

# **Task Management System**

## **Java Programming**

CSCI – 2210 - 01

WORA



University of New Haven

TAGLIATELA COLLEGE OF ENGINEERING, West Haven, CT

Submitted To:

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## Final Project Report of WORA

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WORA

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- |                           |  |
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### Roles of Team Members

Each team member contributed equally towards the following roles:

Programmer, Researcher, UX/UI Designer, Report Writer, Create Task Page, Search for Tasks Page, and Calendar Page

#### Specific Contributions to the Application

1. Ahmed Muntasir Hossain: Database Administrator, User Menu, Tasks for this Week, New User List
2. Emily R. Carlow: User Sign Up and Log in, Create New Admin Account, Approved User List
3. Anta R. Fall: Admin Sign Up and Log in
4. Jake E. Sullivan: Database Administrator, Exit
5. Nathan A. Platt: Update Admin Account, Error Screen

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## Introduction

The Task Management System (TMS) is an application that manages and holds a record of the personal task of different users. TMS displays a calendar for the desired week, month, or year. Using our application, the users are able to add tasks, see their individual calendar data, and update them.

## Project Description

The application has two users:

1. Admin
2. General User

Admin:

The admin is able to log in using the admin portal. They provide their credentials: username and password to log in. After logging in, the admin is displayed a menu to select from the following options:

1. New User List:  
Displays the username and password of new users.
2. Approved User List:  
Displays the username and passwords of approved users.
3. Create New Admin Account:  
Creates an admin account for a new admin.
4. Update Admin Account:  
Updates the personal log in information of an admin.
5. Log Out:  
Logs Out of the portal and returns the admin to the log in page.

General User:

The general user would initially create a new account. The new user is unable to log into TMS until they are approved by the admin. After an admin approves their account, from the new user

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list in the Admin Portal, the user logs into TMS and they are displayed the user menu. The user menu consists of the following options:

1. **Calendar:**  
Displays the current date, month, and year in a calendar format. Moreover, the user has the option to search for a particular month and year. The search will output a calendar of the particular month and year inputted by the user.
2. **Tasks for this Week:**  
Displays all the tasks the user has for this week (7 days) starting from the current local date.
3. **Create New Task:**  
The user inputs the details for a task and adds the task to TMS. Details include title, start date, start time, end date, end time, and description. These details are stored for the particular user and are associated with the logged in user's account.
4. **Search for Task:**  
The user is able to search for a particular task by inputting data in the following fields: title, start date, start time, end date, end time, duration, and description. Based on the user's input, TMS outputs all the tasks that match with the user's request in a tabular form.
5. **Delete User Account:**  
Removes all the records of the user including their username, password and tasks created.
6. **Log Out:**  
Logs Out of the portal and returns the user to the user login page.
7. **Exit**  
Thanks the user for using the application and closes the application.

## Application Process

The application process has been detailed below using flow charts.

The Admin Login flow chart details the process for an admin to log in after inputting their username and password (Fig 1). If the username and password are correct, the admin moves into the admin menu (Fig 2).

The admin menu displays the following options: New User List, Approved User List, Update Admin Account, Create New Admin Account, and Admin Log Out (Fig 2). The admin has the option of viewing a list of new users who have signed up and approving or rejecting their account. The admin also has the option of viewing or deleting users who have been approved by an admin, creating new admin accounts, updating their admin account, and logging out.

The User Login and Create New User flow chart details the process of user login and creating a new user account (Fig 3). The application begins in the user login page. If the user logs in their credentials correctly, they are moved into the user menu (Fig 4 and Fig 5).

The User Menu flowchart shows the options available for a user and their functionalities (Fig 4 and Fig 5). The options include the Calendar, Tasks for this Week, Search for Tasks, Create New Task, Delete User Account, User Log Out and Exit.

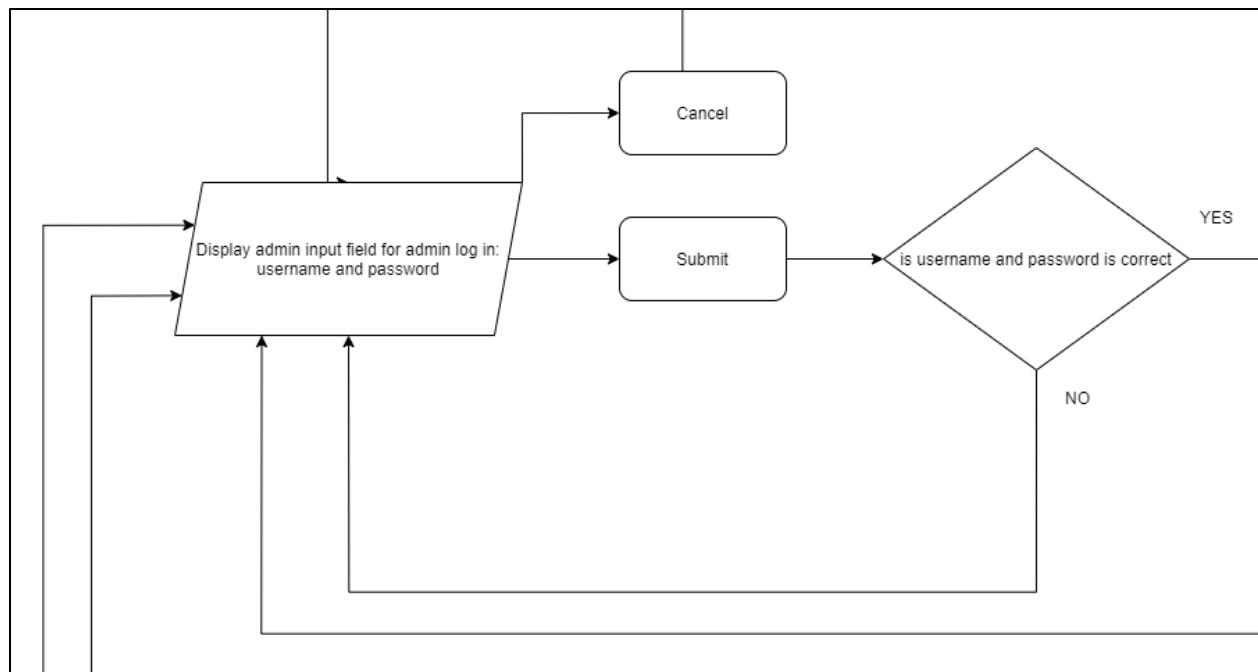


Fig 1: Admin Login Flow Chart

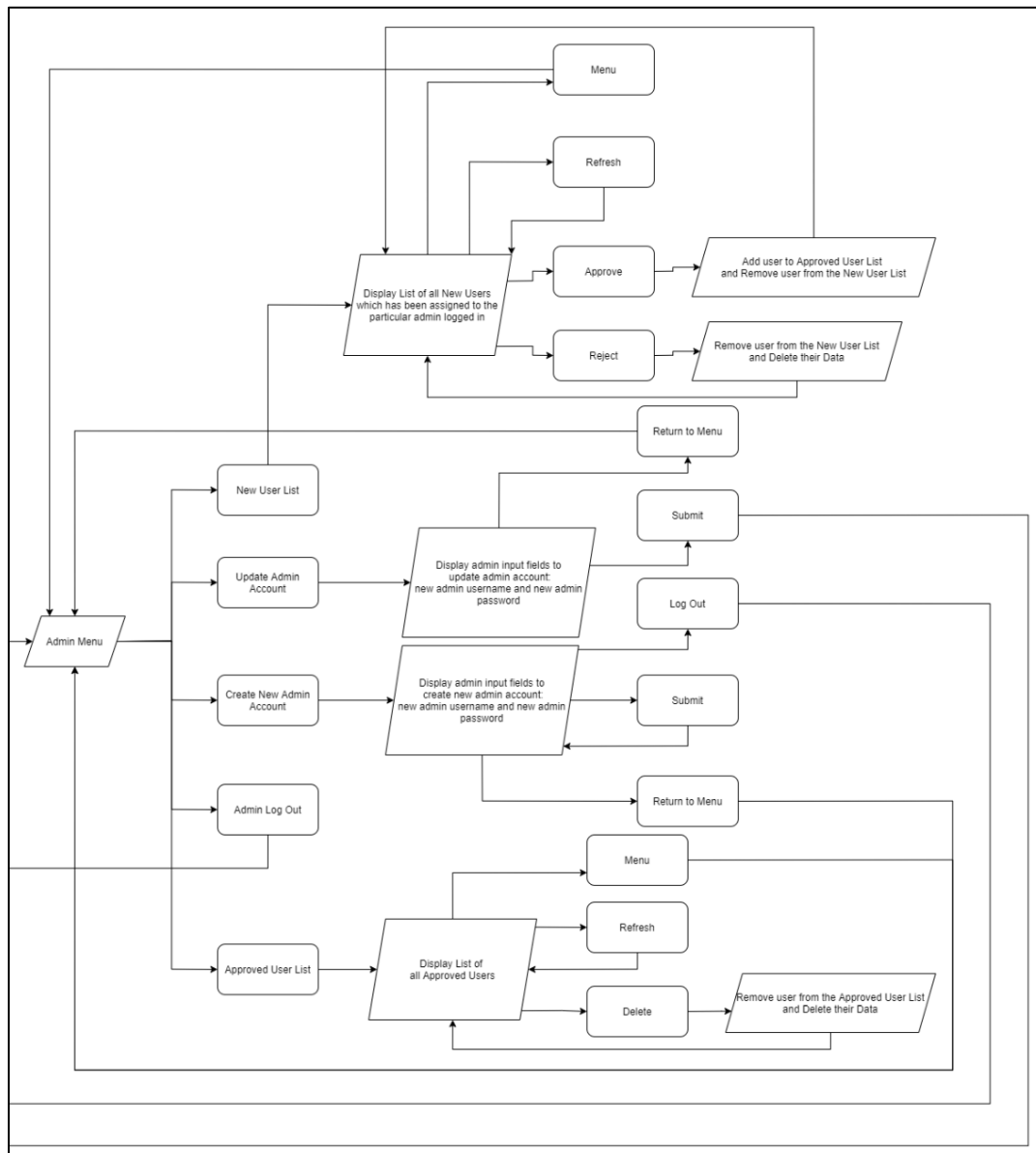


Fig 2: Admin Menu Flow Chart



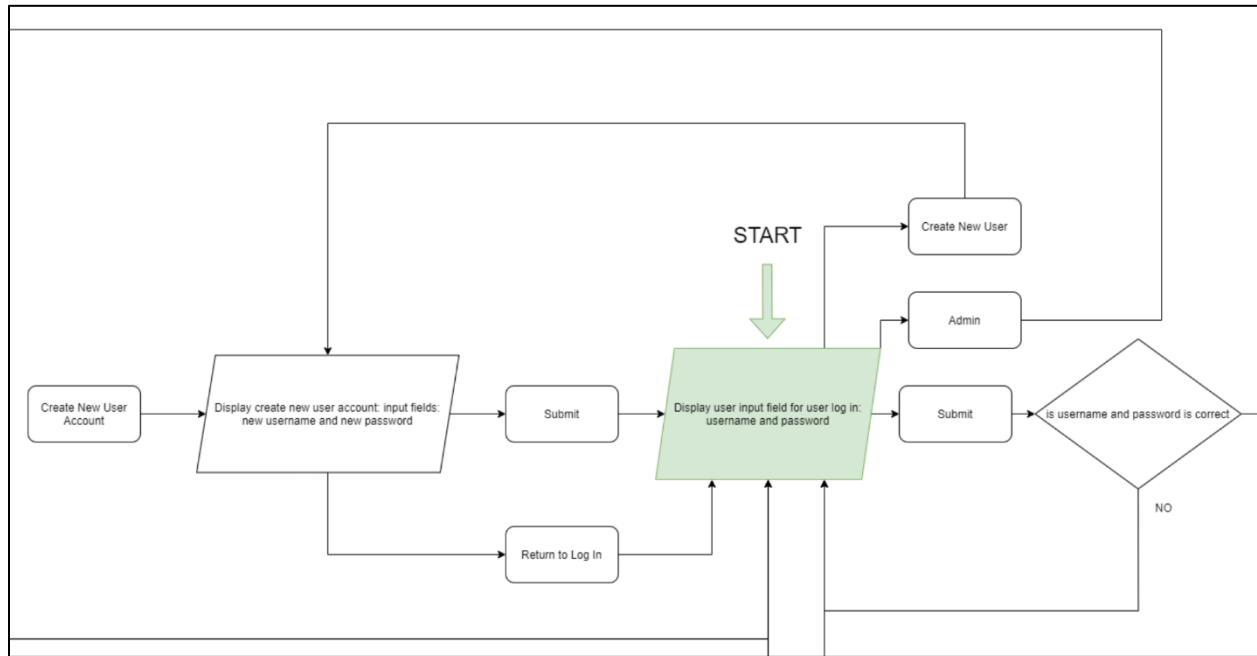


Fig 3: User Login & Create New User Flow Chart

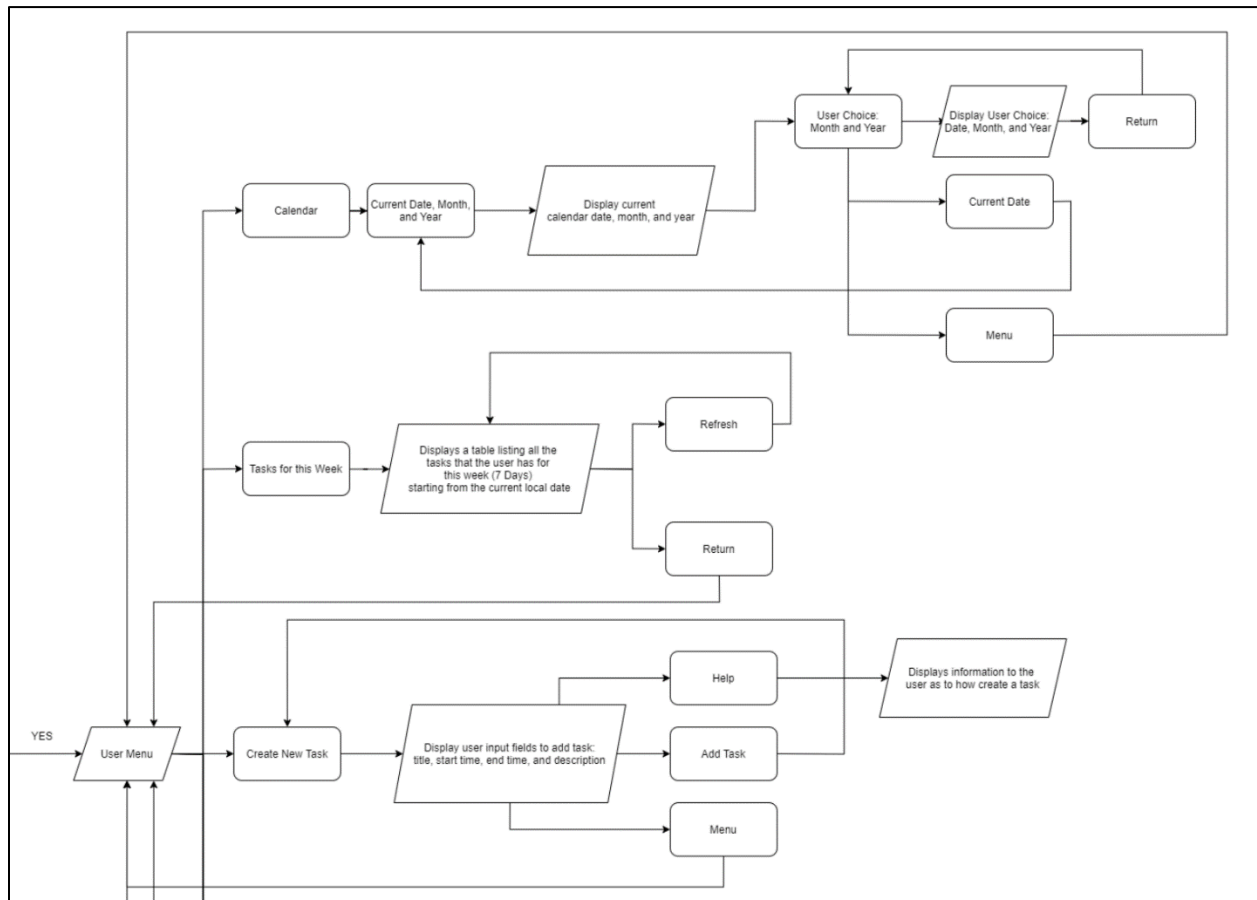


Fig 4: User Menu Flow Chart

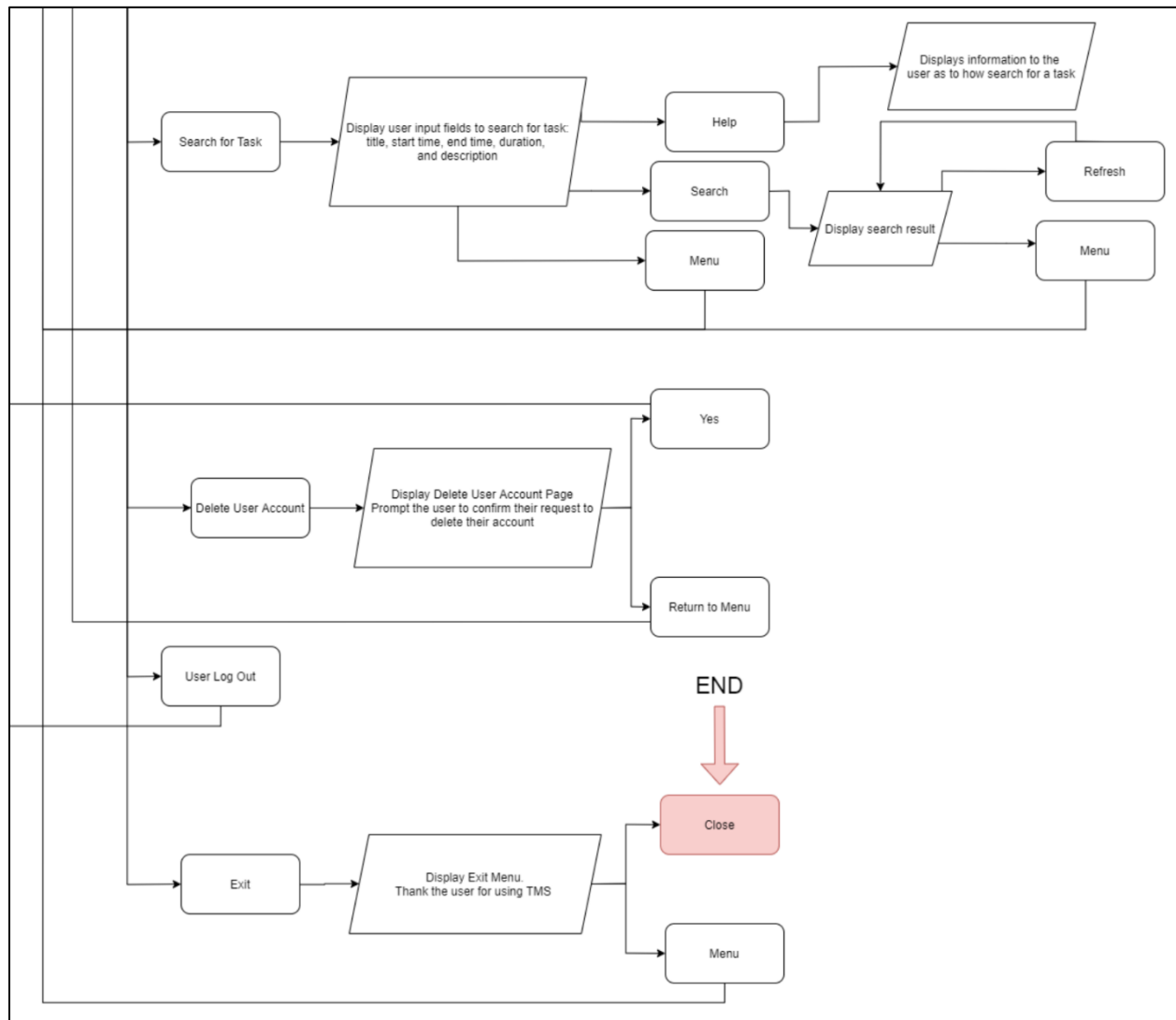


Fig 5: User Menu Flow Chart (cont.)

## Database

The application is connected to a database to store and query information. There are four tables in the database: Admin Account, New User Account, Approved User Account and Task.

### Admin Account:

The Admin Account table has an Admin ID which is the primary key. This is used to uniquely identify all admins. When creating a new admin account, the username and password of admins are stored in the Admin Account table.

### New User Account:

The New User Account table stores data of new users who have signed up on TMS. The User ID is the primary key which is used to uniquely identify each user. Each user is randomly allocated to an admin in the application who would approve their account. This is stored by inserting the allocated Admin ID as a foreign key to the Admin Account table. Additionally, the New User Account stores the username and password of the new user during sign up.

### Approved User Account:

The Approved User Account table stores a list of all approved users. Here the Approved User ID column is the primary key, which is a subset of the User ID column in the New User Account table. When an admin approves a user after signing up, their data is transferred to the Approved User Account table and removed from the New User Account table. However, if an admin rejects a user after signing up, their data is deleted from the New User Account table.

### Task:

The Task table has the Task ID as the primary key. The table stores the information about a task that a particular user created, by using the User ID as foreign key to the Approved User Account table. The user can insert and query the following information when creating a task and searching for a task, respectively: title, start date time, end date time, duration, and description.

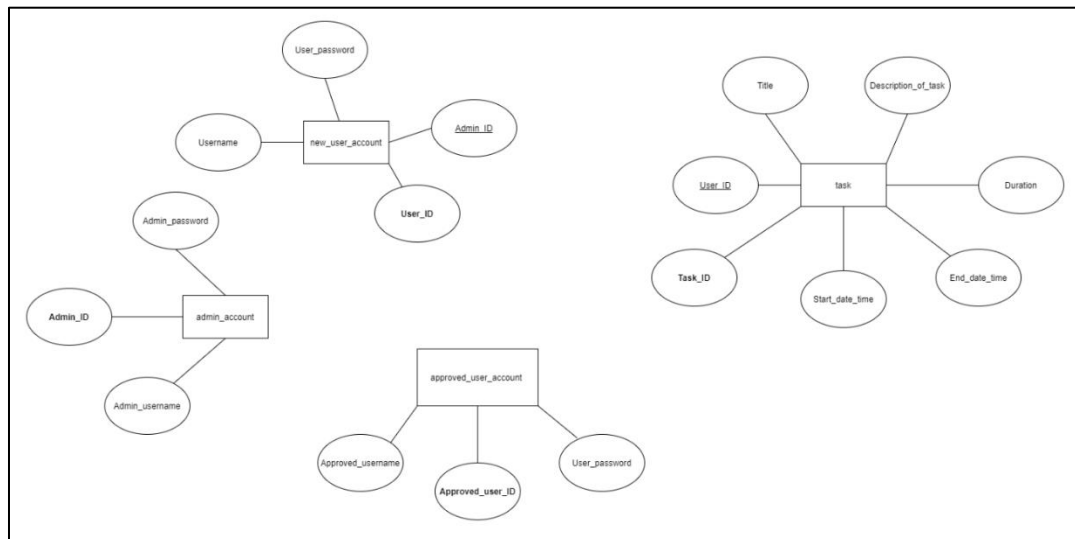


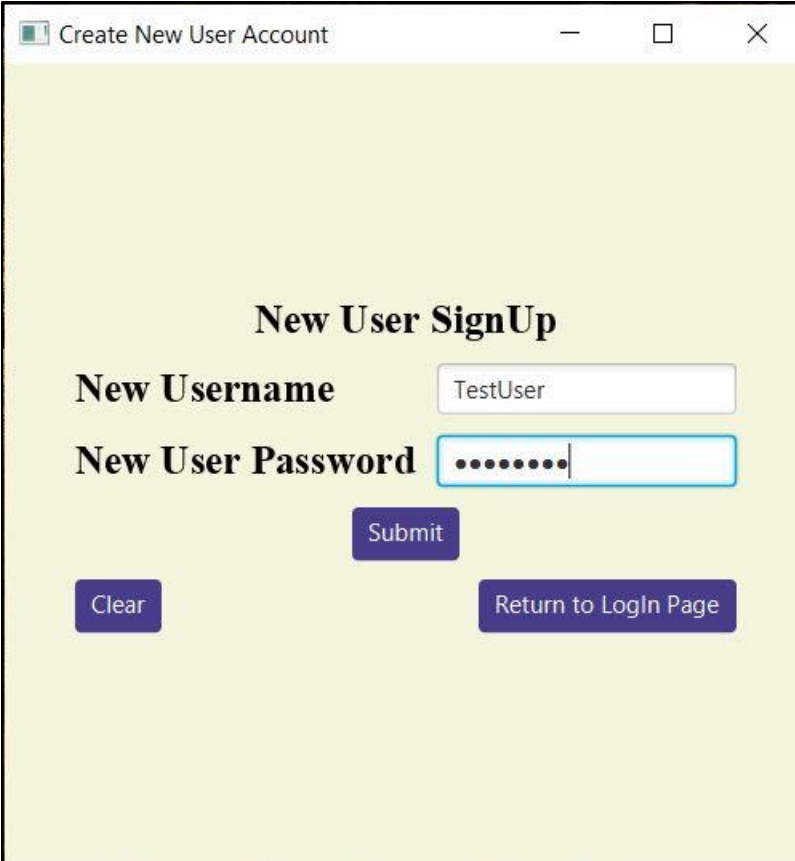
Fig 6: Entity Relationship Diagram

## Graphical User Interface (GUI)

### General User

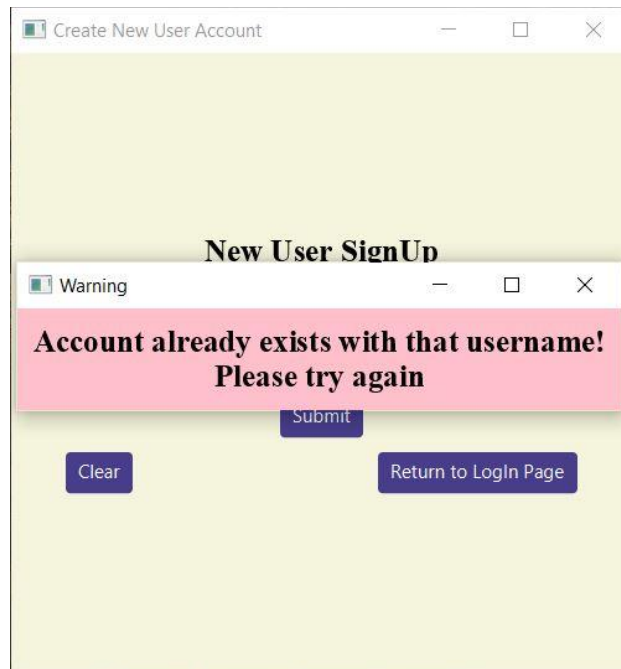
#### Step 1: New User Sign Up

User signs up by creating a new user account (Fig 7). They create a username and password. TMS verifies that the username is unique and that it does not match with a current user. If the user inputs an already existing username or if the password is not at least 8 characters long, then an error message is shown (Fig 8 and Fig 9). If the username is valid then the information is saved in the Task Management System database. The user is then brought back to the User Log In page (Fig 15).

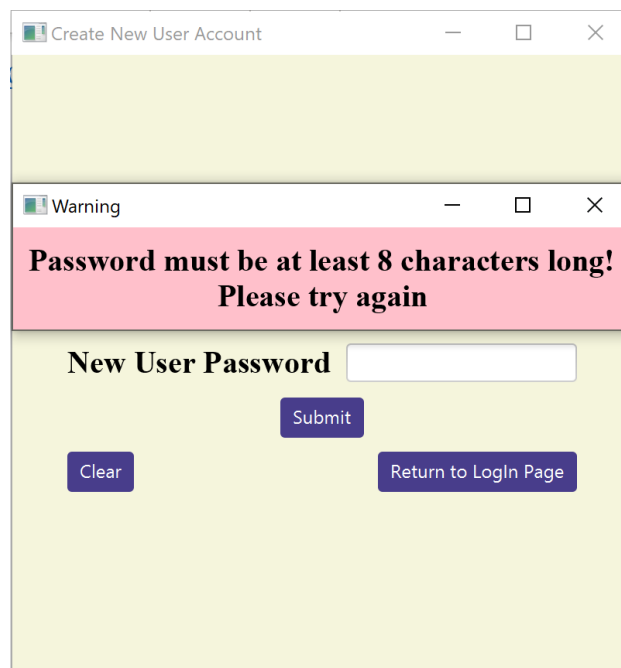


The screenshot shows a window titled "Create New User Account" with standard Windows window controls (minimize, maximize, close). The background is a light yellow color. In the center, the text "New User SignUp" is displayed in a bold, black font. Below this, there are two input fields. The first is labeled "New Username" and contains the text "TestUser". The second is labeled "New User Password" and contains eight dots, indicating a masked password. Below the password field, there are three buttons: "Submit" (purple), "Clear" (purple), and "Return to LogIn Page" (purple). The "Submit" button is positioned to the right of the "Clear" button and above the "Return to LogIn Page" button.

Fig 7: New User Sign Up



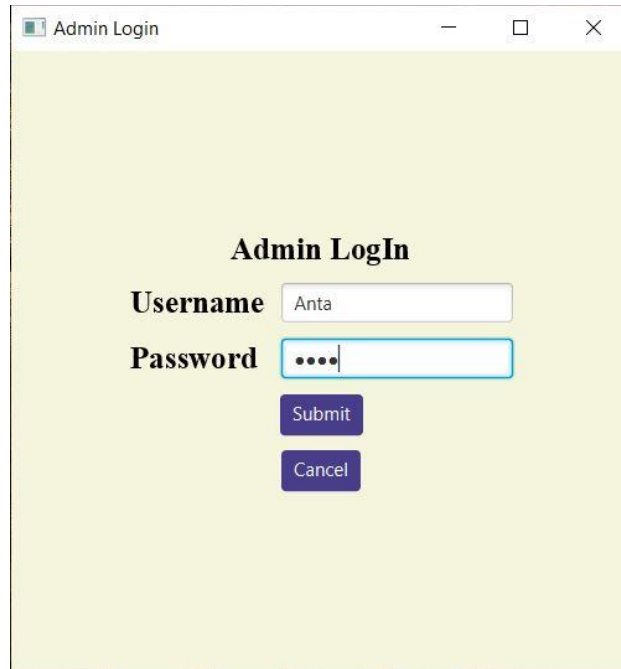
**Fig 8: Account Exists Warning Message during New User Sign Up**



**Fig 9: Password Length not met Warning Screen**

### Step 2: Admin Log In

The user will not be able to log in until the admin approves their account. Therefore, the admin logs in using the admin portal (Fig 10). The admin username and password has been preset when building the application. If the admin provides the wrong username or password, an error message is shown (Fig 11).

A screenshot of a web application window titled "Admin Login". The window has a light yellow background. In the center, the text "Admin LogIn" is displayed in bold. Below it, there are two input fields: "Username" with the text "Anta" and "Password" with four dots. Below the password field are two buttons: "Submit" and "Cancel".

Admin Login

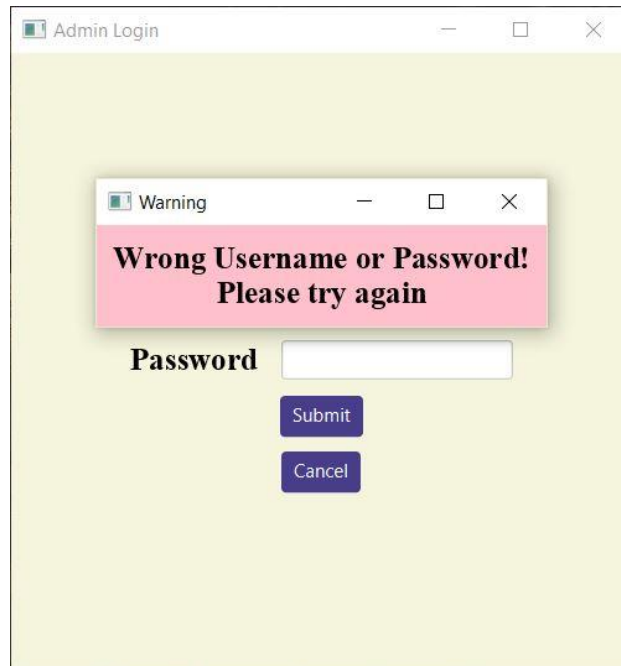
Username Anta

Password ....

Submit

Cancel

**Fig 10: Admin Log In**

A screenshot of the "Admin Login" window with a warning message overlay. The warning message is in a pink box with the text "Wrong Username or Password! Please try again". Below the message, the "Password" input field is visible, along with "Submit" and "Cancel" buttons.

Admin Login

Warning

Wrong Username or Password!  
Please try again

Password

Submit

Cancel

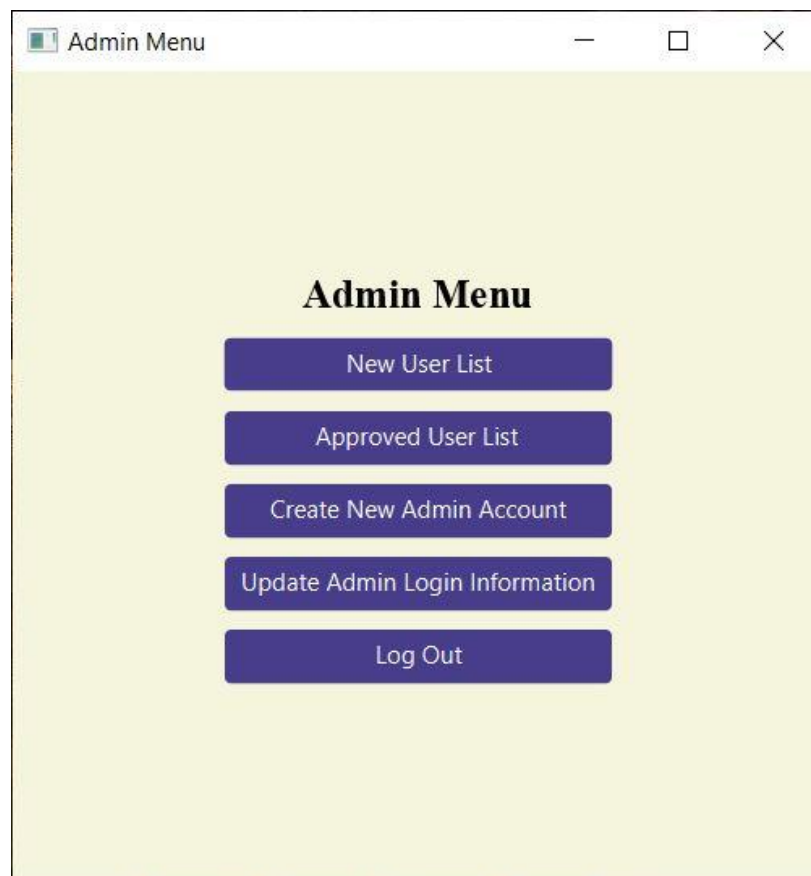
**Fig 11: Warning Message during Admin Log In**

### Step 3: Admin Menu

The admin is brought to the Admin Menu page (Fig 12) provided that the admin username and password is correct (Fig 10). The admin has the following options to choose from the menu:

1. Approving or Rejecting a New User in the New User List section
2. Viewing or Deleting an Approved User in the Approved User List section
3. Creating a new admin account
4. Updating their admin information
5. Logging out of the admin portal

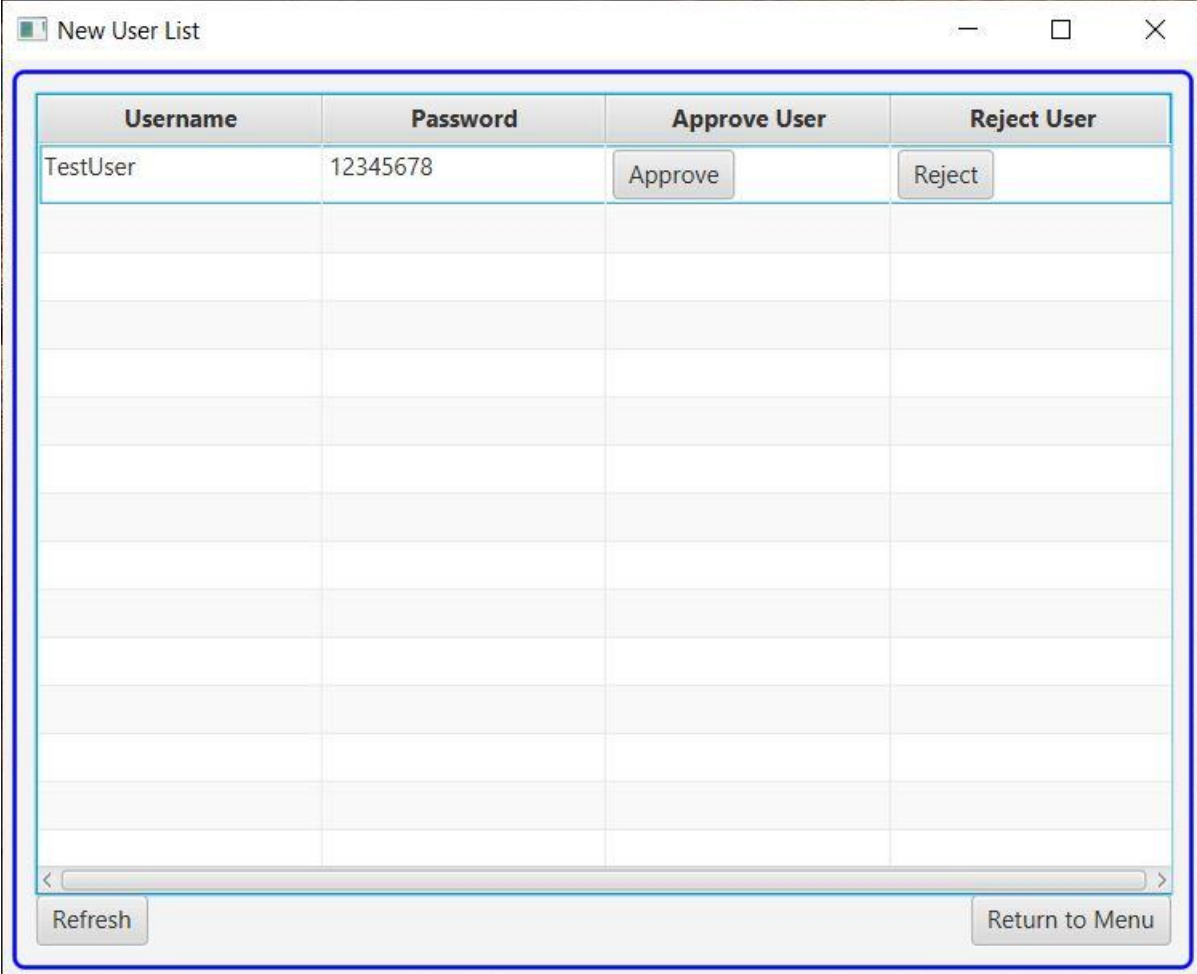
To approve the new user, the admin selects New User List.



**Fig 12: Admin Menu**

#### Step 4: New User List

The admin is able to view a list of all new users (Fig 13) who have signed up in the New User List section. The admin approves the new user “TestUser” by clicking on the Approve button. The admin may also reject a user by clicking on the Reject button.



The screenshot shows a web application window titled "New User List". It contains a table with four columns: "Username", "Password", "Approve User", and "Reject User". The first row of the table displays the user "TestUser" with the password "12345678". In the "Approve User" column, there is an "Approve" button, and in the "Reject User" column, there is a "Reject" button. Below the table, there is a horizontal scrollbar and two buttons: "Refresh" on the left and "Return to Menu" on the right.

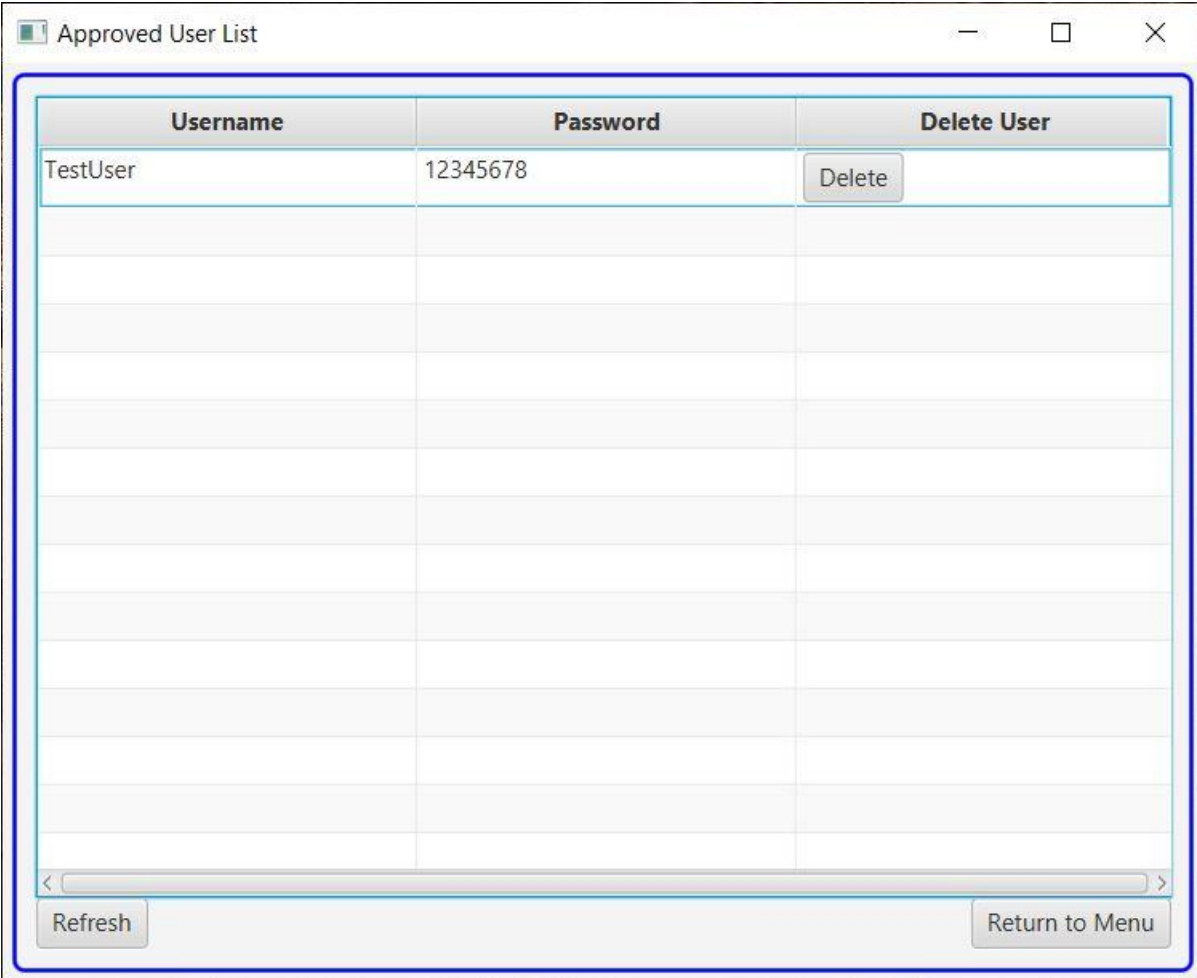
Username	Password	Approve User	Reject User
TestUser	12345678	Approve	Reject

Fig 13: New User List



### Step 5: Approved User List

After a new user is approved, their data is transferred to the approved user list. The admin has the option of viewing all the current users on TMS or deleting their account (Fig 14).



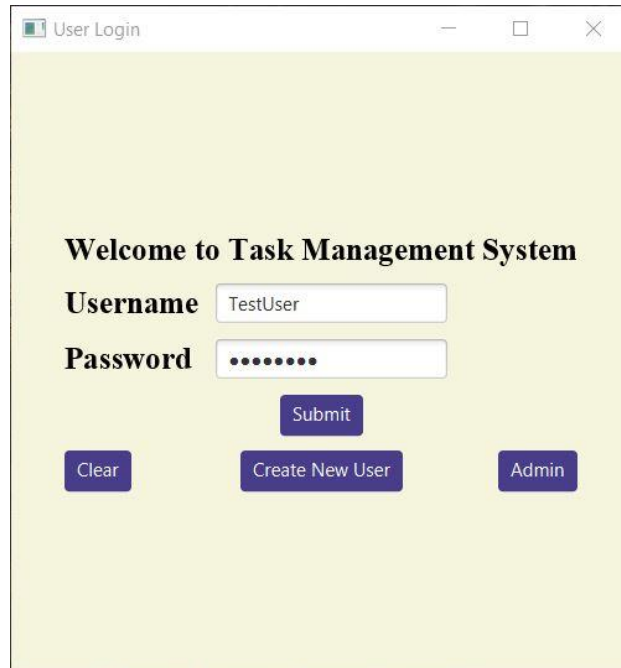
Username	Password	Delete User
TestUser	12345678	Delete

Refresh Return to Menu

**Fig 14: Approved User List**

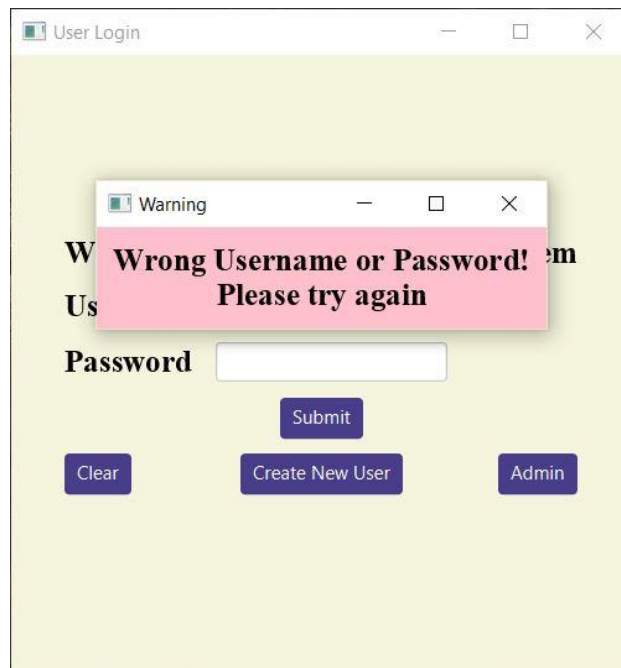
### Step 6: User Log In

The new user is able to log in now since their account has been approved. The user inputs their username and password in the respective fields and clicks on Submit (Fig 15). If the user inputs an incorrect username or password, an error message is shown (Fig 16).



A screenshot of a web application window titled "User Login". The window has a light yellow background. At the top, it says "Welcome to Task Management System". Below this, there are two input fields: "Username" with the text "TestUser" and "Password" with masked characters ".....". To the right of the password field is a "Submit" button. Below the input fields are three buttons: "Clear", "Create New User", and "Admin".

**Fig 15: User Log In**



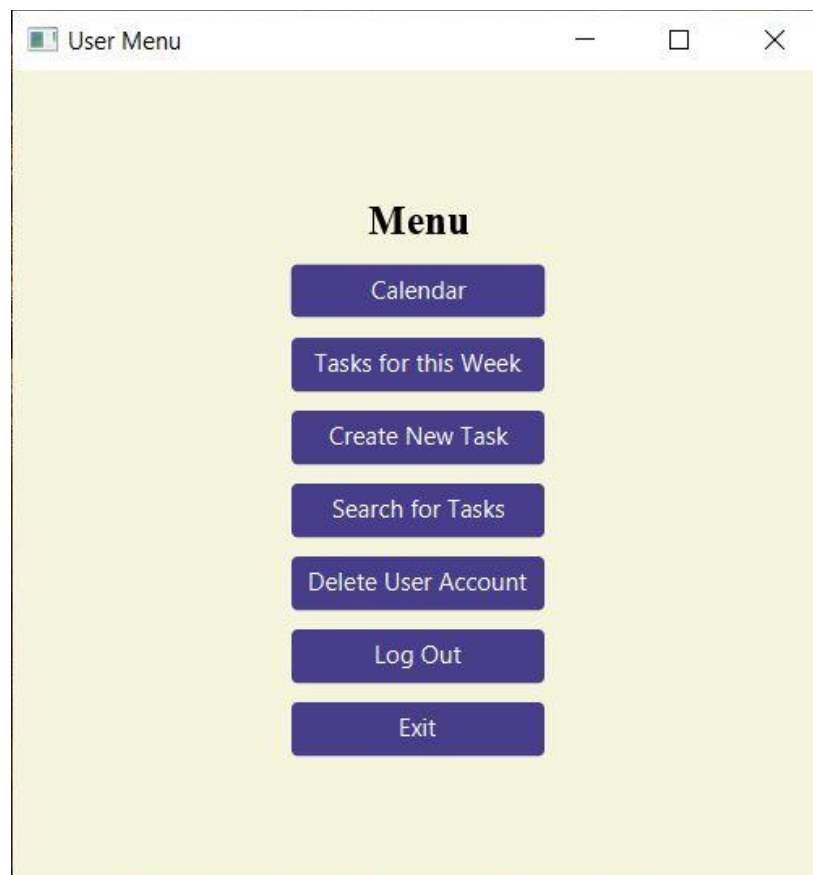
A screenshot of the same "User Login" window, but with a "Warning" dialog box overlaid in the center. The dialog box has a pink background and contains the text "Wrong Username or Password! Please try again". The "Warning" dialog box is partially obscuring the "Username" and "Password" fields. The "Submit" button is still visible below the password field.

**Fig 16: Warning Message during User Log In**

### Step 7: User Menu

The user is brought to the User Menu page provided that the username and password is correct (Fig 17). The user has the following options to choose from the menu:

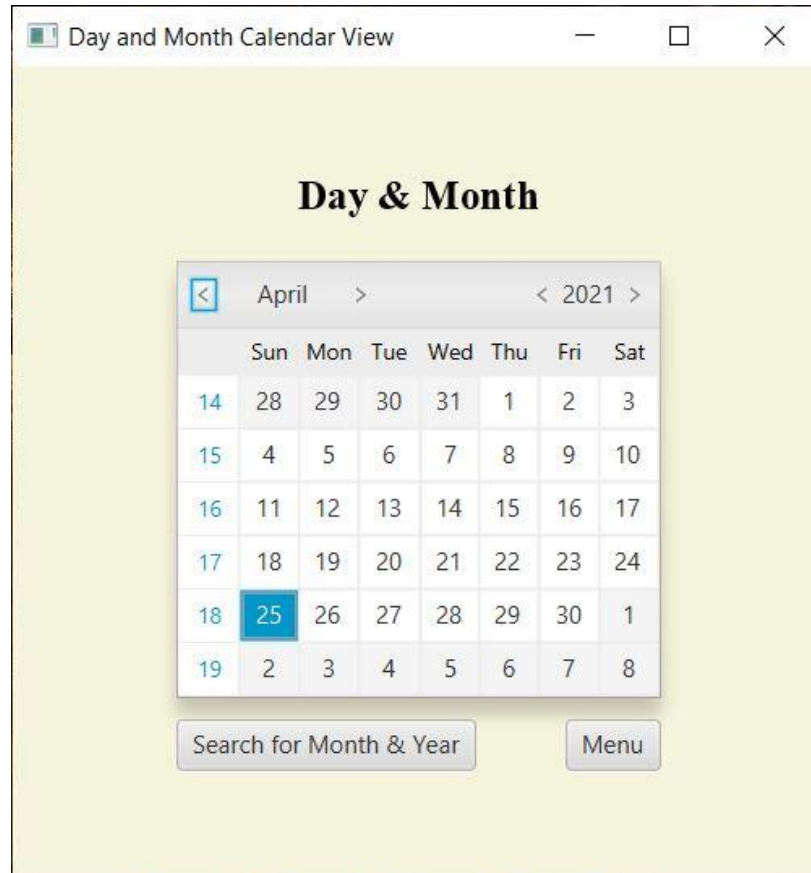
1. Calendar
2. Tasks for this Week
3. Create New Task
4. Search for Tasks
5. Delete User Account
6. Log Out
7. Exit



**Fig 17: User Menu**

### Step 8: Current Date, Month, and Year on a Calendar

The user selects Calendar (Fig 17) from the Menu options. The user is directed to a different page where they are able to view the current date, month, and year on the calendar (Fig 18). They are able to navigate through the calendar using the month and year push buttons, to view a particular date. Moreover, for convenience, the user has the ability to search for a month and year by clicking on the Search for Month & Year button. The user clicks on Search for Month & Year button.



**Fig 18: Current Date, Month, and Year on a Calendar**

### Step 9: Search for a Month and Year in the Calendar

The user inputs a Year and clicks on the Month they would like to view from the options provided (Fig 19). The search outputs a calendar view of the dates for the chosen month and year. The user may decide to return to the previous page by clicking on Current Date.

Month and Year Calendar View

**Month & Year**

Year:

January	February	March	April
May	June	July	August
September	October	November	December

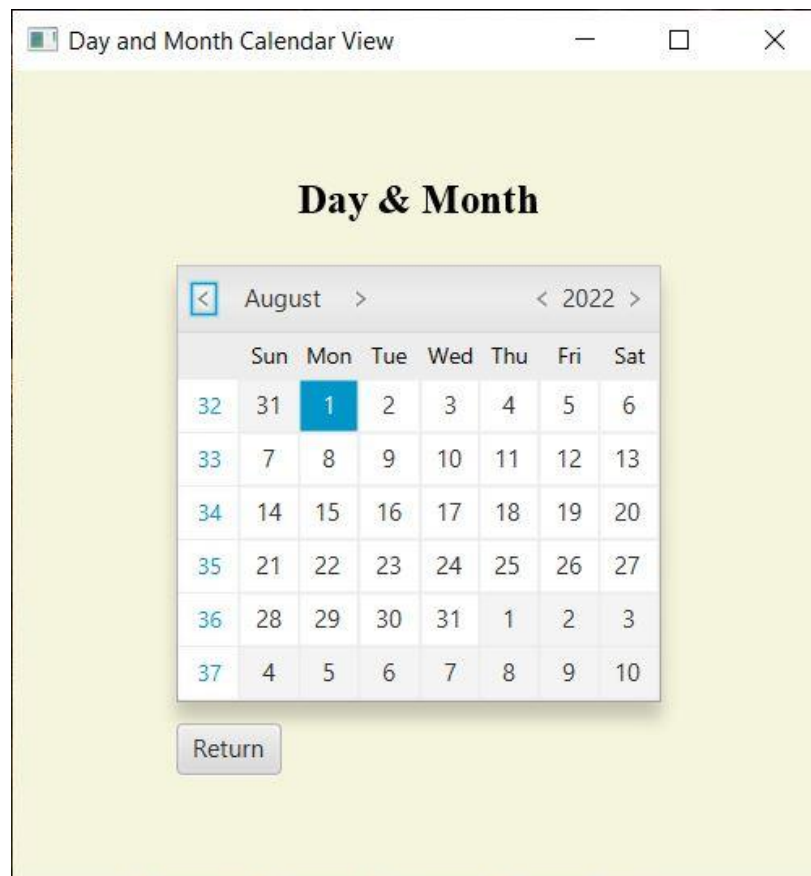
**Fig 19: Search for a Month and Year in the Calendar**

### Step 10: Result from the Search of Month and Year (August 2022)

The user selected August 2022 and was displayed a calendar of that month and year (Fig 20). The user returns to the previous page where they have the following options:

1. Search for a different date
2. Return to the current date
3. Return to menu.

The user selects Menu. The user is provided the list of options as seen in Fig 17. The user selects Tasks for this Week (Fig 21).



**Fig 20: Result from the Search of Month and Year (August 2022)**

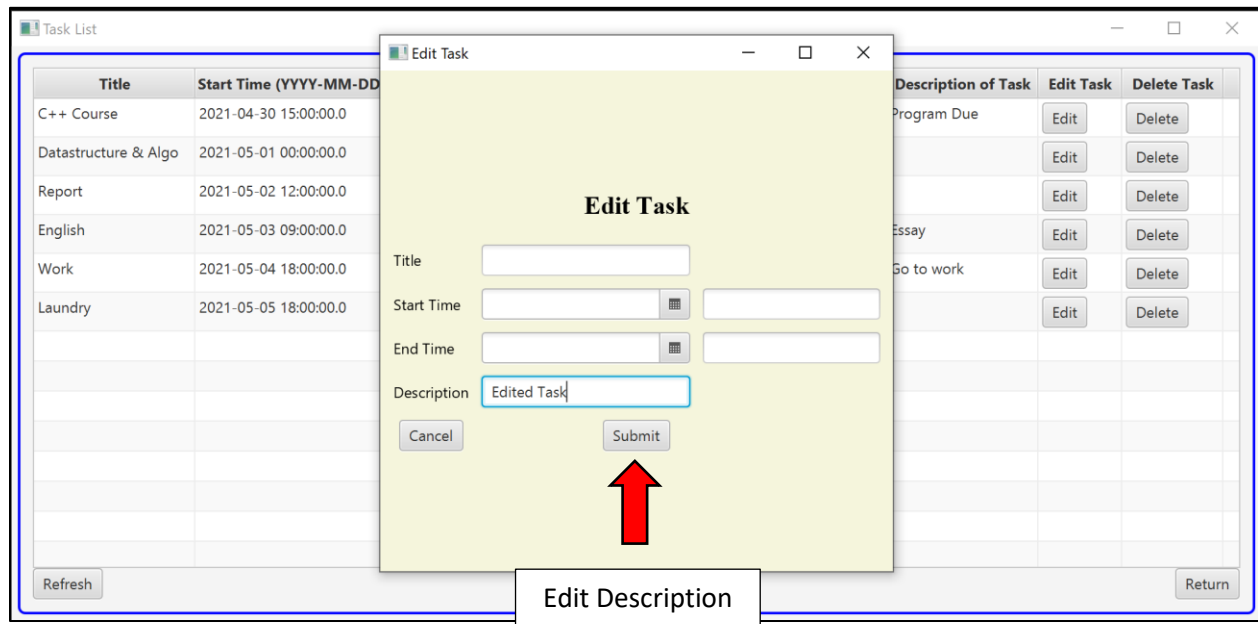
## Step 11: Tasks for this Week

The user can view all the tasks that they have created for the current week (7 Days) starting from the current local date (Fig 21). The tasks for the week is shown in ascending order starting from the current date to the 7<sup>th</sup> day of that week. Additionally, the user has the option to edit or delete a task. If the user clicks on edit for a particular task (Fig 21), then a new window opens where the user can edit the fields for title, start date and time, end date and time, and description (Fig 22). Only the fields that the user edits will be updated on the task list and the remaining fields will remain unchanged (Fig 23). If the user clicks on delete, then the task will be deleted from the task list (Fig 24). Lastly, if the user does not have any tasks for the current week, then an empty table is displayed (Fig 25).

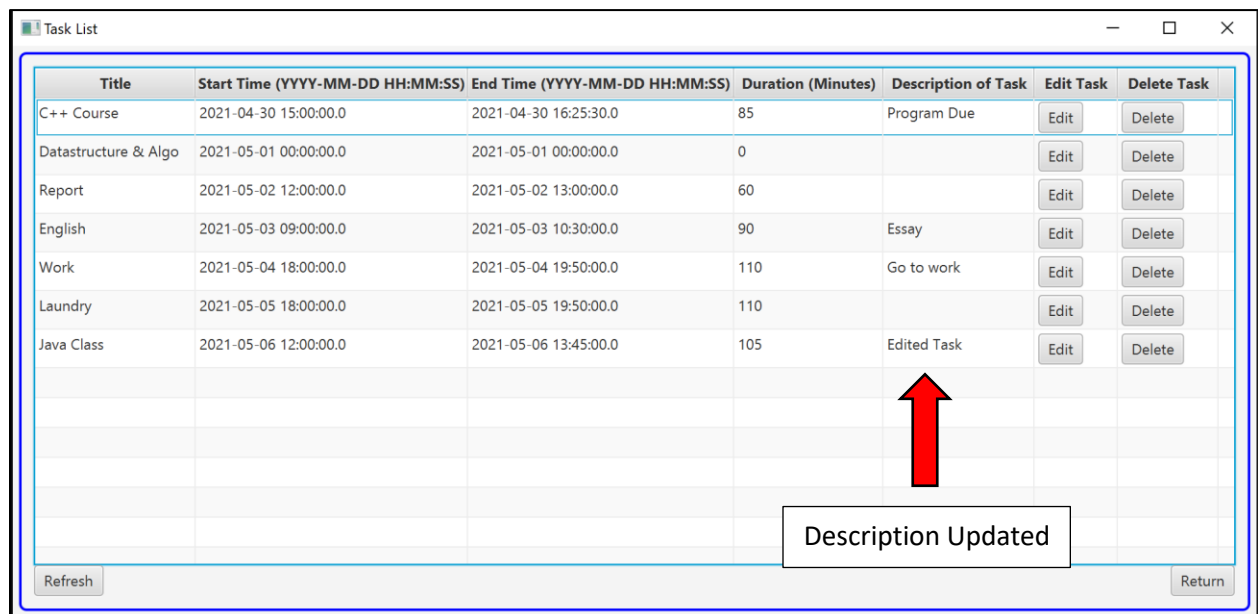
[illegible]

### Fig 21: Tasks for the Week

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**Fig 22: User edits the Description of a Task (Java Class)**



**Fig 23: Description of a Task (Java Class) is Updated**



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[illegible]

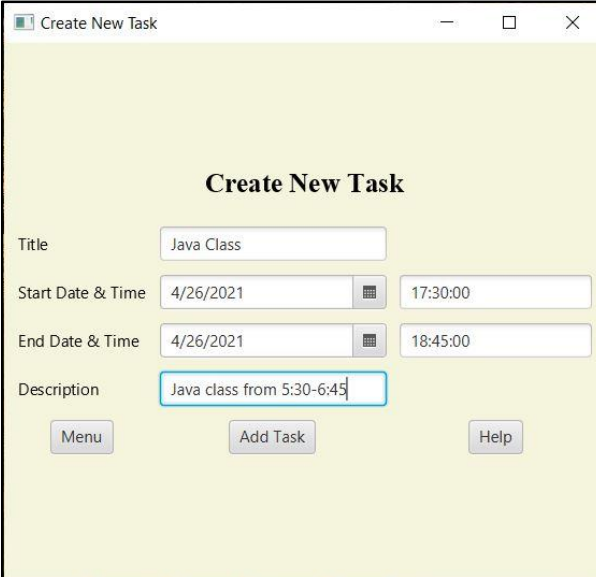
**Fig 24: User deletes a particular Task (Java Class)**

[illegible]

**Fig 25: Empty Table – No Tasks for the Week**

### Step 12: Create New Task

The user is displayed a new page where they are able to input details about their task (Fig 26). The user provides the title, start date, start time, end date, end time, and description. The start date and end date are mandatory fields to create a task, however, the rest of the fields are optional. In Fig 26. the user “TestUser” inputted all the details for their Java Class task. The user clicks on add task to insert their task into the database. A confirmation message is shown if the user adds the task successfully (Fig 27), but an error message is displayed if the user does not input a valid start date and end date (Fig 28). A particular user is able to view only their tasks; they cannot view the tasks of other users. After adding the task, the user returns to the Menu. For user convenience, a help menu is given which provides details on creating a task (Fig 29).

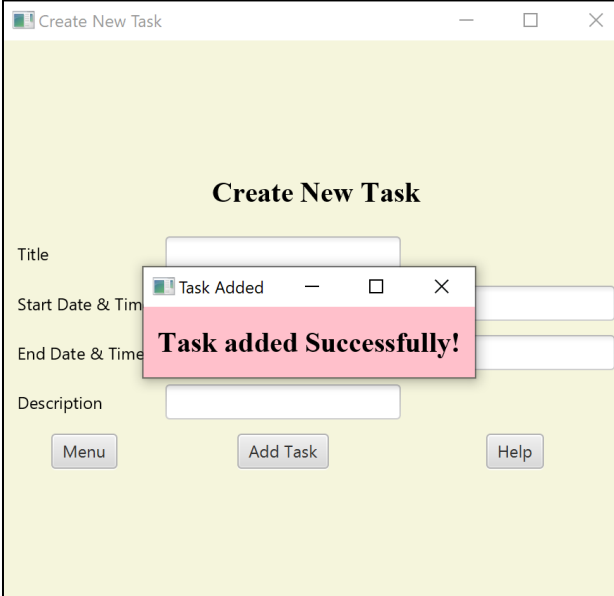


The screenshot shows a web application window titled "Create New Task". The form contains the following fields and values:

- Title: Java Class
- Start Date & Time: 4/26/2021 (with a calendar icon)
- Start Time: 17:30:00
- End Date & Time: 4/26/2021 (with a calendar icon)
- End Time: 18:45:00
- Description: Java class from 5:30-6:45

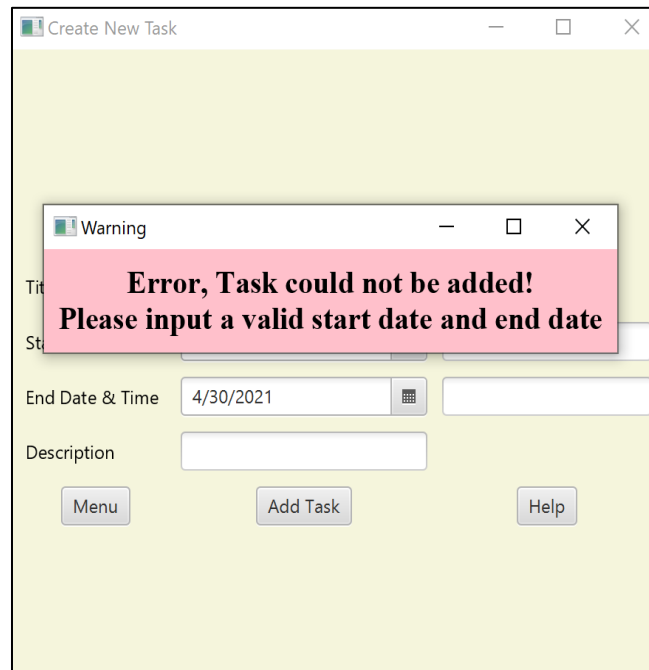
At the bottom of the form are three buttons: "Menu", "Add Task", and "Help".

**Fig 26: Create New Task**

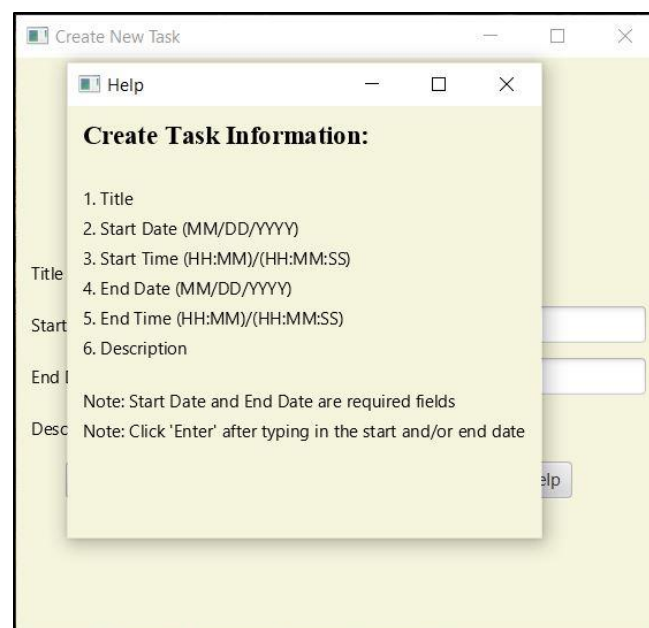


The screenshot shows the same "Create New Task" form as in Fig 26, but with a confirmation message overlay. The message box is titled "Task Added" and contains the text "Task added Successfully!". The "Add Task" button is highlighted in pink. The "Menu", "Add Task", and "Help" buttons are still visible at the bottom.

**Fig 27: Confirmation Message after adding a Task Successfully**



**Fig 28: Error Message if the User does not input a valid Start and End Date**



**Fig 29: Create Task Information**

### Step 13: Search for a Task and View the corresponding Result

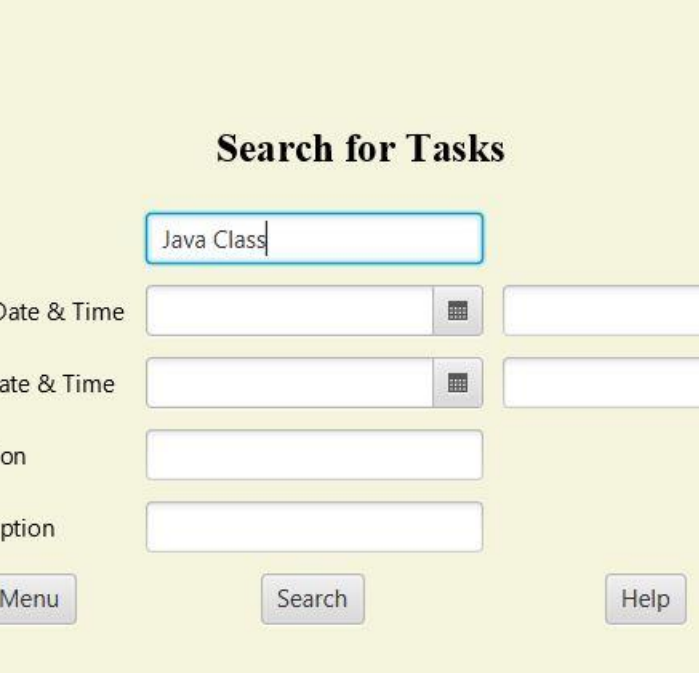
The user selects Search for Tasks from the menu to search for a particular task and view its related data.

The user has several options to search for tasks:

1. The user may input the title of the task (Fig 30) and this would display a table of the all the tasks with that title (Fig 31).
2. The user may input the title and start date (Fig 32), and this would display all the tasks with the same title occurring on that date (Fig 33).
3. The user may input the title, start date, and start time (Fig 34) and this would display all the tasks with the same title, starting at that time on that particular date (Fig 35).

The comprehensive list of all combinations of search functions has been detailed below:


1. Title
2. Start Date
3. Start Time
4. End Date
5. End Time
6. Duration
7. Description
8. Title and Start Date
9. Title, Start Date, and Start Time
10. Start Date and Start Time
11. Start Date, Start Time, End Date, and End Time
12. Start Date and Duration
13. Title and Description
14. Default (No Input): List all tasks for that particular user




Search for Tasks

## Search for Tasks

Title

Start Date & Time  

End Date & Time  

Duration

Description

**Fig 30: Search for a Task using the Title**

[illegible]

**Fig 31: Result of a Search using the Title of a Task**

Search for Tasks

— □ ×

Search for Tasks

Title

Start Date & Time

End Date & Time

Duration

Description

Menu

Search

Help

**Fig 32: Search for a Task using the Title and Start Date**

[illegible]

**Fig 33: Result of a Search using the Title and Start Date of a Task**

Search for Tasks

— □ ×

## Search for Tasks

Title

Calculus III

Start Date & Time

4/29/2021

13:00:00

End Date & Time

Duration

Description

Menu

Search

Help

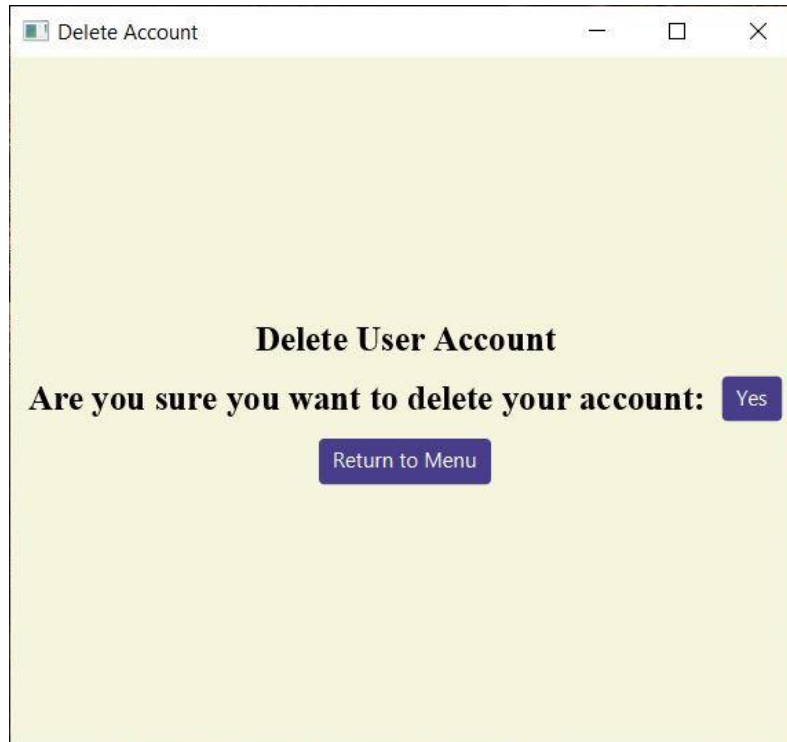
**Fig 34: Search for a Task using the Title, Start Date, and Start Time**

[illegible]

**Fig 35: Result of a Search using the Title, Start Date, and Start Time of a Task**

### Step 14: Delete User Account

The user may delete their account by clicking on the Delete User Account button (Fig 36). The user is prompted to confirm their request. If the user clicks on Yes then their record on TMS, username, password, and tasks, is deleted. Additionally, the user has the option to not delete their account and return to menu.



**Fig 36: Delete User Account**

### Step 15: Exit

The user can close the application by clicking on Exit. TMS thanks the user for using the application and prompts the user to close it by clicking on Close (Fig 37). The user may return to the user menu by clicking on Menu



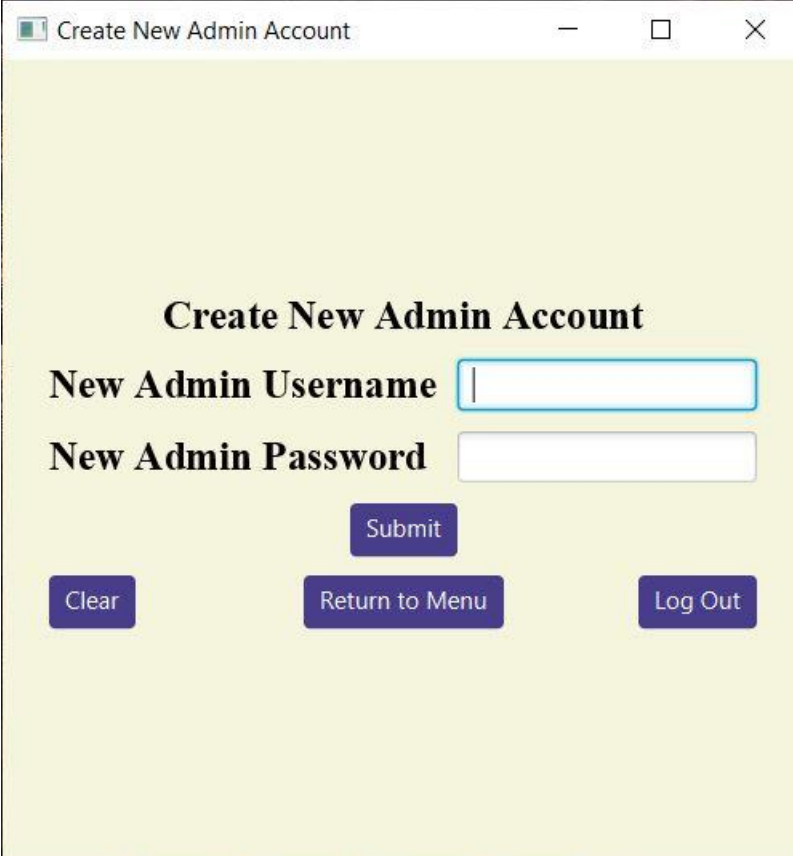
**Fig 37: Exit Screen**



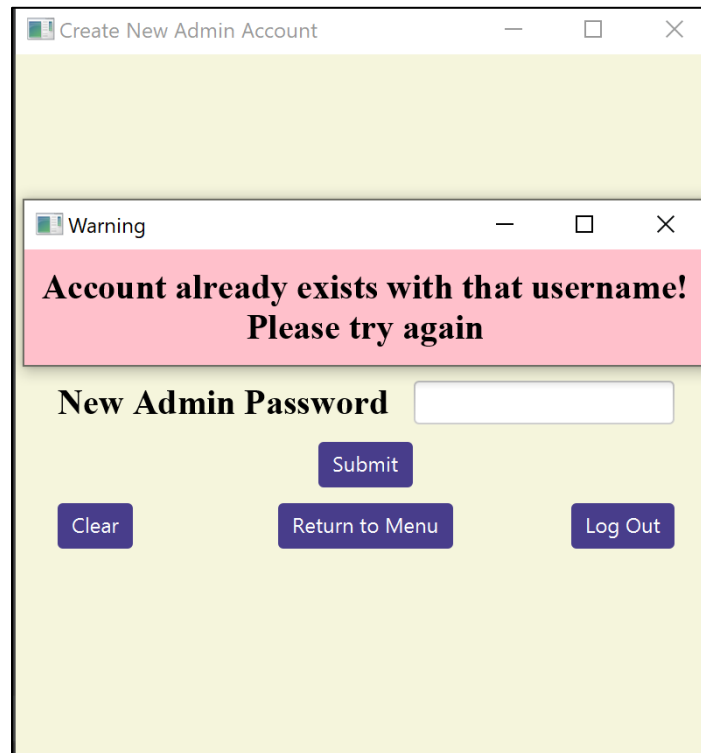
## Admin

### Step 16: Create New Admin Account

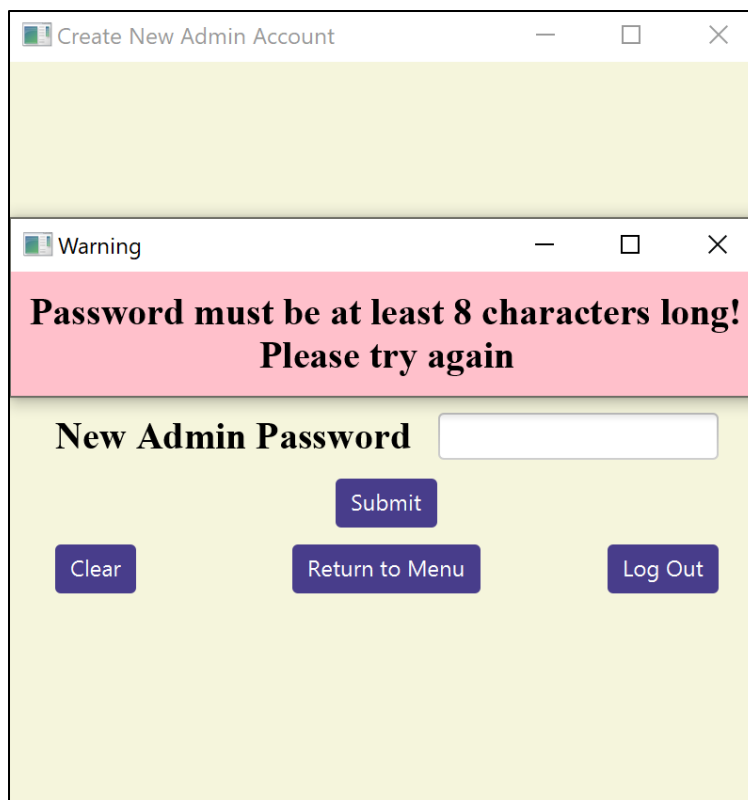
The admin logs into their admin account using their credentials (Fig 10). The admin is displayed the admin menu and is able to choose from the options provided (Fig 12). The admin clicks on Create New Admin Account (Fig 38). This allows the current admin to add a new admin into TMS. The current admin inputs a username and password for the new admin. An error message is displayed if the username already exists or if the password is not at least 8 characters long (Fig 39 and Fig 40). If the admin account is created successfully, the credentials are then passed onto the new admin. The new admin would then log into their account and change their username and password in the Update Admin Account portal (Fig 41).

The image shows a web browser window titled "Create New Admin Account". The page has a light yellow background. At the top, the title "Create New Admin Account" is centered in a bold, black font. Below the title, there are two input fields: "New Admin Username" and "New Admin Password". The "New Admin Username" field has a blue border and a cursor inside. The "New Admin Password" field is a standard white input box. Below these fields, there are four buttons: "Submit" (purple), "Clear" (purple), "Return to Menu" (purple), and "Log Out" (purple). The buttons are arranged with "Submit" in the center, "Clear" to the left, and "Return to Menu" and "Log Out" to the right.

**Fig 38: Create New Admin Account**



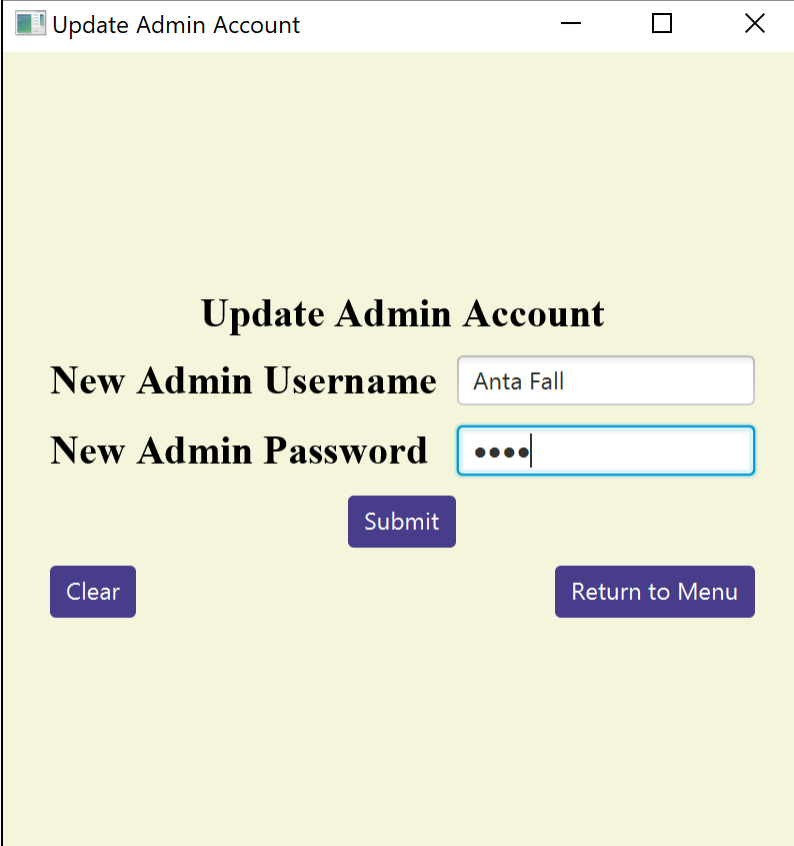
**Fig 39: Account Exists Warning Screen when Creating New Admin Account**



**Fig 40: Password length not met Warning Screen for Admin**

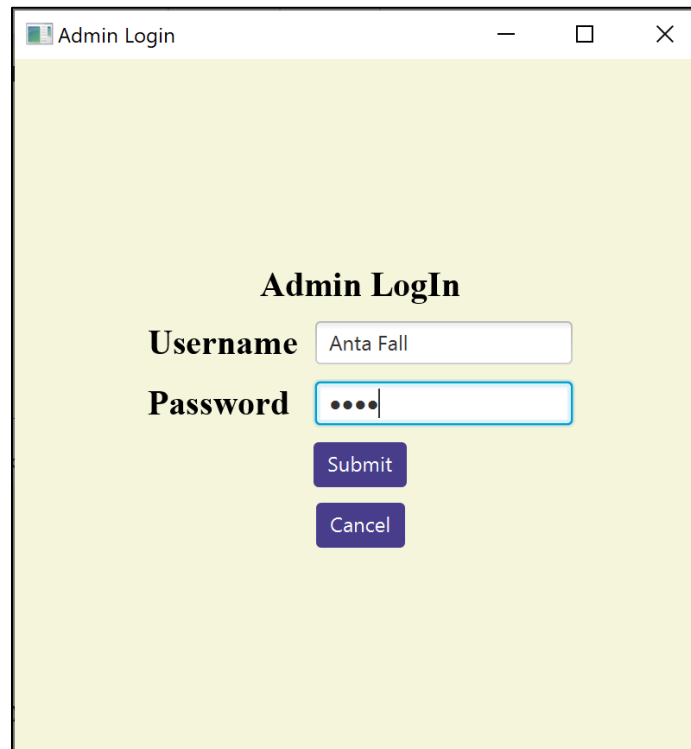
### Step 17: Update Admin Account Information

Any admin logged into their account is able to change their current username and password (Fig 41). In Fig 41, the Admin “Anta Fall” is changing their username from “Anta” to “Anta Fall”. After clicking submit, their admin log in information is updated and they are logged out of their account. The admin is prompted to log into their account using their new username and password (Fig 42). As can be observed in Fig 43, the admin is able to login with their updated username and password.



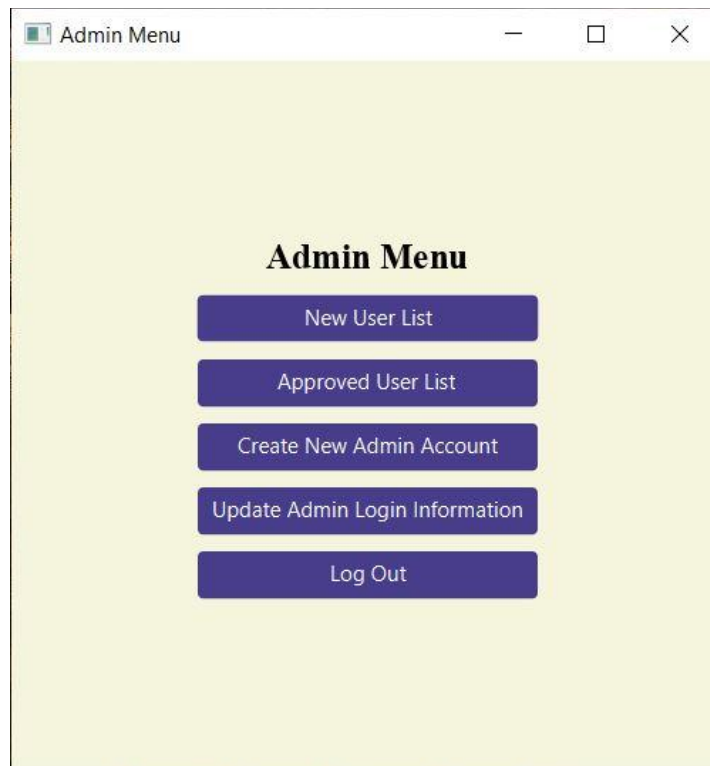
The screenshot shows a web browser window titled "Update Admin Account". The form has a light yellow background and a black border. At the top, the title "Update Admin Account" is centered in bold black text. Below the title, there are two input fields. The first is labeled "New Admin Username" and contains the text "Anta Fall". The second is labeled "New Admin Password" and contains four dots, indicating a password field. Below the input fields, there are three buttons: "Submit" in the center, "Clear" on the left, and "Return to Menu" on the right. All buttons are purple with white text.

**Fig 41: Update Admin Account Information**



The image shows a web browser window titled "Admin Login". The background is a light yellow color. In the center, the text "Admin LogIn" is displayed in a bold, black font. Below this, there are two input fields. The first is labeled "Username" and contains the text "Anta Fall". The second is labeled "Password" and contains four dots, indicating a masked password. Below the password field, there are two buttons: "Submit" and "Cancel", both in a dark blue color with white text.

**Fig 42: Admin Logging in with New Username and Password**



The image shows a web browser window titled "Admin Menu". The background is a light yellow color. In the center, the text "Admin Menu" is displayed in a bold, black font. Below this, there are five buttons stacked vertically, all in a dark blue color with white text. The buttons are labeled: "New User List", "Approved User List", "Create New Admin Account", "Update Admin Login Information", and "Log Out".

**Fig 43: Admin Successfully Logs In**

## Variable Description

1. Stage:

The current stage (parameter) of an Application class is passed to another Application class when transitioning between stages.

2. ResultSet:

The ResultSet from a SELECT query is passed to the databaseArrayList() function. The function returns an array list of objects where each row of the ResultSet is converted to a new object and stored in the array list. The array list is converted to an ObservableList to be added to the TableView.

3. Username and Password:

User inputted values for username and password are stored in variables. These strings are inserted into tables when creating new accounts. Additionally, they are used to query tables when trying to verify the credentials of a user.

4. User ID & Admin ID:

IDs are passed when transitioning between stages (such as, Log in to Menu) to ensure that the data retrieved is specific to the user of the account.

5. Title, Start Date Time, End Date Time, Description, Duration:

User inputted values for the following fields are stored in variables. These data are inserted into the Task table when creating a task. Additionally, they are used to query the Task table when searching for a task.

6. Boolean “Check”:

The boolean check is passed to the SearchTasksTableViewScreen class. When the user clicks on Search for Tasks button, the check is set to false and the Search for Tasks page is displayed. However, if the user clicks on Tasks for this Week button, then check is set to true, and the Tasks for this Week Table is displayed.

## Function Description

1. Admin and User Log In:

A SELECT query is executed with a WHERE condition to determine if the username and password inputted by the user matches exactly (case-sensitive) with one user or admin in their respective table (Approved User Account or Admin Account).

2. Create New Admin and User Account:

Data collected from a user (admin or general) is inserted into their appropriate table (Admin Account or New User Account) using an INSERT statement in MySQL.

3. Set Database Connection:

The SetDatabaseConnection class connects to a local database by passing in the username, password and JDBC URL to the “DriverManager”

4. Create New Task:

User inputted values for title, start date and start time, end date and end time, and description are inserted into the Task table using an INSERT statement in MySQL

5. Search for Task:

A SELECT query is executed to obtain a list of all the tasks from the Task table that matches with the user’s input. The result is displayed in a tabular form using TableView

6. Converting ResultSet data to Java Object, Observable List & Table View:

A SELECT query is executed to retrieve data from a table. The retrieved data is stored in a ResultSet. The ResultSet of the query is passed to the databaseArrayList() function which converts each row of the set into a new object where the fields are initialized with the data from the row. The object is then added to an array list which is converted to an ObservableList using the FXCollections.observableArrayList() function. The observable list is then added to the TableView using the tableView.getItems().addAll() function.

7. Conflict between Tasks on the User’s Calendar:

To determine conflicts between tasks, a SELECT query is executed on the Task table to determine if there exists a task where the start time or end time of the current task is between the start time and end time of another task. If such a conflict exists, then an error message is displayed to the user.

8. DatePickerSkin:

The DatePickerSkin class is used to display the calendar in the calendar section. In Search for Month and Year function, the user chosen values for Month and Year are passed to the DatePickerSkin function to display a calendar for that month and year.

### 9. Edit Task:

An UPDATE statement in MySQL is used to update the Task table depending on the specific field (input) being changed by the user. This SQL statement is executed when the user is editing a task in the Search for Tasks or Tasks for this Week section.

## Findings

There were several new concepts learned when developing this application. The Stage is a window that contains all the contents of the JavaFX application. A Scene is added to the Stage to view the contents of that Scene. The Scene is comprised of all the contents in a Scene Graph. A Scene Graph is a hierarchical structure consisting of Nodes. Nodes are graphical objects such as GridPane, HBox, VBox, Buttons, Texts, Fields and more. The Scene is initialized with a Root Node such as GridPane or HBox or VBox. These panes consist of Leaf Nodes such as buttons, texts, and fields.

The primary findings are listed below:

1. GridPane
2. HBox
3. VBox
4. TableView
5. TableColumn
6. TableCell
7. ObservableList
8. DatePicker
9. Text Configuration
10. TextField Configuration
11. Button Configuration

## GitHub Repository Address

<https://github.com/muntasir-hossain314159/Task-Management-System>

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