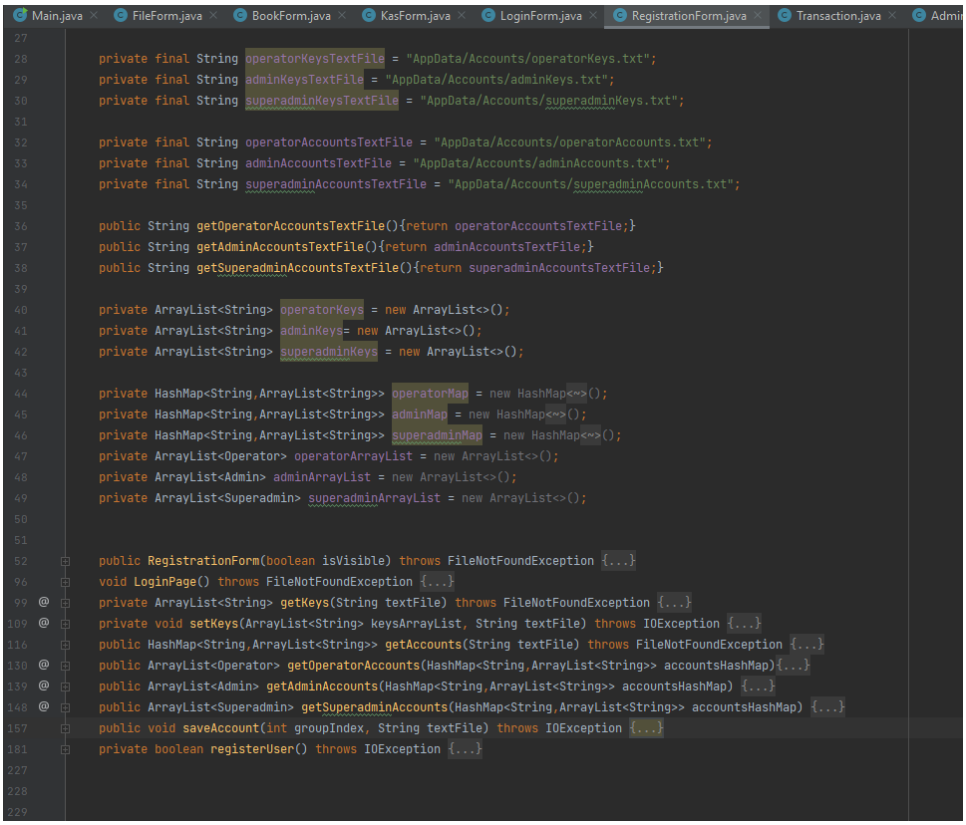


Image 2.10 Registration Screen

File and Scanner are used to read text files that contain serial keys for either Operator, Admin or Superadmin, which are then added into their respective ArrayList<String>. File Writers are then used to store username and password into respective text file based on the serial key input. The user can be returned to the Login Form by either pressing the ‘LOGIN’ button or submitting the registration.

Login Form

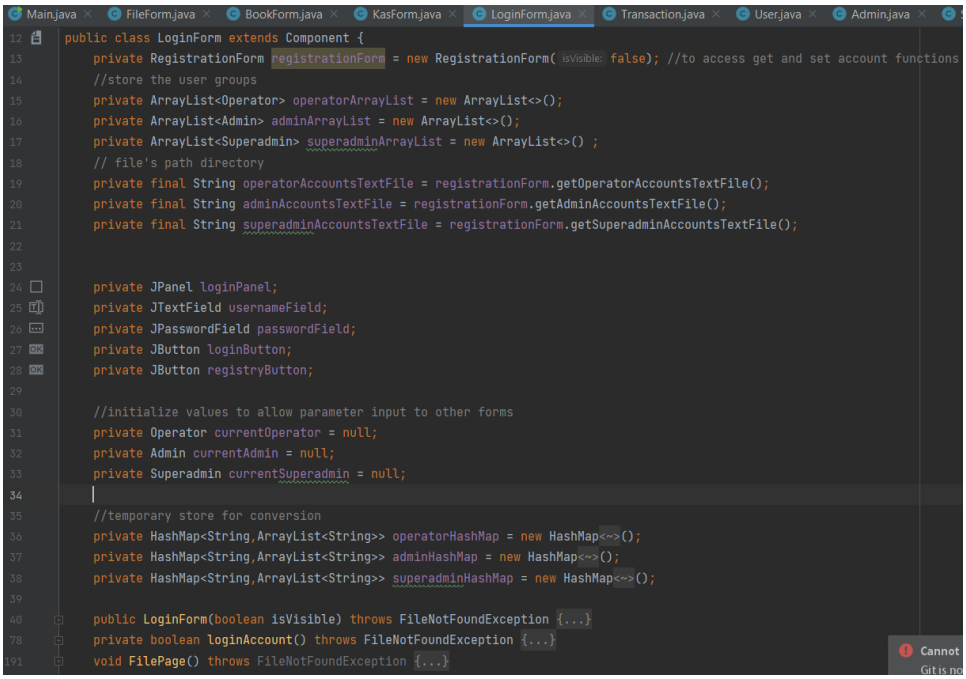


Image 2.11 Login Screen

File and Scanner are used to read text files that contain account's username and password, which are then put into a HashMap<String, String>. An object of type Operator, Admin or Superadmin will then be created and added into their respective ArrayList. A valid login detail will allow the user to be brought to the File Form. If no account exists, the user can press the 'REGISTRY' button to be brought to the Registration Form.

File Form

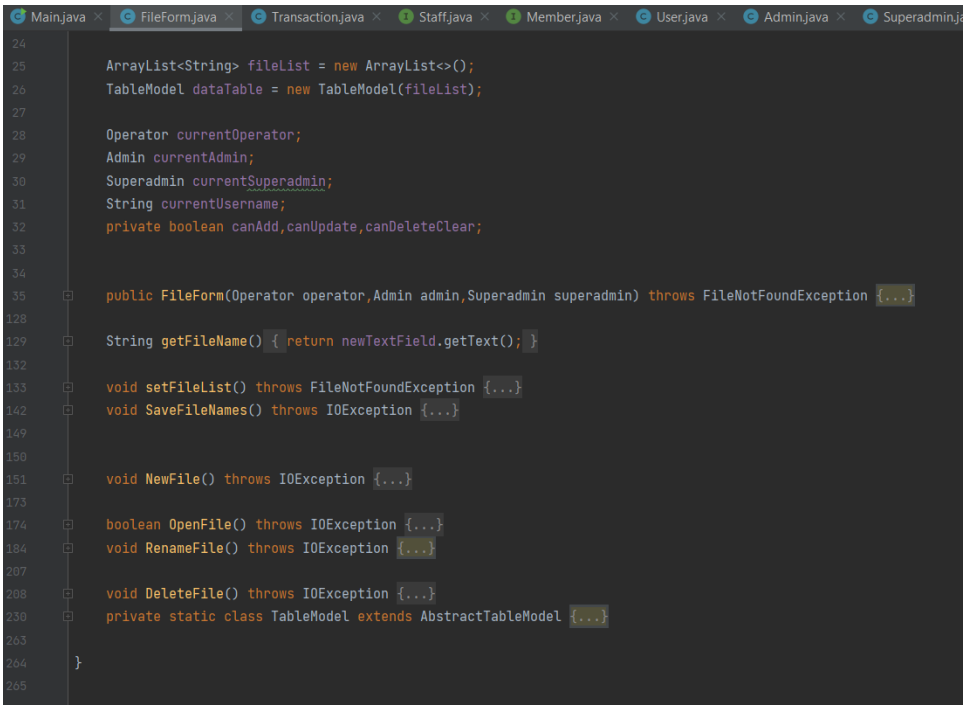


Image 2.12 File Selection Screen

Inside a Scroll Panel and Table, based off an ArrayList, all the books available to be opened will be displayed. The user can create a new book by inputting the desired name in a Text Field and pressing the 'New' button. To open an existing file, select a row in the table and press the 'Open' button, which will bring the user to the Kas Form. The first course of action is the same as opening for file renaming and deletion, except the button to be pressed differs.

Book Form

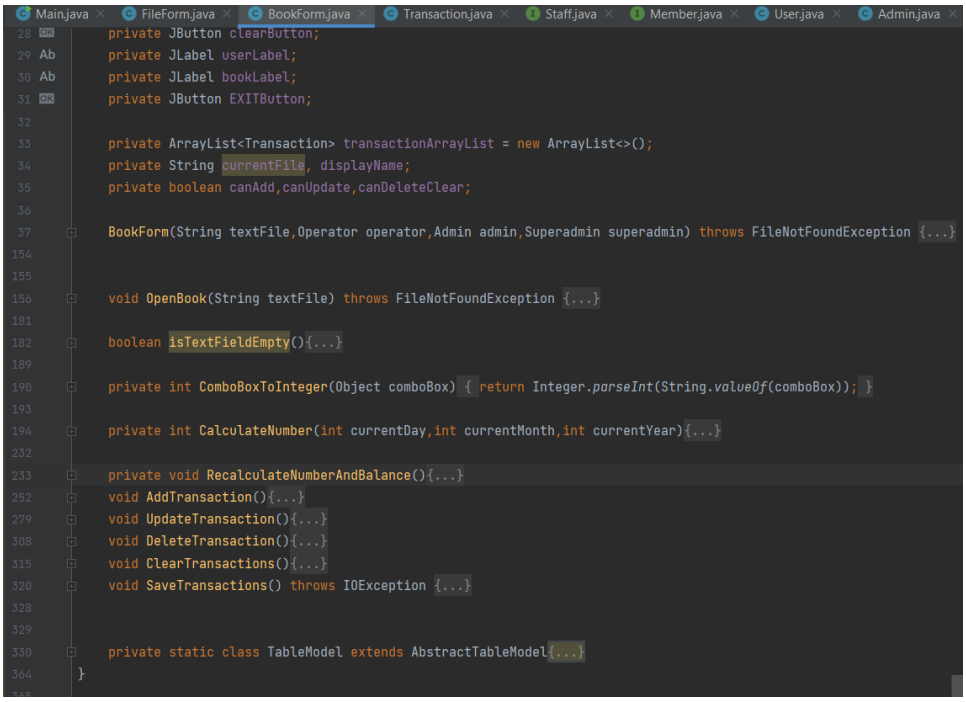


Image 2.13 *Buku Kas* Screen

The list of buttons (Add, Update, Delete, and Clear) available will depend on the current user's rank. The date can be adjusted by using the available Combo Box, and the same goes for the type of transaction: Debit or Credit. As for money and description, they can be written in the Text Fields. When a button is pressed, it will convert the Combo Boxes' selected item and Text Fields' Text into the appropriate data types.

When a new transaction is to be added, it will check whether the ArrayList<Transaction> is empty first. If it is not empty, it will first calculate the appropriate number and index for it to be inserted at. Else If it is empty, it will immediately add the transaction to the ArrayList. After either course of flow, it will recalculate every transaction's appropriate number and balance before updating the Table.

The difference between updating and deleting a transaction is that updating removes the selected existing transaction and adds a new one, while deleting a transaction only removes the selected transaction.

Staff Form

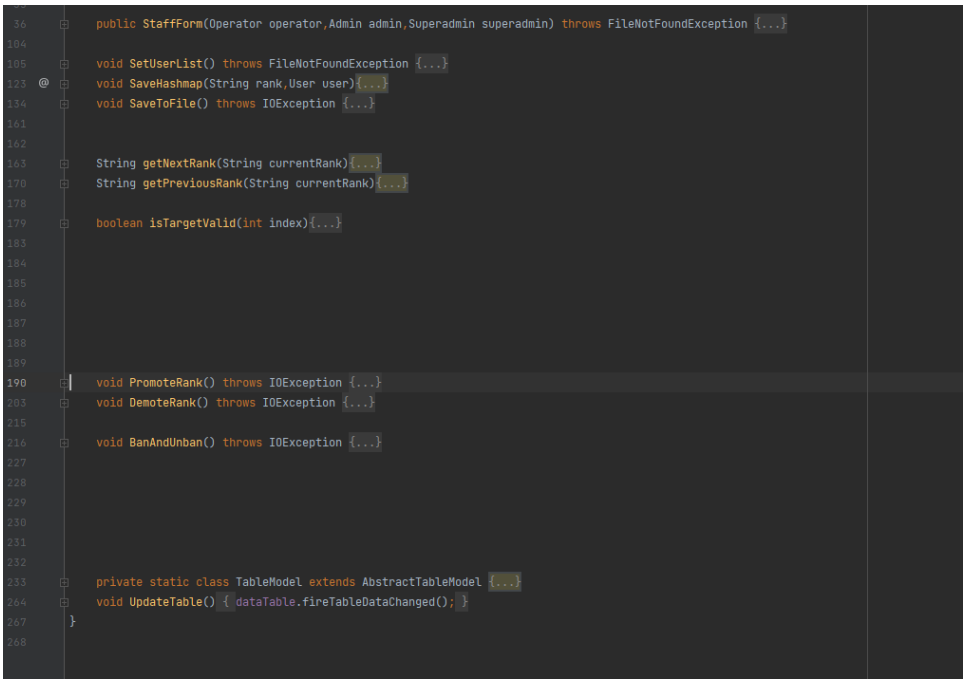


Image 2.14 Staff Panel Screen

This Form is exclusively visible to users whose rank is part of Staff (Admin and Superadmin). All users regardless of ranks will be displayed in a Table, based off ArrayList<User>, which data is obtained from the same HashMap method Login Form used and iterated using for each loop to be added into the ArrayList.

After selecting a user's row, there are several choices to be made: Promote, Demote, Ban and Unban. Promotion and Demotion can only occur if the target's next rank or previous rank is lower than the user's rank. Ban and unban can be done when the target's rank is below the user's rank. It does not remove the account, but simply toggle a Boolean value to make login impossible.

Evidence of Working Program

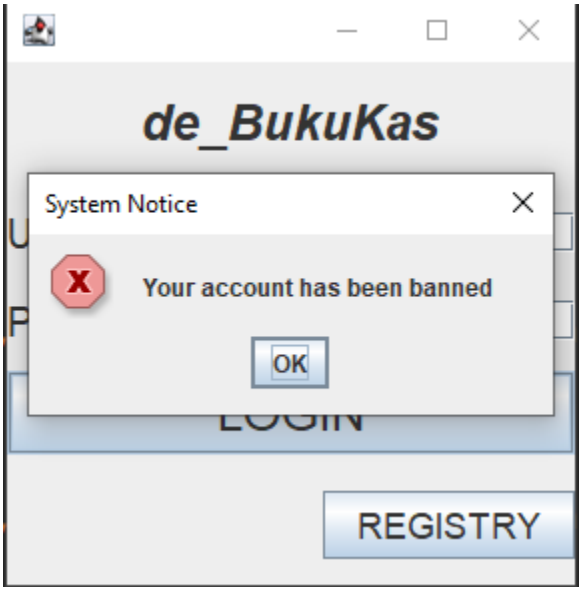


Image 3.1 Unable to login due to account being banned

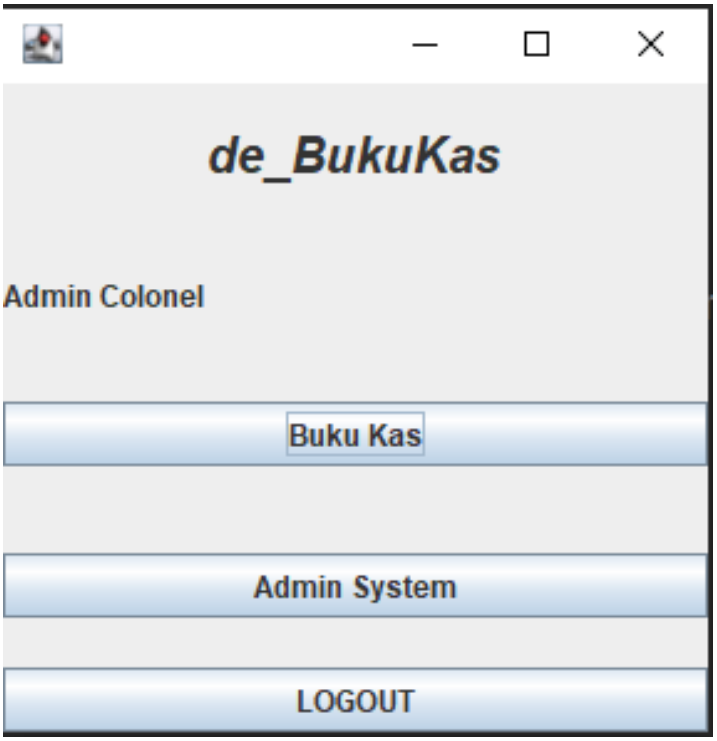


Image 3.2 Menu Screen after successful login

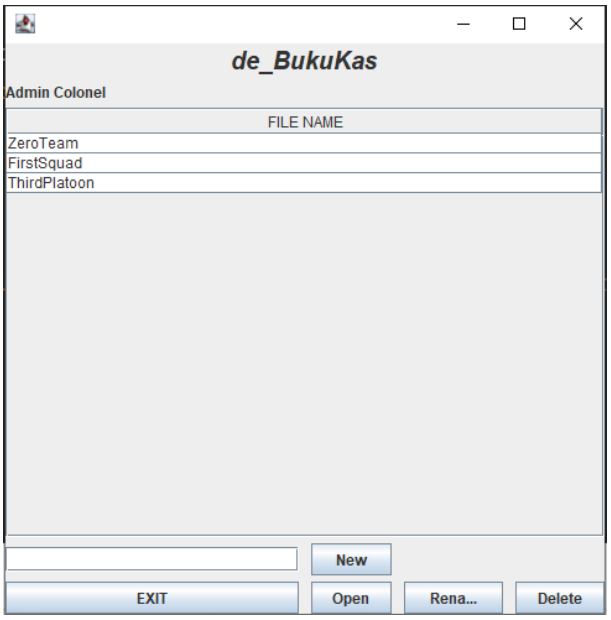


Image 3.3 File Selection Screen after choosing to go to *Buku Kas*

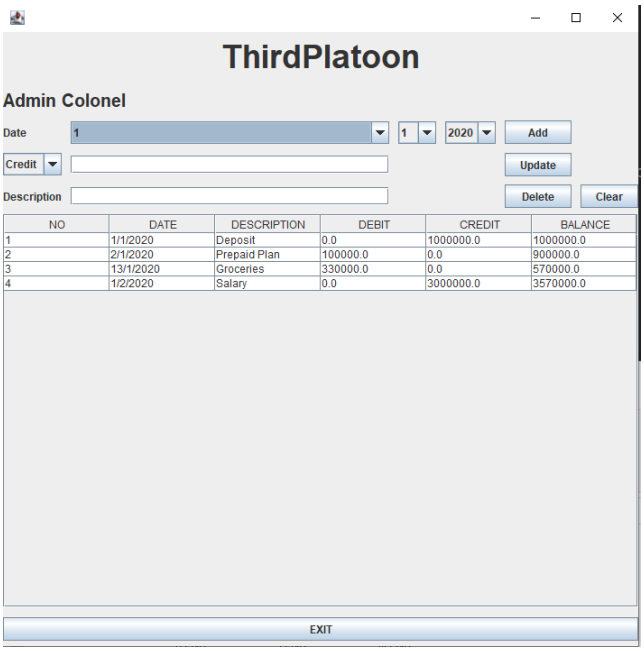


Image 3.4 A *Buku Kas* Screen

Image 3.5 The Staff Panel Screen

Resources

Create Login and Registration Forms Using Java, MySQL and IntelliJ IDEA (With Source Code)

https://www.baeldung.com/java-write-to-file

https://www.w3schools.com/java/java_hashmap.asp

https://stackoverflow.com/questions/10960213/how-can-i-read-comma-separated-values-from-a-text-file-in-java#:~:text=You%20may%20use%20the%20String,split(%22%2C%22)%3B

Java SWING #19 - How to Exit Program on Button Click in Java Netbeans

https://www.geeksforgeeks.org/java-program-to-rename-a-file/