

# Software Application Development Using Python

Enterprise Resource Planning

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## Introduction

The Academic Unit Management System is a software application developed in Python that manages user registration, authentication, profile editing, and deregistration functionalities for an academic unit. This documentation provides an overview of the code structure, class hierarchy, implemented functionalities, using pickle library functions for storing data, and details on the tkinter based graphical user interface (GUI)

## Class Hierarchy

- **User:** Base class with essential user attributes like user ID, password, and security details.
- **Teacher:** Subclass of **User** representing academic unit teachers with additional attributes like department and office address.
- **Student:** Generalized subclass for students, with common attributes for both UGs and PGs.
  - **UGs:** Subclass of **Student** for undergraduate students, with additional attributes for minor and major courses.
  - **PGs:** Subclass of **Student** for postgraduate students, with an attribute for specialization.

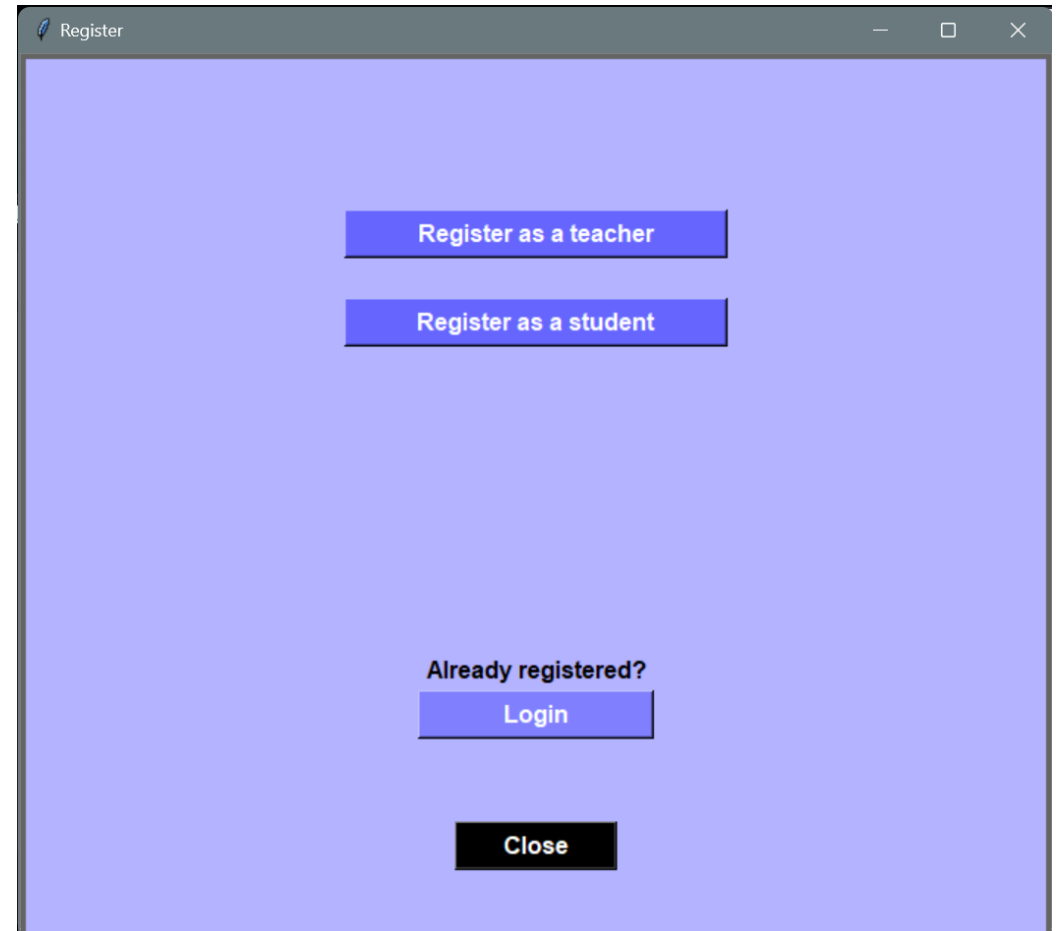
## Home:

- Initializes the main Tkinter window (**root**) with specific properties.
- Creates a Label widget (**homePageLabel**) to display a welcome message.
- Defines two buttons (**registerButton** and **loginButton**) to trigger the **register** and **login** functions when clicked.
- Creates a quit button (**quitButton**) to exit the application.
- The layout is set using the **place** method to position the widgets relative to the window.



## Register:

- **Checking if the window is already open:**
  - The function first checks if the **register\_window** global variable is not **None**. If it is not **None**, it means the registration window is already open. In that case, the existing window is lifted to the top, making it visible.
- **Creating the registration window:**
  - If the registration window is not open, a new Toplevel window (**register\_window**) is created.
  - The new window is configured with a title, geometry, and background color.
- **Register as a Teacher/Student buttons:**
  - Two buttons (**registerTeacherButton** and **registerStudentButton**) are created to trigger the **registerTeacher** and **registerStudent** functions, respectively.
  - These buttons are positioned using the **place** method.
- **Login section:**
  - A label (**loginLabel**) is added to prompt users who are already registered to log in.
  - A login button (**loginButton**) is created to trigger the **login** function.
  - Both login-related widgets are placed using the **place** method.
- **Close button:**
  - A button (**homepagebutton**) is created to close the registration window.



## Register as a teacher:

- **Widgets for user input:**

- Entry widgets are created for the user to input the teacher's userID, password, name, security question, security answer, department, and security key.
- Comboboxes are used for selecting the department and security question from predefined lists.

- **Checkbox to show/hide password and security key:**

- Checkbuttons are added to allow users to show/hide the password and security key.

- **Register button:**

- A button is created to trigger the **registerTeacherButtonClicked** function with the entered data.
- The button is styled and positioned using the **place** method.

- **Go back button:**

- A button is added to go back to the main registration window
- The button is styled and positioned using the **place** method.

- **Security Key:**

A confidential code used as an additional layer of verification during teacher registration.

It ensures that only authorized individuals with the correct security key can successfully register as teachers.

The security key is kept confidential, and there's an option to visually confirm the input through a show/hide feature. (here I have set it to SEL@30012024 i.e. date of submission).

The screenshot displays a window titled "Register as a teacher" with a light blue background. The form contains the following elements:

- Enter your userID:** A text input field containing "abir@iitkgp.in".
- Enter your password:** A text input field with masked characters "\*\*\*\*\*". To its right is a checkbox labeled "Show password".
- Enter your name:** A text input field containing "Abir Das".
- Select your security question:** A dropdown menu with the selected option "What is your favourite color?".
- Enter your security answer:** A text input field containing "white".
- Select your department:** A dropdown menu with the selected option "Computer Science and Engineering".
- Enter Teacher security key:** A text input field with masked characters "\*\*\*\*\*". To its right is a checkbox labeled "Show security key".
- Register Teacher:** A blue button with white text.
- Go back to register:** A black button with white text.

## Register as a Student:

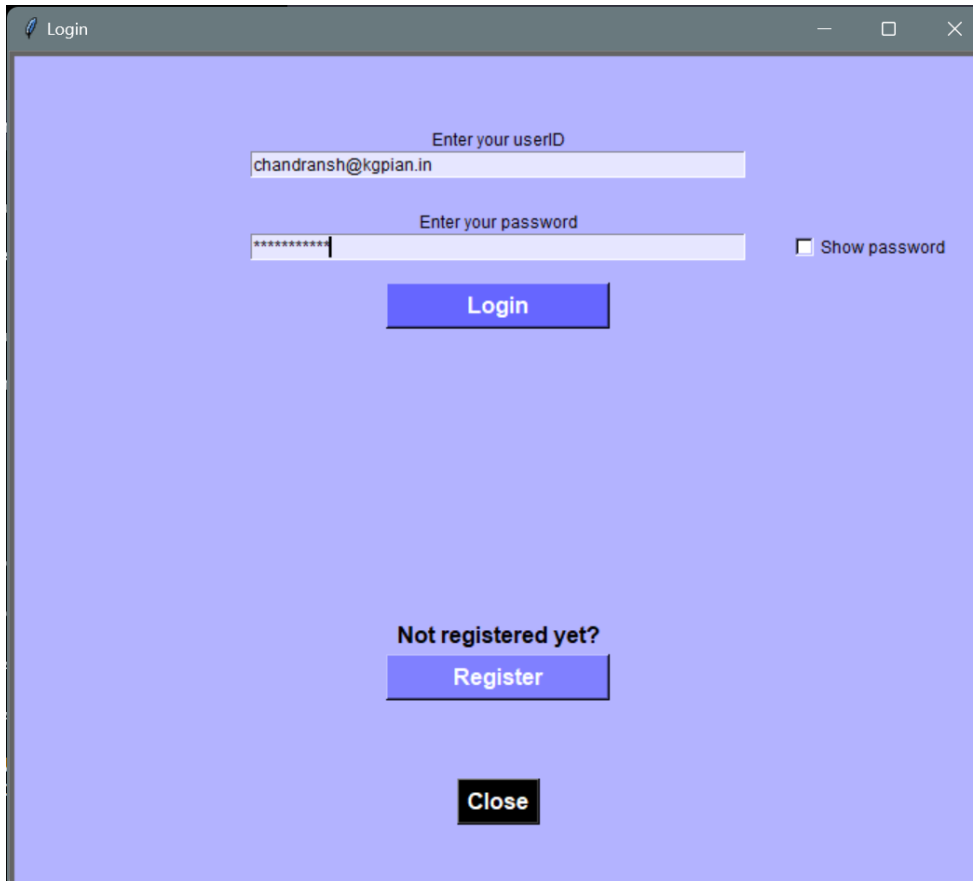
- **Widgets for user input:**
  - Entry widgets are provided for the user to input the student's userID, password, name, security question, security answer, and enrollment details such as year, degree, and department.
  - Comboboxes are used for selecting the degree, security question, enrollment year, and department from predefined lists.
- **Checkbox to show/hide password:**
  - A Checkbutton is included to allow users to show/hide the password.
- **Dropdown menus for selecting degree, year, and department:**
  - Comboboxes are used to create dropdown menus for selecting the degree (UG/PG), enrollment year, and department.
- **Register button:**
  - A button is created to trigger the **registerStudentButtonClicked** function with the entered data.
  - The button is styled and positioned using the **place** method.
- **Go back button:**
  - A button is included to go back to the main registration window (**on\_registerStudent\_window\_closed** function).
  - The button is styled and positioned using the **place** method.
- **Functionality to show/hide password:**
  - Similar to the previous code, the **showPassword** function (not provided in the code snippet) appears to be used to toggle the visibility of the password.

## Login:

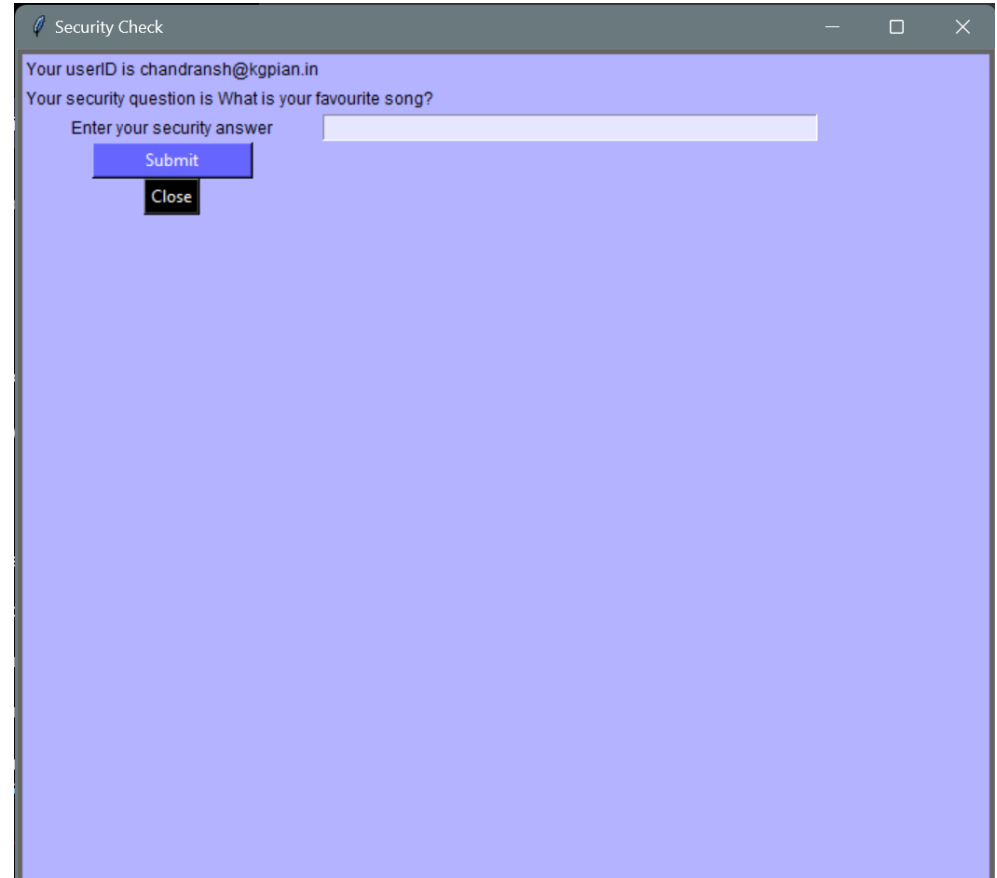
**Login** function is designed to create a common login window for both teachers and students. The window prompts the user to enter their userID and password.

Upon entering the correct password, a security check window is opened. If the user provides an incorrect password, they are allowed a maximum of three attempts. After three incorrect attempts, the user's account is locked, preventing further login.

Only a teacher can free the account (see in Teacher's Profile)



The Login window has a light blue background and a dark gray title bar with the text "Login". It contains two input fields: "Enter your userID" with the value "chandrash@kgpian.in" and "Enter your password" with masked characters "\*\*\*\*\*". A checkbox labeled "Show password" is to the right of the password field. Below the fields is a blue "Login" button. At the bottom, there is a link "Not registered yet?" above a blue "Register" button, and a black "Close" button.



The Security Check window has a light blue background and a dark gray title bar with the text "Security Check". It displays the text "Your userID is chandrash@kgpian.in" and "Your security question is What is your favourite song?". Below this is an input field for the security answer and a blue "Submit" button. At the bottom is a black "Close" button.

## Student Profile:

- Student Profile Window:

Displays user details such as userID, name, password, year, degree, and department.

Does not initially display information about courses, minors, majors, specialization, address, and phone number.

Includes buttons for "Edit," "Logout," and "Deregister."

- Edit Button:

Opens an editing mode allowing the user to update their profile.

Allows the user to fill in information for courses, minors, majors, address, and phone number.

Provides an option to set a new password.

Specifically, for courses, presents a list of available courses for selection.

Allows the user to multiselect from the list of courses.

CGPA field is not editable for students; only teachers can fill or update it.

- Logout Button:

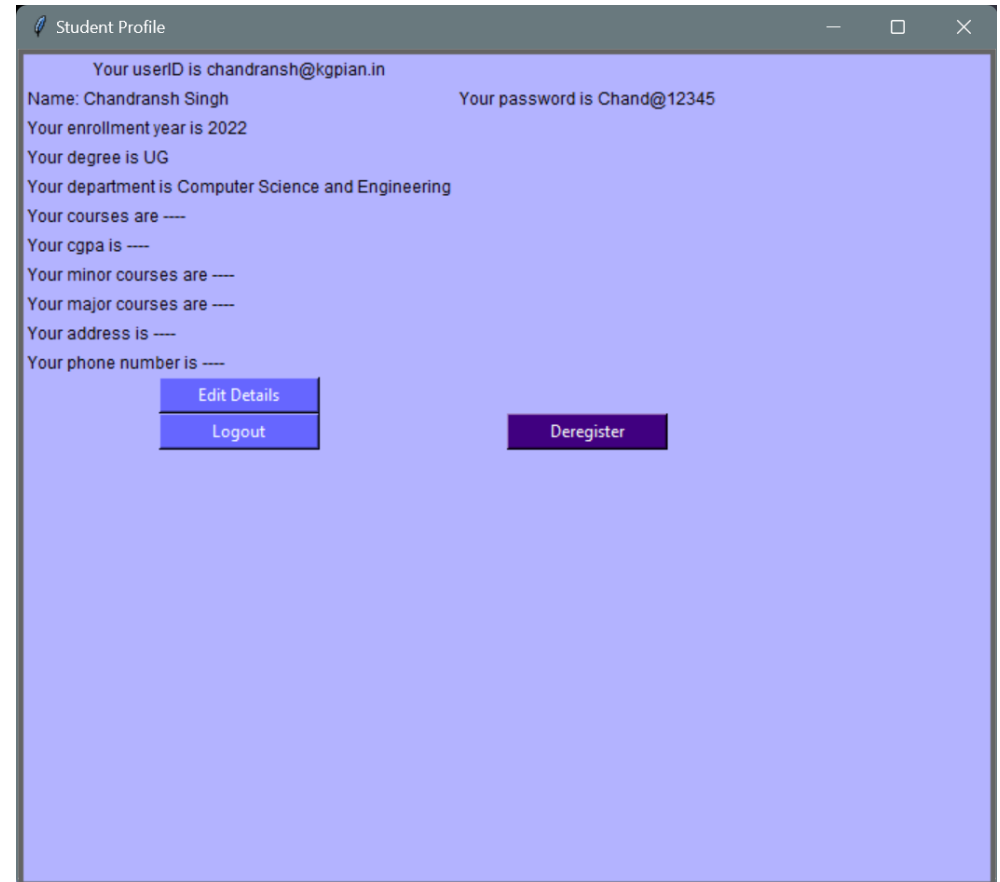
Closes the student profile window and logs the user out.

- Deregister Button:

Initiates the process for user deregistration by asking the password for confirmation.

On successful submission, logically deletes the user's account.

This design allows students to view their basic profile information initially and edit it when needed. The editing feature provides flexibility for updating various details, and the logout and deregister buttons offer options for leaving the system, while the CGPA remains under the control of the teacher.



The screenshot shows a window titled "Student Profile" with a light blue background. At the top, it displays "Your userID is chandrash@kgpian.in". Below this, the user's details are listed: "Name: Chandransh Singh", "Your enrollment year is 2022", "Your degree is UG", "Your department is Computer Science and Engineering", "Your courses are ----", "Your cgpa is ----", "Your minor courses are ----", "Your major courses are ----", "Your address is ----", and "Your phone number is ----". On the right side, it says "Your password is Chand@12345". At the bottom, there are three buttons: "Edit Details" (blue), "Logout" (blue), and "Deregister" (purple).

## Student Details Edit Window, Deregistration window: (while editing and student profile after saving the details)

Edit UG Details

Your userID is chandrash@kgpian.in

Enter your new password

Select your courses

Course 1  
Course 2  
Course 3  
Course 4  
Course 5

Select your minor courses

mCourse 1  
mCourse 2  
mCourse 3  
mCourse 4  
mCourse 5

Select your major courses

MCourse 1  
MCourse 2  
MCourse 3  
MCourse 4  
MCourse 5

Enter your new address

Vidhyasagar Hall, IITKGP

Enter your new phone number

6397911090

Save

Go back to profile

Student Profile

Your userID is chandrash@kgpian.in

Name: Chandransh Singh

Your enrollment year is 2022

Your degree is UG

Your department is Computer Science and Engineering

Your courses are: Course 1

Your cgpa is ---

Your minor courses are: mCourse 2, mCourse 3

Your major courses are: MCourse 4, MCourse 5

Your address is Vidhyasagar Hall, IITKGP

Your phone number is 6397911090

Edit Details

Logout

Deregister

Deregistration

Your userID is chandrash@kgpian.in

Enter your password

Show password

Deregister

Close

## Teacher's Profile:

### 1. Teacher Profile:

- Displays user details such as userID, name, password, and department.
- Initially does not display information about courses and office address.
- Includes buttons for "Edit My Details," "Logout," and "Deregister."

### 2. Edit My Details Button:

- Opens an editing mode allowing the teacher to update their profile.
- Allows the teacher to add or modify courses they teach and update their office address.
- Provides an option to change the password.

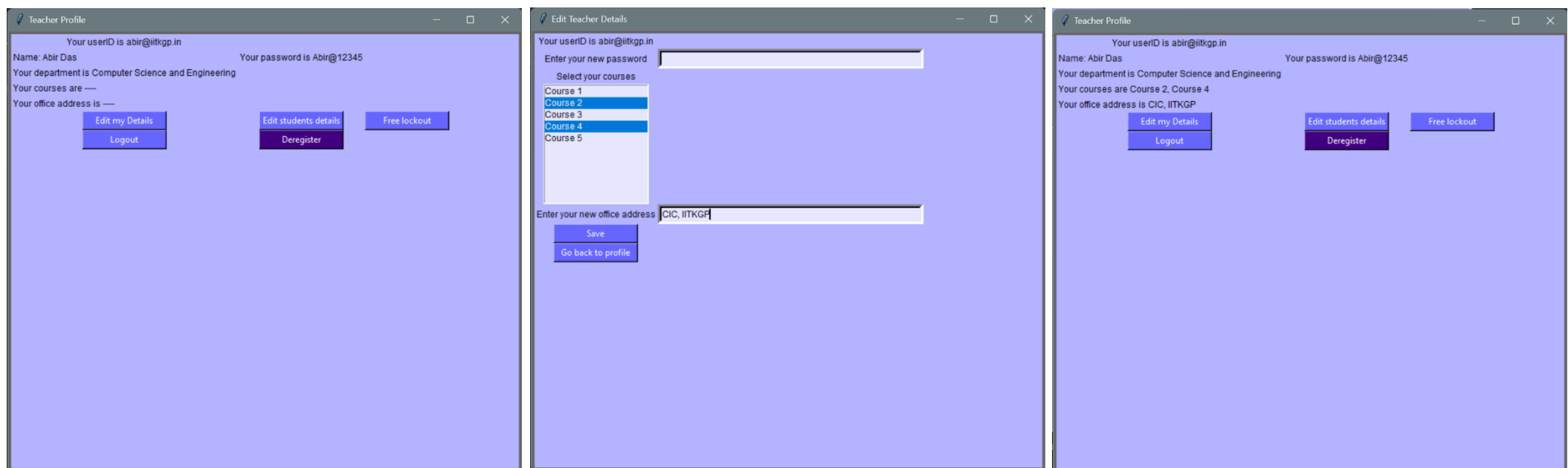
### 3. Logout Button:

- Closes the teacher profile window and logs the teacher out.
- Presumably returns the teacher to the login or home page.

### 4. Deregister Button:

- Initiates the process for teacher deregistration.
- On successful submission, logically deletes the teacher's account.

This design allows teachers to view and update their basic profile information, manage the courses they teach, and change their password. The logout and deregister buttons offer options for leaving the system.

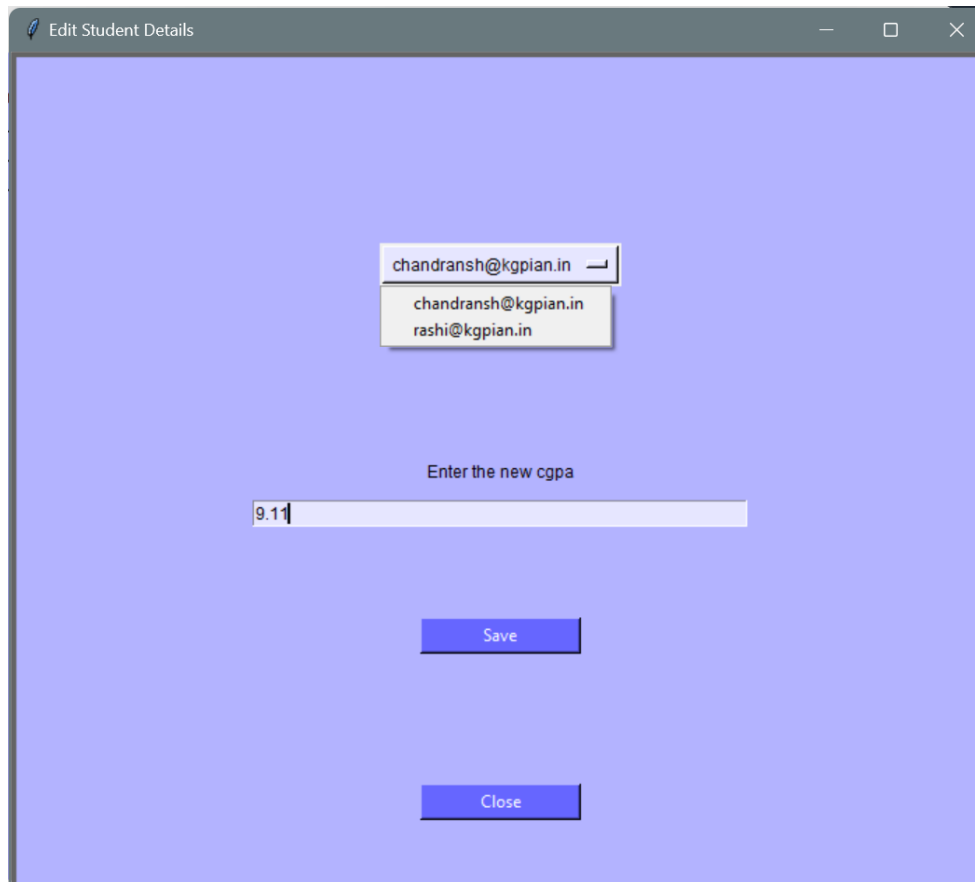




## Teachers' special privilege

### Teacher-Specific Features:

- **Edit Student Details Button:**
  - Opens a mode allowing the teacher to update specific student details.
  - Provides the privilege to change the CGPA of a student.
  - Teacher can select userID of the student from a dropdown menu and fill its cgpa



chandrash@kgpian.in

chandrash@kgpian.in  
rashi@kgpian.in

Enter the new cgpa

9.11

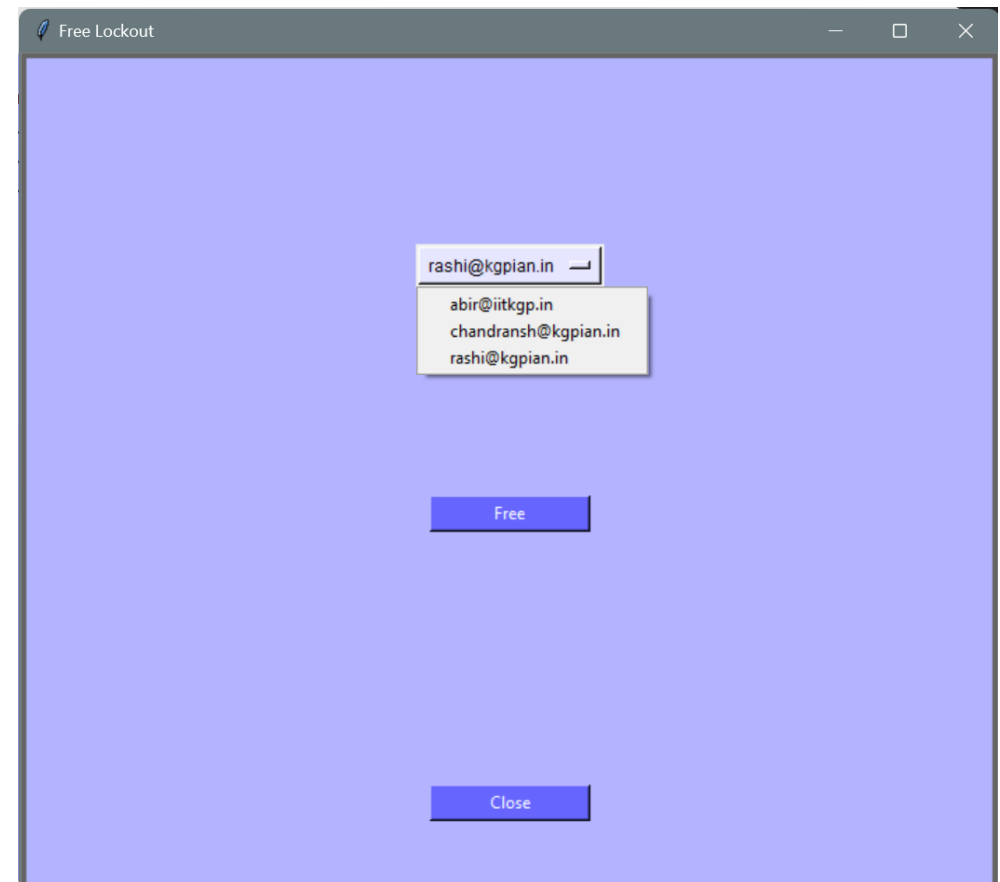
Save

Close

- **Free Lockout Button:**

- Allows the teacher to unlock accounts that have been locked due to multiple incorrect login attempts.
- From a list of all users, select any userID and press Free button to get the account out of the lock mode.

These additions provide the teacher with specific functionalities related to managing student details and handling locked accounts, reinforcing their role in administrative tasks within the academic unit.



rashi@kgpian.in

abir@iitkgp.in  
chandrash@kgpian.in  
rashi@kgpian.in

Free

Close

## Summary of Functionalities:

### 1. Registration:

- Users can register as either teachers or students.
- Teachers provide additional details such as department and security key.
- Students provide details based on their degree (UG/PG), including optional fields like minor/major courses or specialization.

### 2. Login:

- Users can log in with their registered userID and password.
- The system checks for valid inputs, including a valid userID and password.
- Appropriate error messages are displayed for invalid inputs or unregistered users.
- Upon successful login, a security check function is called

### 3. Security Check:

- *Security Check Window:*

Displays the user's userID.

Displays the security question associated with the userID.

Asks the user to enter their security answer.

- *Handling Incorrect Attempts:*

If the security answer is incorrect, the system increments the incorrect attempts count.

If the count reaches 3, the user is locked out, and an appropriate message is displayed.

- *Logging In:*

If the security answer is correct, the user is logged in.

The user's incorrect attempts count is reset.

- *User Profiles:*

If the user is a teacher, their profile is opened using the teacherProfile function

If the user is a student, their profile is opened using the studentProfile function.

### 4. Graphical User Interface (GUI):

- The application uses Tkinter for GUI.
- It includes windows for home, registration, login, teacher registration, and student registration.
- Dropdowns, entry fields, buttons, and labels are used for user interactions.

### 5. Data Persistence:

- User data is stored in a pickle file (**users.pk**).
- Teacher and student details are stored separately in the same file.

### 6. Edit options

### 7. Deregistration of user

## Tools and Libraries Used:

- Tkinter: For creating the graphical user interface.
- Pickle: For storing and retrieving user data in/from a file.