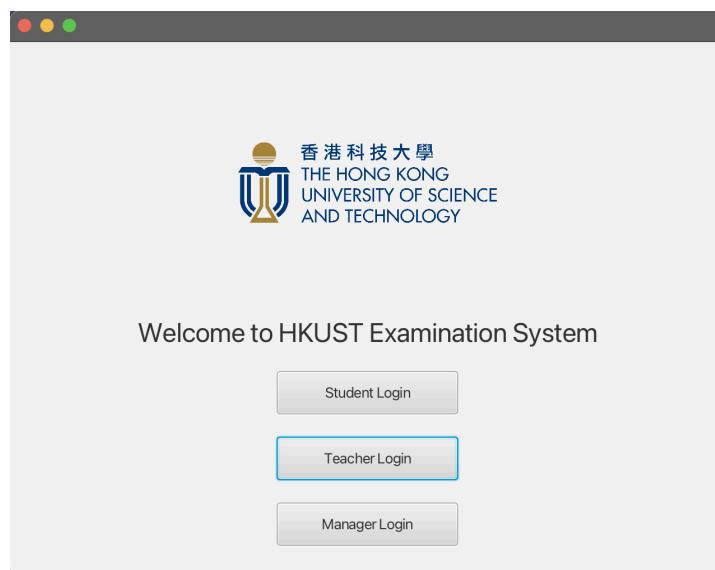


# Supplementary Notes + Screenshots of the execution of the application

## Task 1 - Student Portal

### Login and Registration

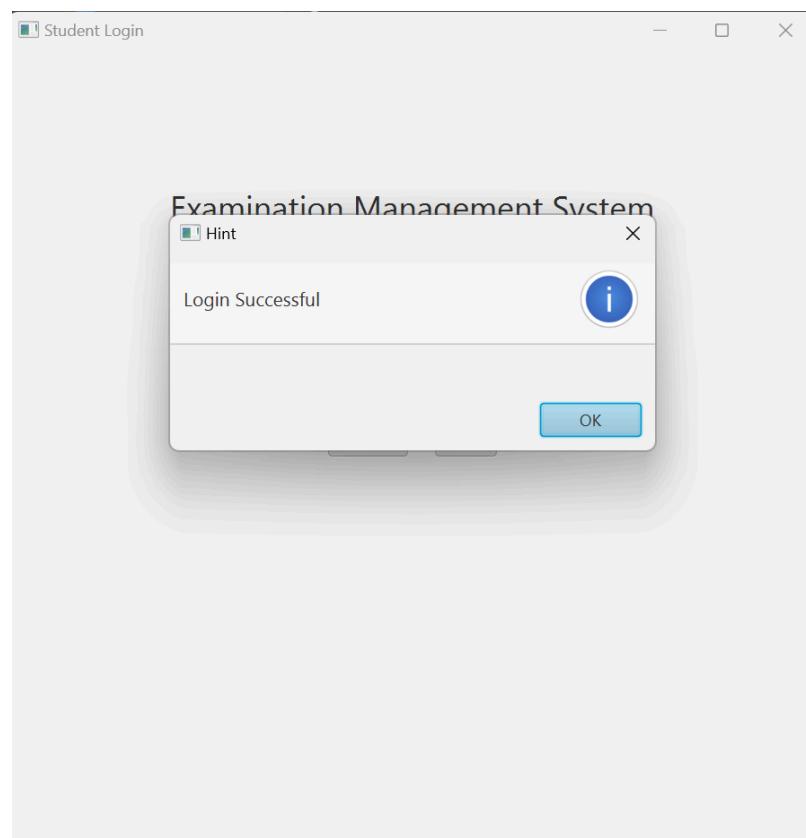
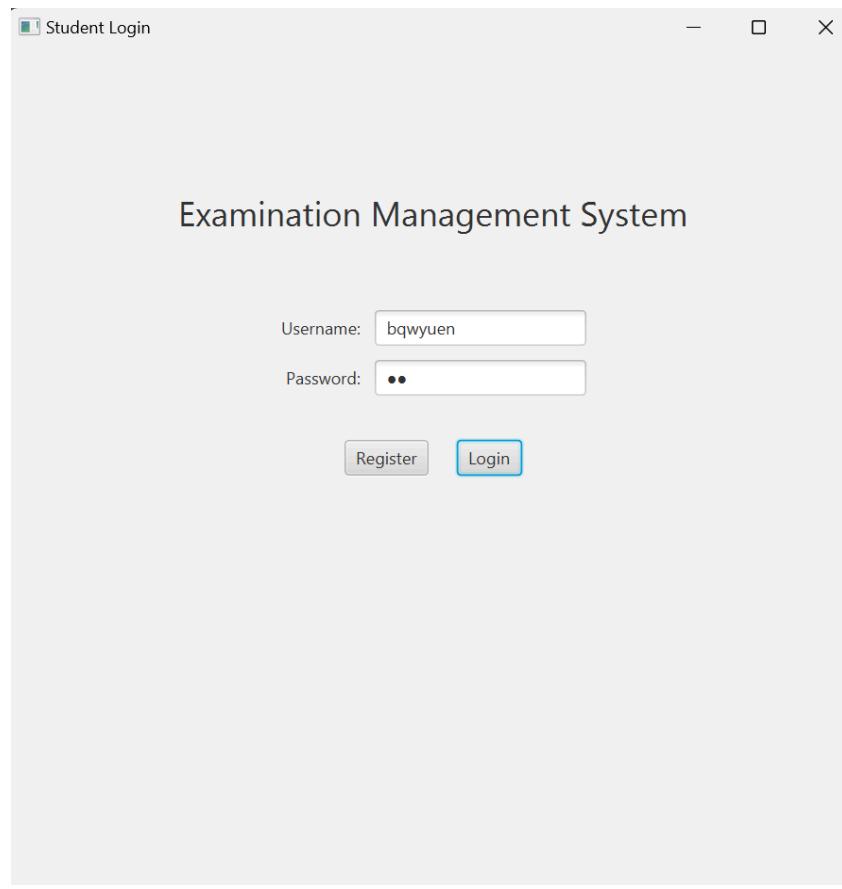
- When the user clicks on the Student Login button, the user will be prompted to the Student Login Page.



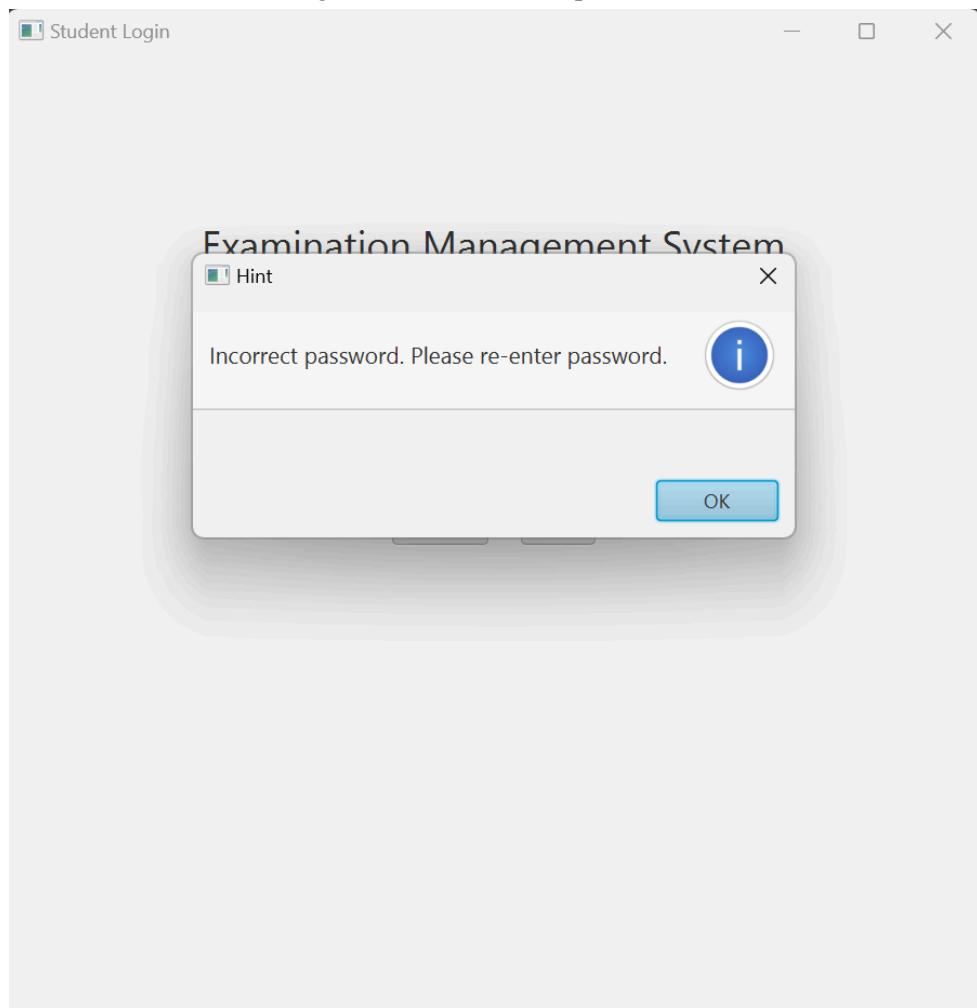
- The Student can click on the register button and register for an account.

A screenshot of a registration form. The form fields are: "Username" (input field with placeholder "Please enter your username"), "Name" (input field with placeholder "Please enter your name"), "Gender" (dropdown menu with placeholder "Please select your gender"), "Age" (input field with placeholder "Please enter your age"), "Department" (input field with placeholder "Please enter your department"), "Password" (input field with placeholder "Please enter the password"), and "PasswordConfirm" (input field with placeholder "Please confirm the password"). At the bottom are "Close" and "Register" buttons.

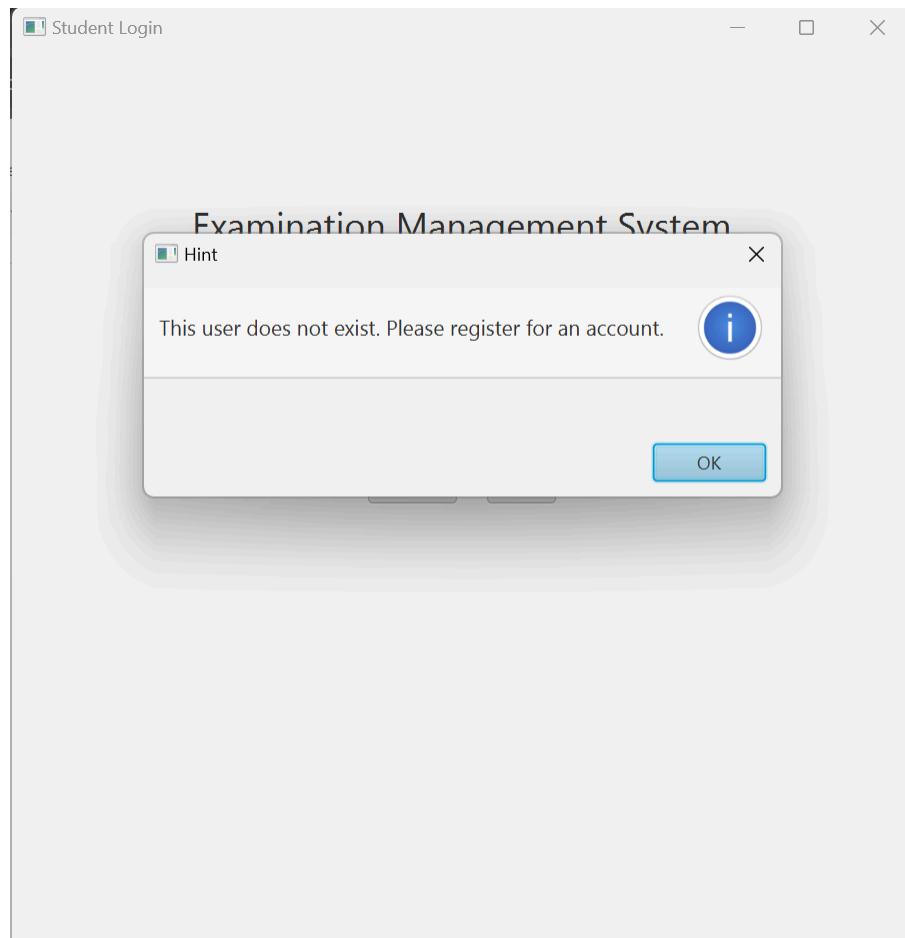
- The Student can login into an existing account. If successful a prompt will notify them that the login successful.



- If the password has been entered incorrectly, a prompt will appear, notifying the user that the password is incorrect, asking them to re-enter the password.

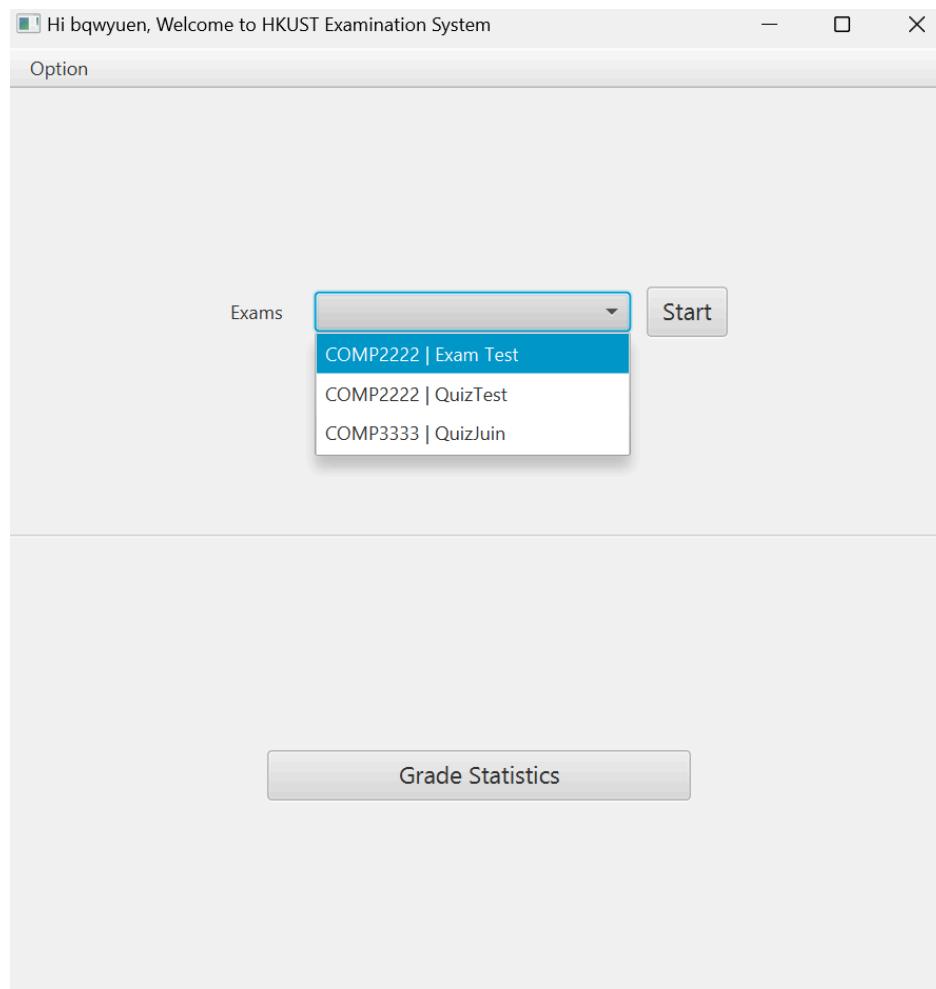


- If an unknown username is entered, a prompt will appear, notifying the user that the Student does not exist, asking them to register for an account.

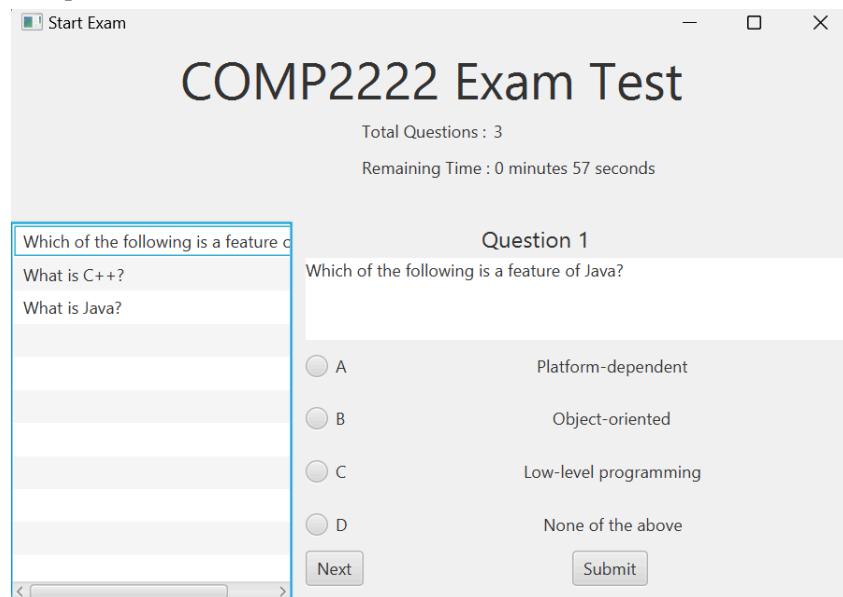


## Quiz Selection

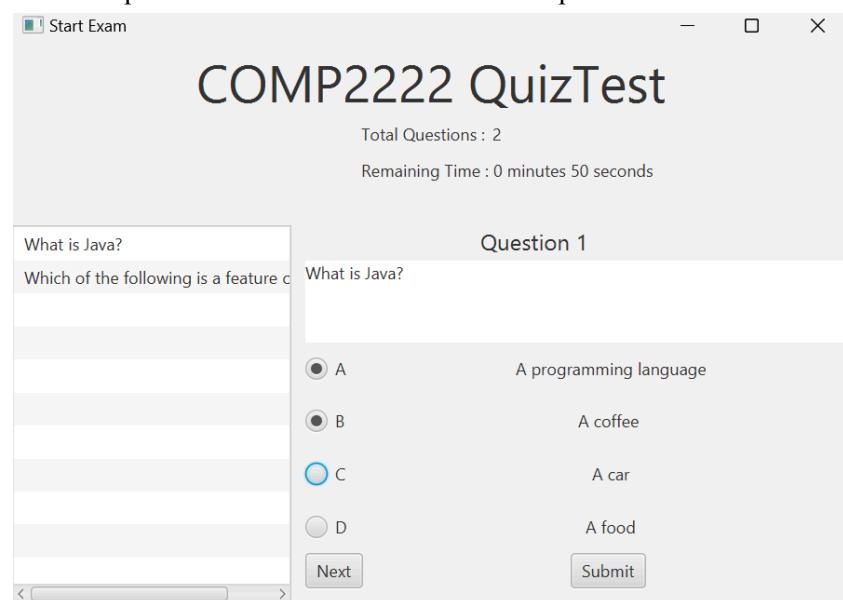
- The Student can choose a quiz for a course corresponding to the student's department that the Student has not taken.



- Once the Student starts the quiz, questions from the question database will be retrieved and displayed in the left panel. A timer will begin a countdown that reflects the predetermined duration of the quiz.



- For multiple-choice questions the Student can select multiple answers.



- For single-choice questions the Student can only select a single answer.

Start Exam

# COMP2222 QuizTest

Total Questions : 2

Remaining Time : 0 minutes 30 seconds

What is Java?

Which of the following is a feature of Java?

Question 2

Which of the following is a feature of Java?

A Platform-dependent

B Object-oriented

C Low-level programming

D None of the above

**Next** **Submit**

Start Exam

# COMP2222 QuizTest

Total Questions : 2

Remaining Time : 0 minutes 13 seconds

What is Java?

Which of the following is a feature of Java?

Question 2

Which of the following is a feature of Java?

A Platform-dependent

B Object-oriented

C Low-level programming

D None of the above

**Next** **Submit**

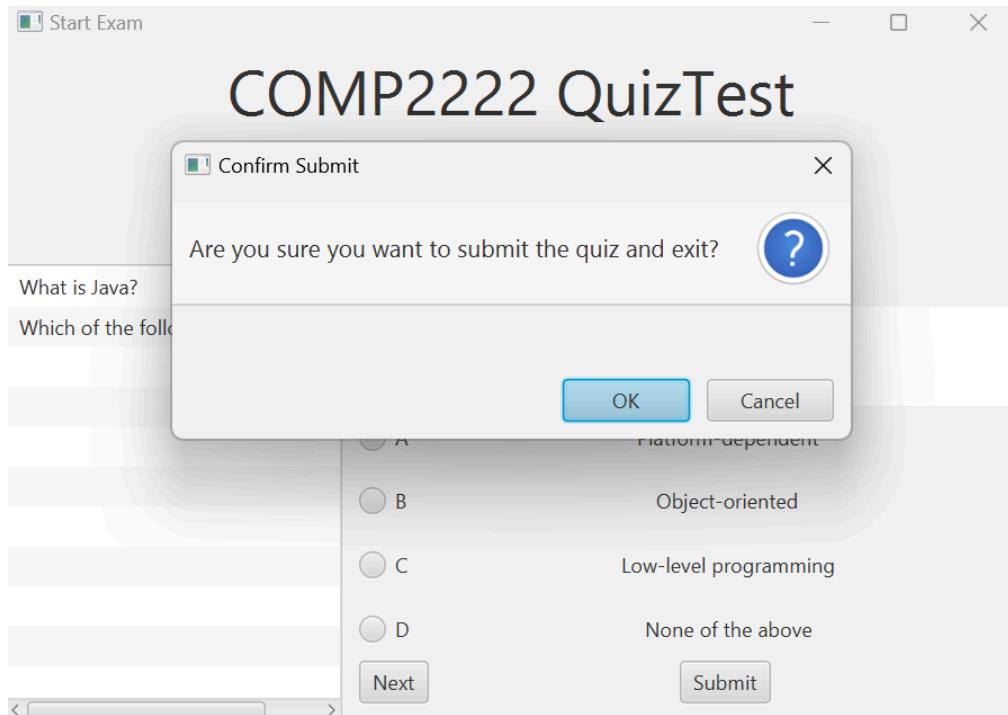
- Once the timer is up or the student clicks on the submit button, the Student's answers are checked against the answers listed in the quiz database and their corresponding score is shown.

The image consists of two screenshots of a Windows application window titled "COMP2222 QuizTest".

**Screenshot 1 (Top):** The application window shows "Total Questions : 2" and "Remaining Time : 0 minutes 1 seconds". A "Hint" dialog box is open, displaying "1/2 Correct, the precision is 50%, the score is 40/50". The "OK" button is visible at the bottom of the dialog. The main window shows a question "What is Java?" with options A, B, C, and D. Option D is selected. Other options include "None of the above", "Next", and "Submit".

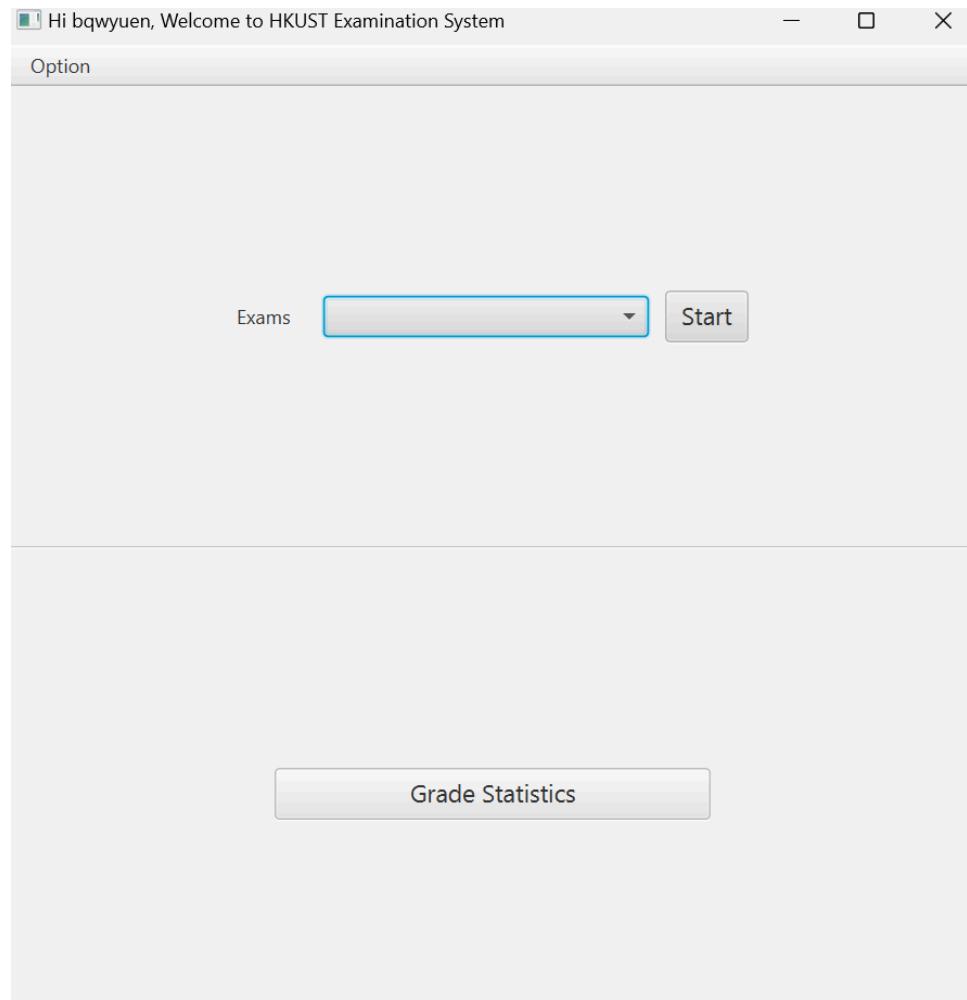
**Screenshot 2 (Bottom):** The application window shows the same question and options. A "Hint" dialog box is open, displaying "Time's up!". The "OK" button is visible at the bottom of the dialog. The main window shows the same question and options, with the "Submit" button highlighted.

- If the Student clicks on the close window button, a prompt will appear asking them if they want to continue with their action. If yes, their score will be displayed and the window closes; if no, the quiz will continue.

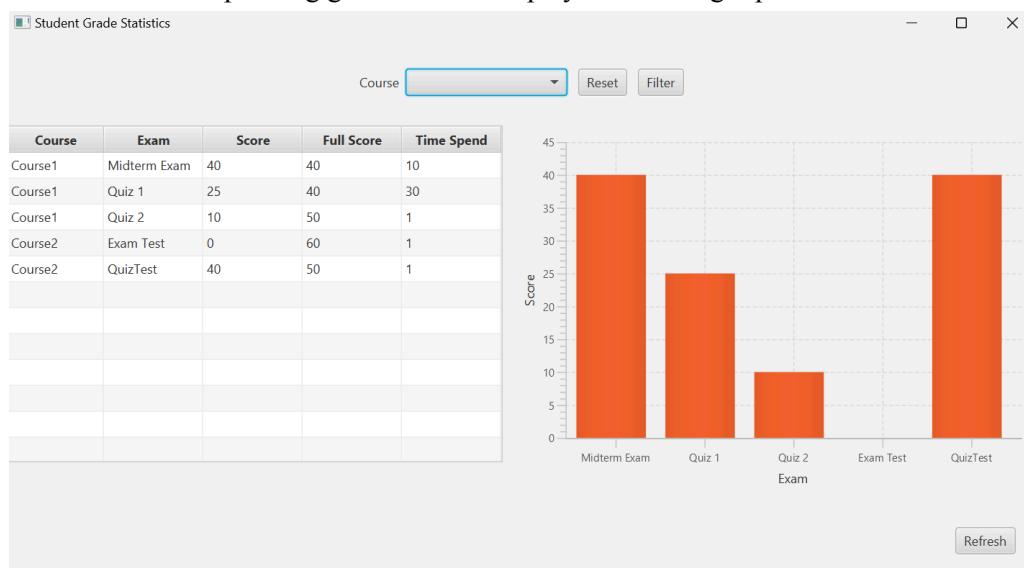


## Check Student Grade Statistics

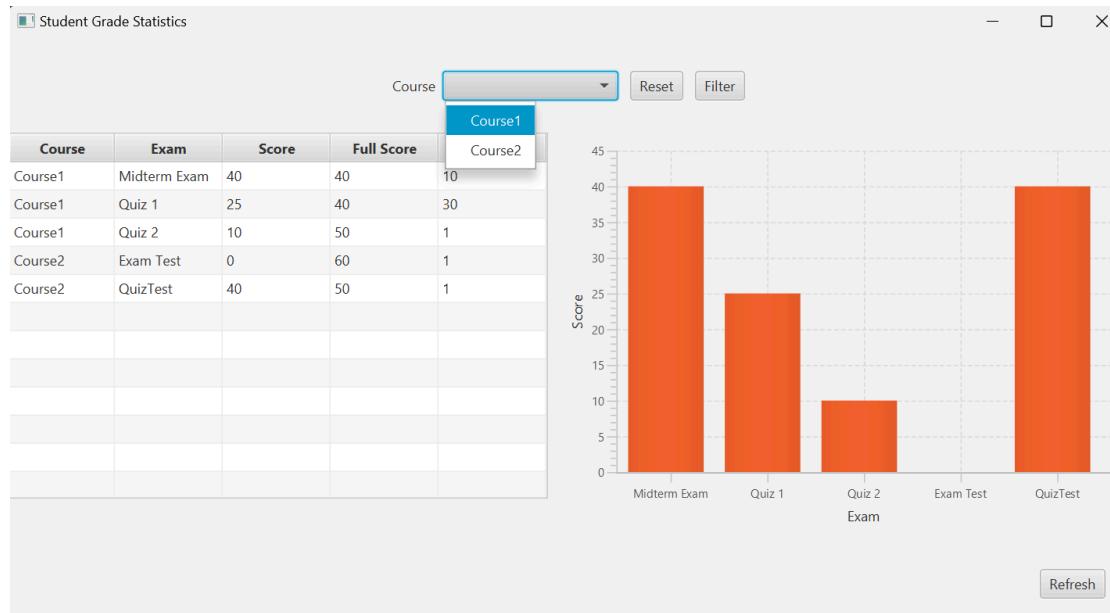
- If the Student wants to check their grade statistics, they can click on the check grade statistics button.



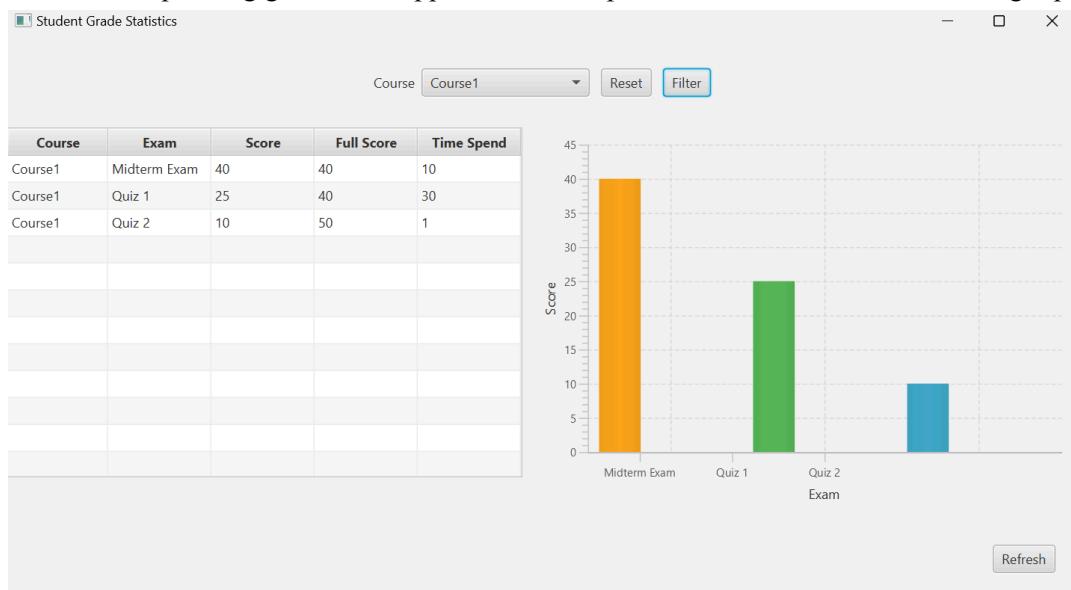
- Grades of the Student are retrieved from the grade database and displayed on the left panel. A bar chart of the corresponding grades is also displayed on the right panel.



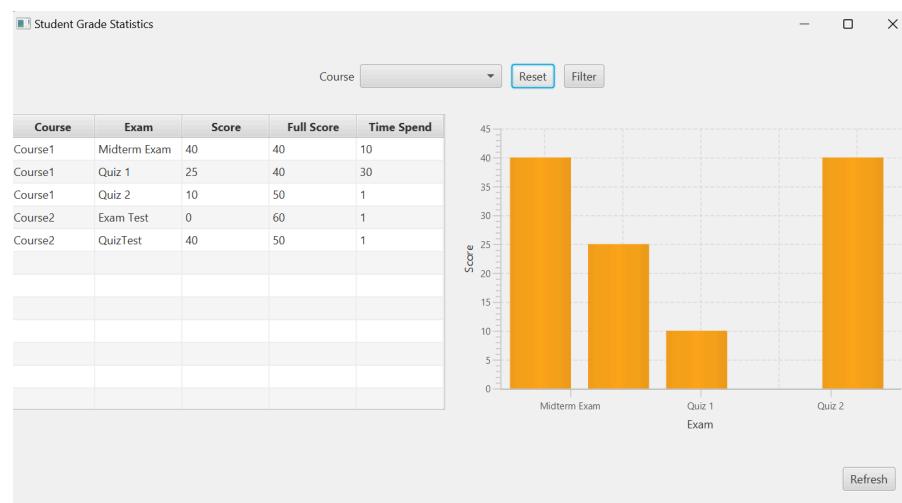
- The Student can filter the grades according to courses in the drop-down list and click on the filter button.



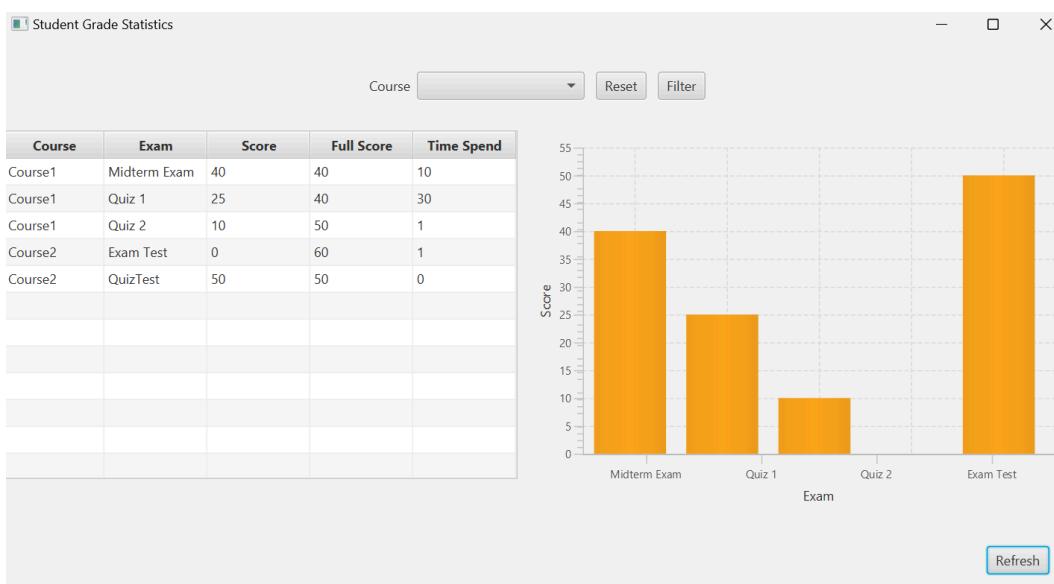
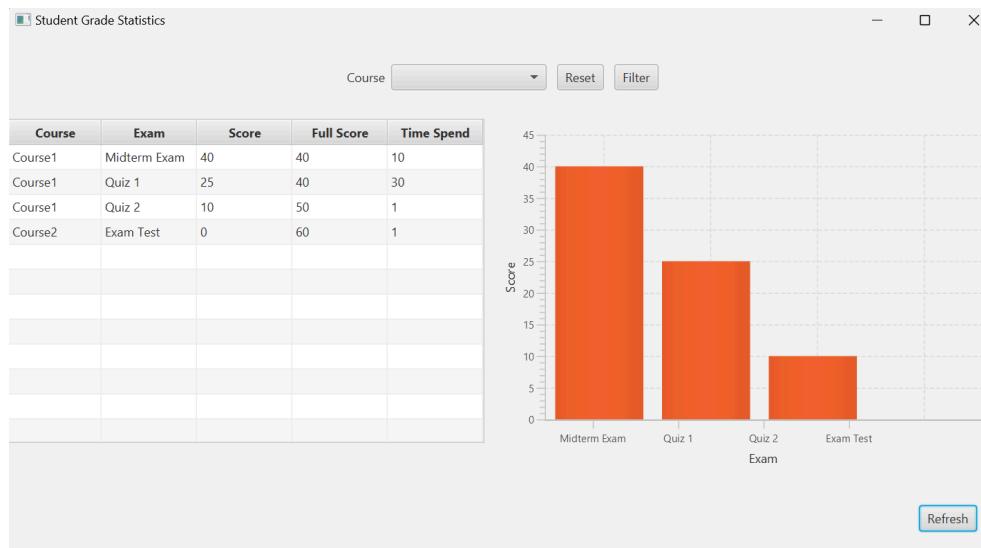
- The corresponding grades will appear in the left panel and in the bar chart on the right panel.



- If the student wants to reset the filters they can either click on the reset button or the refresh button.



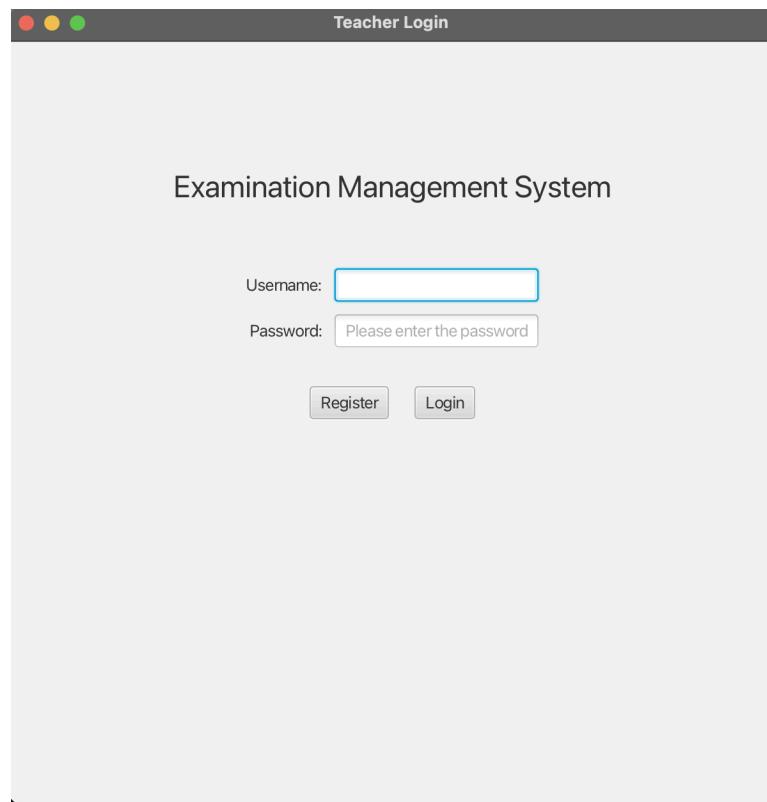
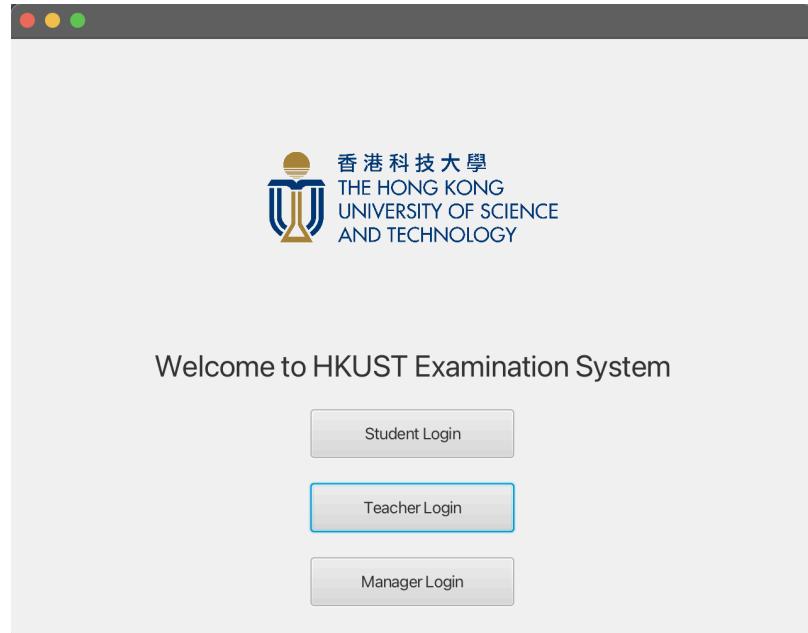
- If a quiz has been taken while the student grade statistics window is open, the Student can reload the database and gather the new data.



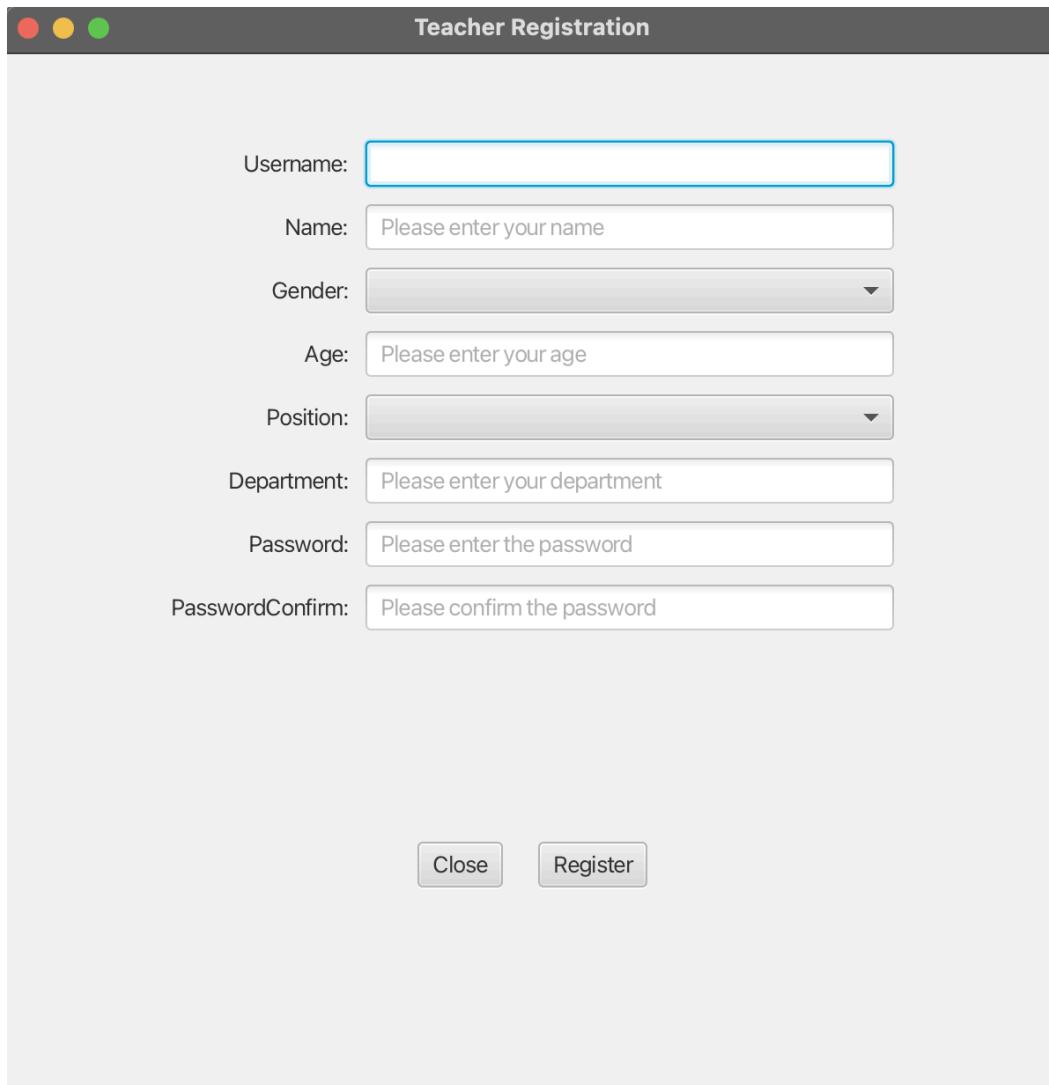
## Task 2 - Teacher Portal

### Login and Registration

- When the user clicks on the Teacher Login button, the user will be prompted to the Teacher Login Page.



- A teacher can register an account by clicking on the Register button and then the teacher will be prompted to the Teacher Registration Page.

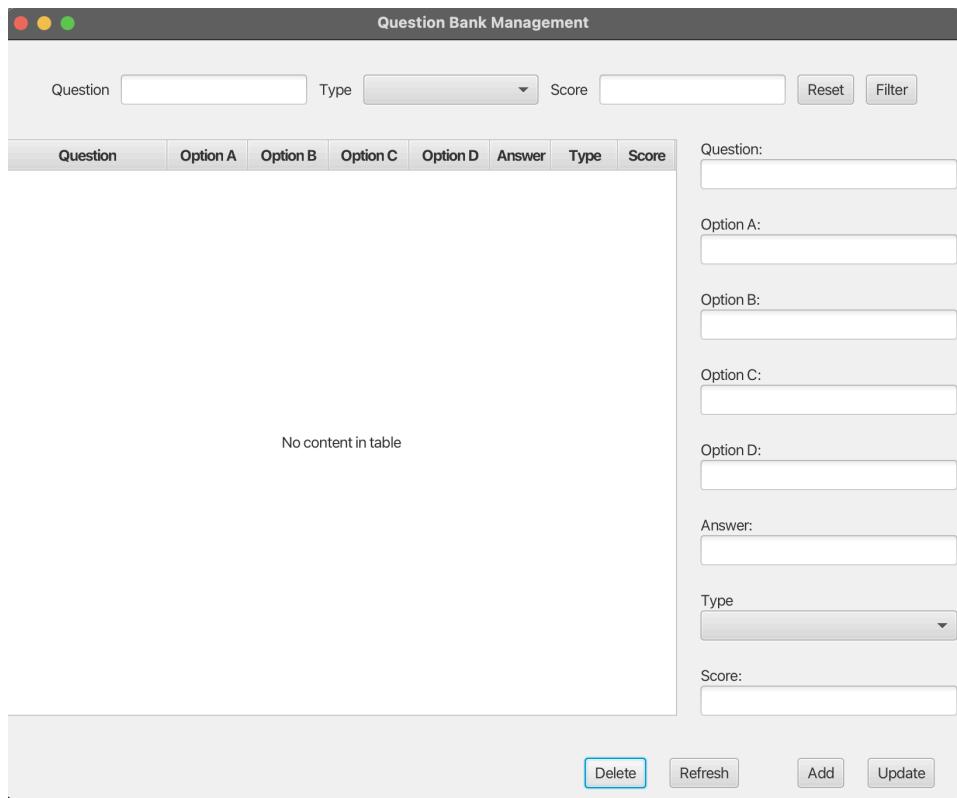


The image shows a 'Teacher Registration' dialog box. At the top, there are three small circular icons (red, yellow, green) on the left and the title 'Teacher Registration' in white text on a dark grey header bar. Below the header, there are seven input fields arranged vertically. Each field has a label on the left and a text input box on the right. The labels are: 'Username:', 'Name:', 'Gender:', 'Age:', 'Position:', 'Department:', and 'Password:'. The 'Username:' field has a blue border, indicating it is the active or selected field. The other fields have a light grey border. Below these input fields are two buttons: 'Close' on the left and 'Register' on the right, both in a light grey box with a thin border.

Username:	<input type="text"/>
Name:	<input type="text" value="Please enter your name"/>
Gender:	<input type="text"/>
Age:	<input type="text" value="Please enter your age"/>
Position:	<input type="text"/>
Department:	<input type="text" value="Please enter your department"/>
Password:	<input type="text" value="Please enter the password"/>
PasswordConfirm:	<input type="text" value="Please confirm the password"/>

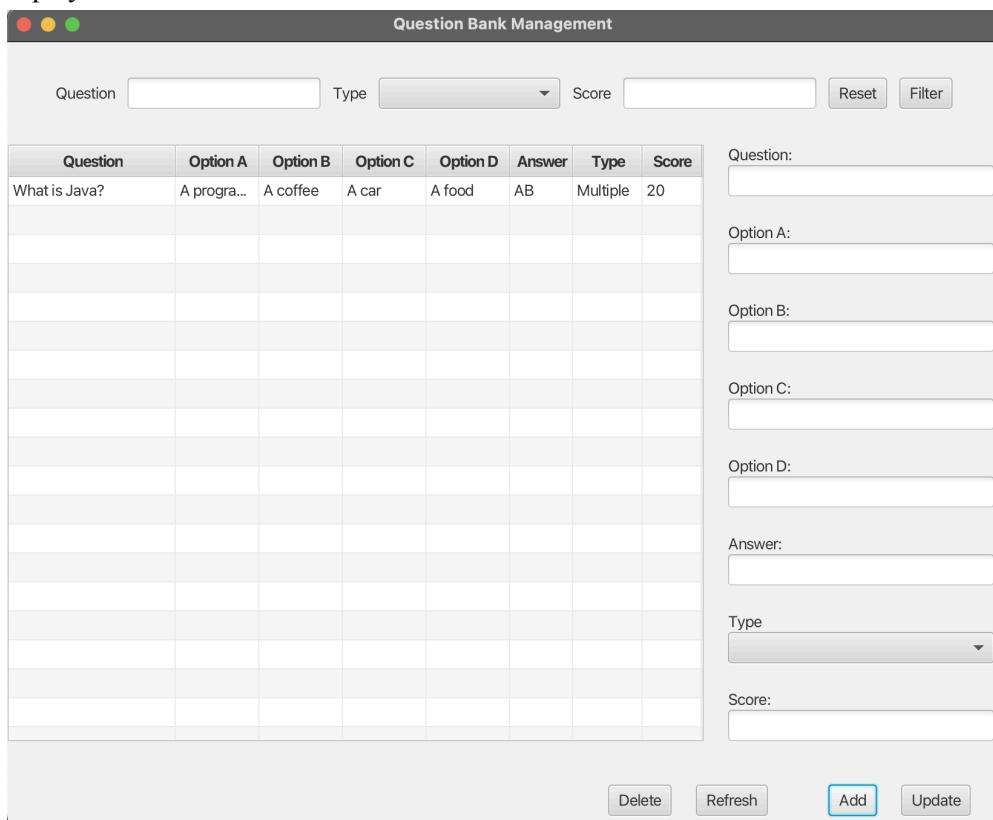
## Question Bank Management

- When a teacher just started to use the exam management system, the question database will be empty at first and the following page will be displayed.



The screenshot shows a window titled "Question Bank Management". At the top, there are search and filter fields: "Question" (text input), "Type" (dropdown), "Score" (text input), "Reset" (button), and "Filter" (button). Below these are two tables. The first table has columns: Question, Option A, Option B, Option C, Option D, Answer, Type, and Score. It displays the message "No content in table". The second table is a form with fields: Question (text input), Option A (text input), Option B (text input), Option C (text input), Option D (text input), Answer (text input), Type (dropdown), and Score (text input). At the bottom are buttons: Delete, Refresh, Add (highlighted with a blue border), and Update.

- A teacher can add a question to the question database, and the newly added question will be displayed at the table.



The screenshot shows the same "Question Bank Management" window. The first table now contains one row of data: "What is Java?", "A progra...", "A coffee", "A car", "A food", "AB", "Multiple", and "20". The second table remains the same as in the previous screenshot. The "Add" button at the bottom is highlighted with a blue border, indicating it was used to add the question.

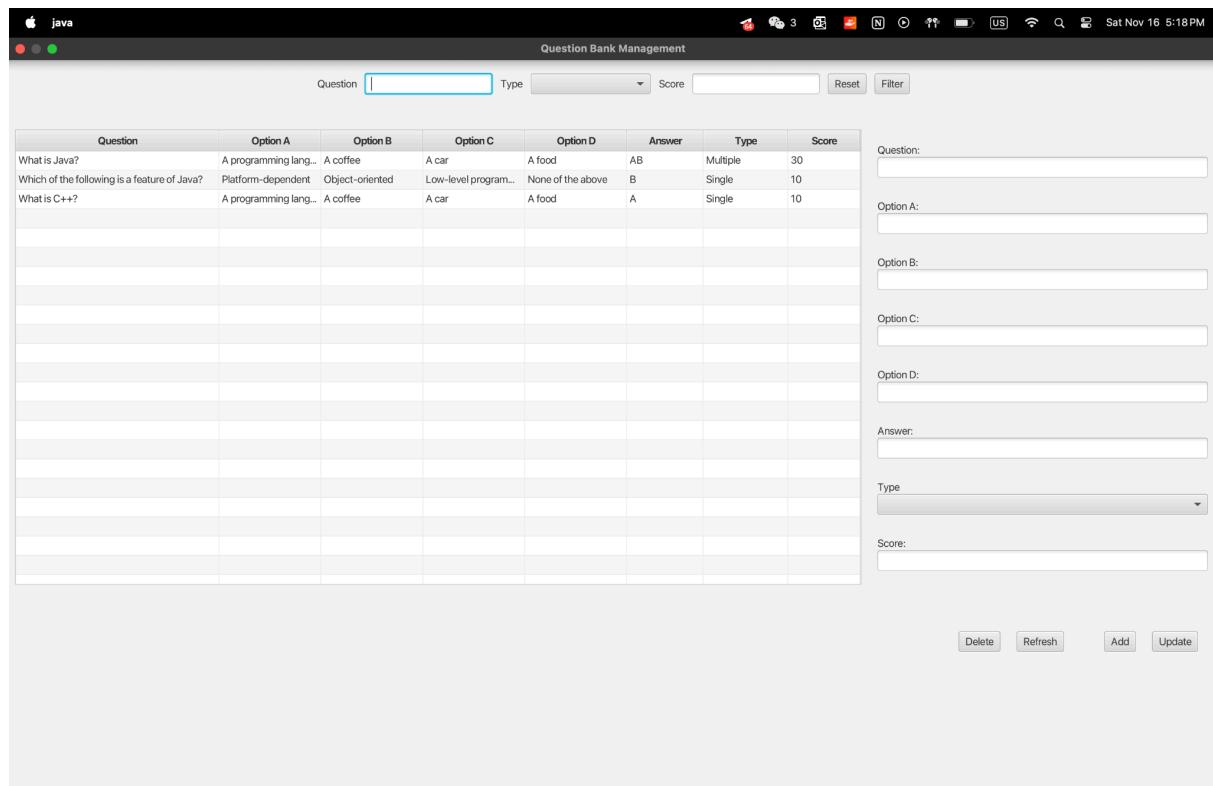
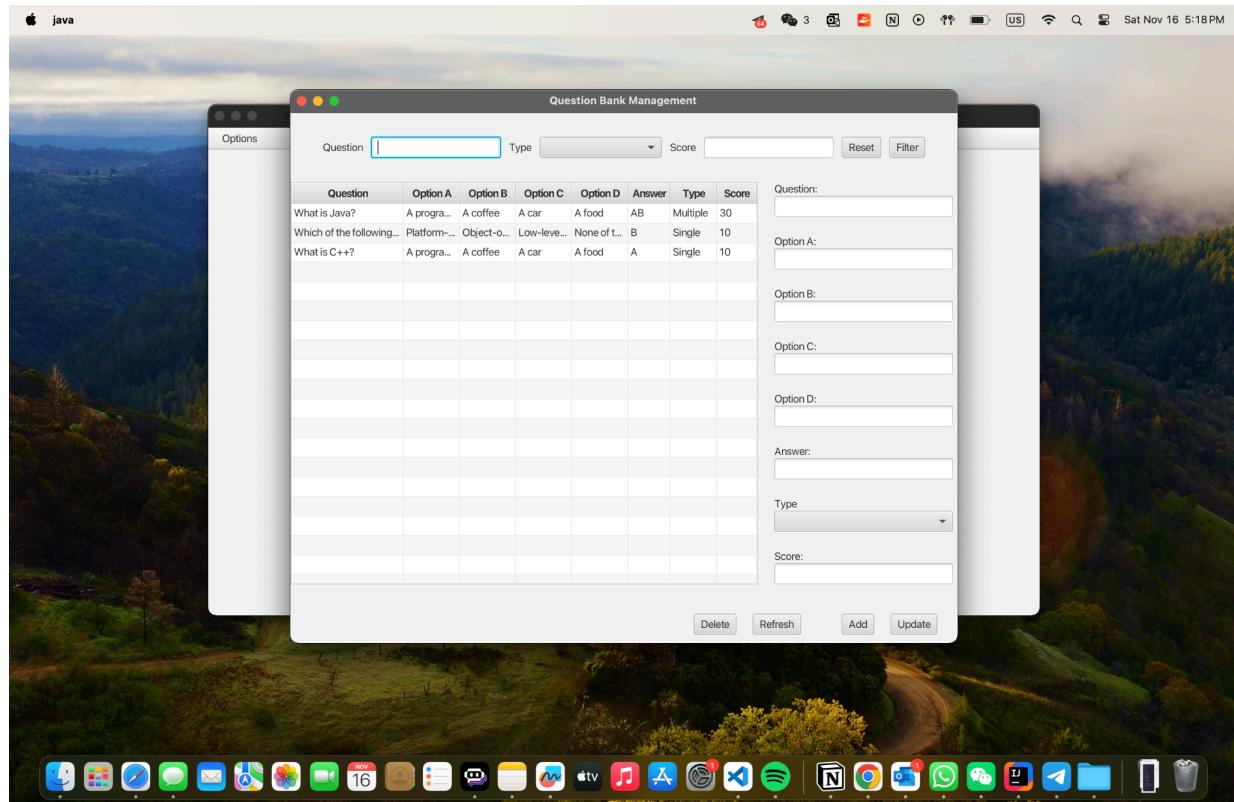
- A teacher can update the question from the database, by simply clicking the question from the table and the question information will be filled in for different fields on the right hand side. Then the teacher can perform the desired modifications and update the question. If all checks have passed, a confirmation message will be shown when a teacher wants to update the question. If the teacher clicks yes, then the question will be updated.

- A teacher can delete a question from the database by using a similar approach as updating a question.

- A teacher can also filter the questions by using certain keywords. For example, if a teacher would like to see all questions that have the keyword “Java”, then the teacher can filter the questions using the filter feature by typing “Java” at the question filter text field and click on the filter button. The type filter and score filter can be applied in this manner also.

- If the teacher would like to refresh the question bank management page or would like to deselect the question selected from the table, they can either click on the refresh button or click on anywhere in the page that does not belong to any button or table with questions.

- The question bank management page is also responsive with the change of window size to ensure the user can view the page properly with different window sizes.



## Exam Management

- When a teacher just started to use the exam management system, the exam database will be empty at first and the following page will be displayed.

The screenshot shows the 'Exam Management' application window. At the top, there are search and filter fields for 'Exam Name', 'Course ID', 'Publish', 'Question', 'Type', and 'Score'. Below these are two tables. The left table has columns for 'Exam Name', 'Course ID', 'Exam Time', and 'Publish'. The right table has columns for 'Question in Exam', 'Type', and 'Score'. Both tables are currently empty, with the message 'No content in table' displayed. At the bottom, there are buttons for 'Delete from left', 'Add to left', and other application controls.

- A teacher can add an exam to the exam database by choosing the questions available in the question database, and the newly added exam will be displayed at the table.

The screenshot shows the 'Exam Management' application window after an exam has been added. The left table now contains a single row for 'Midterm Exam' with values 'COMP1111', '60', and 'No' in the 'Course ID', 'Exam Time', and 'Publish' columns respectively. The right table still shows the same three questions as before. At the bottom, the 'Add' button is highlighted in blue, indicating it was used to add the exam.

- A teacher can update the exam from the database, by simply clicking the exam from the table and the exam information will be filled in for different fields on the bottom of the right hand side and the questions in the exam will also be displayed in the middle table. Then the teacher can perform the desired modifications and update the exam. If all checks have passed, a confirmation message will be shown when a teacher wants to update the exam. If the teacher clicks yes, then the question will be updated.

The application interface consists of several panels:

- Top Panel:** Contains search fields for 'Exam Name', 'Course ID', 'Publish' status, and buttons for 'Reset' and 'Filter'.
- Table Panel:** A grid showing exam details. One row is selected, highlighted in blue, representing the 'Midterm Exam'.
- Question Panel:** A table showing individual exam questions with columns for 'Question in Exam', 'Type', and 'Score'.
- Bottom Panel:** Form fields for editing the selected exam, including 'Exam Name', 'Exam Time', 'Course ID', and 'Publish' status.
- Buttons:** 'Delete from left', 'Add to left', 'Delete', 'Refresh', 'Add', and 'Update'.

- A published exam is not allowed to be updated. Also, the updated exam must have at least one question in the exam. If there is no question in the exam, the update of the exam is not allowed.
- A teacher can delete an exam from the database by using a similar approach as updating an exam.

- A teacher can also filter the exams by using certain keywords. For example, if a teacher would like to see all exams that are “Quiz” but not actual exams like midterm exam or final exam, then the teacher can filter the exams using the filter feature by typing “Quiz” at the question filter text field and clicking on the filter button. The course ID filter and publish status filter can be applied in this manner also.

**Exam Management**

Exam Name:  Course ID:  Publish:  Reset  Filter      Question:  Type:  Score:  Reset  Filter

Exam Name	Course ID	Exam Time	Publish	Question in Exam	Type	Score	Question	Type	Score
Midterm Exam	COMP1111	60	No				What is Java?	Multiple	30
Quiz 1	COMP1111	50	No				Which of the following is a feature of Java?	Single	10
Quiz 2	COMP1111	50	No				What is C++?	Single	10
No content in table									
<input type="button"/> Delete from left <input type="button"/> Add to left									
Exam Name: <input type="text"/> Exam Time: <input type="text"/> Course ID: <input type="text"/> Publish: <input type="text"/>				<input type="button"/> Delete <input type="button"/> Refresh <input type="button"/> Add <input type="button"/> Update					

**Exam Management**

Exam Name:  Course ID:  Publish:  Reset  Filter      Question:  Type:  Score:  Reset  Filter

Exam Name	Course ID	Exam Time	Publish	Question in Exam	Type	Score	Question	Type	Score
Quiz 1	COMP1111	50	No				What is Java?	Multiple	30
Quiz 2	COMP1111	50	No				Which of the following is a feature of Java?	Single	10
No content in table									
<input type="button"/> Delete from left <input type="button"/> Add to left									
Exam Name: <input type="text"/> Exam Time: <input type="text"/> Course ID: <input type="text"/> Publish: <input type="text"/>				<input type="button"/> Delete <input type="button"/> Refresh <input type="button"/> Add <input type="button"/> Update					

- A teacher can also filter the questions by using certain keywords. For example, if a teacher would like to see all questions that have the keyword “Java”, then the teacher can filter the questions using the filter feature by typing “Java” at the question filter text field and click on the filter button. The type filter and score filter can be applied in this manner also.

The application interface for Exam Management consists of two main sections: a top navigation bar and a bottom data entry section.

**Top Section:**

- Contains fields for Exam Name, Course ID, Publish status, and a 'Filter' button.
- Contains fields for Question, Type, and Score, with a 'Filter' button.

**Bottom Section:**

- A table with columns: Exam Name, Course ID, Exam Time, Publish, Question in Exam, Type, Score, Question, Type, and Score.
- Sample data in the table:
 

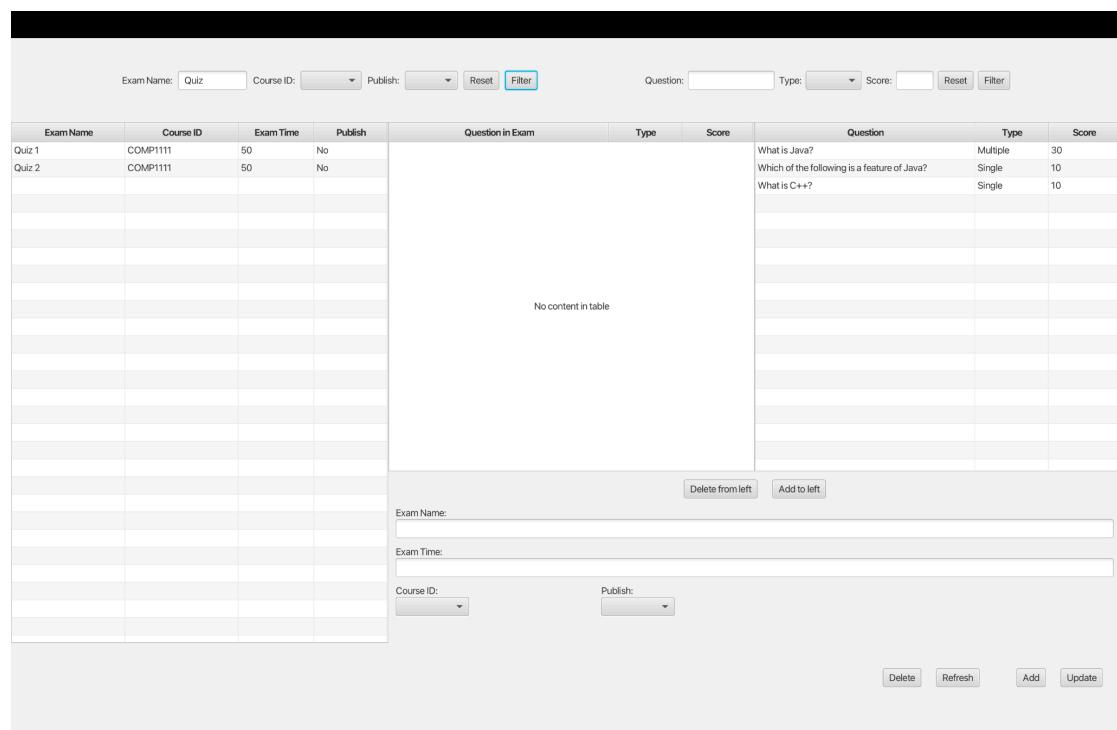
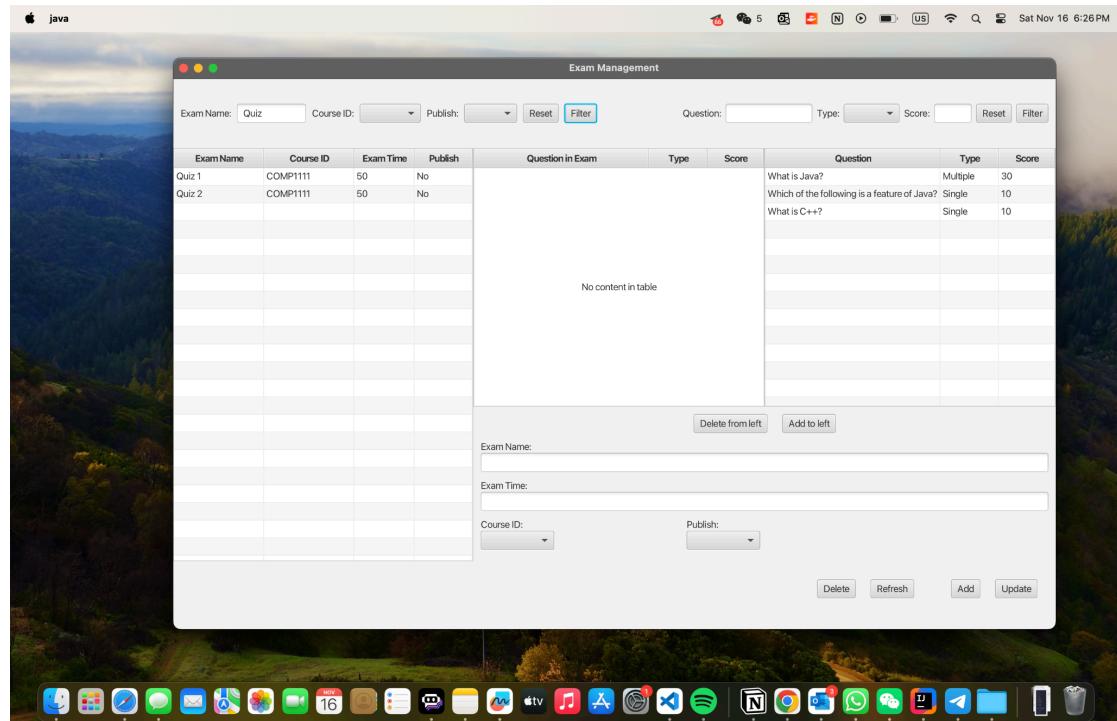
Midterm Exam	COMP1111	60	No	What is Java?	Multiple	30	What is Java?	Multiple	30
Quiz 1	COMP1111	50	No				Which of the following is a feature of Java?	Single	10
Quiz 2	COMP1111	50	No				What is C++?	Single	10
- Buttons: Delete from left, Add to left.
- Form fields for Exam Name, Exam Time, Course ID, and Publish.
- Buttons: Delete, Refresh, Add, Update.

- If the teacher would like to refresh the exam management page or would like to deselect the exam or question selected from the table, they can click on the refresh button.

- A teacher can add a question to the exam by selecting the question in the question table on the right hand side and click the “Add to left” button.

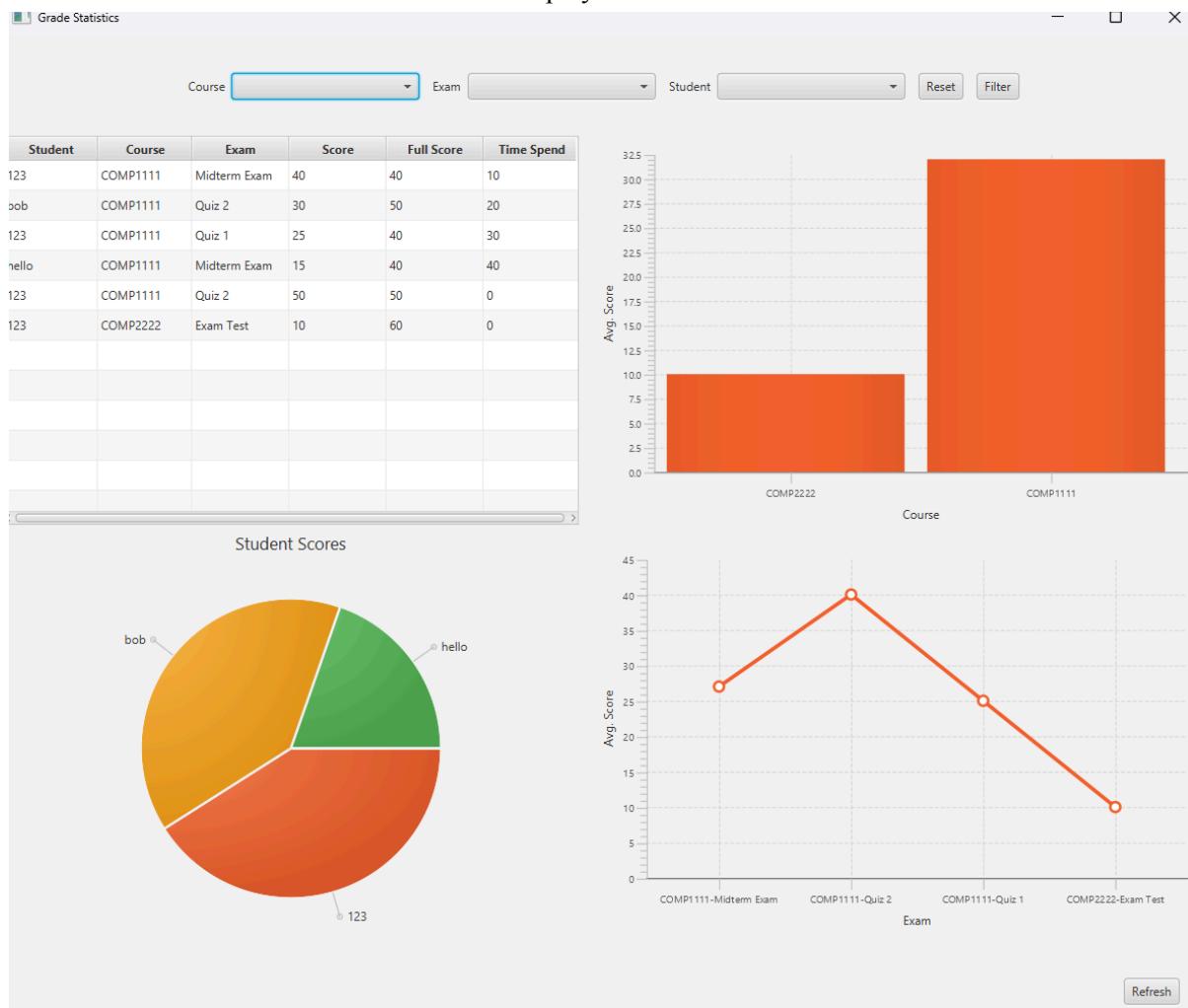
- A teacher can delete a question from the exam by selecting the question in the exam question table in the middle and clicking the “Delete from left” button.

- The exam management page is also responsive with the change of window size to ensure the user can view the page properly with different window sizes.

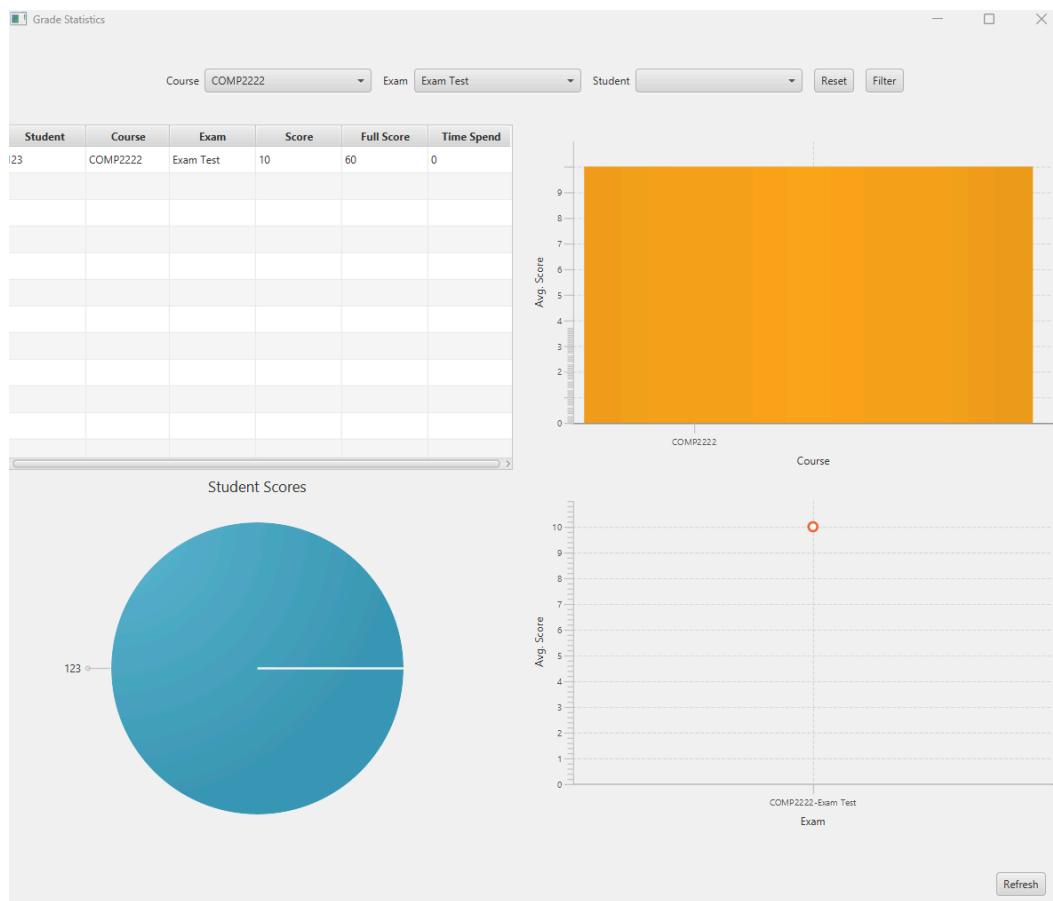


## Task 3 - Teacher Grade Statistics

- When the Teacher clicks on the “Grade Statistics” button in the Teacher main menu, the Teacher Grade Statistics UI will be displayed.



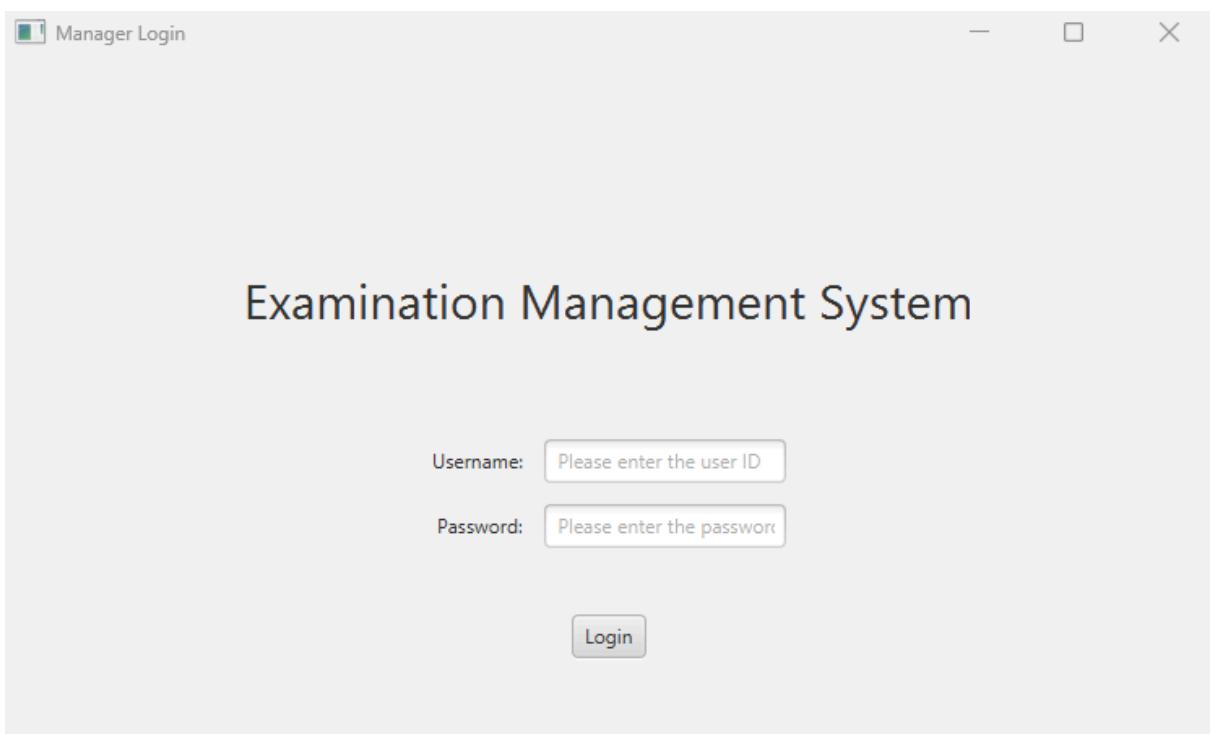
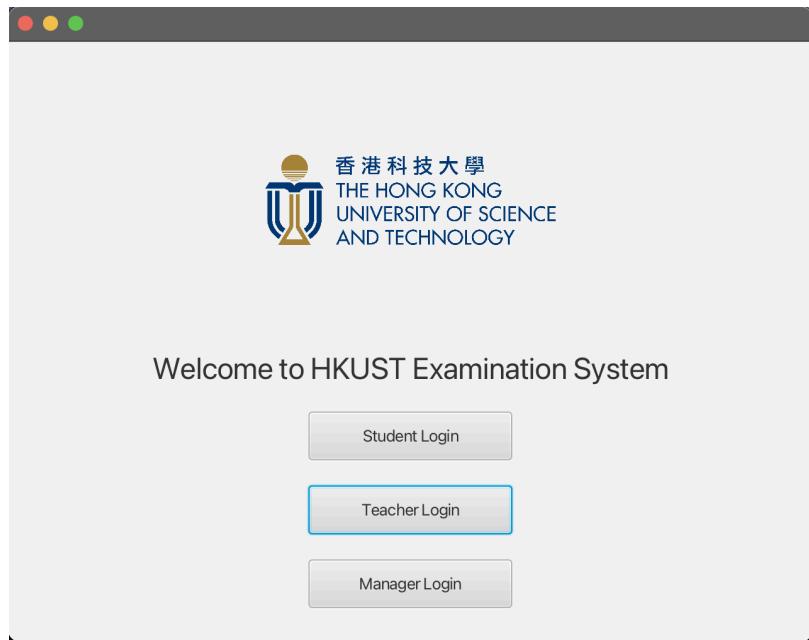
- If the Teacher wants to filter the statistics, the teacher can choose the course, exam and student from the drop down menu and click the “Filter” button.
- If no grades are found for the combination of filters chosen, the graphs and charts will be empty.
- To reset the filters, click the “Reset” button.
- In case there has been a change to the database when the window is open, the teacher can click the “Refresh” button to fetch the newest changes.



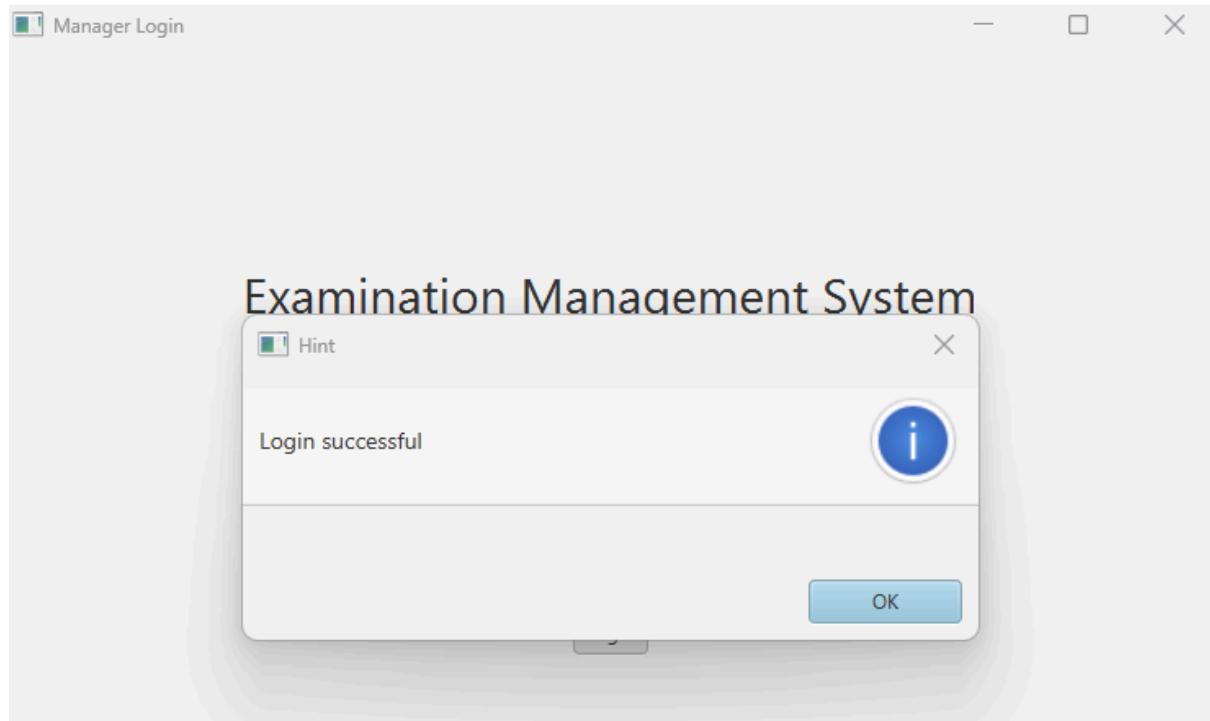
## Task 3 - Manager Portal

### Manager Login

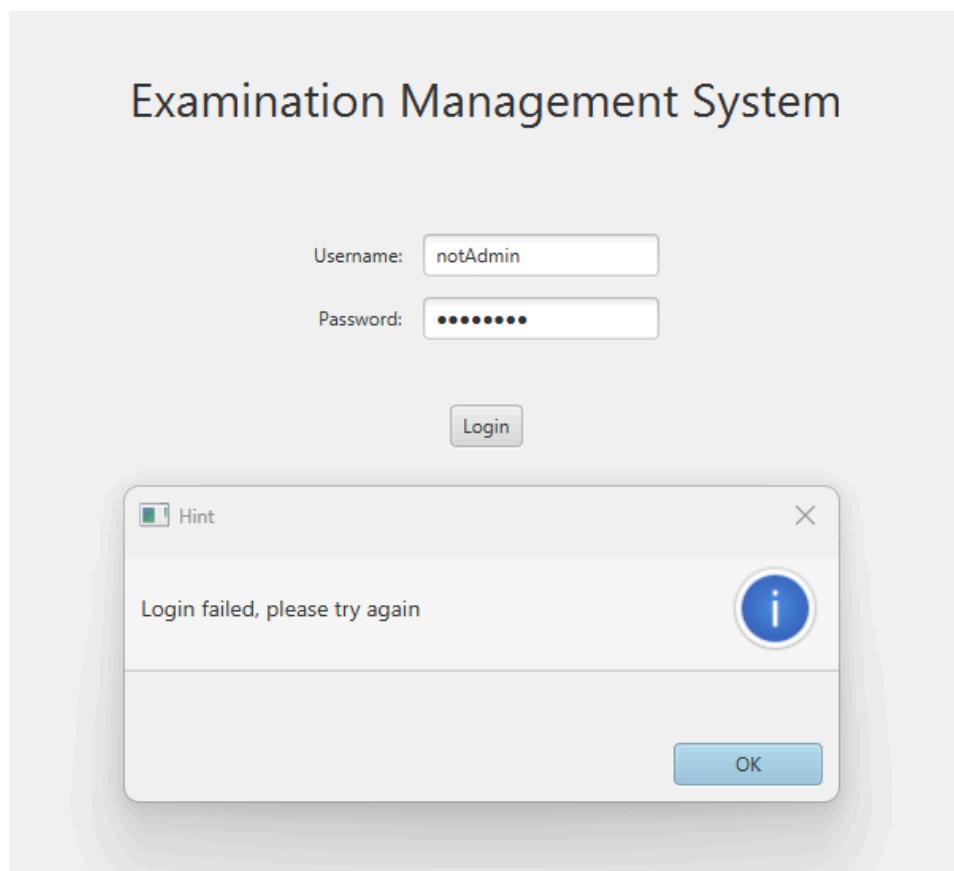
- When the user clicks on the Manager Login button, the user will be prompted to the Manager Login Page.



- The Manager can login into their existing account, using “admin” and “admin” as username and password respectively. If successful, a prompt will notify them that the login is successful.

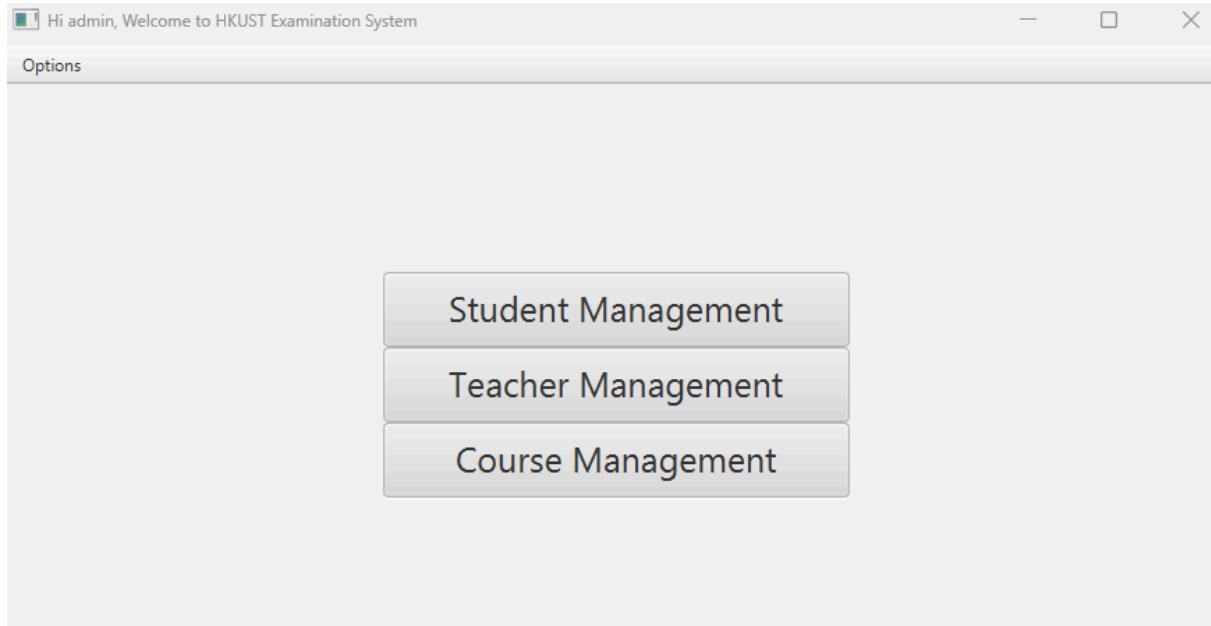


- If a user tries to login without the manager's credentials, a login failure message will be raised.



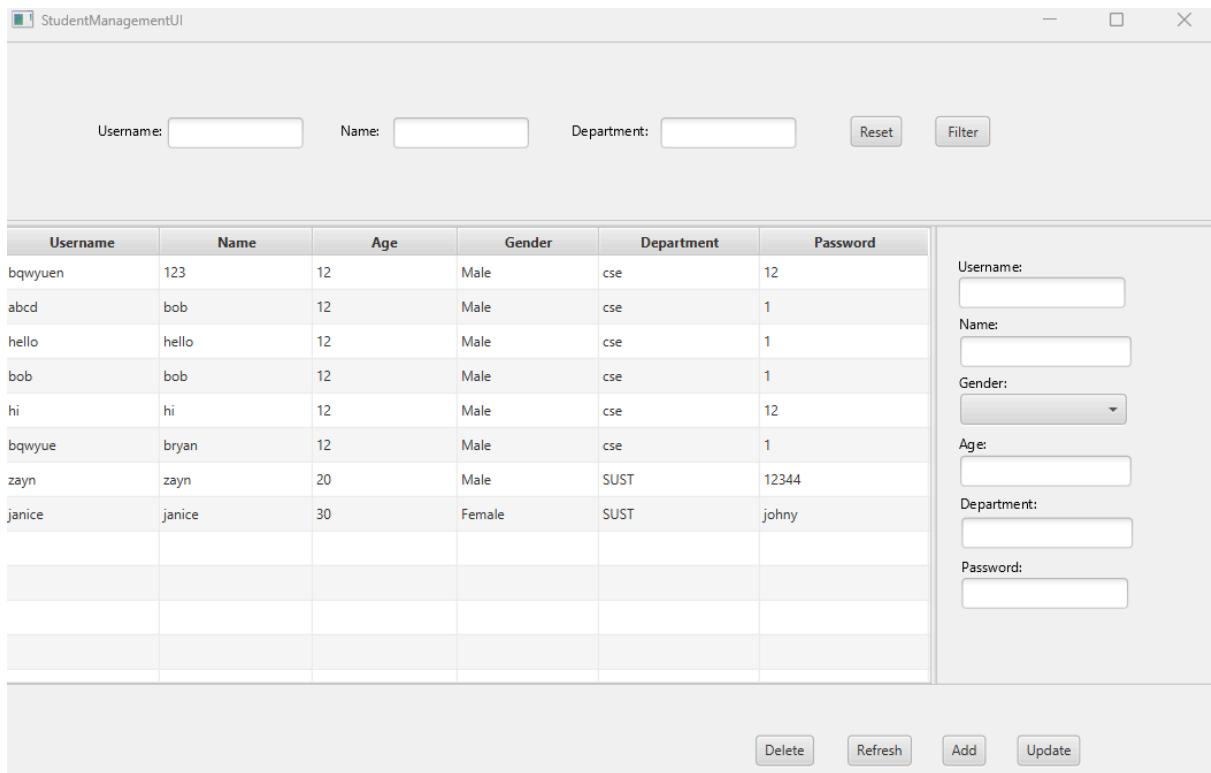
## **Manager Main Menu**

- Upon successful login, the Manager is shown a page consisting of Student Management, Teacher Management and Course Management.

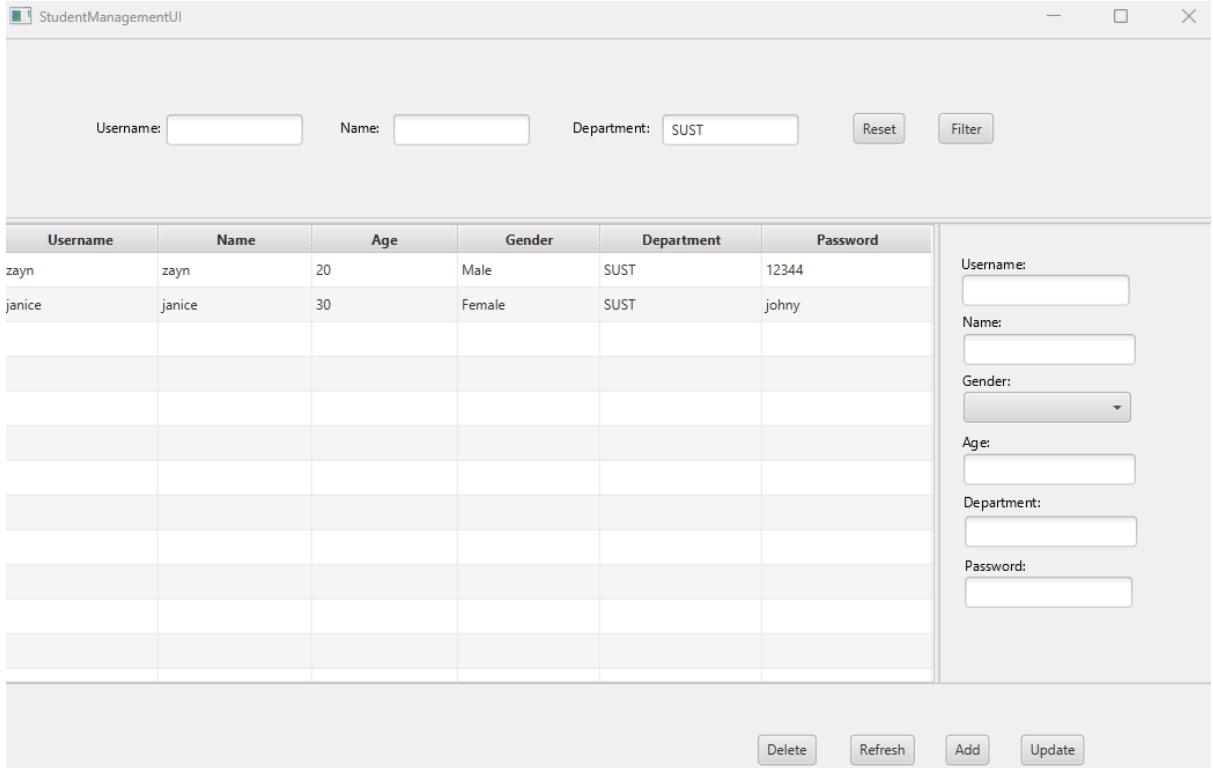


## **Student Management**

- If the Manager wants to manage students, select “Student Management”. The manager is shown a page consisting of the existing students and their information respectively.



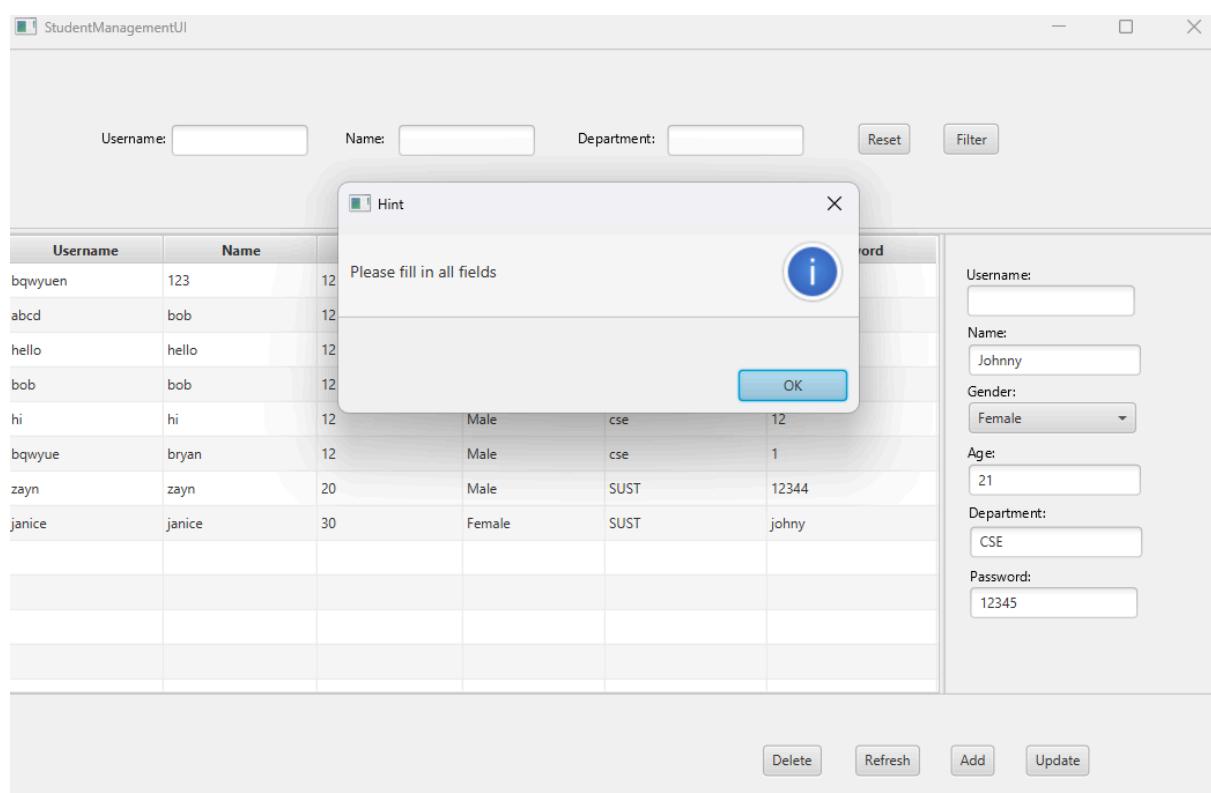
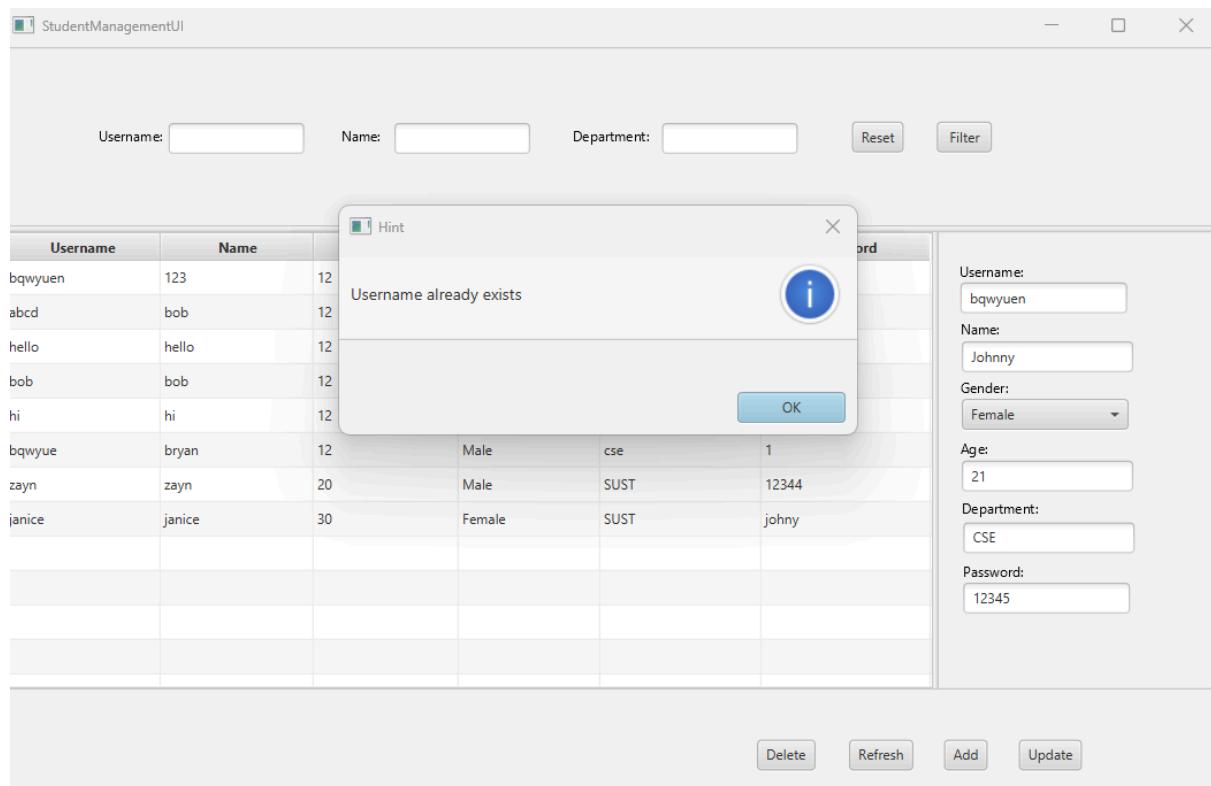
- If the manager wants to filter students, they can input the details they wish to filter and press the “Filter” button. For example, to filter for students in the “SUST” department, the manager inputs ‘SUST’ into the “Department” filter input and presses “Filter”.
- The manager can reset the filters by clicking the “Reset” button.

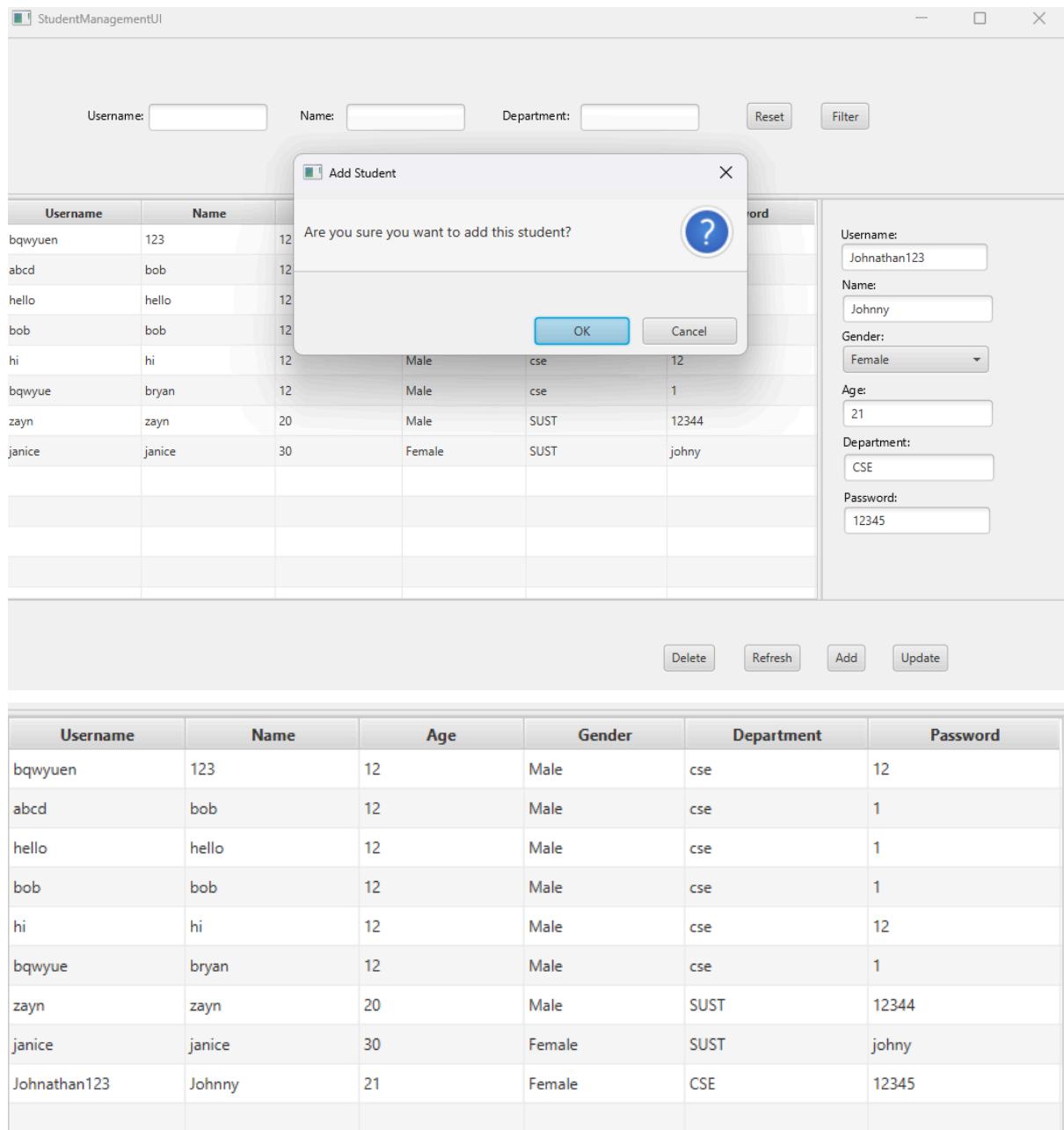


The screenshot shows a Windows application window titled "StudentManagementUI". At the top, there are three input fields: "Username", "Name", and "Department", followed by "Reset" and "Filter" buttons. Below this is a table with columns: Username, Name, Age, Gender, Department, and Password. The table contains two rows of data: "zayn" (20, Male, SUST, 12344) and "janice" (30, Female, SUST, johny). To the right of the table is a sidebar with filter inputs: "Username", "Name", "Gender" (dropdown), "Age", "Department", and "Password". At the bottom are "Delete", "Refresh", "Add", and "Update" buttons.

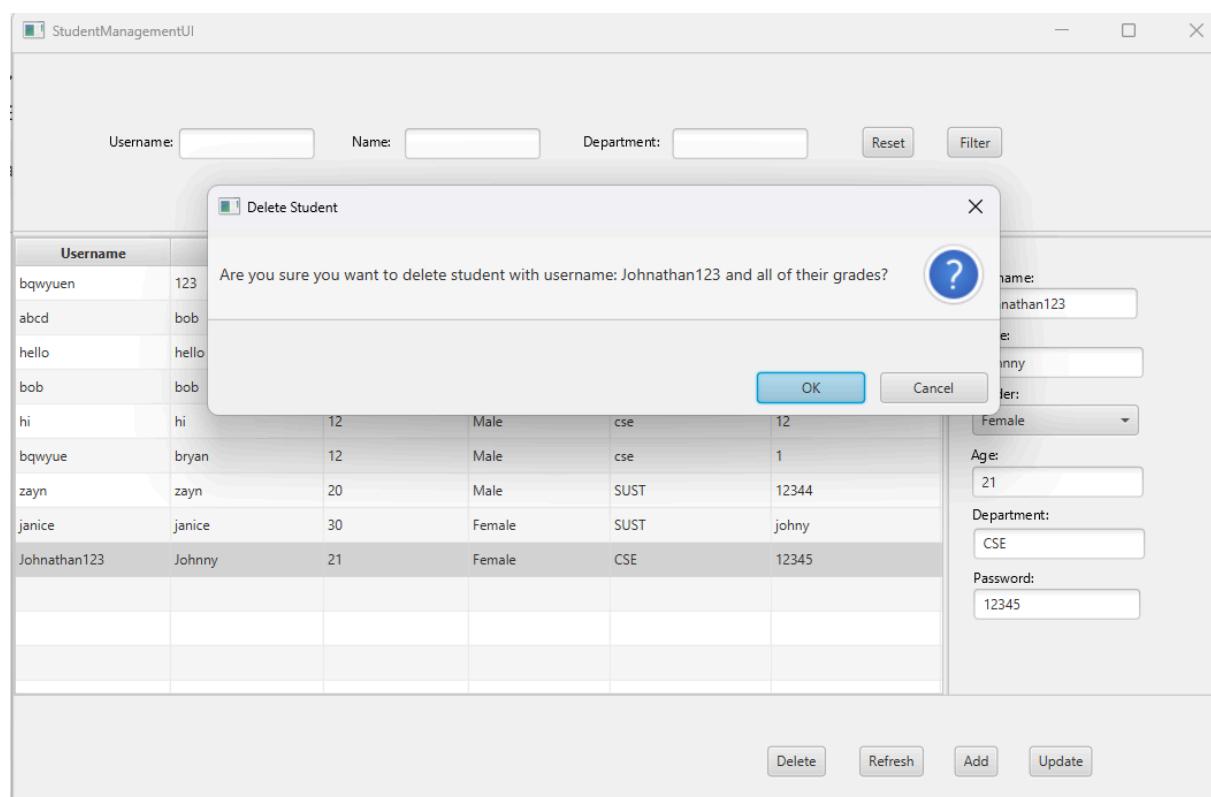
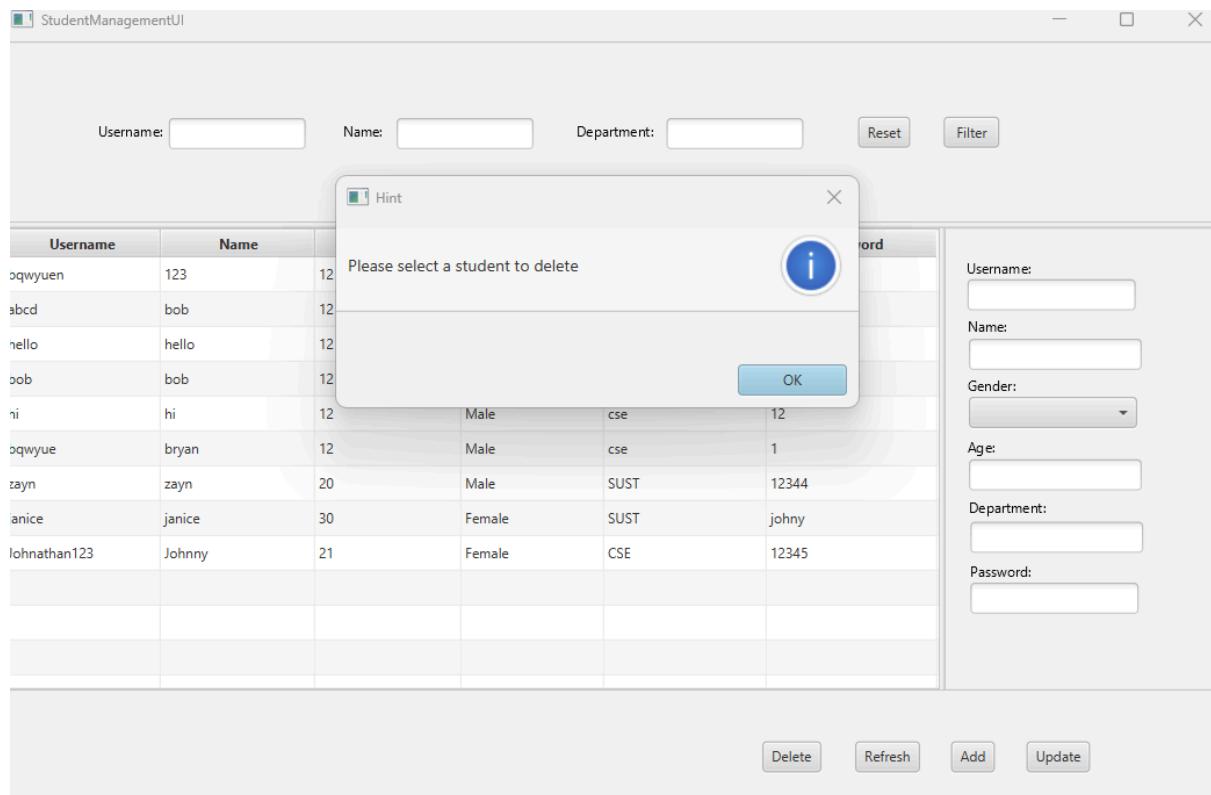
Username	Name	Age	Gender	Department	Password
zayn	zayn	20	Male	SUST	12344
janice	janice	30	Female	SUST	johny

- If the manager wants to add a student, then input the details and press the “Add” button.
- Checks will be done to ensure that the input fields are all filled, and validations to ensure that the input is correct.
- Upon successfully adding the student, the manager can press the “Refresh” button to see the updated table.

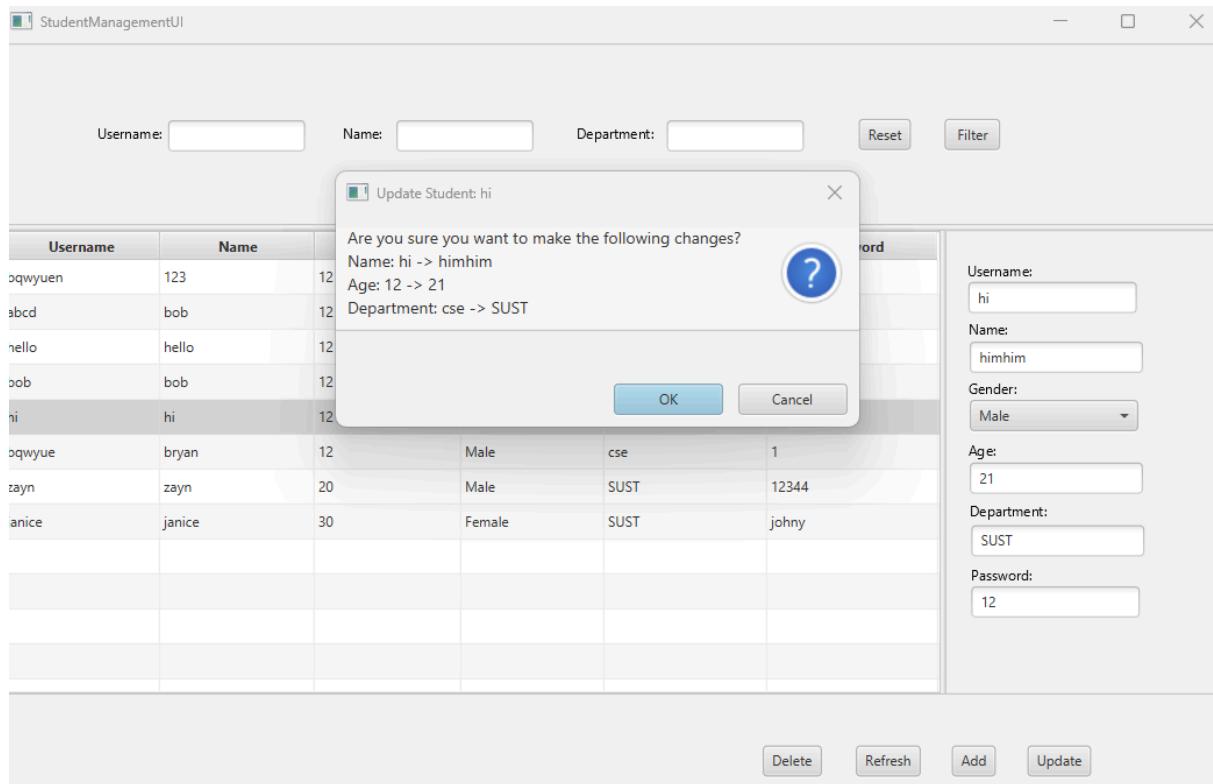




- The manager can delete a student by clicking any student in the table and pressing the “Delete” button.
  - Checks will be carried out to ensure that a student has been selected
  - Upon confirming the deletion, the student’s information, including their grades, will be deleted from the databases.
  - Click “Refresh” to see the updated changes.

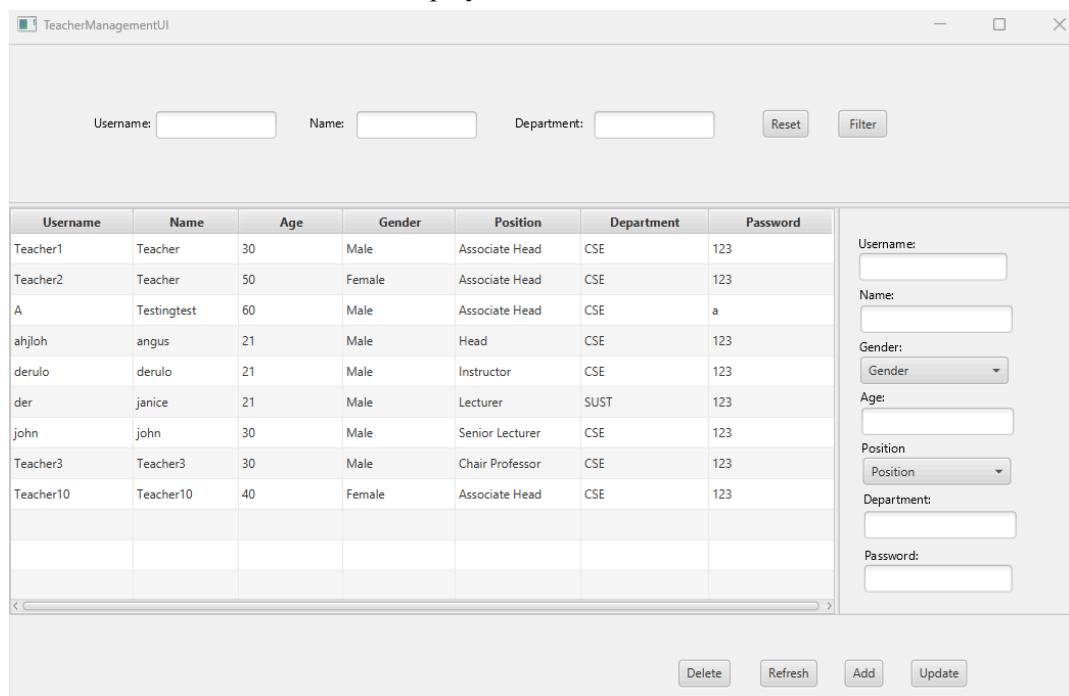


- If the manager wants to update a student, click the student from the table and change the fields to be updated in the input fields. A prompt showing the confirmation message will be output in case of any updates.
- Upon confirming the changes, the students information will be updated accordingly.
- Click the “Refresh” button to see the changes.

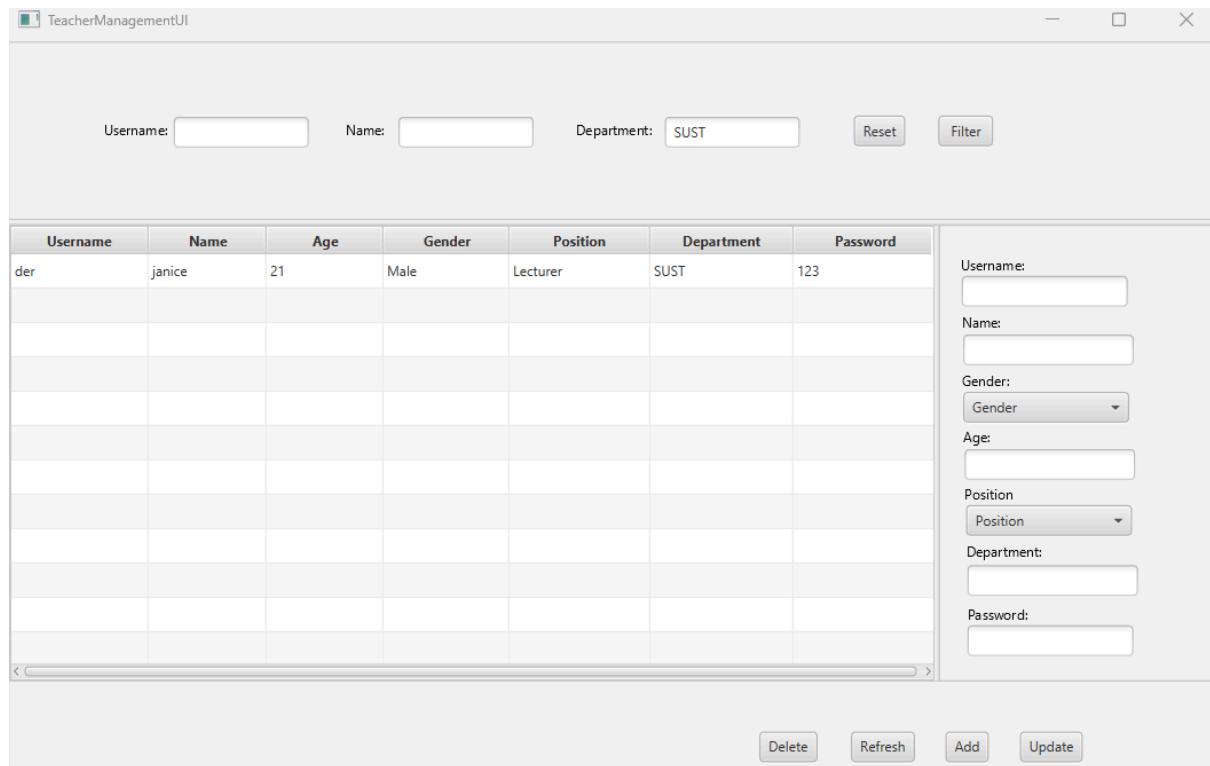


## Teacher Management

- Teacher Management has very similar logic as Student Management, with the addition of a “Position” field.
- If the manager wants to manage teachers, click the “Teacher Management” button on the Manager main menu.
- A list of teachers will be displayed with buttons for various functions.

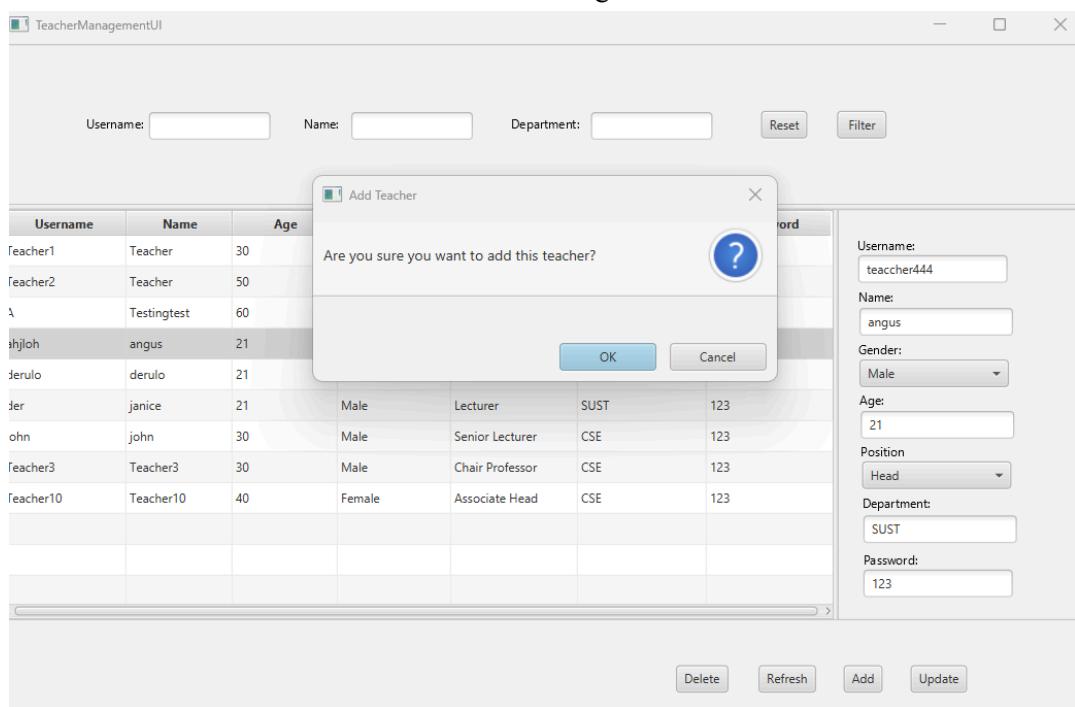


- To filter teachers, the manager inputs either “Username”, “Name” or “Department” to filter teachers. For example, teachers from the “SUST” department can be filtered by inputting “SUST” into the “Department” filter field and clicking the “Filter” button.
- The filter can be reset by clicking the “Reset” button.



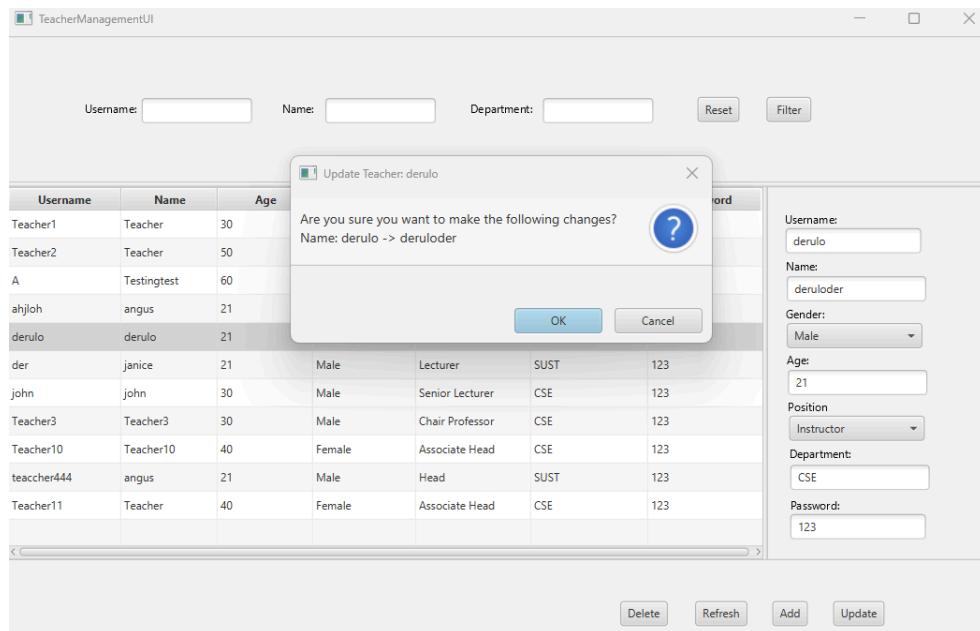
The screenshot shows a Windows application window titled "TeacherManagementUI". At the top, there are three input fields: "Username", "Name", and "Department", with "Department" currently set to "SUST". To the right of these are "Reset" and "Filter" buttons. Below the input fields is a table with columns: Username, Name, Age, Gender, Position, Department, and Password. The table contains several rows of teacher data. To the right of the table is a sidebar with the same filtering controls: "Username", "Name", "Gender" (dropdown), "Age" (input), "Position" (dropdown), "Department" (dropdown), and "Password". At the bottom of the window are buttons for "Delete", "Refresh", "Add", and "Update".

- If the manager wants to add a teacher, input all the fields and press the “Add” button.
- Checks will be carried out.
- Upon confirmation, the teacher will be added to the database.
- Click the “Refresh” button to see the changes.

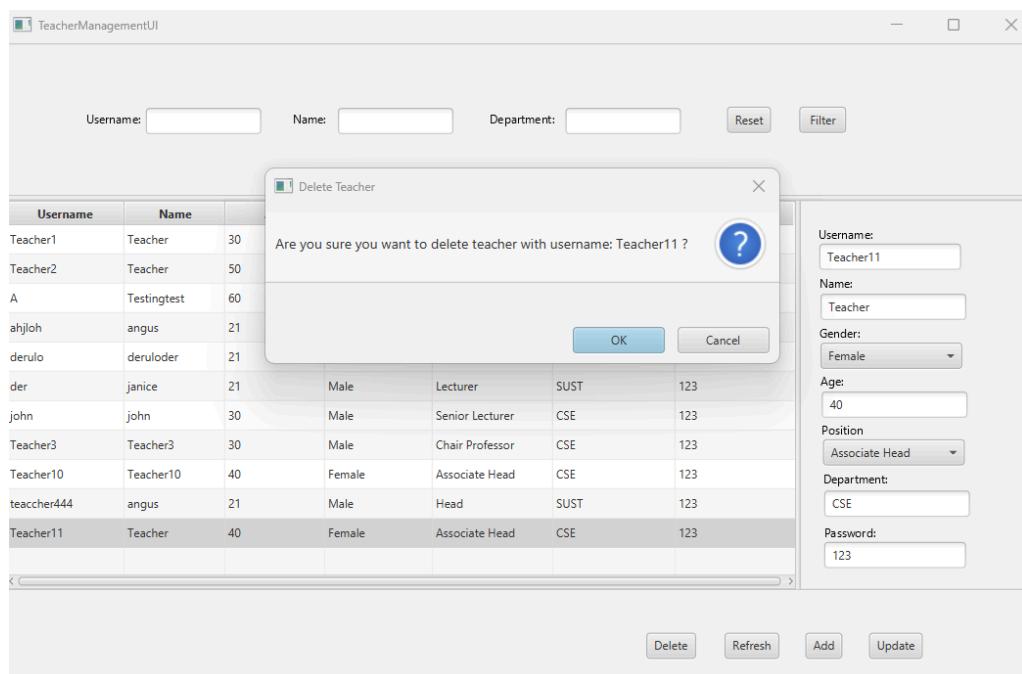


The screenshot shows the same "TeacherManagementUI" application window. A modal dialog box titled "Add Teacher" is in the foreground, asking "Are you sure you want to add this teacher?" with "OK" and "Cancel" buttons. In the background, the main window shows the teacher list table and the sidebar with the same filtering controls. The sidebar also includes a "Password" input field. The "Add" button at the bottom of the main window is highlighted.

- If the manager wants to update the teacher, click on any teacher in the teacher table, replace any information to be updated, and click the “Update” button.
- If the manager wishes to deselect the teacher, click on anywhere that is not in the teacher table or input section.
- Upon confirmation, the teacher will be updated in the database.
- Click the “Refresh” button to refresh the table.



- If the manager wants to delete a teacher, select a teacher from the teacher table and click the “Delete” button.
- If the manager wishes to deselect the teacher, click on anywhere that is not in the teacher table or input section.
- Upon confirmation, the teacher will be deleted from the database.
- Click the “Refresh” button to refresh the table.



## Course Management

- If the manager wants to manage courses, click the “Course Management” button in the Manager main menu.
- To filter courses, the manager inputs either “Name” or “Department” to filter courses. For example, courses from the “SUST” department can be filtered by inputting “SUST” into the “Department” filter field and clicking the “Filter” button.
- If the manager wants to reset the filters, click the “Reset” button.

The screenshot shows a Windows application window titled "CourseManagementUI". At the top, there are four input fields: "Course ID:", "Course Name:", "Department:", and a "Filter" button. Below these is a table with columns "CourseID", "Course Name", and "Department". The table contains the following data:

CourseID	Course Name	Department
COMP1111	Course1	CSE
COMP2222	Course2	CSE
COMP3333	Course3	CSE
COMP4444	Course4	SUST
COMP5555	Course5	CSE

On the right side of the table, there are three more input fields: "Course ID:", "Course Name:", and "Department:", each with a corresponding text box. At the bottom of the window are buttons for "Delete", "Refresh", "Add", and "Update".

The screenshot shows the same "CourseManagementUI" window. The "Department:" field is now set to "SUST", and the "Filter" button is clicked. The table now only shows the single course from the SUST department:

CourseID	Course Name	Department
COMP4444	Course4	SUST

The right side of the window still shows the filtering fields and the bottom buttons remain the same: "Delete", "Refresh", "Add", and "Update".

- If the manager wants to add a course, input all the fields and press the “Add” button.
- Checks will be carried out.
- Upon confirmation, the course will be added to the database.
- Click the “Refresh” button to see the changes.

CourseManagementUI

CourseID	Course Name	Department
COMP1111	Course1	CSE
COMP2222	Course2	CSE
COMP3333	Course3	CSE
COMP4444	Course4	SUST
COMP5555	Course5	CSE
ISDN1234	Introduction to Design	ISD

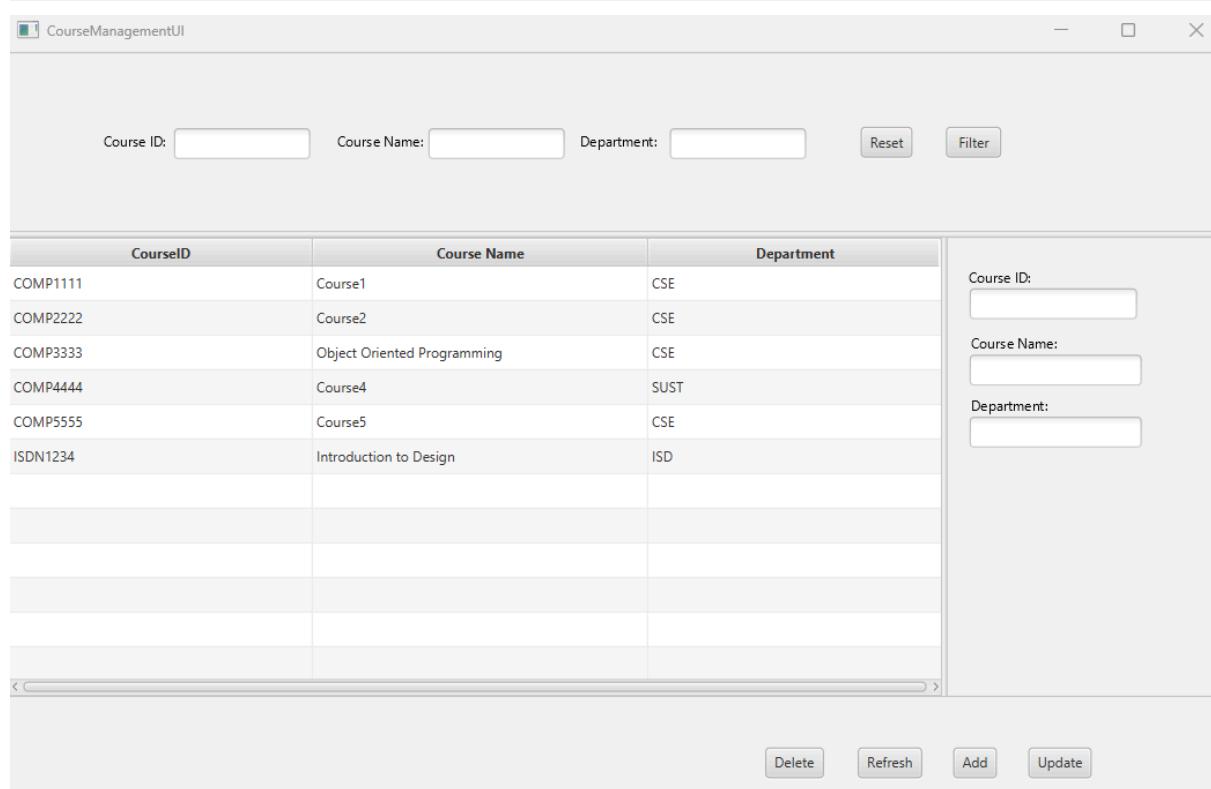
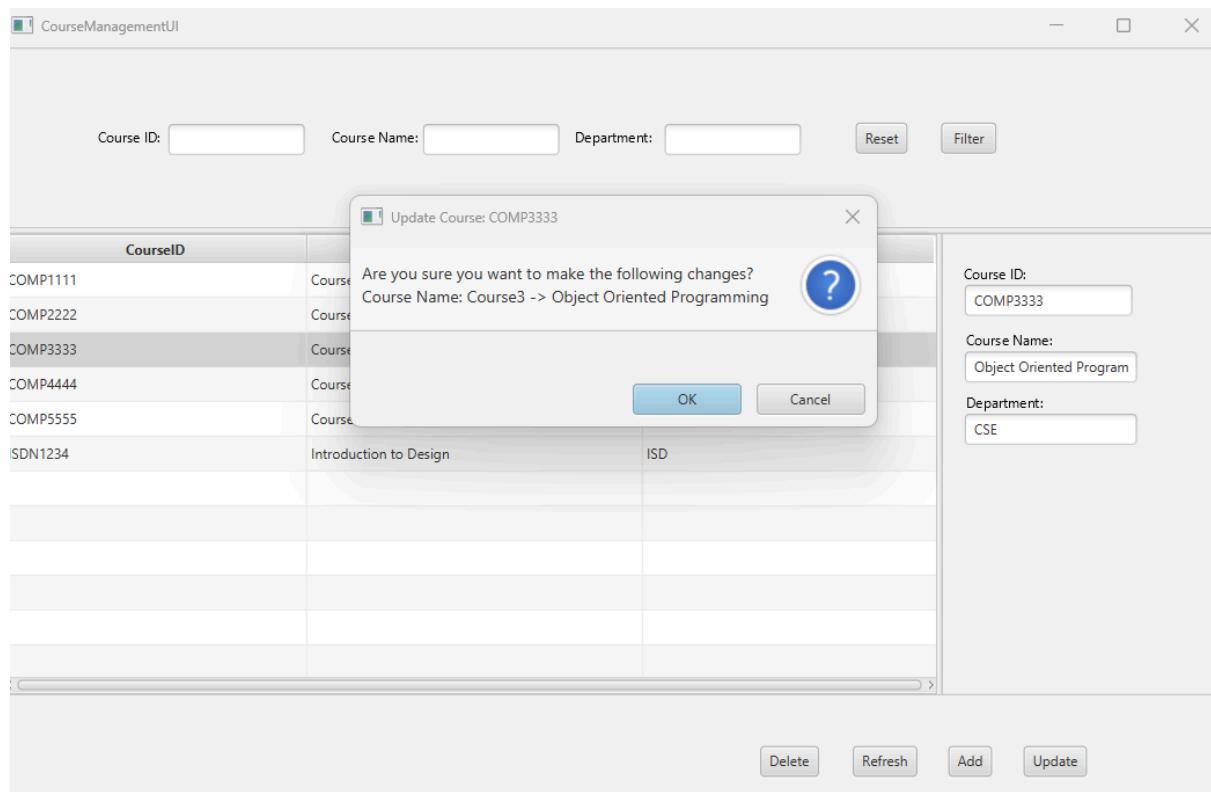
Course ID:  Course Name:  Department:

CourseManagementUI

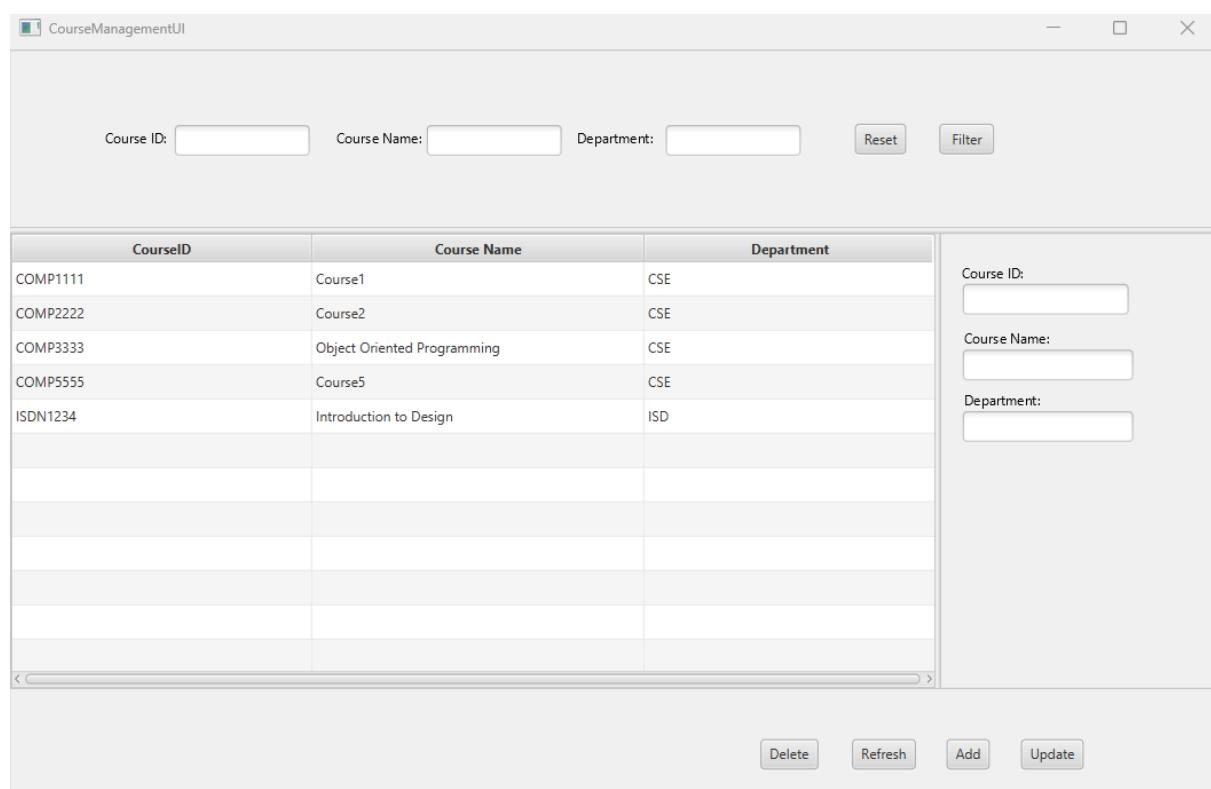
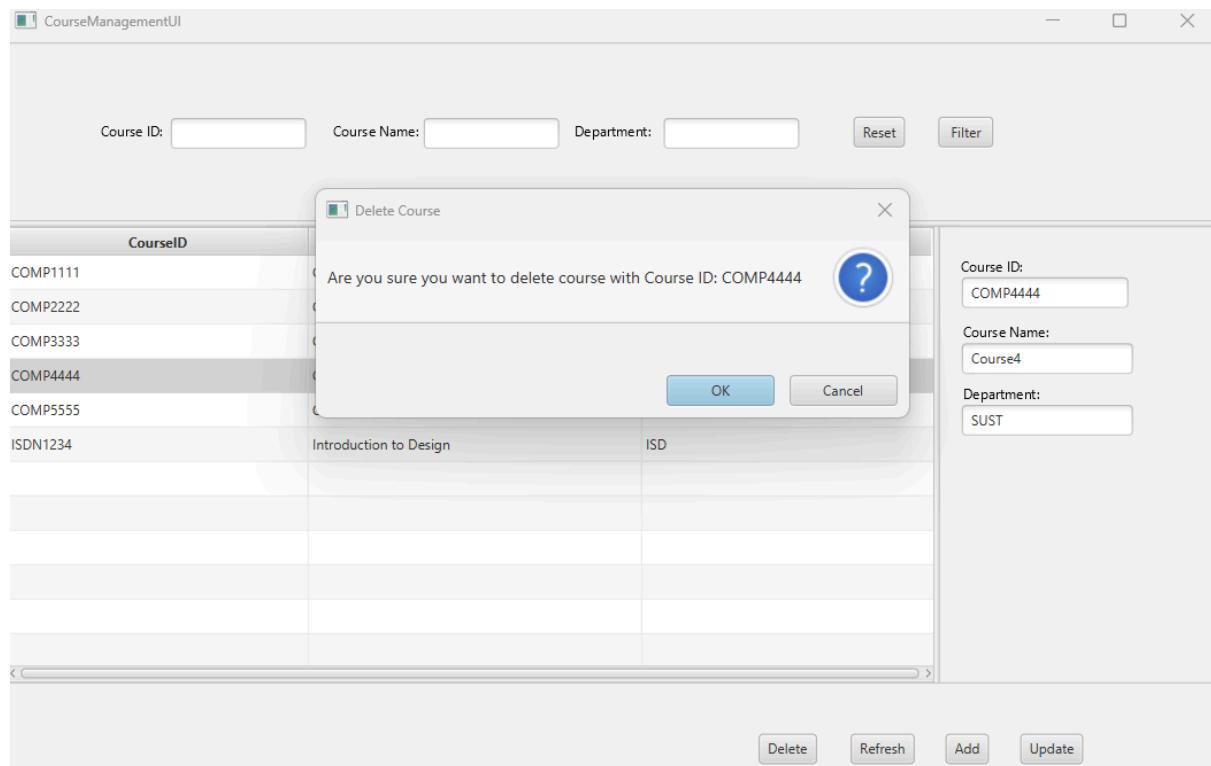
CourseID	Course Name	Department
COMP1111	Course1	CSE
COMP2222	Course2	CSE
COMP3333	Course3	CSE
COMP4444	Course4	SUST
COMP5555	Course5	CSE
ISDN1234	Introduction to Design	ISD

Course ID:  Course Name:  Department:

- If the manager wants to update the course, click on any course in the course table, replace any information to be updated, and click the “Update” button.
- If the manager wishes to deselect the course, click on anywhere that is not in the course table or input section.
- Upon confirmation, the course will be updated in the database.
- Click the “Refresh” button to refresh the table.



- If the manager wants to delete a course, select a course from the course table and click the “Delete” button.
- If the manager wishes to deselect the course, click on anywhere that is not in the course table or input section..
- Upon confirmation, the course will be deleted from the database.
- Click the “Refresh” button to refresh the table.



## **Report on the unit testing**

## **Report on the coverage test**

Element	Class, %	Method, %	Line, %	Branch, %
comp3111.examsystem	80% (29/36)	72% (251/346)	71% (1585/2220)	62% (831/1330)
model	100% (8/8)	86% (72/83)	90% (136/150)	100% (0/0)
Main	0% (0/1)	0% (0/2)	0% (0/7)	100% (0/0)
controller	77% (17/22)	70% (161/230)	75% (1369/1821)	70% (753/1070)
TeacherLoginController	100% (1/1)	75% (6/8)	68% (26/38)	100% (14/14)
TeacherMainController	100% (1/1)	80% (4/5)	69% (16/23)	100% (0/0)
SelectLoginController	0% (0/1)	0% (0/3)	0% (0/24)	100% (0/0)
ManagerMainController	0% (0/1)	0% (0/5)	0% (0/23)	100% (0/0)
StudentMainController	100% (1/1)	77% (7/9)	75% (49/65)	91% (22/24)
StudentRegisterController	100% (1/1)	100% (4/4)	100% (31/31)	75% (20/26)
StudentGradeStatisticController	100% (2/2)	76% (10/13)	70% (78/111)	75% (27/36)
StudentLoginController	100% (1/1)	60% (3/5)	55% (15/27)	75% (6/8)
TeacherRegisterController	100% (1/1)	100% (7/7)	94% (56/59)	73% (25/34)
QuizViewController	33% (1/3)	45% (10/22)	52% (77/146)	73% (19/26)
CourseManagementController	100% (1/1)	56% (13/23)	72% (130/180)	72% (70/96)
TeacherGradeStatisticController	66% (2/3)	68% (17/25)	86% (139/161)	72% (45/62)
ManagerLoginController	100% (1/1)	100% (4/4)	81% (27/33)	70% (14/20)
TeacherQuestionBankManagementController	100% (1/1)	75% (15/20)	73% (146/199)	69% (141/204)
TeacherExamManagementController	100% (1/1)	93% (29/31)	92% (270/291)	67% (203/300)
TeacherManagementController	100% (1/1)	73% (17/23)	78% (160/204)	67% (74/110)
StudentManagementController	100% (1/1)	65% (15/23)	72% (149/206)	66% (73/110)