# Basic Programming Practicum

# Final Exam Project

## Students Code of Conduct Management System

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## 1 Preliminary

This document provides the documentation of how to use a CLI app that keep track of Student's violated rules. It includes a detailed steps on how to use each and every menu, a flowchart to understand the code flow, and the code itself.

## 2 Compiling and Running

The app itself is just a single `.java` file so it should be trivial to run it. It can be compiled using the `javac` command and then use the `java` command to run it.

Although, the app is provided in a form of Maven project, so it would be easier to just use an Integrated Development Environment (IDE) and import the project itself. After doing that, simply press `Ctrl + F5` or the play button in the IDE.

For a better experience, the app should be run on a terminal that supports ANSI escape code, such as the new Windows Terminal, because the program uses `\033[H\033[2J` to reset the screen state. It is done to simulate how a page navigation would work inside a GUI app.

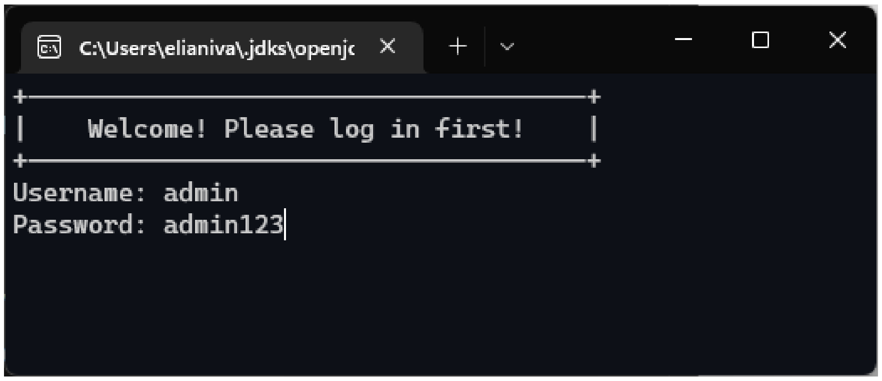
## 3 Usage

These are the steps to use each and every part that is available on the app, including the logic behind it.

### 3.1 Top Level Menu

#### 3.1.1 Logging In

Upon running the app, there should be a prompt asking the user to log in. Since there is no database integration, the credential is hardcoded. Insert **admin** as the username and **admin123** as the password.

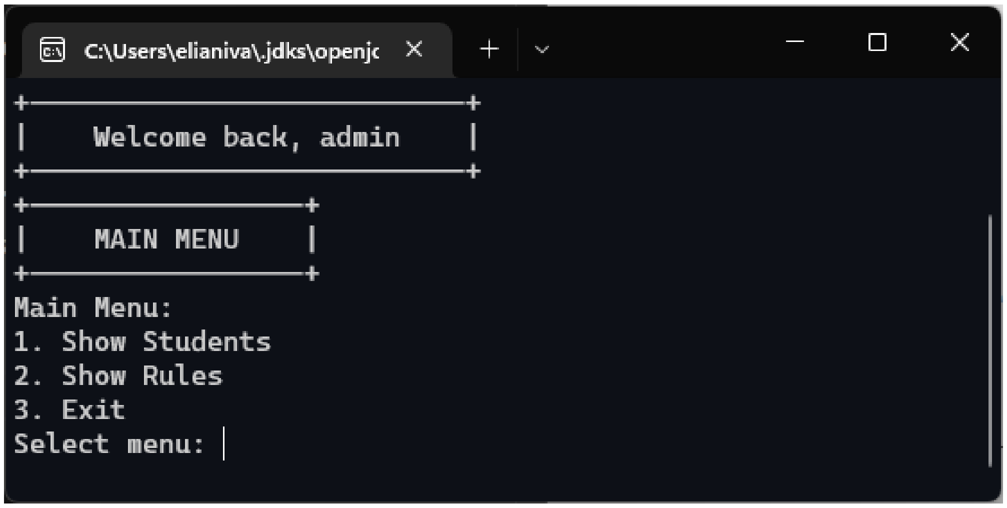


```
+------------------------------------+
|    Welcome! Please log in first!   |
+------------------------------------+
Username: admin
Password: admin123
```

Figure 1: The app prompting a username and password

### 3.1.2 Main Menu

After the user logged in, there should be a main menu with a greeting message. The greeting message will only appear on initial login. It will not appear later on.

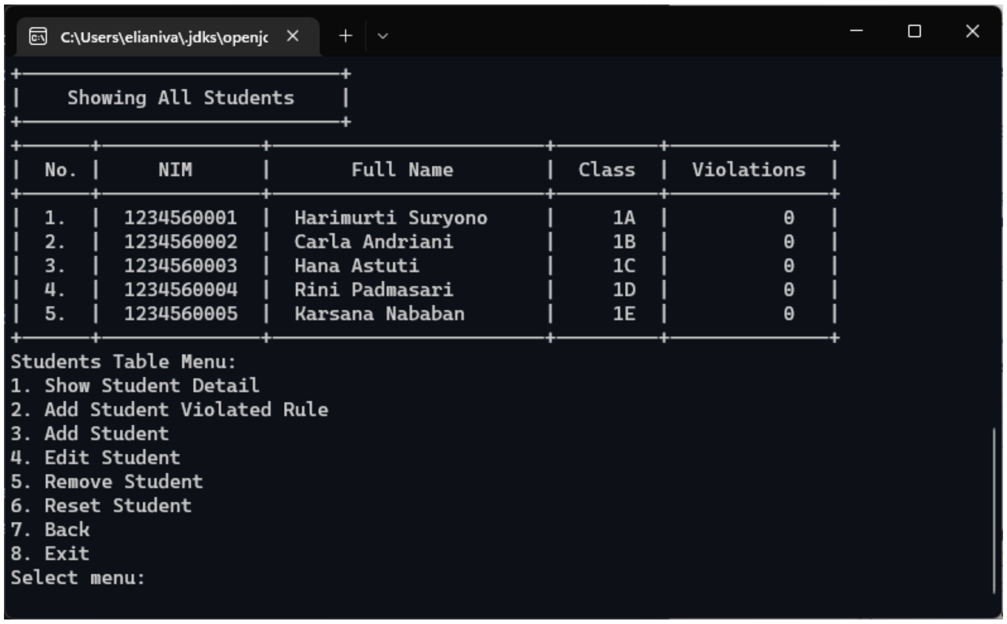


```
C:\Users\elianiva\.jdks\openjc
+---------------------------+
|    Welcome back, admin    |
+---------------------------+
+-----------------+
|    MAIN MENU    |
+-----------------+
Main Menu:
1. Show Students
2. Show Rules
3. Exit
Select menu:
```

Figure 2: The app showing a main menu

## 3.2 Students Menu

On the main menu, choose the first menu to show a list of actions related to Student operations. The app should now display all students along with their menu.



```
C:\Users\elianiva\.jdks\openjc
+---------------------------+
|    Showing All Students   |
+---------------------------+
+------+--------------+---------------------------+-----------+-------------+
| No.  |     NIM      |         Full Name         |  Class  |  Violations  |
+------+--------------+---------------------------+-----------+-------------+
| 1.   |  1234560001  |  Harimurti Suryono        |      1A |            0 |
| 2.   |  1234560002  |  Carla Andriani           |      1B |            0 |
| 3.   |  1234560003  |  Hana Astuti              |      1C |            0 |
| 4.   |  1234560004  |  Rini Padmasari           |      1D |            0 |
| 5.   |  1234560005  |  Karsana Nababan          |      1E |            0 |
+------+--------------+---------------------------+-----------+-------------+
Students Table Menu:
1. Show Student Detail
2. Add Student Violated Rule
3. Add Student
4. Edit Student
5. Remove Student
6. Reset Student
7. Back
8. Exit
Select menu:
```

Figure 3: The app showing students list along with their menu

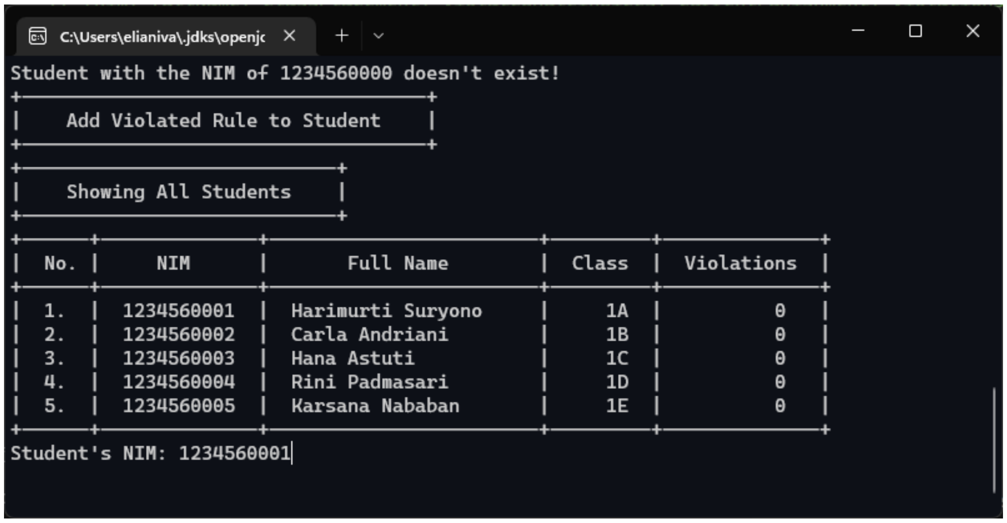
### 3.2.1 Student Entity

Before going with the rest of the menu, there are some things that should be noted. These are some details regarding each Student entity along with its validation

1. **NIM**
    - Min Length: 10 characters
    - Max Length: 10 characters
    - Allowed to be empty: No
2. **Full Name**
    - Min Length: 1 character
    - Max Length: 20 characters
    - Allowed to be empty: No
3. **Class**
    - Min Length: 1 character
    - Max Length: 2 characters
    - Allowed to be empty: No
4. **Violated Rules**
    - Min Length: 0 character
    - Max Length: 3 characters
    - Allowed to be empty: Yes
5. **Total Violations**
    - Min: 0
    - Max: `Integer.MAX_VALUE`
    - Allowed to be empty: No, but has a default value of 0

### 3.2.2 Adding Violated Rule to a Student

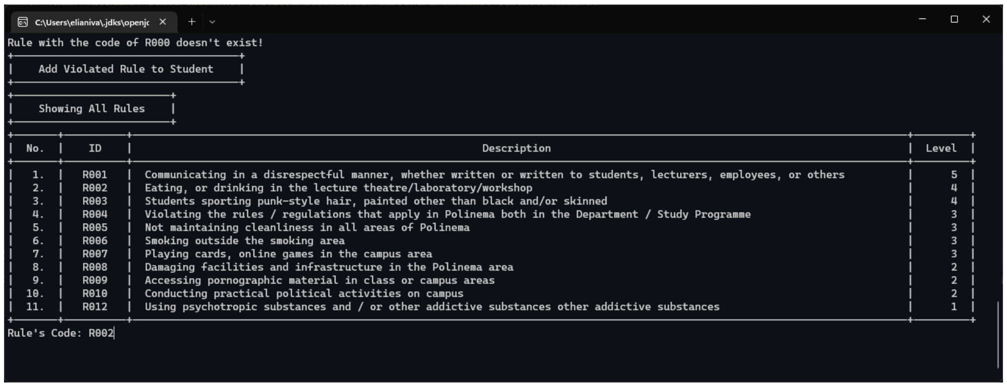
The main purpose of this app is to manage rules that have been violated by the student along with its punishment. To do this, select the **Add Student Violated Rule**. Upon selecting the menu, the app will prompt for a student's NIM.



```
Student with the NIM of 1234560000 doesn't exist!
+--------------------------------+
|    Add Violated Rule to Student    |
+--------------------------------+
+------------------------+
|    Showing All Students    |
+------------------------+
+------+--------------+------------------------+--------+------------+
| No.  |     NIM      |       Full Name        | Class  | Violations |
+------+--------------+------------------------+--------+------------+
|  1.  |  1234560001  |  Harimurti Suryono     |    1A  |        0   |
|  2.  |  1234560002  |  Carla Andriani        |    1B  |        0   |
|  3.  |  1234560003  |  Hana Astuti           |    1C  |        0   |
|  4.  |  1234560004  |  Rini Padmasari        |    1D  |        0   |
|  5.  |  1234560005  |  Karsana Nababan       |    1E  |        0   |
+------+--------------+------------------------+--------+------------+
Student's NIM: 1234560001
```

Figure 4: The app asking for student's NIM and showing a warning when student was not found

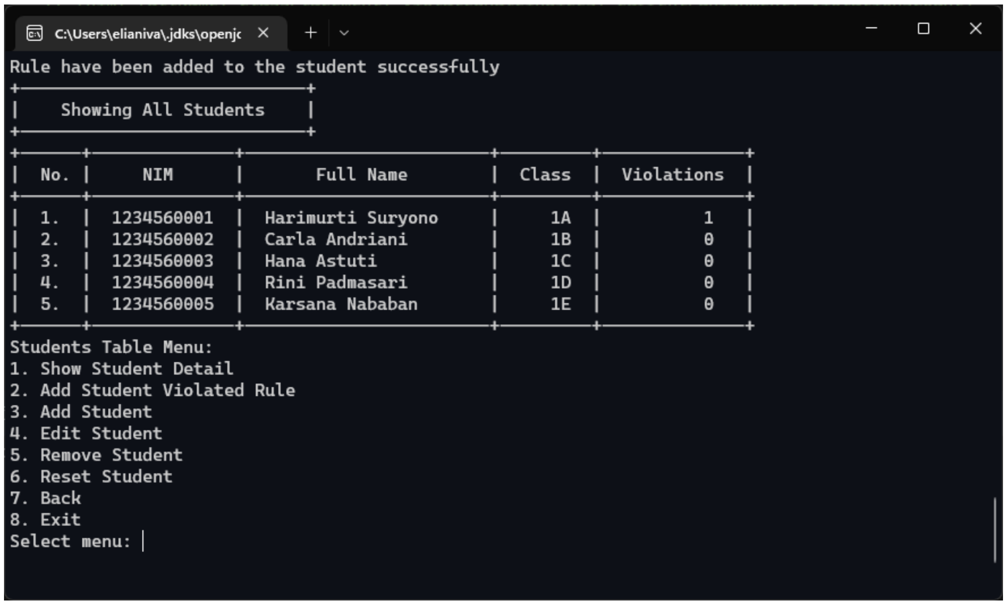
After successfuly selcting the student, the app will show the list of the rules and ask for a rule id to be attached to the student indicating that the student has violated that rule. The same input validation applies.



```
Rule with the code of R000 doesn't exist!
+--------------------------------+
|    Add Violated Rule to Student    |
+--------------------------------+
+------------------------+
|    Showing All Rules    |
+------------------------+
+------+--------+------------------------------------------------------------------------------------------------+---------+
| No.  |   ID   |                                          Description                                           |  Level  |
+------+--------+------------------------------------------------------------------------------------------------+---------+
|  1.  |  R001  |  Communicating in a disrespectful manner, whether written or written to students, lecturers, employees, or others  |     5   |
|  2.  |  R002  |  Eating, or drinking in the lecture theatre/laboratory/workshop                                 |     4   |
|  3.  |  R003  |  Students sporting punk-style hair, painted other than black and/or skinned                    |     4   |
|  4.  |  R004  |  Violating the rules / regulations that apply in Polinema both in the Department / Study Programme |     3   |
|  5.  |  R005  |  Not maintaining cleanliness in all areas of Polinema                                          |     3   |
|  6.  |  R006  |  Smoking outside the smoking area                                                              |     3   |
|  7.  |  R007  |  Playing cards, online games in the campus area                                                |     3   |
|  8.  |  R008  |  Damaging facilities and infrastructure in the Polinema area                                   |     2   |
|  9.  |  R009  |  Accessing pornographic material in class or campus areas                                      |     2   |
| 10.  |  R010  |  Conducting practical political activities on campus                                           |     2   |
| 11.  |  R012  |  Using psychotropic substances and / or other addictive substances other addictive substances  |     1   |
+------+--------+------------------------------------------------------------------------------------------------+---------+
Rule's Code: R002
```

Figure 5: The app asking for rule's id and showing a warning when student was not found

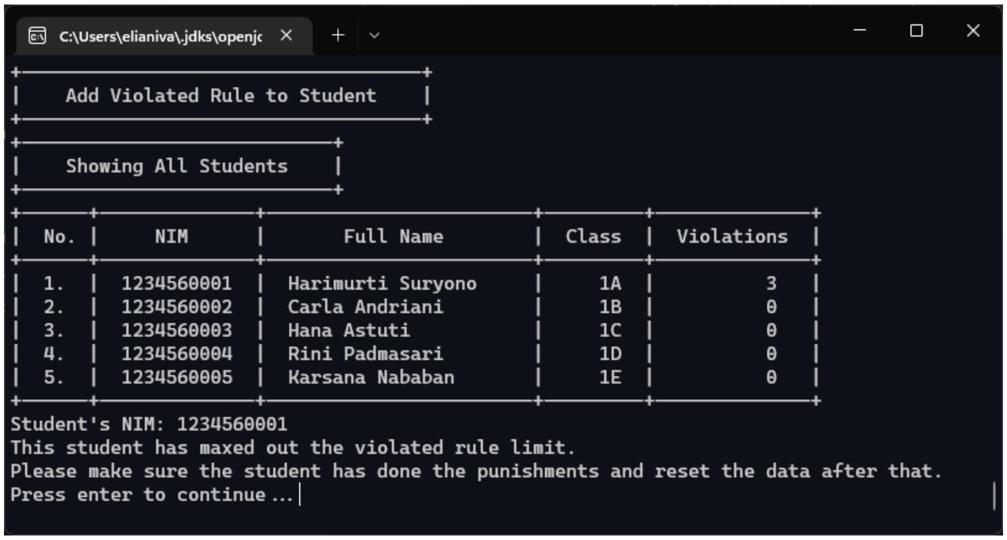
The app should show the success message after attaching the rule to the student



```
Rule have been added to the student successfully
+------------------------+
|    Showing All Students    |
+------------------------+
+------+--------------+-------------------------+---------+-------------+
| No.  |     NIM      |        Full Name        |  Class  |  Violations |
+------+--------------+-------------------------+---------+-------------+
| 1.   |  1234560001  |  Harimurti Suryono      |    1A   |           1 |
| 2.   |  1234560002  |  Carla Andriani         |    1B   |           0 |
| 3.   |  1234560003  |  Hana Astuti            |    1C   |           0 |
| 4.   |  1234560004  |  Rini Padmasari         |    1D   |           0 |
| 5.   |  1234560005  |  Karsana Nababan        |    1E   |           0 |
+------+--------------+-------------------------+---------+-------------+
Students Table Menu:
1. Show Student Detail
2. Add Student Violated Rule
3. Add Student
4. Edit Student
5. Remove Student
6. Reset Student
7. Back
8. Exit
Select menu:
```

Figure 6: The app showing a success message

If the student has maxed out the limit, meaning that they have violated 3 rules and haven't done the punishment that is given, then the app will throw an error.



```
+----------------------------------+
|    Add Violated Rule to Student    |
+----------------------------------+
+------------------------+
|    Showing All Students    |
+------------------------+
+------+--------------+-------------------------+---------+-------------+
| No.  |     NIM      |        Full Name        |  Class  |  Violations |
+------+--------------+-------------------------+---------+-------------+
| 1.   |  1234560001  |  Harimurti Suryono      |    1A   |       3     |
| 2.   |  1234560002  |  Carla Andriani         |    1B   |       0     |
| 3.   |  1234560003  |  Hana Astuti            |    1C   |       0     |
| 4.   |  1234560004  |  Rini Padmasari         |    1D   |       0     |
| 5.   |  1234560005  |  Karsana Nababan        |    1E   |       0     |
+------+--------------+-------------------------+---------+-------------+
Student's NIM: 1234560001
This student has maxed out the violated rule limit.
Please make sure the student has done the punishments and reset the data after that.
Press enter to continue ...
```

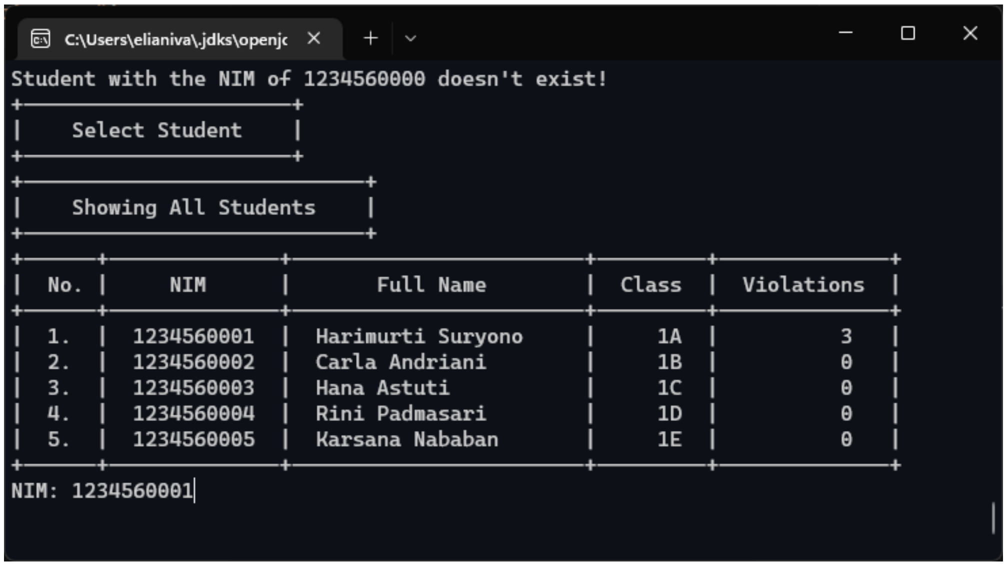
Figure 7: The app showing an error because it maxed out

Here are some brief rules regarding the rules:

- If the student has 3 rules, new rule can't be added. The student need to be reset first.
- If the student received 3 rules on the same level, the next punishment is going to be the punishment for the next level.

### 3.2.3 Showing a Student Detail

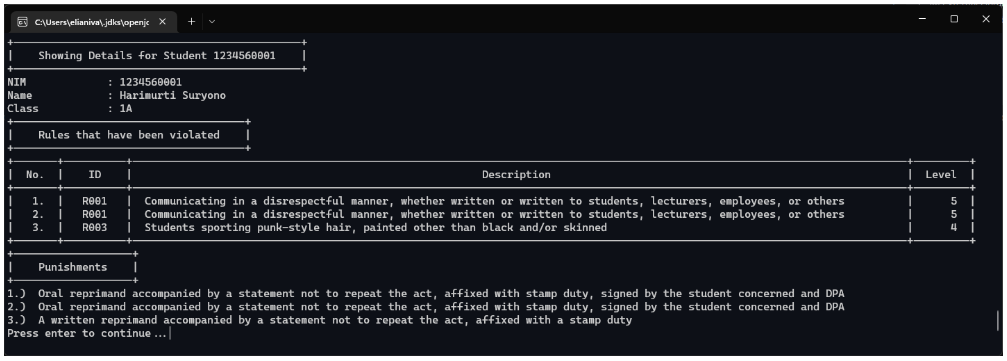
To show a student detail, simply select the **Show Student Detail** menu and the app will prompt for a student NIM.



```
Student with the NIM of 1234560000 doesn't exist!
+------------------------+
|    Select Student      |
+------------------------+
+------------------------------+
|    Showing All Students      |
+------------------------------+
+-------+--------------+------------------------+---------+---------------+
| No.  |     NIM      |       Full Name        | Class  |  Violations   |
+-------+--------------+------------------------+---------+---------------+
|  1.  |  1234560001  |  Harimurti Suryono     |    1A  |            3  |
|  2.  |  1234560002  |  Carla Andriani        |    1B  |            0  |
|  3.  |  1234560003  |  Hana Astuti           |    1C  |            0  |
|  4.  |  1234560004  |  Rini Padmasari        |    1D  |            0  |
|  5.  |  1234560005  |  Karsana Nababan       |    1E  |            0  |
+-------+--------------+------------------------+---------+---------------+
NIM: 1234560001
```

Figure 8: The app asking for a Student NIM

The student detail shows their detail along with their violated rules and punishments.

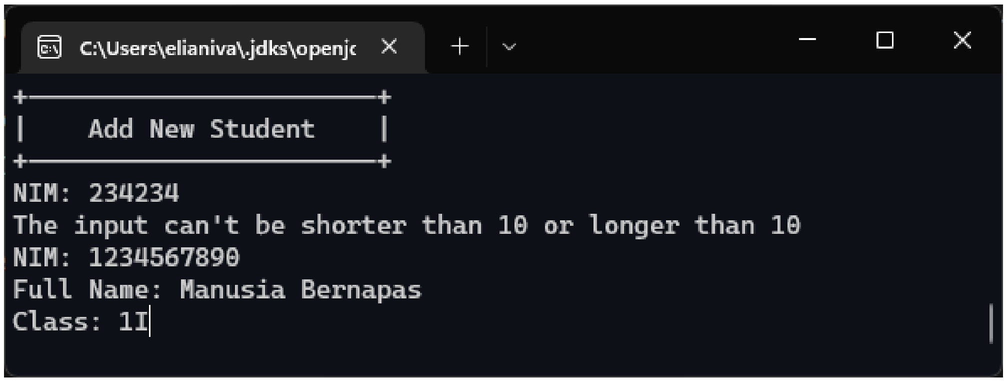


```
+------------------------------------------+
|    Showing Details for Student 1234560001    |
+------------------------------------------+
NIM            : 1234560001
Name           : Harimurti Suryono
Class          : 1A
+------------------------------------+
|    Rules that have been violated    |
+------------------------------------+
+-------+--------+-------------------------------------------------------------------------------------------------+---------+
| No.  |   ID   |                                   Description                                    |  Level  |
+-------+--------+-------------------------------------------------------------------------------------------------+---------+
|  1.  |  R001  |  Communicating in a disrespectful manner, whether written or written to students, lecturers, employees, or others  |     5  |
|  2.  |  R001  |  Communicating in a disrespectful manner, whether written or written to students, lecturers, employees, or others  |     5  |
|  3.  |  R003  |  Students sporting punk-style hair, painted other than black and/or skinned                                        |     4  |
+-------+--------+-------------------------------------------------------------------------------------------------+---------+
+--------------------+
|    Punishments     |
+--------------------+
1.)  Oral reprimand accompanied by a statement not to repeat the act, affixed with stamp duty, signed by the student concerned and DPA
2.)  Oral reprimand accompanied by a statement not to repeat the act, affixed with stamp duty, signed by the student concerned and DPA
3.)  A written reprimand accompanied by a statement not to repeat the act, affixed with a stamp duty
Press enter to continue ...
```

Figure 9: The app showing Student's detail

### 3.2.4 Adding a New Student

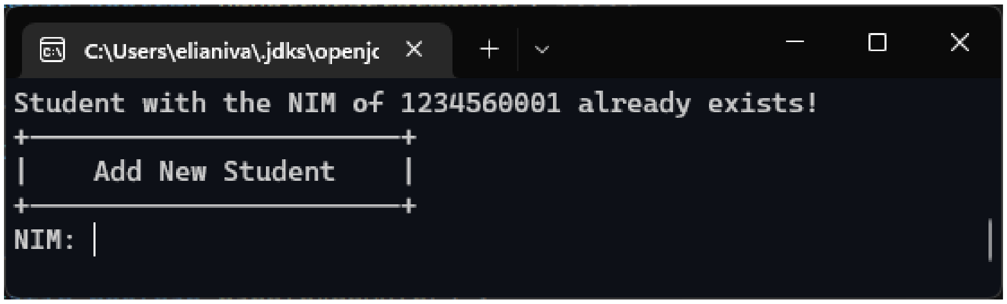
To add a new student, pick the **Add Student** menu. The app should ask for the student details. After inserting all of the students detail, the app should print a success message.



```
+------------------------+
|    Add New Student     |
+------------------------+
NIM: 234234
The input can't be shorter than 10 or longer than 10
NIM: 1234567890
Full Name: Manusia Bernapas
Class: 1I
```

Figure 10: The app asking for student's data and showing a warning on invalid input

If a student with the same NIM already exists, the app will print a warning and ask for a new student's detail.

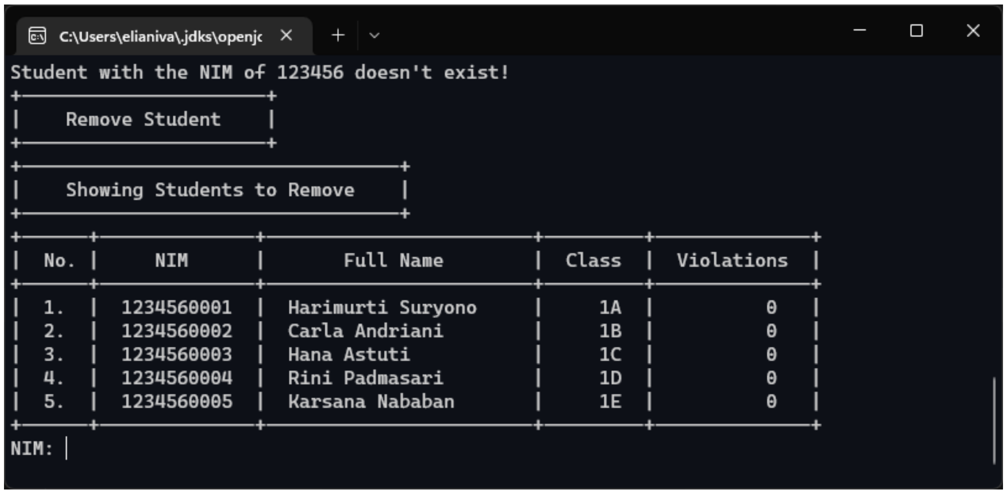


```
Student with the NIM of 1234560001 already exists!
+------------------------+
|    Add New Student     |
+------------------------+
NIM: 
```

Figure 11: The app showing a warning because the student already exists

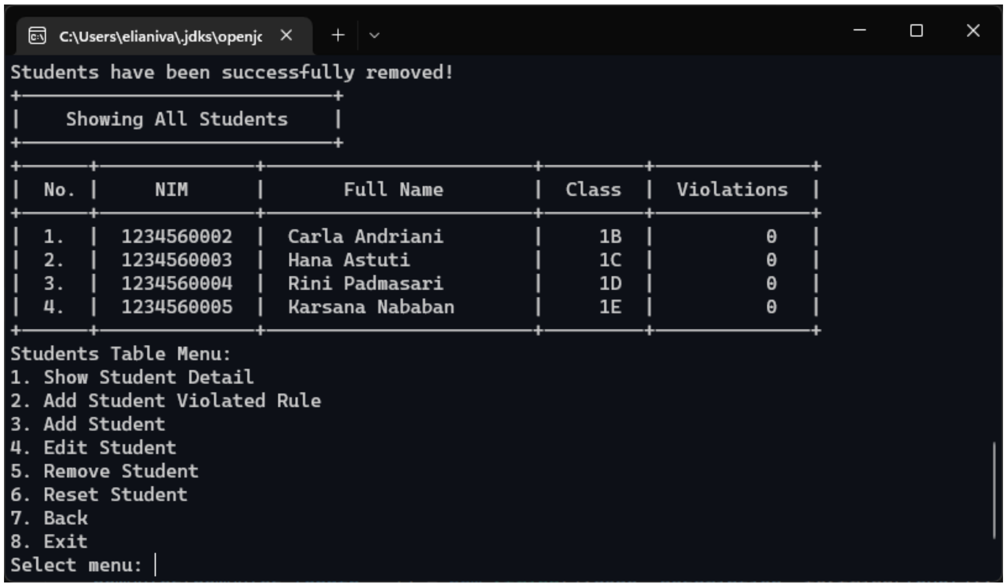
### 3.2.5 Removing a Student

Removing a student is quite straight forward. Select the **Remove Student** menu and the app should ask for a NIM. If the student exists, a success message should be printed. Otherwise, a warning will be printed and the app will ask for another NIM.



```
Student with the NIM of 123456 doesn't exist!
+----------------------+
|    Remove Student    |
+----------------------+
+-----------------------------------+
|    Showing Students to Remove     |
+-----------------------------------+
+------+--------------+------------------------+---------+--------------+
| No.  |     NIM      |       Full Name        |  Class  |  Violations  |
+------+--------------+------------------------+---------+--------------+
| 1.   | 1234560001   | Harimurti Suryono      |    1A   |          0   |
| 2.   | 1234560002   | Carla Andriani         |    1B   |          0   |
| 3.   | 1234560003   | Hana Astuti            |    1C   |          0   |
| 4.   | 1234560004   | Rini Padmasari         |    1D   |          0   |
| 5.   | 1234560005   | Karsana Nababan        |    1E   |          0   |
+------+--------------+------------------------+---------+--------------+
NIM:
```

Figure 12: The app showing a warning because the student doesn't exists

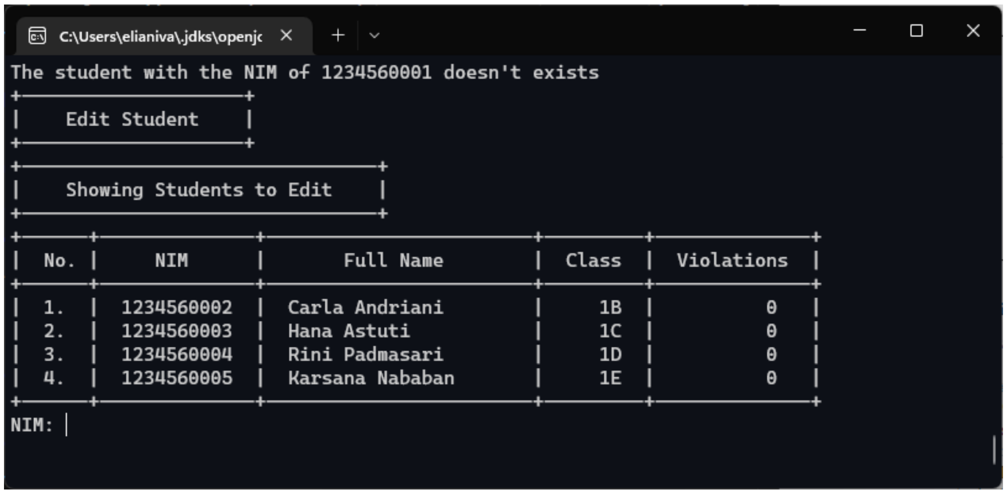


```
Students have been successfully removed!
+----------------------------+
|    Showing All Students    |
+----------------------------+
+------+--------------+------------------------+---------+--------------+
| No.  |     NIM      |       Full Name        |  Class  |  Violations  |
+------+--------------+------------------------+---------+--------------+
| 1.   | 1234560002   | Carla Andriani         |    1B   |          0   |
| 2.   | 1234560003   | Hana Astuti            |    1C   |          0   |
| 3.   | 1234560004   | Rini Padmasari         |    1D   |          0   |
| 4.   | 1234560005   | Karsana Nababan        |    1E   |          0   |
+------+--------------+------------------------+---------+--------------+
Students Table Menu:
1. Show Student Detail
2. Add Student Violated Rule
3. Add Student
4. Edit Student
5. Remove Student
6. Reset Student
7. Back
8. Exit
Select menu:
```

Figure 13: The app showing a success message because the student has been deleted

### 3.2.6 Editing a Student

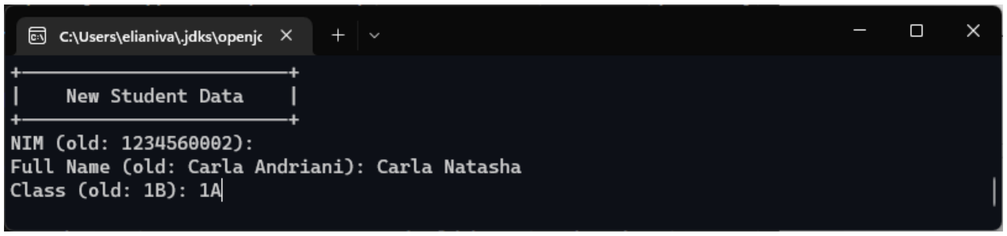
To edit a student's data, pick the TODO menu. The app will ask for a NIM and if the student with that NIM is found, the app will continue to ask for other details. Otherwise, a warning message saying that the student doesn't exist should be printed.



```
The student with the NIM of 1234560001 doesn't exists
+-------------------+
|    Edit Student   |
+-------------------+
+------------------------------+
|    Showing Students to Edit  |
+------------------------------+
+------+-------------+----------------------+---------+-------------+
| No.  |     NIM     |      Full Name       |  Class  | Violations  |
+------+-------------+----------------------+---------+-------------+
|  1.  | 1234560002  |  Carla Andriani      |    1B   |         0   |
|  2.  | 1234560003  |  Hana Astuti         |    1C   |         0   |
|  3.  | 1234560004  |  Rini Padmasari      |    1D   |         0   |
|  4.  | 1234560005  |  Karsana Nababan     |    1E   |         0   |
+------+-------------+----------------------+---------+-------------+
NIM: 
```

Figure 14: The app showing a warning because the student doesn't exists

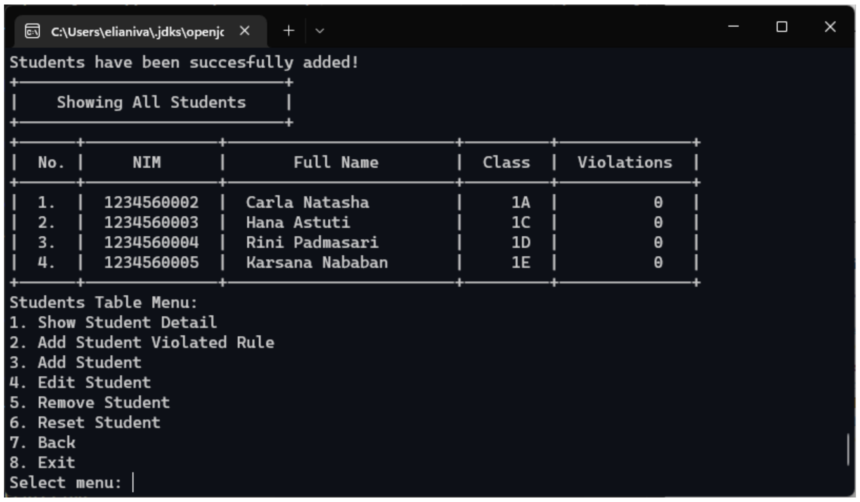
To preserve the old data, simply leave the input empty like shown below:



```
+----------------------+
|    New Student Data  |
+----------------------+
NIM (old: 1234560002):
Full Name (old: Carla Andriani): Carla Natasha
Class (old: 1B): 1A
```

Figure 15: The app asking for the new studen'ts detail

After inserting the new Student data, the app will check if the new NIM will conflict with the old one. If it doesn't then the app will modify the old data with the new one, otherwise a print warning will be printed and the app will ask again for the new student data.

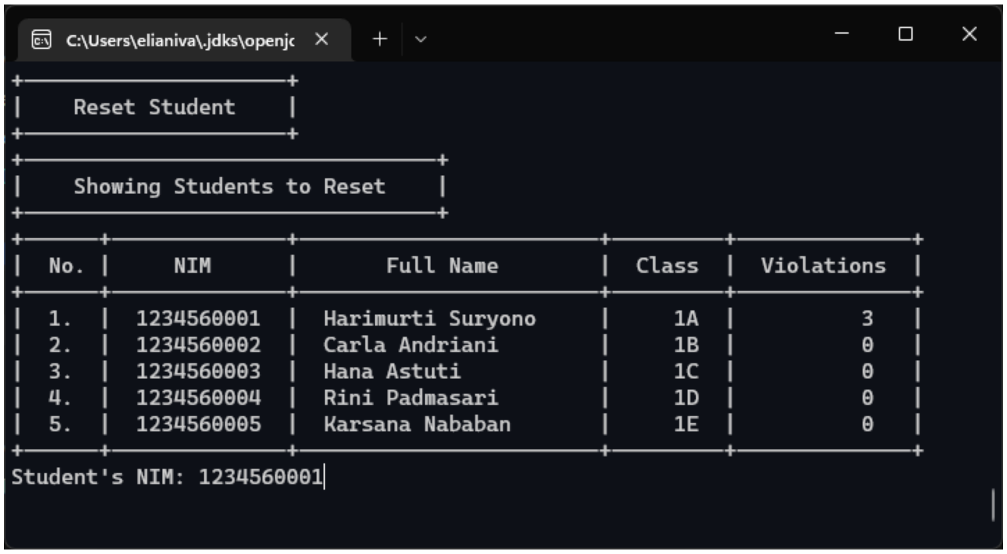


```
Students have been succesfully added!
+--------------------------+
|   Showing All Students   |
+--------------------------+
+------+-------------+----------------------+---------+-------------+
| No.  |     NIM     |      Full Name       |  Class  |  Violations |
+------+-------------+----------------------+---------+-------------+
|  1.  | 1234560002  | Carla Natasha        |    1A   |           0 |
|  2.  | 1234560003  | Hana Astuti          |    1C   |           0 |
|  3.  | 1234560004  | Rini Padmasari       |    1D   |           0 |
|  4.  | 1234560005  | Karsana Nababan      |    1E   |           0 |
+------+-------------+----------------------+---------+-------------+
Students Table Menu:
1. Show Student Detail
2. Add Student Violated Rule
3. Add Student
4. Edit Student
5. Remove Student
6. Reset Student
7. Back
8. Exit
Select menu: 
```

Figure 16: The app showing a success message because the student has been edited

### 3.2.7 Reset a Student

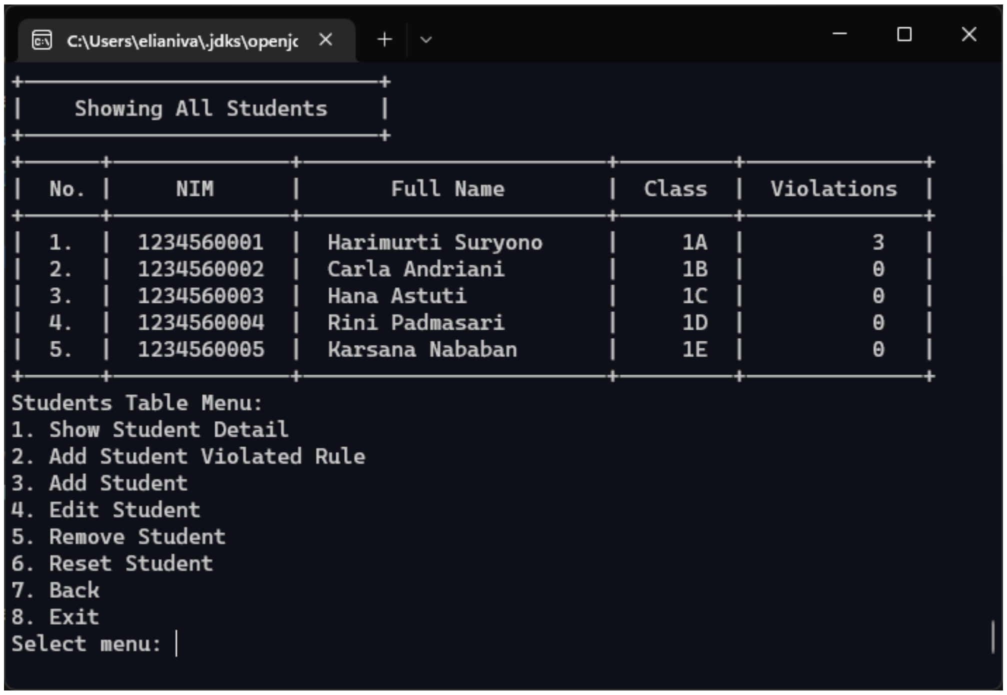
When a student has maxed out their limit, a reset needs to be done before adding a new violated rule. To perform this, select the **Reset Student** menu and the app should ask for a student's NIM.



```
+-------------------+
|   Reset Student   |
+-------------------+
+----------------------------------+
|   Showing Students to Reset      |
+----------------------------------+
+------+-------------+----------------------+---------+-------------+
| No.  |     NIM     |      Full Name       |  Class  |  Violations |
+------+-------------+----------------------+---------+-------------+
|  1.  | 1234560001  | Harimurti Suryono    |    1A   |           3 |
|  2.  | 1234560002  | Carla Andriani       |    1B   |           0 |
|  3.  | 1234560003  | Hana Astuti          |    1C   |           0 |
|  4.  | 1234560004  | Rini Padmasari       |    1D   |           0 |
|  5.  | 1234560005  | Karsana Nababan      |    1E   |           0 |
+------+-------------+----------------------+---------+-------------+
Student's NIM: 1234560001
```

Figure 17: The app asking a student's NIM to reset

When the NIM is valid, the app should display a success message

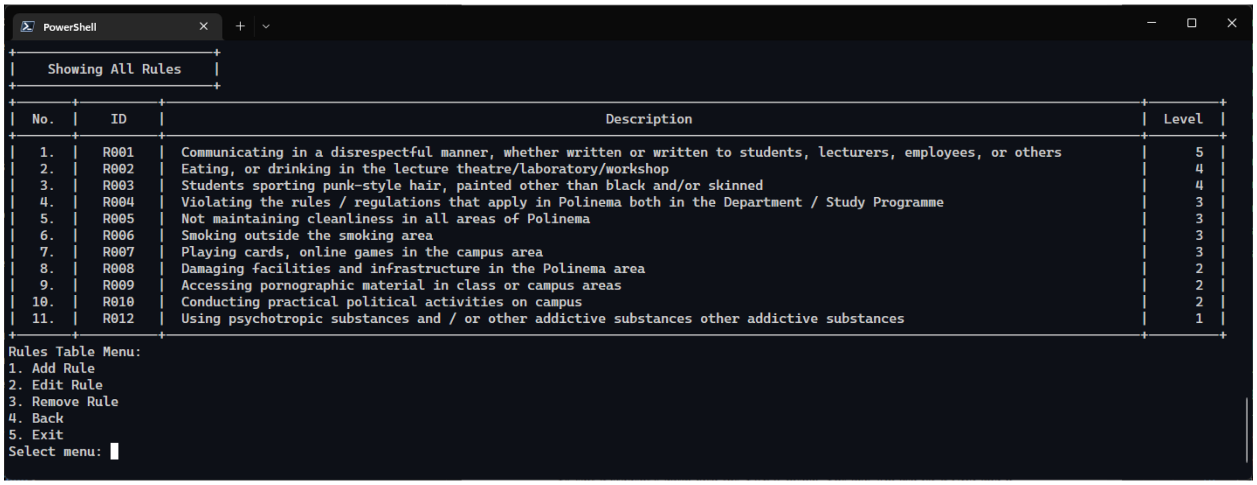


```
+---------------------------+
|    Showing All Students   |
+---------------------------+
+------+--------------+-------------------------+----------+---------------+
| No.  |     NIM      |        Full Name        |  Class   |  Violations   |
+------+--------------+-------------------------+----------+---------------+
|  1.  |  1234560001  |  Harimurti Suryono      |    1A    |          3    |
|  2.  |  1234560002  |  Carla Andriani         |    1B    |          0    |
|  3.  |  1234560003  |  Hana Astuti            |    1C    |          0    |
|  4.  |  1234560004  |  Rini Padmasari         |    1D    |          0    |
|  5.  |  1234560005  |  Karsana Nababan        |    1E    |          0    |
+------+--------------+-------------------------+----------+---------------+
Students Table Menu:
1. Show Student Detail
2. Add Student Violated Rule
3. Add Student
4. Edit Student
5. Remove Student
6. Reset Student
7. Back
8. Exit
Select menu:
```

Figure 18: The app showing a success message after resetting a student

## 3.3 Rules Menu

On the main menu, choose the second menu to show a list of actions related to Rules operations. The app should now display all rules along with their menu.



```
+--------------------------+
|    Showing All Rules     |
+--------------------------+
+-------+----------+------------------------------------------------------------------------------------------------------------+---------+
|  No.  |    ID    |                                                 Description                                                | Level   |
+-------+----------+------------------------------------------------------------------------------------------------------------+---------+
|   1.  |   R001   |  Communicating in a disrespectful manner, whether written or written to students, lecturers, employees, or others |    5    |
|   2.  |   R002   |  Eating, or drinking in the lecture theatre/laboratory/workshop                                           |    4    |
|   3.  |   R003   |  Students sporting punk-style hair, painted other than black and/or skinned                                |    4    |
|   4.  |   R004   |  Violating the rules / regulations that apply in Polinema both in the Department / Study Programme          |    3    |
|   5.  |   R005   |  Not maintaining cleanliness in all areas of Polinema                                                     |    3    |
|   6.  |   R006   |  Smoking outside the smoking area                                                                         |    3    |
|   7.  |   R007   |  Playing cards, online games in the campus area                                                           |    3    |
|   8.  |   R008   |  Damaging facilities and infrastructure in the Polinema area                                              |    2    |
|   9.  |   R009   |  Accessing pornographic material in class or campus areas                                                 |    2    |
|  10.  |   R010   |  Conducting practical political activities on campus                                                      |    2    |
|  11.  |   R012   |  Using psychotropic substances and / or other addictive substances other addictive substances             |    1    |
+-------+----------+------------------------------------------------------------------------------------------------------------+---------+
Rules Table Menu:
1. Add Rule
2. Edit Rule
3. Remove Rule
4. Back
5. Exit
Select menu: █
```

Figure 19: The app showing rules list along with their menu

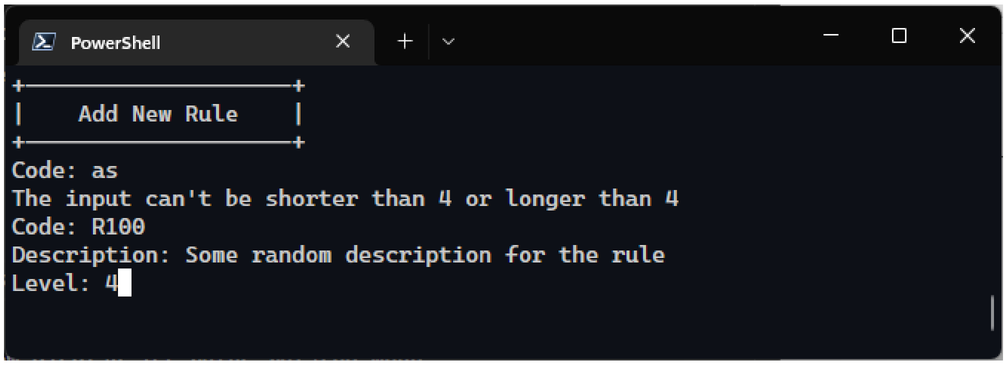
### 3.3.1 Rule Entity

Before going with the rest of the menu, there are some things that should be noted. These are some details regarding each Student entity along with its validation

1. **Code**
   - Min Length: 4 characters
   - Max Length: 4 characters
   - Allowed to be empty: No
2. **Description**
   - Min Length: 10 character
   - Max Length: 120 characters
   - Allowed to be empty: No
3. **Level**
   - Min: 1
   - Max: 5
   - Allowed to be empty: No

### 3.3.2 Adding a New Rule

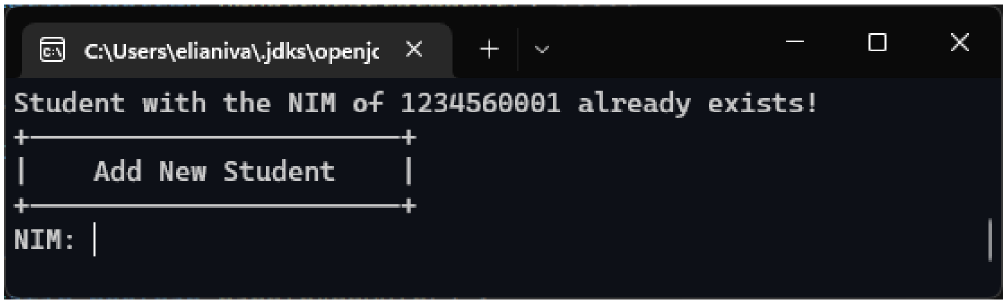
To add a new rule, pick the **Add Rule** menu. The app should ask for the rule details. After inserting all of the rule details, the app should print a success message.



```
+--------------------+
|    Add New Rule    |
+--------------------+
Code: as
The input can't be shorter than 4 or longer than 4
Code: R100
Description: Some random description for the rule
Level: 4
```

Figure 20: The app asking for rule's data and showing a warning on invalid input

If a rule with the same code already exists, the app will print a warning and ask for a new rule detail.

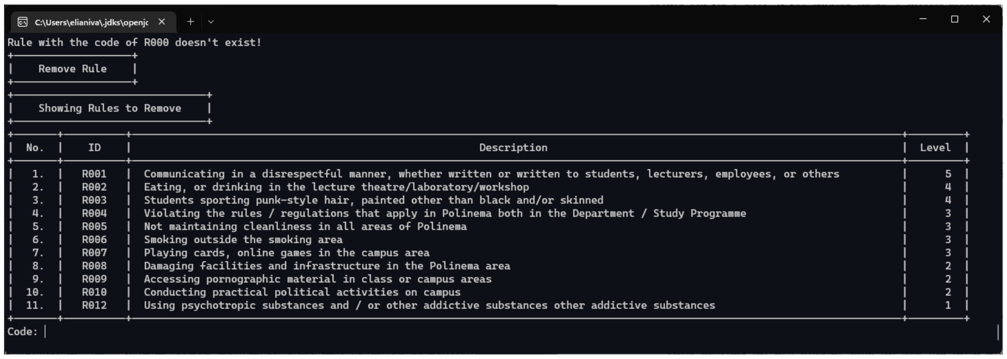


```
Student with the NIM of 1234560001 already exists!
+------------------------+
|    Add New Student     |
+------------------------+
NIM:
```

Figure 21: The app asking for rule's data and showing a warning on invalid input

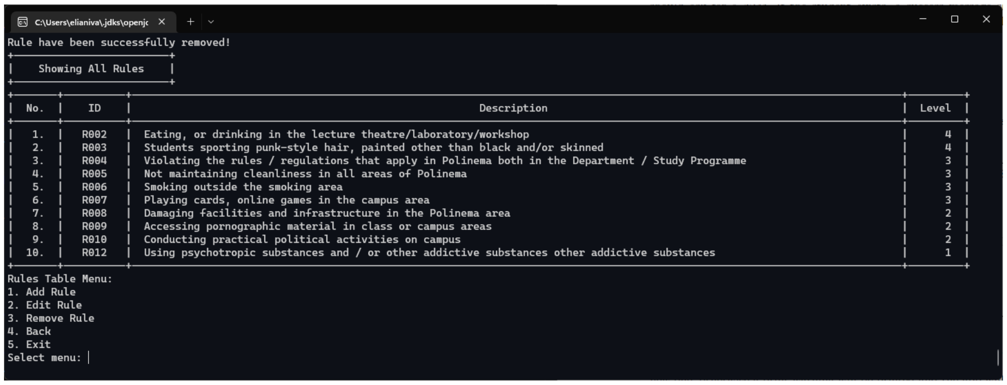
### 3.3.3 Removing a Rule

Removing a student is quite straight forward. Select the TODO menu and the app should ask for a NIM. If the student exists, a success message should be printed. Otherwise, a warning will be printed and the app will ask for another NIM.



```
Rule with the code of R000 doesn't exist!
+-------------------+
|    Remove Rule    |
+-------------------+
+--------------------------------+
|    Showing Rules to Remove     |
+--------------------------------+
+--------+----------+-------------------------------------------------------------------------------------------------------------------------------+---------+
|  No.   |    ID    |                                                          Description                                                          |  Level  |
+--------+----------+-------------------------------------------------------------------------------------------------------------------------------+---------+
|   1.   |   R001   |  Communicating in a disrespectful manner, whether written or written to students, lecturers, employees, or others             |      5  |
|   2.   |   R002   |  Eating, or drinking in the lecture theatre/laboratory/workshop                                                               |      4  |
|   3.   |   R003   |  Students sporting punk-style hair, painted other than black and/or skinned                                                   |      4  |
|   4.   |   R004   |  Violating the rules / regulations that apply in Polinema both in the Department / Study Programme                            |      3  |
|   5.   |   R005   |  Not maintaining cleanliness in all areas of Polinema                                                                         |      3  |
|   6.   |   R006   |  Smoking outside the smoking area                                                                                             |      3  |
|   7.   |   R007   |  Playing cards, online games in the campus area                                                                               |      3  |
|   8.   |   R008   |  Damaging facilities and infrastructure in the Polinema area                                                                  |      2  |
|   9.   |   R009   |  Accessing pornographic material in class or campus areas                                                                     |      2  |
|  10.   |   R010   |  Conducting practical political activities on campus                                                                          |      2  |
|  11.   |   R012   |  Using psychotropic substances and / or other addictive substances other addictive substances                                 |      1  |
+--------+----------+-------------------------------------------------------------------------------------------------------------------------------+---------+
Code: 
```

Figure 22: The app showing a warning because the rule doesn't exist

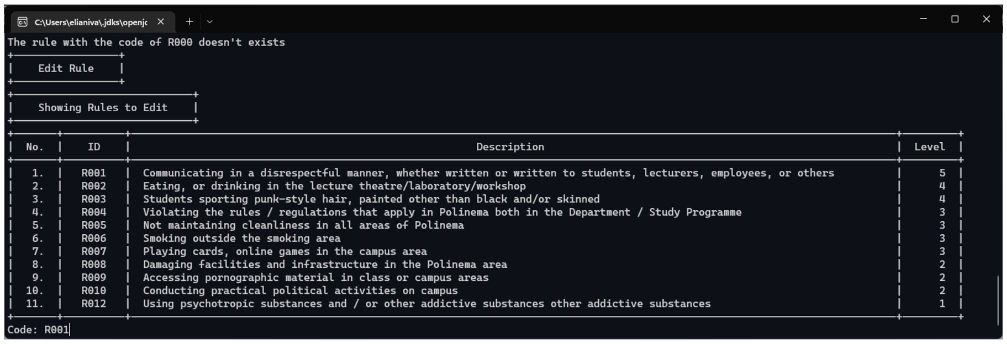


```
Rule have been successfully removed!
+--------------------------+
|    Showing All Rules     |
+--------------------------+
+--------+----------+-------------------------------------------------------------------------------------------------------------------------------+---------+
|  No.   |    ID    |                                                          Description                                                          |  Level  |
+--------+----------+-------------------------------------------------------------------------------------------------------------------------------+---------+
|   1.   |   R002   |  Eating, or drinking in the lecture theatre/laboratory/workshop                                                               |      4  |
|   2.   |   R003   |  Students sporting punk-style hair, painted other than black and/or skinned                                                   |      4  |
|   3.   |   R004   |  Violating the rules / regulations that apply in Polinema both in the Department / Study Programme                            |      3  |
|   4.   |   R005   |  Not maintaining cleanliness in all areas of Polinema                                                                         |      3  |
|   5.   |   R006   |  Smoking outside the smoking area                                                                                             |      3  |
|   6.   |   R007   |  Playing cards, online games in the campus area                                                                               |      3  |
|   7.   |   R008   |  Damaging facilities and infrastructure in the Polinema area                                                                  |      2  |
|   8.   |   R009   |  Accessing pornographic material in class or campus areas                                                                     |      2  |
|   9.   |   R010   |  Conducting practical political activities on campus                                                                          |      2  |
|  10.   |   R012   |  Using psychotropic substances and / or other addictive substances other addictive substances                                 |      1  |
+--------+----------+-------------------------------------------------------------------------------------------------------------------------------+---------+
Rules Table Menu:
1. Add Rule
2. Edit Rule
3. Remove Rule
4. Back
5. Exit
Select menu: 
```

Figure 23: The app showing a success message because the rule has been deleted

### 3.3.4 Editing a Rule

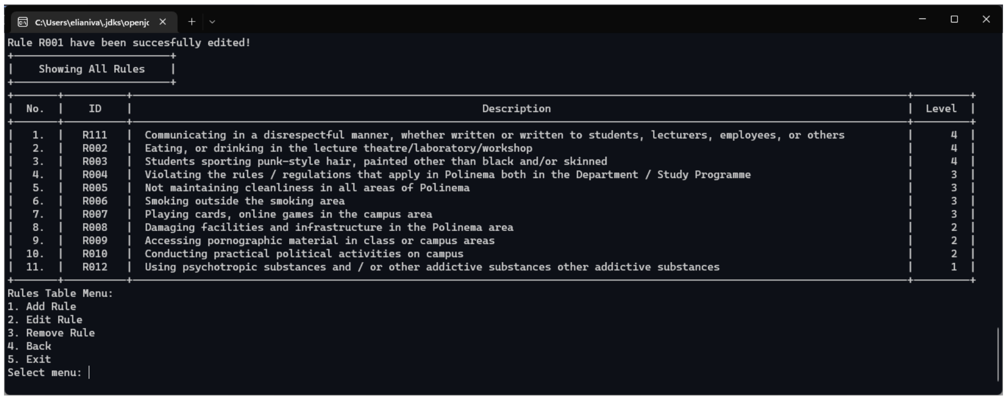
To edit a student's data, pick the TODO menu. The app will ask for a NIM and if the student with that NIM is found, the app will continue to ask for other details. Otherwise, a warning message saying that the student doesn't exist should be printed.



```
C:\Users\elianiva\.jdks\openjc
The rule with the code of R000 doesn't exists
+---------------+
|   Edit Rule   |
+---------------+
+-------------------------+
|   Showing Rules to Edit   |
+-------------------------+
+------+--------+--------------------------------------------------------------------------------------------------+-------+
| No.  |   ID   |                                            Description                                           | Level |
+------+--------+--------------------------------------------------------------------------------------------------+-------+
|  1.  |  R001  |  Communicating in a disrespectful manner, whether written or written to students, lecturers, employees, or others  |   5   |
|  2.  |  R002  |  Eating, or drinking in the lecture theatre/laboratory/workshop                                  |   4   |
|  3.  |  R003  |  Students sporting punk-style hair, painted other than black and/or skinned                      |   4   |
|  4.  |  R004  |  Violating the rules / regulations that apply in Polinema both in the Department / Study Programme |   3   |
|  5.  |  R005  |  Not maintaining cleanliness in all areas of Polinema                                            |   3   |
|  6.  |  R006  |  Smoking outside the smoking area                                                                |   3   |
|  7.  |  R007  |  Playing cards, online games in the campus area                                                  |   3   |
|  8.  |  R008  |  Damaging facilities and infrastructure in the Polinema area                                     |   2   |
|  9.  |  R009  |  Accessing pornographic material in class or campus areas                                        |   2   |
| 10.  |  R010  |  Conducting practical political activities on campus                                             |   2   |
| 11.  |  R012  |  Using psychotropic substances and / or other addictive substances other addictive substances    |   1   |
+------+--------+--------------------------------------------------------------------------------------------------+-------+
Code: R001
```

Figure 24: The app asking for a rule id and warning

After inserting the new Student data, the app will check if the new NIM will conflict with the old one. If it doesn't then the app will modify the old data with the new one, otherwise a print warning will be printed and the app will ask again for the new student data.



```
C:\Users\elianiva\.jdks\openjc
Rule R001 have been succesfully edited!
+-----------------------+
|   Showing All Rules   |
+-----------------------+
+------+--------+--------------------------------------------------------------------------------------------------+-------+
| No.  |   ID   |                                            Description                                           | Level |
+------+--------+--------------------------------------------------------------------------------------------------+-------+
|  1.  |  R111  |  Communicating in a disrespectful manner, whether written or written to students, lecturers, employees, or others  |   4   |
|  2.  |  R002  |  Eating, or drinking in the lecture theatre/laboratory/workshop                                  |   4   |
|  3.  |  R003  |  Students sporting punk-style hair, painted other than black and/or skinned                      |   4   |
|  4.  |  R004  |  Violating the rules / regulations that apply in Polinema both in the Department / Study Programme |   3   |
|  5.  |  R005  |  Not maintaining cleanliness in all areas of Polinema                                            |   3   |
|  6.  |  R006  |  Smoking outside the smoking area                                                                |   3   |
|  7.  |  R007  |  Playing cards, online games in the campus area                                                  |   3   |
|  8.  |  R008  |  Damaging facilities and infrastructure in the Polinema area                                     |   2   |
|  9.  |  R009  |  Accessing pornographic material in class or campus areas                                        |   2   |
| 10.  |  R010  |  Conducting practical political activities on campus                                             |   2   |
| 11.  |  R012  |  Using psychotropic substances and / or other addictive substances other addictive substances    |   1   |
+------+--------+--------------------------------------------------------------------------------------------------+-------+
Rules Table Menu:
1. Add Rule
2. Edit Rule
3. Remove Rule
4. Back
5. Exit
Select menu:
```

Figure 25: The app showing a success message

## 4 Flowchart

These section describes the flow of the application using a flowchart. All of these flowcharts are made using MermaidJS.

### 4.1 Main Menu

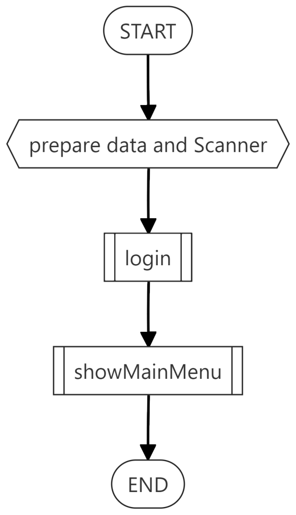


Figure 26: `Main(String[] args)`

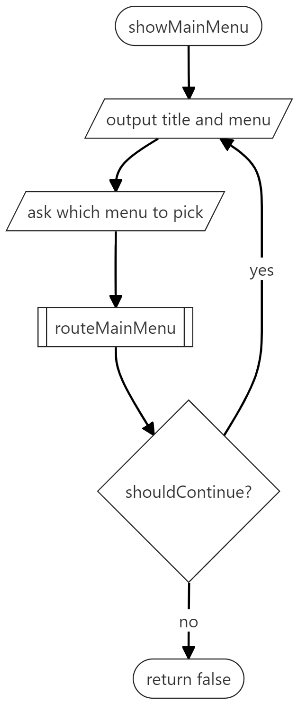


Figure 27: `showMainMenu()`

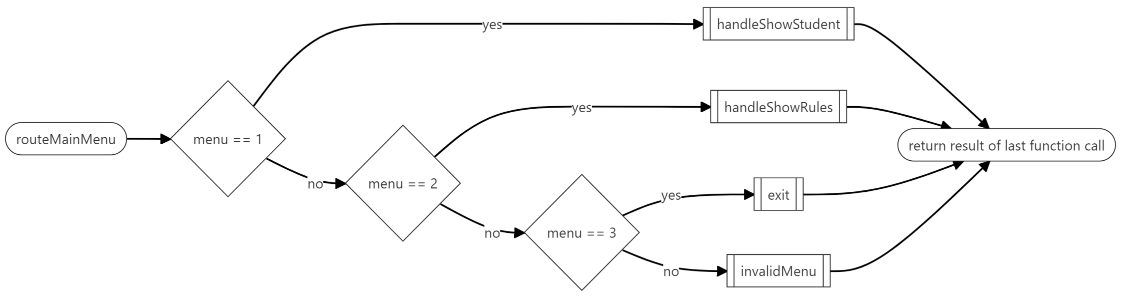


Figure 28: `routeMainMenu(int chosenMenu)`

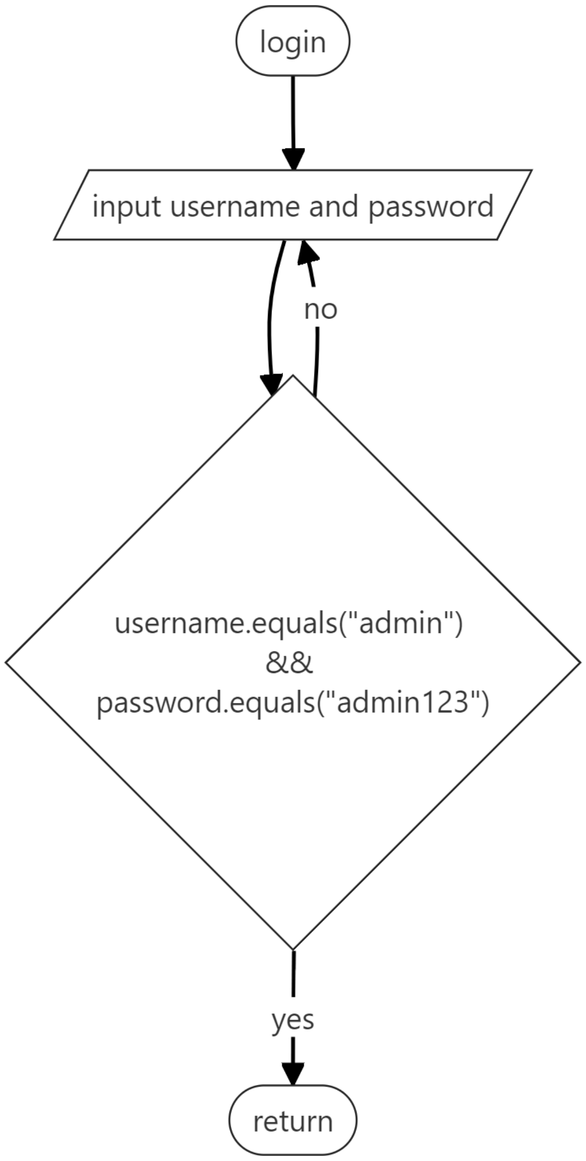


Figure 29: `login()`

## 4.2 Students Menu

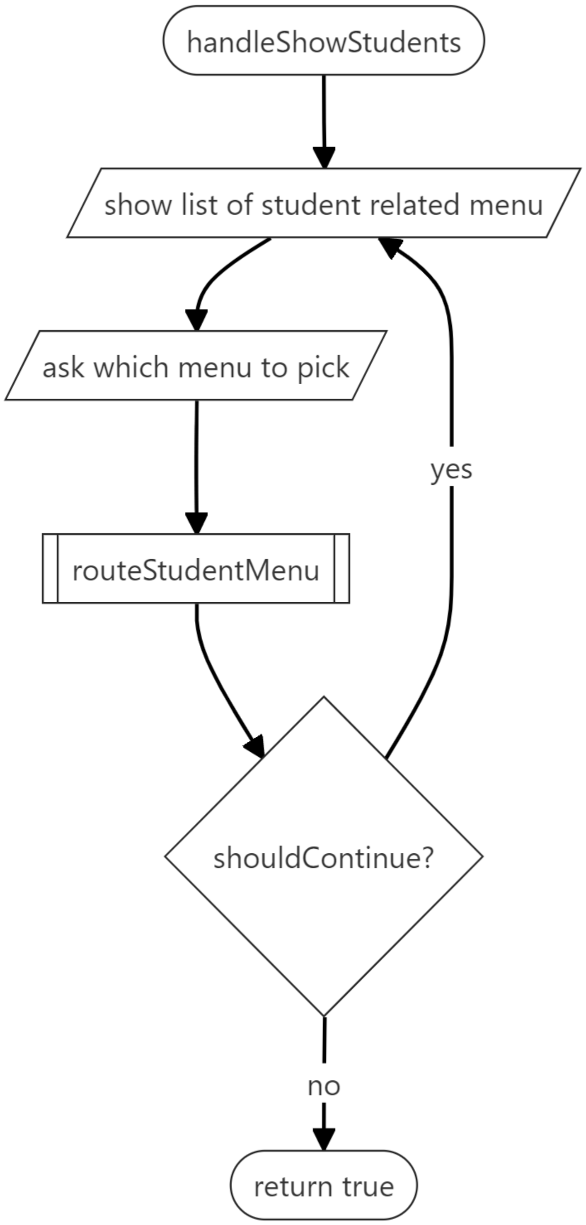


Figure 30: `handleShowStudents()`

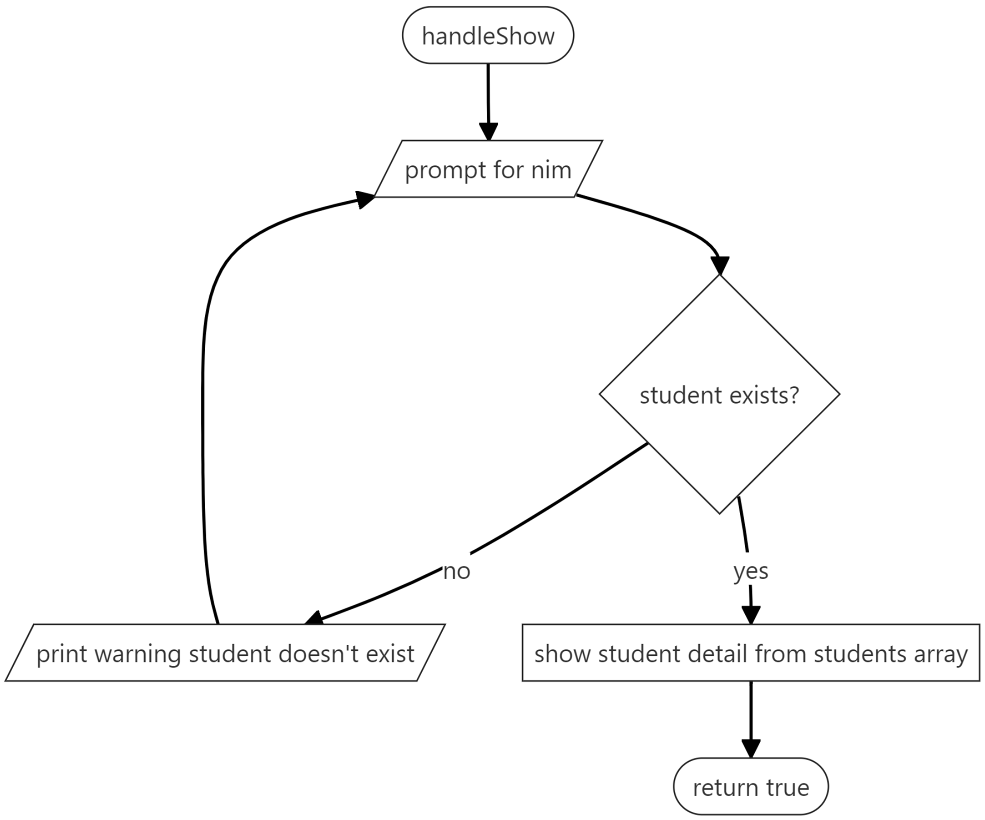

handleShow
prompt for nim
student exists?
no
yes
print warning student doesn't exist
show student detail from students array
return true

Figure 31: `handleShowStudentDetail()`

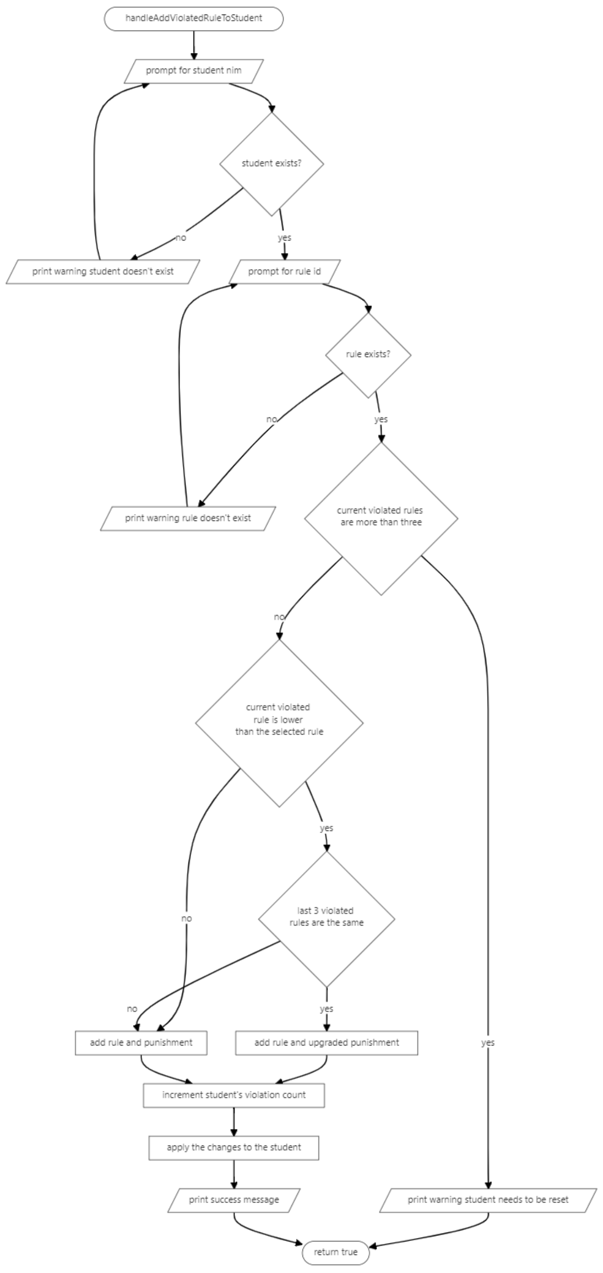

handleAddViolatedRuleToStudent
prompt for student nim
student exists?
no
yes
print warning student doesn't exist
prompt for rule id
rule exists?
no
yes
print warning rule doesn't exist
current violated rules are more than three
no
current violated rule is lower than the selected rule
yes
no
last 3 violated rules are the same
no
yes
add rule and punishment
add rule and upgraded punishment
yes
increment student's violation count
apply the changes to the student
print success message
print warning student needs to be reset
return true

Figure 32: `handleAddViolatedRuleToStudent()`

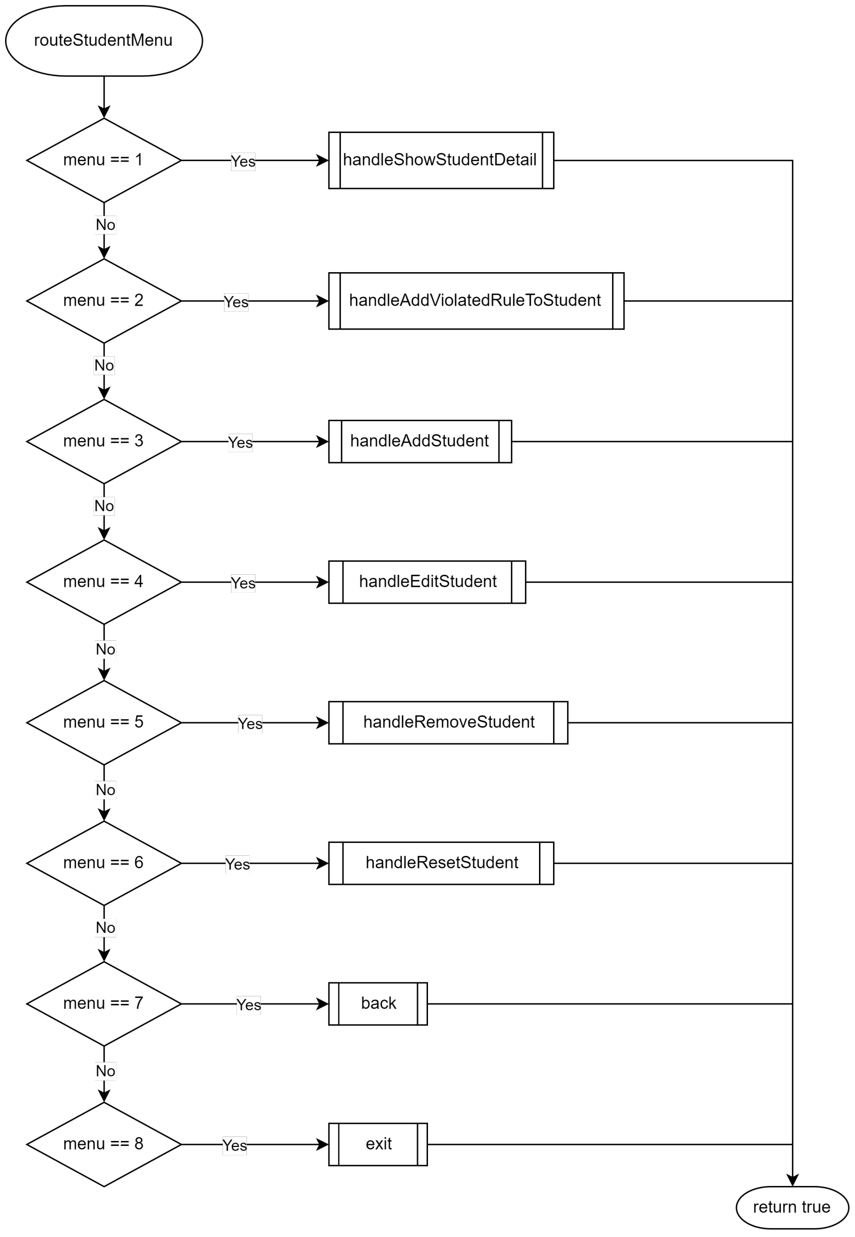


Figure 33: `routeStudentMenu(int chosenMenu)`

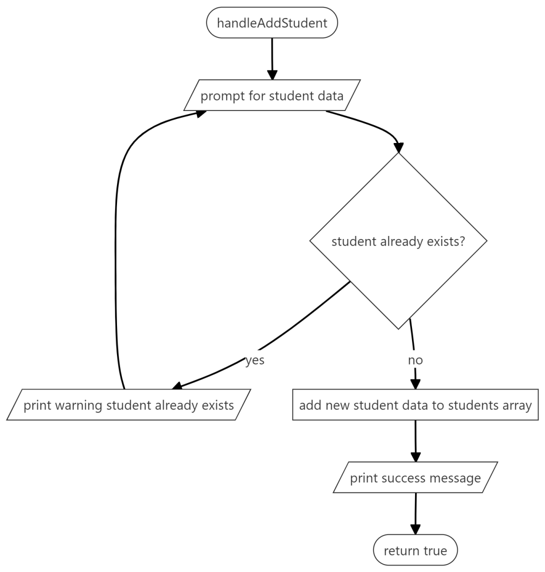


Figure 34: `handleAddStudent()`

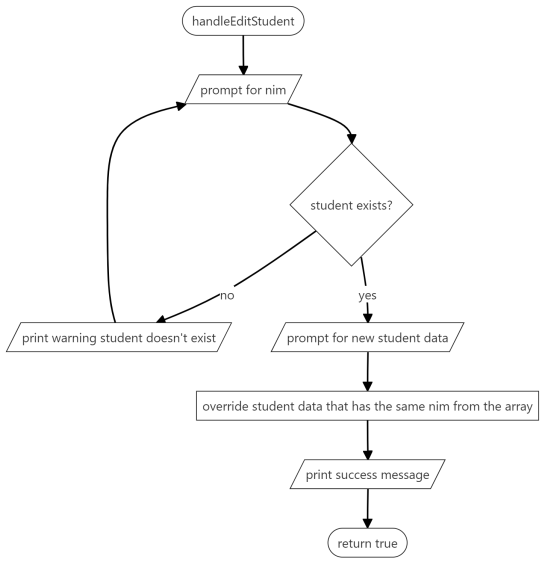

handleEditStudent
prompt for nim
student exists?
no
yes
print warning student doesn't exist
prompt for new student data
override student data that has the same nim from the array
print success message
return true

Figure 35: `handleEditStudent()`

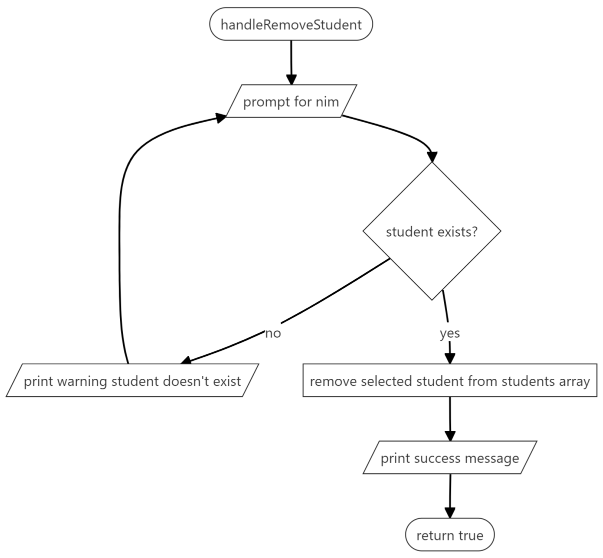


Figure 36: `handleRemoveStudent()`

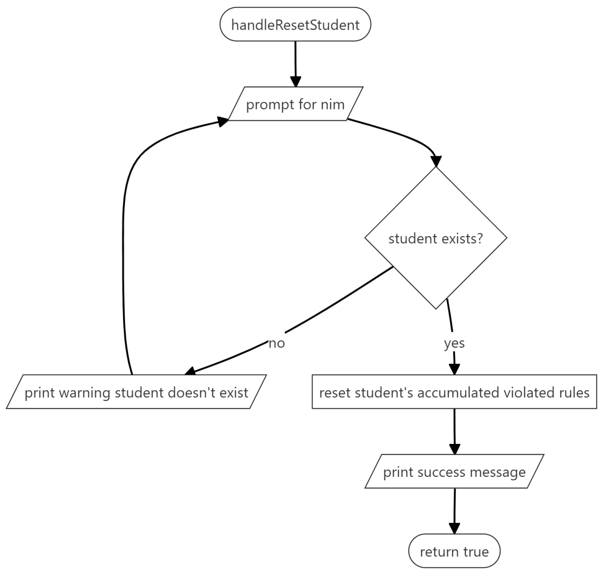


Figure 37: `handleResetStudent()`

## 4.3 Rule Menu

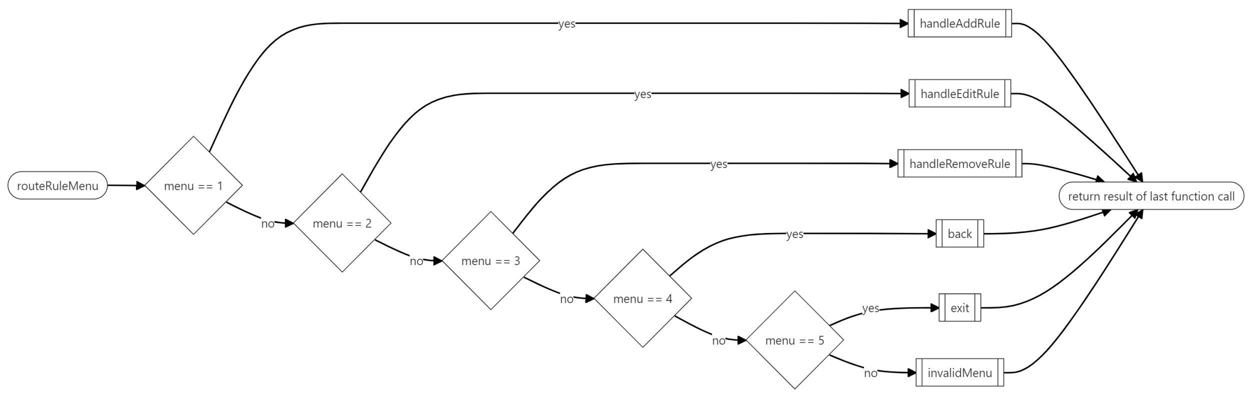


Figure 38: `routeRuleMenu()`

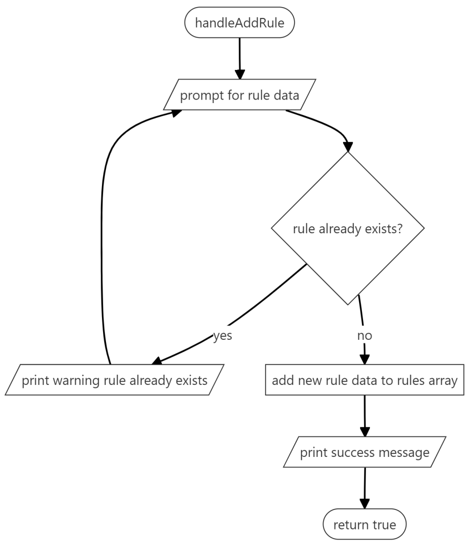


Figure 39: `handleAddRule()`

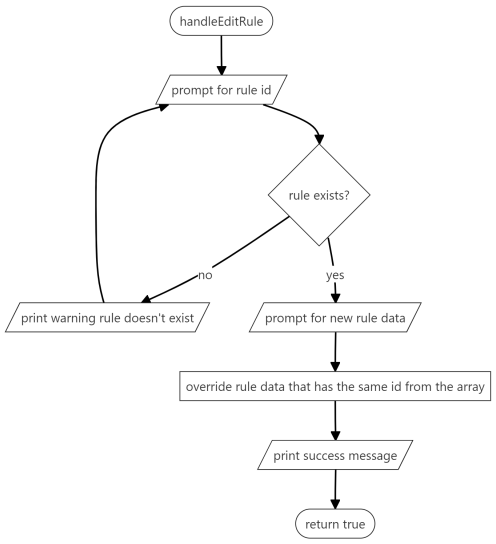


Figure 40: `handleEditRule()`

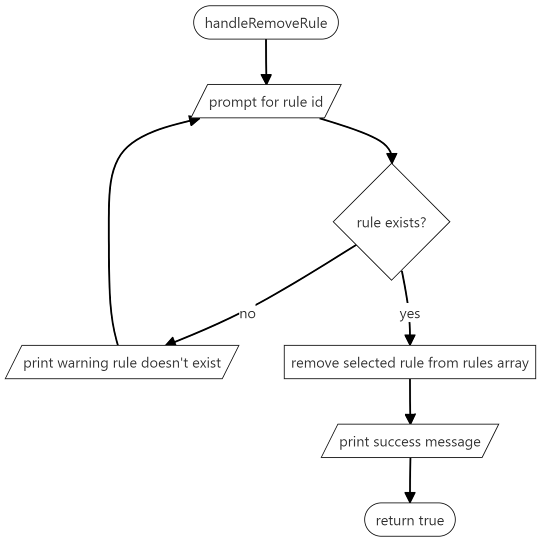


Figure 41: `handleRemoveRule()`

## 5 Code

```java
package my.id.elianiva; // remove this to run on a single file mode

import java.util.Scanner;

public class Main {
    static String LINE_PLUS = "+";
    static String LINE_HORIZONTAL = "-";
    static String LINE_VERTICAL = "|";
    static String USERNAME = "admin";
    static String PASSWORD = "admin123";

    // [nim, fullName, classPlacement, violatedRuleIndices, currentPunishment, violationsCount]
    static String[][] students = {
            {"1234560001", "Harimurti Suryono", "1A", "", "", "0"},
            {"1234560002", "Carla Andriani", "1B", "", "", "0"},
            {"1234560003", "Hana Astuti", "1C", "", "", "0"},
            {"1234560004", "Rini Padmasari", "1D", "", "", "0"},
            {"1234560005", "Karsana Nababan", "1E", "", "", "0"}
    };

    // [code, description, level]
    static String[][] rules = {
            {"R001", "Communicating in a disrespectful manner, whether written or written to students, lecturers, employees, or others", "5"},
            {"R002", "Eating, or drinking in the lecture theatre/laboratory/workshop", "4"},
            {"R003", "Students sporting punk-style hair, painted other than black and/or skinned", "4"},
            {"R004", "Violating the rules / regulations that apply in Polinema both in the Department / Study Programme", "3"},
            {"R005", "Not maintaining cleanliness in all areas of Polinema", "3"},
            {"R006", "Smoking outside the smoking area", "3"},
            {"R007", "Playing cards, online games in the campus area", "3"},
            {"R008", "Damaging facilities and infrastructure in the Polinema area", "2"},
            {"R009", "Accessing pornographic material in class or campus areas", "2"},
            {"R010", "Conducting practical political activities on campus", "2"},
            {"R012", "Using psychotropic substances and / or other addictive substances other addictive substances", "1"},
    };

    static String[] punishments = {
            "Oral reprimand accompanied by a statement not to repeat the act, affixed with stamp duty, signed by the student concerned and DPA",
            "A written reprimand accompanied by a statement not to repeat the act, affixed with a stamp duty",
            """
               a. Make a statement not to repeat the act, affixed with stamp duty, signed by the student concerned and DPA
                    b. Perform special tasks, such as being responsible for repairing or cleaning up, and other tasks. cleaning, and other tasks.""",
            """
```

```
                a. Compensation for damages or replacement of similar objects/goods and/or
                     b. Performing social service duties for a certain period of time and/or
                     c. Given a grade of D in the relevant course when committing the offence""",
            """
                a. Disabled (Academic/Terminal Leave) for two semesters and/or
                     b. Dismissed as a student."""
    };

    static Scanner scanner = new Scanner(System.in);

    public static void main(String[] args) {
        clearScreen();
        renderTitle("Welcome! Please log in first!");
        login();
        clearScreen();
        renderTitle("Welcome back, " + USERNAME);
        while (true) {
            renderTitle("MAIN MENU");
            int chosenMenu = pickMenu("Main Menu: ", new String[]{
                    "Show Students",
                    "Show Rules",
                    "Exit"
            });
            boolean shouldContinue = routeMainMenu(chosenMenu);
            if (shouldContinue) continue;
            break;
        }
    }

    static void login() {
        while (true) {
            String username = getNonEmptyString("Username: ", "Username can't be empty!");
            String password = getNonEmptyString("Password: ", "Password can't be empty!");
            if (username.equals(USERNAME) && password.equals(PASSWORD)) {
                break;
            }
            clearScreen();
            System.out.println("Incorrect username and password!");
        }
    }

    static boolean routeMainMenu(int chosenMenu) {
        return switch (chosenMenu) {
            case 1 -> handleShowStudents();
            case 2 -> handleShowRules();
            case 3 -> exit();
            default -> handleInvalidMenu();
        };
    }
```

```java

    static boolean routeStudentMenu(int chosenMenu) {
        return switch (chosenMenu) {
            case 1 -> handleShowStudentDetail();
            case 2 -> handleAddViolatedRuleToStudent();
            case 3 -> handleAddStudent();
            case 4 -> handleEditStudent();
            case 5 -> handleRemoveStudent();
            case 6 -> handleResetStudent();
            case 7 -> back();
            case 8 -> exit();
            default -> handleInvalidMenu();
        };
    }

    static boolean routeRuleMenu(int chosenMenu) {
        return switch (chosenMenu) {
            case 1 -> handleAddRule();
            case 2 -> handleEditRule();
            case 3 -> handleRemoveRule();
            case 4 -> back();
            case 5 -> exit();
            default -> handleInvalidMenu();
        };
    }

    static boolean exit() {
        clearScreen();
        renderTitle("Exiting...");
        System.exit(0);
        return false;
    }

    static boolean back() {
        clearScreen();
        return false;
    }

    static boolean handleInvalidMenu() {
        System.out.println("Invalid menu!");
        clearScreen();
        return true;
    }

    static boolean handleShowStudents() {
        clearScreen();
        while (true) {
            renderStudentsTable("Showing All Students", students);
            int chosenMenu = pickMenu("Students Table Menu: ", new String[]{
                    "Show Student Detail",
                    "Add Student Violated Rule",
                    "Add Student",
                    "Edit Student",
                    "Remove Student",
                    "Reset Student",
                    "Back",
                    "Exit",
            });
            boolean shouldContinue = routeStudentMenu(chosenMenu);
            if (shouldContinue) continue;
            break;
        }
        return true;
    }

    static boolean handleShowStudentDetail() {
        clearScreen();
        String nim;

        while (true) {
            renderTitle("Select Student");
            renderStudentsTable("Showing All Students", students);
            nim = getNonEmptyString("NIM: ", "NIM can't be empty!");

            if (has(students, nim, 0)) break;

            clearScreen();
            System.out.println("Student with the NIM of " + nim + " doesn't exist!");
        }

        clearScreen();
        renderTitle("Showing Details for Student " + nim);

        int studentIndex = -1;
        for (int i = 0; i < students.length; i++) {
            if (students[i][0].equals(nim)) {
                studentIndex = i;
                break;
            }
        }
        if (studentIndex == -1) {
            clearScreen();
            System.out.println("Failed to find the student with a nim of " + nim);
            return true;
        }

        String[] student = students[studentIndex];
        System.out.println("NIM\t\t: " + student[0]);
        System.out.println("Name\t\t: " + student[1]);
        System.out.println("Class\t\t: " + student[2]);

        if (student[3].length() > 0) {
            renderRulesTable("Rules that have been violated", filterRulesByIndices(rules,
↪   student[3]));
        }

        if (student[4].length() > 0) {
            renderPunishmentsList("Punishments", filterPunishmentsByIndices(punishments, student[4]));
        }

        getString("Press enter to continue...");

        clearScreen();
        return true;
    }

    static boolean handleAddViolatedRuleToStudent() {
        clearScreen();
        String nim, code;

        int studentIndex = -1;
        while (true) {
            renderTitle("Add Violated Rule to Student");
            renderStudentsTable("Showing All Students", students);
            nim = getNonEmptyStringWithLimit("Student's NIM: ", "NIM can't be empty!", 10, 10, false);

            if (!has(students, nim, 0)) {
                clearScreen();
                System.out.println("Student with the NIM of " + nim + " doesn't exist!");
                continue;
            }

            for (int i = 0; i < students.length; i++) {
                if (students[i][0].equals(nim)) {
                    studentIndex = i;
                    break;
                }
            }

            if (students[studentIndex][3].length() == 3) {
                System.out.println("This student has maxed out the violated rule limit.");
                System.out.println("Please make sure the student has done the punishments and reset the data after that.");
                getString("Press enter to continue...");
                return true;
            }

            break;
        }

        clearScreen();

        int ruleIndex = -1;
        while (true) {
            renderTitle("Add Violated Rule to Student");
            renderRulesTable("Showing All Rules", rules);
            code = getNonEmptyStringWithLimit("Rule's Code: ", "Code can't be empty!", 4, 4, false);

            if (!has(rules, code, 0)) {
                clearScreen();
                System.out.println("Rule with the code of " + code + " doesn't exist!");
                continue;
            }

            for (int i = 0; i < rules.length; i++) {
                if (rules[i][0].equals(code)) {
                    ruleIndex = i;
                    break;
                }
            }

            break;
        }

        String[] currentStudent = students[studentIndex];

        boolean isUpgraded = shouldUpgrade(currentStudent, rules[ruleIndex]);
        currentStudent[3] += toString(ruleIndex);
        currentStudent[4] += resolvePunishmentIndex(currentStudent[3], isUpgraded);
        currentStudent[5] = incrementString(currentStudent[5], Integer.MAX_VALUE);

        clearScreen();
        System.out.println("Rule have been added to the student successfully");

        return true;
    }

    static boolean handleAddStudent() {
        clearScreen();
        String nim, fullName, classPlacement;

        while (true) {
            renderTitle("Add New Student");
            nim = getNonEmptyStringWithLimit("NIM: ", "NIM can't be empty!", 10, 10,
↪   false);
            fullName = getNonEmptyStringWithLimit("Full Name: ", "Full Name can't be
↪   empty!", 1, 20, false);
            classPlacement = getNonEmptyStringWithLimit("Class: ", "Class can't be
↪   empty!", 1, 2, false);

            if (!has(students, nim, 0)) break;

            clearScreen();
            System.out.println("Student with the NIM of " + nim + " already exists!");
        }

        String[][] newStudents = new String[students.length + 1][2];
        for (int i = 0; i < students.length; i++) {
            newStudents[i] = students[i];
        }
        newStudents[newStudents.length - 1] = new String[]{nim, fullName, classPlacement, "", "", "0"};
        students = newStudents;

        clearScreen();
        System.out.println("Students have been succesfully added!");
        return true;
    }

    static boolean handleEditStudent() {
        clearScreen();
        String oldNim, nim, fullName, classPlacement;
        int studentIndex = -1;

        while (true) {
            renderTitle("Edit Student");
            renderStudentsTable("Showing Students to Edit", students);
            oldNim = getNonEmptyStringWithLimit("NIM: ", "NIM can't be empty!", 10, 10, false);

            if (has(students, oldNim, 0)) break;

            clearScreen();
            System.out.println("The student with the NIM of " + oldNim + " doesn't exists");
        }

        for (int i = 0; i < students.length; i++) {
            if (students[i][0].equals(oldNim)) {
                studentIndex = i;
                break;
            }
        }

        if (studentIndex == -1) {
            clearScreen();
            System.out.println("Failed to find student to edit");
            return true;
        }

        String[] student = students[studentIndex];

        clearScreen();
        renderTitle("New Student Data");
        nim = getNonEmptyStringWithLimit("NIM (old: " + student[0] + "): ", "NIM can't be empty!", 10, 10, true);
        fullName = getNonEmptyStringWithLimit("Full Name (old: " + student[1] + "): ", "Full Name can't be empty!", 1, 20, true);
        classPlacement = getNonEmptyStringWithLimit("Class (old: " + student[2] + "): ", "Class can't be empty!", 1, 2, true);

        students[studentIndex][0] = nim.isEmpty() ? student[0] : nim;
        students[studentIndex][1] = fullName.isEmpty() ? student[1] : fullName;
        students[studentIndex][2] = classPlacement.isEmpty() ? student[2] :
↪   classPlacement;

        clearScreen();
        System.out.println("Students have been succesfully added!");
        return true;
    }

    static boolean handleRemoveStudent() {
        clearScreen();
        String nim;

        while (true) {
            renderTitle("Remove Student");
            renderStudentsTable("Showing Students to Remove", students);
            nim = getNonEmptyString("NIM: ", "NIM can't be empty!");

            if (has(students, nim, 0)) break;

            clearScreen();
            System.out.println("Student with the NIM of " + nim + " doesn't exist!");
        }

        String[][] filteredStudents = new String[students.length - 1][4];
        int count = 0;
        for (String[] student : students) {
            if (student[0].equals(nim)) continue;
            filteredStudents[count] = student;
            count++;
        }
        students = filteredStudents;

        clearScreen();
        System.out.println("Students " + nim + " have been successfully removed!");
        return true;
    }

    static boolean handleResetStudent() {
        clearScreen();
        String nim;


        int studentIndex = -1;
        while (true) {
            renderTitle("Reset Student");
            renderStudentsTable("Showing Students to Reset", students);
            nim = getNonEmptyStringWithLimit("Student's NIM: ", "NIM can't be empty!",
↪   10, 10, false);

            if (!has(students, nim, 0)) {
                clearScreen();
                System.out.println("Student with the NIM of " + nim + " doesn't exist!");
                continue;
            }

            for (int i = 0; i < students.length; i++) {
                if (students[i][0].equals(nim)) {
                    studentIndex = i;
                    break;
                }
            }

            break;
        }

        students[studentIndex][3] = "";
        students[studentIndex][4] = "";

        clearScreen();
        System.out.println("Students have been successfully reset!");
        return true;
    }

    static boolean handleShowRules() {
        clearScreen();
        while (true) {
            renderRulesTable("Showing All Rules", rules);
            int chosenMenu = pickMenu("Rules Table Menu: ", new String[]{
                    "Add Rule",
                    "Edit Rule",
                    "Remove Rule",
                    "Back",
                    "Exit",
            });
            boolean shouldContinue = routeRuleMenu(chosenMenu);
            if (shouldContinue) continue;
            break;
        }
        return true;
    }

    static boolean handleAddRule() {
        clearScreen();
        String code, description;
        int level;

        while (true) {
            renderTitle("Add New Rule");
            code = getNonEmptyStringWithLimit("Code: ", "Code can't be empty!", 4, 4,
↪   false);
            description = getNonEmptyStringWithLimit("Description: ", "Description can't
↪   be empty!", 10, 120, false);
            level = getIntegerWithRange("Level: ", 1, 5, false);

            if (!has(rules, code, 0)) break;

            clearScreen();
            System.out.println("Rule with the code of " + code + " already exists!");
        }

        String[][] newRules = new String[rules.length + 1][2];
        for (int i = 0; i < rules.length; i++) {
            newRules[i] = rules[i];
        }
        newRules[newRules.length - 1] = new String[]{code, description, toString(level)};
        rules = newRules;

        clearScreen();
        System.out.println("New rule have been successfully added!");
        return true;
    }

    static boolean handleEditRule() {
        clearScreen();
        String oldCode, code, description;
        int level;
        int ruleIndex = -1;

        while (true) {
            renderTitle("Edit Rule");
            renderRulesTable("Showing Rules to Edit", rules);
            oldCode = getNonEmptyStringWithLimit("Code: ", "Code can't be empty!", 4, 4,
↪   false);

            if (has(rules, oldCode, 0)) break;

            clearScreen();
            System.out.println("The rule with the code of " + oldCode + " doesn't
↪   exists");
        }

        for (int i = 0; i < rules.length; i++) {
            if (rules[i][0].equals(oldCode)) {
                ruleIndex = i;
                break;
            }
        }

        if (ruleIndex == -1) {
            clearScreen();
            System.out.println("Failed to find rule to edit");
            return true;
        }

        String[] rule = rules[ruleIndex];

        clearScreen();
        renderTitle("New Rule Detail");
        while (true) {
            code = getNonEmptyStringWithLimit("Code (old: " + rule[0] + "): ", "Code
↪   can't be empty!", 4, 4, true);
            if (!has(rules, code, 0)) break;
            System.out.println("There's a rule with the same code already! Please try
↪ another one.");
        }
        description = getNonEmptyStringWithLimit("Description (old: " + rule[1] + "): ",
↪ "Description can't be empty!", 10, 120, true);
        level = getIntegerWithRange("Level (old: " + rule[2] + "): ", 1, 5, true);

        rules[ruleIndex][0] = code.isEmpty() ? rule[0] : code;
        rules[ruleIndex][1] = description.isEmpty() ? rule[1] : description;
        rules[ruleIndex][2] = level == -1 ? rule[2] : String.format("%s", level);

        clearScreen();
        System.out.println("Rule " + oldCode + " have been succesfully edited!");
        return true;
    }

    static boolean handleRemoveRule() {
        clearScreen();
        String code;

        while (true) {
            renderTitle("Remove Rule");
            renderRulesTable("Showing Rules to Remove", rules);
            code = getNonEmptyString("Code: ", "Code can't be empty!");

            if (has(rules, code, 0)) break;

            clearScreen();
            System.out.println("Rule with the code of " + code + " doesn't exist!");
        }

        String[][] filteredRules = new String[rules.length - 1][3];
        int count = 0;
        for (int i = 0; i < rules.length; i++) {
            if (rules[i][0].equals(code)) continue;
            filteredRules[count] = rules[i];
            count++;
        }
        rules = filteredRules;

        clearScreen();
        System.out.println("Rule " + code + " have been successfully removed!");
        return true;
    }

    static void renderTitle(String title) {
        int paddingSize = 4;
        int titleLength = title.length();

        String horizontalBorder = LINE_PLUS + LINE_HORIZONTAL.repeat(titleLength +
↪ paddingSize * 2) + LINE_PLUS;

        System.out.println(horizontalBorder);
        System.out.println(LINE_VERTICAL + " ".repeat(paddingSize) + title + " ".repeat(paddingSize) + LINE_VERTICAL);
        System.out.println(horizontalBorder);
    }

    static void renderStudentsTable(String title, String[][] students) {
        renderTitle(title);
        final String tableLine = String.format(
                "%s%s%s%s%s%s%s%s%s%s%s",
                LINE_PLUS, LINE_HORIZONTAL.repeat(6), LINE_PLUS, LINE_HORIZONTAL.repeat(14),
                LINE_PLUS, LINE_HORIZONTAL.repeat(24), LINE_PLUS, LINE_HORIZONTAL.repeat(9),
                LINE_PLUS, LINE_HORIZONTAL.repeat(14), LINE_PLUS
        );
        System.out.println(tableLine);
        System.out.printf("%s   No. %s      NIM      %s        Full Name         %s  Class %s  Violations  %s\n", LINE_VERTICAL, LINE_VERTICAL, LINE_VERTICAL, LINE_VERTICAL, LINE_VERTICAL, LINE_VERTICAL);
        System.out.println(tableLine);
        for (int i = 0; i < students.length; i++) {
            String[] student = students[i];
            System.out.printf(
                    "%s  %-2s   %s  %-10s  %s  %-20s  %s  %5s  %s   %8s   %s\n",
                    LINE_VERTICAL, (i + 1) + ".", LINE_VERTICAL, student[0], LINE_VERTICAL, student[1],
                    LINE_VERTICAL, student[2], LINE_VERTICAL, student[5], LINE_VERTICAL);
        }
        System.out.println(tableLine);
    }

    static void renderRulesTable(String title, String[][] rules) {
        renderTitle(title);
        final String tableLine = String.format(
                "%s%s%s%s%s%s%s%s%s",
                LINE_PLUS, LINE_HORIZONTAL.repeat(7), LINE_PLUS, LINE_HORIZONTAL.repeat(10),
                LINE_PLUS, LINE_HORIZONTAL.repeat(124), LINE_PLUS, LINE_HORIZONTAL.repeat(9), LINE_PLUS);
        System.out.println(tableLine);
        System.out.printf(
                "%s  No.  %s    ID    %s  %sDescription%s    %s  Level   %s\n",
                LINE_VERTICAL, LINE_VERTICAL, LINE_VERTICAL, " ".repeat(54), " ".repeat(54), LINE_VERTICAL, LINE_VERTICAL);
        System.out.println(tableLine);
        for (int i = 0; i < rules.length; i++) {
            String[] rule = rules[i];
            System.out.printf(
                    "%s  %3s  %s   %-5s  %s  %-120s   %s  %5s  %s\n",
                    LINE_VERTICAL, (i + 1) + ".", LINE_VERTICAL, rule[0], LINE_VERTICAL, rule[1],
                    LINE_VERTICAL, rule[2], LINE_VERTICAL);
        }
        System.out.println(tableLine);
    }

    static void renderPunishmentsList(String title, String[] punishments) {
        renderTitle(title);
        for (int i = 0; i < punishments.length; i++) {
            String punishment = punishments[i];
            System.out.printf("%3s  %-120s\n", (i + 1) + ".)", punishment);
        }
    }

    static int pickMenu(String menuTitle, String[] menus) {
        System.out.println(menuTitle);
        for (int i = 0; i < menus.length; i++) {
            System.out.printf("%d. %s\n", i + 1, menus[i]);
        }
        return getIntegerWithRange("Select menu: ", 1, menus.length, false);
    }

    static String getString(String prompt) {
        System.out.print(prompt);
        return scanner.nextLine().trim();
    }

    static String getNonEmptyString(String prompt, String warning) {
        while (true) {
            System.out.print(prompt);
            String userInput = scanner.nextLine().trim();
            if (!userInput.isEmpty()) return userInput;
            System.out.println(warning);
        }
    }

    static String getNonEmptyStringWithLimit(String prompt, String warning, int min, int
↪   max, boolean allowEmpty) {
        while (true) {
            String userInput = allowEmpty ? getString(prompt) : getNonEmptyString(prompt,
↪   warning);
            if (allowEmpty && userInput.isEmpty()) return userInput;
            if (userInput.length() >= min && userInput.length() <= max) return userInput;
            System.out.println("The input can't be shorter than " + min + " or longer
↪   than " + max);
        }
    }

    static int getIntegerWithRange(String prompt, int min, int max, boolean allowEmpty) {
        while (true) {
            System.out.print(prompt);
            String userInputStr = scanner.nextLine();
            if (userInputStr.isEmpty()) {
                if (allowEmpty) return -1;
                System.out.println("Input can't be empty!");
                continue;
            }

            int userInput = Integer.parseInt(userInputStr);
            if (userInput >= min && userInput <= max) return userInput;

            System.out.println("The input can't be lower than " + min + " or greater than
↪   " + max);
        }
    }

    static void clearScreen() {
        System.out.print("\033[H\033[2J");
        System.out.flush();
    }

    static boolean has(String[][] items, String needle, int fieldIndex) {
        for (String[] item : items) {
            if (item[fieldIndex].equals(needle)) return true;
        }
        return false;
    }

    static String toString(int number) {
        return String.format("%d", number);
    }

    static String toString(char character) {
        return String.format("%c", character);
    }

    static boolean shouldUpgrade(String[] student, String[] nextRule) {
        String ruleIndices = student[3];
        int length = ruleIndices.length();
        if (length < 2) return false;

        boolean lastThreeRuleAreSame = true;
        String previousLevel = "";
        for (int i = length - 1; i > length - 3; i--) {
            String[] currentRule =
↪   rules[Integer.parseInt(toString(ruleIndices.charAt(i)))];
            if (!previousLevel.isEmpty() && !currentRule[2].equals(previousLevel)) {
                lastThreeRuleAreSame = false;
                break;
            }
            previousLevel = currentRule[2];
        }
        if (!previousLevel.equals(nextRule[2])) {
            lastThreeRuleAreSame = false;
        }

        return lastThreeRuleAreSame;
    }

    static String incrementString(String previous, int limit) {
        int prev = Integer.parseInt(previous);
        int now = prev + 1;
```

```java
        return now < limit ? toString(now) : previous;
    }

    static String resolvePunishmentIndex(String currentLevel, boolean isUpgraded) {
        int lastRuleIndex =
    ↪   Integer.parseInt(toString(currentLevel.charAt(currentLevel.length() - 1)));
        int lastLevel = Integer.parseInt(rules[lastRuleIndex][2]);

        if (!isUpgraded || lastLevel == 1) return toString(punishments.length -
    ↪   lastLevel);

        return toString(punishments.length - (lastLevel - 1));
    }

    static String[][] filterRulesByIndices(String[][] rules, String indices) {
        String[][] filteredRules = new String[indices.length()][3];
        for (int i = 0; i < indices.length(); i++) {
            int index = Integer.parseInt(String.format("%c", indices.charAt(i)));
            filteredRules[i] = rules[index];
        }
        return filteredRules;
    }

    static String[] filterPunishmentsByIndices(String[] punishments, String indices) {
        String[] filteredPunishments = new String[indices.length()];
        for (int i = 0; i < indices.length(); i++) {
            int index = Integer.parseInt(String.format("%c", indices.charAt(i)));
            filteredPunishments[i] = punishments[index];
        }
        return filteredPunishments;
    }
}
```