

Group Project Documentation

University of Technology, Jamaica

Faculty of Engineering & Computing (FENC)

School of Computing & Information Technology (SCIT)

Artificial Intelligence (CMP4011)

Mr. Howard James

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Group members:

Roberto James - 2100101

Kemar Christie - 2005904

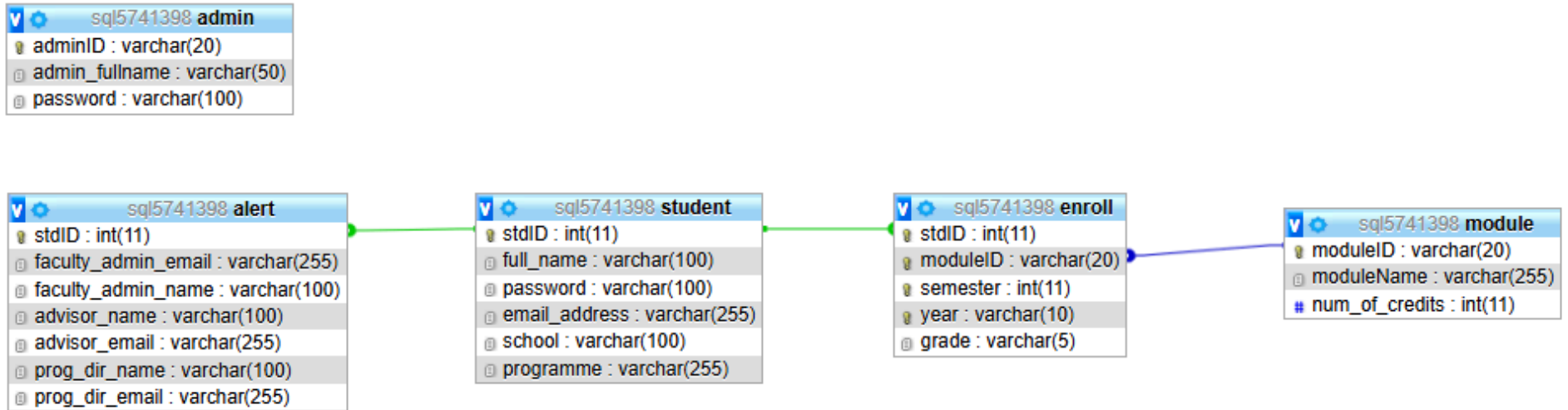
Dwayne Gibbs- 2007512

Tyoni Davis - 1701860

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System Design- Class Diagram



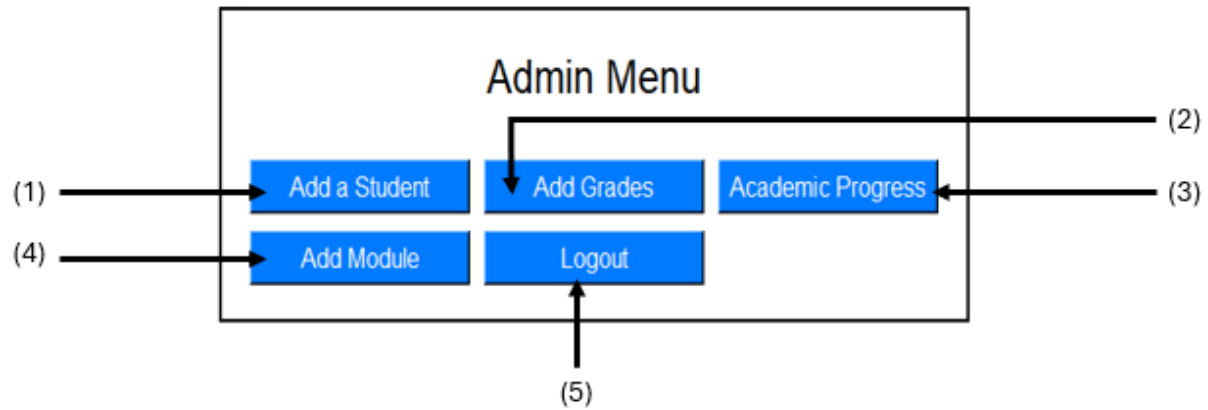
User Manual

Login Page

The diagram shows a login form titled "Login". It contains a dropdown menu labeled "Select a User Type" with a downward arrow, followed by two text input fields labeled "ID" and "Password". Below these fields are two buttons: "Clear" and "Submit". Numbered arrows point to each element: (1) points to the dropdown menu, (2) points to the ID input field, (3) points to the Password input field, (4) points to the Submit button, and (5) points to the Clear button.

- 1) **Select a User Type:** This dropdown menu allows the user to choose their specific user type from a list of options such as “Admin”, “Student”
- 2) **ID:** This text input field is where the user enters their unique identification number or username.
- 3) **Password:** This secure text input field is where the user enters their password. This input is masked to prevent others from seeing the characters being typed.
- 4) **Submit:** This button is clicked to submit the entered ID and password for authentication.
- 5) **Clear:** This button is used to clear all the input fields, resetting the form to its initial state.

Admin Menu Page



- 1) **Add a Student:** This button is used to add a new student to the system.
- 2) **Add Grades:** This button is used to input grades for students.
- 3) **Academic Progress:** This button is used to view or track the academic progress of students.
- 4) **Add Module:** This button is used to add new modules to the system.
- 5) **Logout:** This button is used to log out of the admin interface.

Student Info Page

The diagram shows a web form titled "Student Info" and "Alert". It contains several input fields for student and advisor information, and three buttons: "Clear", "Submit", and "Back to Menu". Numbered callouts (1-14) point to specific elements:

- (1) Full Name input field
- (2) Password input field
- (3) Programme input field
- (4) Advisor Name input field
- (5) Prog. Dir. Name input field
- (6) Fac. Admin Name input field
- (7) Clear button
- (8) Email input field
- (9) School input field
- (10) Advisor Email input field
- (11) Prog. Dir. Email input field
- (12) Fac. Admin Email input field
- (13) Submit button
- (14) Back to Menu button

- 1) **Full Name:** Input field for entering the student's full name. This allows the admin to identify and distinguish the student within the system.
- 2) **Password:** Input field for entering the student's password. This allows the admin to set or update the student's login credentials.
- 3) **Programme:** Input field for entering the student's programme. This allows the admin to specify the academic programme the student is enrolled in.
- 4) **Advisor Name:** Input field for entering the advisor's name. This allows the admin to assign or update the student's academic advisor.

- 5) **Prog. Dir. Name:** Input field for entering the programme director's name. This allows the admin to assign or update the student's programme director.
- 6) **Fac. Admin Name:** Input field for entering the faculty administrator's name. This allows the admin to assign or update the student's faculty administrator.
- 7) **Clear:** Button to clear all input fields. This allows the admin to reset the form and start over.
- 8) **Email:** Input field for entering the student's email address. This allows the admin to update or specify the student's contact information.
- 9) **School:** Input field for entering the name of the school. This allows the admin to specify the school the student belongs to.
- 10) **Advisor Email:** Input field for entering the advisor's email address. This allows the admin to update the contact information for the student's advisor.
- 11) **Prog. Dir. Email:** Input field for entering the programme director's email address. This allows the admin to update the contact information for the programme director.
- 12) **Fac. Admin Email:** Input field for entering the faculty administrator's email address.
This allows the admin to update the contact information for the faculty administrator.
- 13) **Submit:** Button to submit the entered information. This allows the admin to save the updates made to the student's information.
- 14) **Back to Menu:** Button to navigate back to the main menu. This allows the admin to return to the main interface.

Enter Student Info for Grade Entry Page

The diagram shows a form titled "Enter Student Info" with three dropdown menus and three buttons. Numbered callouts point to the following elements:

- (1) Student ID: dropdown menu
- (2) Academic Year: dropdown menu
- (3) Semester: dropdown menu
- (4) Submit button
- (5) Clear button
- (6) Back to Menu button

- 1) **Student ID:** Dropdown menu for selecting the student's ID. This allows the admin to choose the correct student for grade entry.
- 2) **Academic Year:** Dropdown menu for selecting the academic year. This allows the admin to specify the academic year for the grades being entered.
- 3) **Semester:** Dropdown menu for selecting the semester. This allows the admin to specify the semester for which the grades are being entered.
- 4) **Submit:** Button to submit the entered information and proceed to the grade entry form. This allows the admin to move to the next step of entering grades.
- 5) **Clear:** Button to clear all input fields. This allows the admin to reset the form if needed.
- 6) **Back to Menu:** Button to navigate back to the main menu. This allows the admin to return to the main interface.

Add Student Grades Page

The screenshot shows a web interface titled "Add Student Grades". At the top, it says "Admin Name: John Doe". Below this is a table with three columns: "Module Code", "Module Name", and "Grade". The table contains four rows of data. To the right of the table is a vertical scrollbar. Below the table are three input fields, each with a label above it: "Module Code", "Module Name", and "Grade". Below these fields are two blue buttons: "Update Student Grade" and "Back to Menu".

Module Code	Module Name	Grade
BIO3004	Introduction to Bioinformatics	55
CIT2004	Object Oriented Programming	88
CIT3003	Analysis of Algorithms	75
CIT3027	Mobile Computing	89

Below the table, there are three input fields and two buttons:

- (1) Points to the "Module Code" input field.
- (2) Points to the "Update Student Grade" button.
- (3) Points to the "Back to Menu" button.
- (4) Points to the "Grade" column of the table.
- (5) Points to the "Grade" input field.
- (6) Points to the "Module Name" input field.

- 1) **Module Code:** Grayed-out text box displaying the module code. This field autofills with the selected module's code.
- 2) **Update Student Grade:** Button to update the grade of a student. This allows the admin to submit the entered grade information.
- 3) **Back to Menu:** Button to navigate back to the main menu. This allows the admin to return to the main interface.
- 4) **Grades Table:** Table displaying existing student modules and grades with columns for "Module Code," "Module Name," and "Grade."
- 5) **Grade:** Enabled textbox for entering the grade. This allows the admin to input the student's grade for the specified module.
- 6) **Module Name:** Grayed-out text box displaying the module name. This field autofills with the selected module's name.

Admin Select Student Page

The image shows a web form titled "Admin Select Student". It contains three input fields and two buttons. Numbered callouts point to each element: (1) points to the "Enter Student ID" dropdown, (2) points to the "Academic Year" dropdown, (3) points to the "Desired GPA (Optional)" text input field, (4) points to the "Next" button, and (5) points to the "Back" button.

Admin Select Student

Enter Student ID

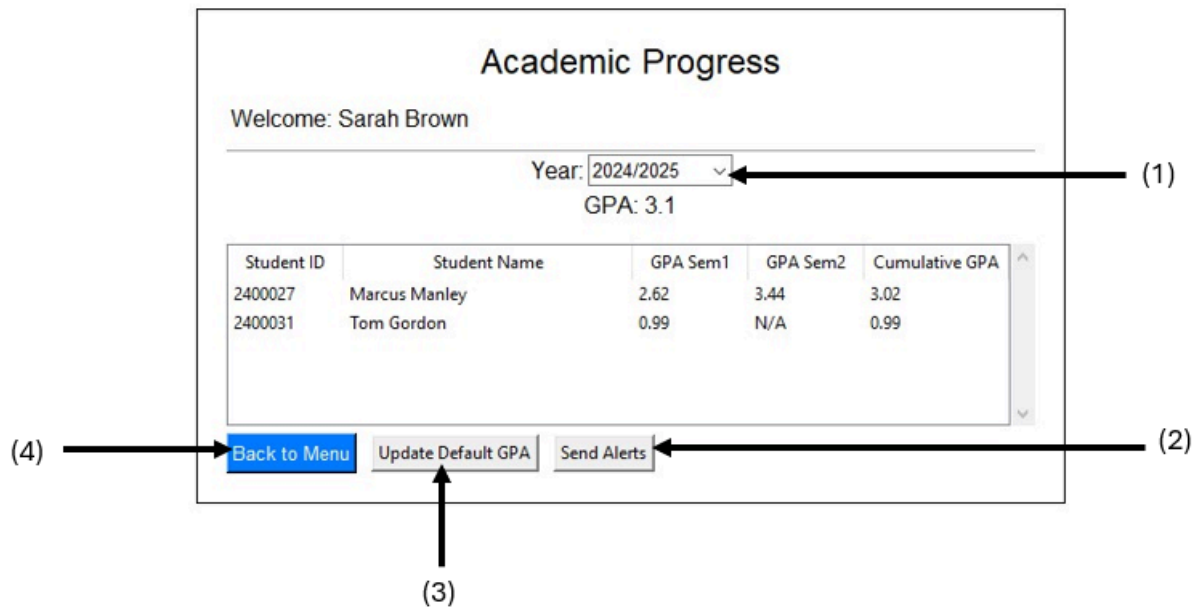
Academic Year

Desired GPA (Optional)

Back Next

- 1) **Enter Student ID:** Dropdown menu for selecting the student's ID. This allows the admin to choose the correct student for the next action.
- 2) **Academic Year:** Dropdown menu for selecting the academic year. This allows the admin to specify the academic year relevant to the student.
- 3) **Desired GPA (Optional):** Text input field for entering the desired GPA, if applicable. This allows the admin to input an optional GPA target for the student.
- 4) **Next:** Button to proceed to the next step. This allows the admin to move forward after entering the required information.
- 5) **Back:** Button to navigate back to the previous menu. This allows the admin to return to the previous interface.

Academic Progress Page



- 1) **Year:** Dropdown menu for selecting the academic year. This allows the admin to specify the academic year for their module selection.
- 2) **Send Alerts:** Button that send alerts based on the academic progress data. This allows the admin to trigger notifications or alerts to the relevant students or administrators based on the GPA data.
- 3) **Update Default GPA:** Button to update the default GPA value. This allows the admin to update the default GPA value.
- 4) **Back to Menu:** Button to navigate back to the main menu. This allows the admin to return to the main interface.

Academic Progress Page (Student)

Academic Progress

Welcome: John Doe

Year: 2024/2025
GPA: 2.0

Student ID	Student Name	GPA Sem 1	GPA Sem 2	Cumulative GPA
2400026	Kyle Willis	3.57	3.66	3.61

Back to Menu
← (1)

Features Academic Progress of students with their ID, name, GPA for both semesters and the cumulative GPA

- 1) **Back to Menu:** Button to navigate back to the main menu. This allows the admin to return to the main interface.

Add Modules Page

Add Modules

Welcome John Doe

Module Code
Module Name
Module Credit

Remove Module
Add to Database

Module Code
Module Name
Module Credits

Add Module
View All Modules In Database

Back to Menu
← (5)

(6) → Remove Module

(7) → Add to Database

(8) → Add Module

(9) → View All Modules In Database

(1) ← Module Credit

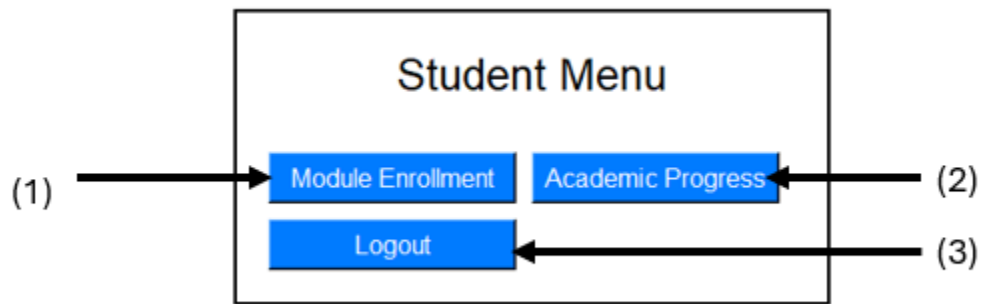
(2) ← Add to Database

(3) ← Module Credits

(4) ← View All Modules In Database

- 1) **Modules Table:** Table displaying modules with columns for "Module Code," "Module Name," and "Module Credit." This allows the admin to see all entries for easy management.
- 2) **Add to Database:** Button to add the entered module information to the database. This allows the admin to save the new module information.
- 3) **Module Credits:** Input field for entering the module's credit value. This allows the admin to specify the number of credits for the new module
- 4) **View All Modules In Database:** Button to view a list of all modules currently in the database. This allows the admin to review existing modules.
- 5) **Back to Menu:** Button to navigate back to the main menu. This allows the admin to return to the main interface.
- 6) **Remove Module:** Button to remove a module from the list. This allows the admin to delete an existing module.
- 7) **Module Name:** Input field for entering the module name. This allows the admin to specify the name of the new module.
- 8) **Module Code:** Input field for entering the module code. This allows the admin to specify the code for the new module.
- 9) **Add Module:** Button to add a module to the database. This button allows a module to be added to the table.

Student Menu Page



- 1) **Module Enrollment:** Button to navigate to the module enrollment section. This allows students to enroll in their desired modules.
- 2) **Academic Progress:** Button to view academic progress. This allows students to check their grades and track their academic performance.
- 3) **Logout:** Button to log out of the student menu. This allows students to securely exit the interface.

Select your Modules Page

Select Your Modules

(7) Student : 2400029 - Marissa Brown

Year : Semester : (1)

Modules you selected will appear in this table

Module Code	Module Name	Module Credit

(8) (2)

(9) Remove Module Confirm Module Selection Total Credits = 0 (3)

Select a module from the drop down

(10) Module Code Module Name Credits

(5)

(11) Add Module

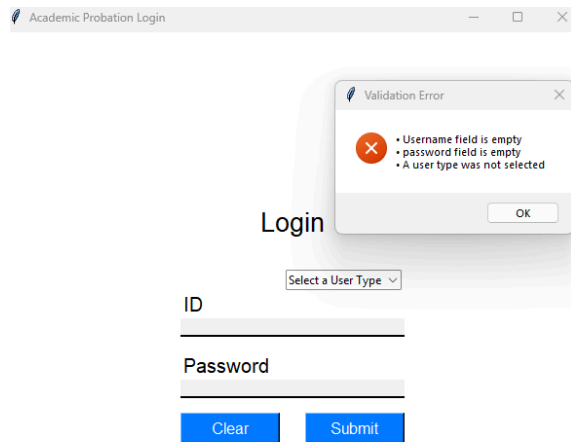
Back to Menu (6)

- 1) **Semester:** Dropdown menu for selecting the semester. This allows students to specify the semester for which the modules are being selected.
- 2) **Selected Modules Table:** Table where selected modules will appear, with columns for "Module Code," "Module Name," and "Module Credit." This allows students to view and manage the list of selected modules.
- 3) **Total Credits:** Label showing the total credits accumulated from the selected modules. This allows students to keep track of the total credit load for the selected modules.
- 4) **Module Name:** Dropdown menu for selecting a module name. This allows students to choose the name of the module to be added.
- 5) **Credits:** Dropdown menu for displaying the total credits for a module. This allows students to see the credit value of the module being added.

- 6) **Back to Menu:** Button to navigate back to the main menu. This allows students to return to the main interface.
- 7) **Year:** Dropdown menu for selecting the academic year. This allows students to specify the academic year for the module selection.
- 8) **Confirm Selection:** Button for confirming the module selection. This allows students to finalize the selection of modules.
- 9) **Remove Module:** Button for removing a selected module. This allows students to delete a module from the list of selected modules.
- 10) **Module Code:** Dropdown menu for selecting a module code. This allows students to choose the code of the module to be added.
- 11) **Add Module:** Button to add the selected module to the list. This allows students to add the chosen module to their selected list of courses.

Error Handling

Login Page



1) Username Field:

- **Error:** Username field is empty.
- **Handling:** Display a validation error message indicating that the username field must be filled out.

2) Password Field:

- **Error:** Password field is empty.
- **Handling:** Display a validation error message indicating that the password field must be filled out.

3) User Type Dropdown:

- **Error:** User type was not selected.
- **Handling:** Display a validation error message indicating that a user type must be selected.

Student Info Page

The screenshot shows a web application window titled "Academic Probation Login". Inside, there is a form titled "--- Student Info ---". The form contains several input fields: "Full Name", "Password", "Programme", "Advisor Name", "Prog. Dir. Name", "Prog. Dir. Email", "Fac. Admin Name", and "Fac. Admin Email". At the bottom of the form are three buttons: "Clear", "Submit", and "Back to Menu". A "Validation Error" dialog box is open over the form, displaying a list of error messages. The first error message is "First name field is empty". The other error messages are: "Email field is empty", "Password field is empty", "School field is empty", "Programme field is empty", "Advisor name field is empty", "Advisor email field is empty", "Programme Director name field is empty", "Programme Director email is empty", "Faculty Admin name field is empty", and "Faculty Admin email field is empty". The dialog box has an "OK" button.

1) Full Name Field:

- **Error:** Full Name field is empty.
- **Handling:** Display a validation error message indicating that the Full Name field must be filled out. This helps ensure that the student's full name is provided.

2) Password Field:

- **Error:** Password field is empty.
- **Handling:** Display a validation error message indicating that the Password field must be filled out. This ensures that a password is entered for security purposes.

3) Programme Field:

- **Error:** Programme field is empty.
- **Handling:** Display a validation error message indicating that the Programme field must be filled out. This helps to specify the student's programme of study.

4) Advisor Name Field:

- **Error:** Advisor Name field is empty.
- **Handling:** Display a validation error message indicating that the Advisor Name field must be filled out. This ensures that the name of the student's advisor is provided.

5) Programme Director Name Field:

- **Error:** Programme Director Name field is empty.
- **Handling:** Display a validation error message indicating that the Programme Director Name field must be filled out. This helps to specify the name of the programme director.

6) Faculty Admin Name Field:

- **Error:** Faculty Admin Name field is empty.
- **Handling:** Display a validation error message indicating that the Faculty Admin Name field must be filled out. This helps to provide the name of the faculty administrator.

7) Email Field:

- **Error:** Email field is empty.
- **Handling:** Display a validation error message indicating that the Email field must be filled out. This ensures that the student's email address is provided.

8) School Field:

- **Error:** School field is empty.
- **Handling:** Display a validation error message indicating that the School field must be filled out. This specifies the school the student is enrolled in.

9) Advisor Email Field:

- **Error:** Advisor Email field is empty.

- **Handling:** Display a validation error message indicating that the Advisor Email field must be filled out. This ensures that the email address of the student's advisor is provided.

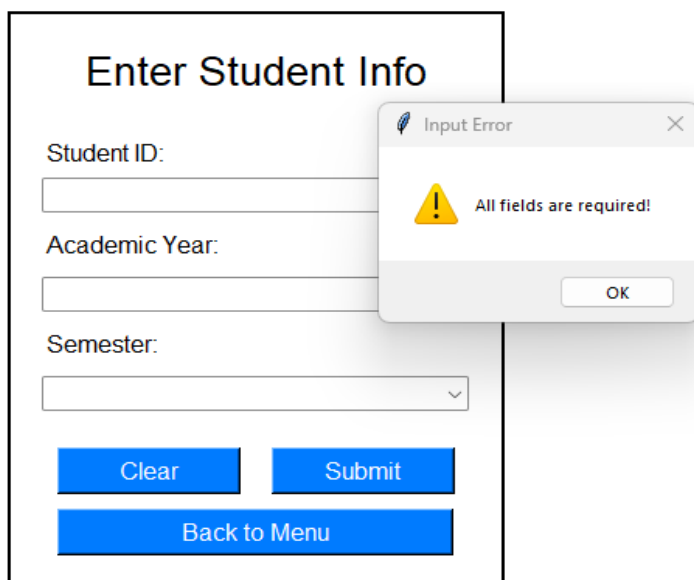
10) Programme Director Email Field:

- **Error:** Programme Director Email field is empty.
- **Handling:** Display a validation error message indicating that the Programme Director Email field must be filled out. This ensures that the email address of the programme director is provided.

11) Faculty Admin Email Field:

- **Error:** Faculty Admin Email field is empty.
- **Handling:** Display a validation error message indicating that the Faculty Admin Email field must be filled out. This helps to provide the email address of the faculty administrator.

Enter Student Info for Grade Entry Page



The screenshot shows a web form titled "Enter Student Info". It contains three input fields: "Student ID:", "Academic Year:", and "Semester:". Below these fields are three buttons: "Clear", "Submit", and "Back to Menu". An "Input Error" dialog box is overlaid on the form, displaying a yellow warning icon and the message "All fields are required!". The dialog box has an "OK" button.

- **Error:** One or more fields (Student ID, Academic Year, Semester) are left empty.
- **Handling:** As soon as the user leaves a field empty, an error message should be displayed. The form shows a dialog box titled "Input Error" with a warning icon and the message "All fields are required!"

Add Student Grades Page

The screenshot shows a web application titled "Add Student Grades". At the top, it says "Admin Name: John Doe". Below this is a table with two columns: "Module Code" and "Module Name". The table contains four rows of data:

Module Code	Module Name
BIO3004	Introduction to Bioinformatics
CIT2004	Object Oriented Programming
CIT3003	Analysis of Algorithms
CIT3027	Mobile Computing

Below the table, there are three input fields labeled "Module Code", "Module Name", and "Grade". The "Grade" field is currently empty. Below these fields are two buttons: "Update Student Grade" and "Back to Menu".

A modal dialog box titled "Invalid Grade" is displayed over the form. It contains a yellow warning icon and the text "Grade should be an integer". There is an "OK" button at the bottom right of the dialog.

1) Grade field

- **Error:** Grade field is left empty.
- **Handling:** As soon as the user leaves a field empty, an error message should be displayed. The form shows a dialog box titled "Invalid Grade" with a warning icon and the message "Grade should be an integer"

The screenshot shows a web application interface for adding a student. At the top, there is a title 'Add Student' and a field for 'Admin Name: J...'. Below this is a table with three columns: 'Module Code', 'Module Name', and 'Grade'. The table contains four rows of data. The first row is highlighted in blue. Below the table, there are three input fields for 'Module Code', 'Module Name', and 'Grade'. The 'Module Code' field contains 'BIO3004', the 'Module Name' field contains 'Introduction to Bioinformatics', and the 'Grade' field contains '-1'. Below these fields are two buttons: 'Update Student Grade' and 'Back to Menu'. An error dialog box titled 'Invalid Grade' is overlaid on the form. It contains a yellow warning icon and the message 'Grade must be between 0 to 100'. There is an 'OK' button at the bottom of the dialog.

Module Code	Module Name	Grade
BIO3004	Introduction to Bioinformatics	55
CIT2004	Object Oriented Programming	88
CIT3003	Analysis of Algorithms	75
CIT3027	Mobile Computing	89

Module Code	Module Name	Grade
BIO3004	Introduction to Bioinformatics	-1

Update Student Grade

Back to Menu

Invalid Grade

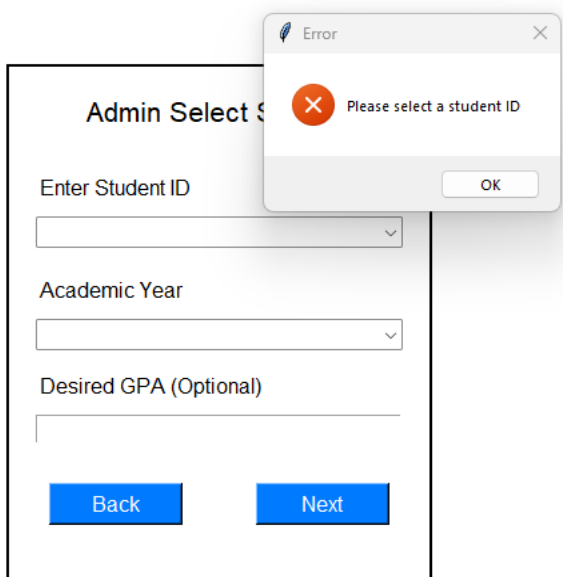
Grade must be between 0 to 100

OK

2) Grade Field

- **Error:** A negative integer was entered in the grade field.
- **Handling:** As soon as the user adds an integer that is not between the 0 to 100, an error message should be displayed. The form shows a dialog box titled "Invalid Grade" with a warning icon and the message "Grade must be between "0 to 100"

Admin Select Student Page



The screenshot shows a web form titled "Admin Select Student". The form has three input fields: "Enter Student ID" (a dropdown menu), "Academic Year" (a dropdown menu), and "Desired GPA (Optional)" (a text input field). Below these fields are two blue buttons labeled "Back" and "Next". An error dialog box is overlaid on the form, titled "Error" with a red 'X' icon. The message in the dialog box says "Please select a student ID" and there is an "OK" button.

1) Enter Student ID:

- **Error:** Dropdown menu for selecting the student's ID is empty.
- **Error Handling:** If the student ID is not selected, display a validation error message indicating that the student ID must be selected. This allows the system to ensure that the correct student is chosen for the next actions.

2) Academic Year:

- **Error:** Dropdown menu for selecting the academic year is empty.
- **Error Handling:** If the academic year is not selected, display a validation error message indicating that the academic year must be selected. This allows the system to ensure that the correct academic year is specified for the student's records.

3) Next:

- **Field:** Button to proceed to the next step.

- **Error Handling:** If any required fields (Student ID or Academic Year) are not selected, prevent submission and display a validation error message. This allows the system to ensure all necessary information is provided before proceeding.

Add Modules Page

Add Modules

Welcome John Doe

Module Code	Module Name	Module Credits

Module Code	Module Name	Module Credits
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="button" value="Add Module"/>	<input type="button" value="View All Modules In Database"/>	

Selection Error

⚠ Please select at least one record to delete.

OK

Add Modules

Welcome John Doe

Module Code	Module Name	Module Credits

Module Code	Module Name	Module Credits
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="button" value="Add Module"/>	<input type="button" value="View All Modules In Database"/>	

Input Error

⚠ Please fill in all fields.

OK

Add Modules

Welcome John Doe

Module Code

Module Name

Module Credits

Remove Module

Add to Database

Add Module

View All Modules In Database

[Back to Menu](#)

1) Module Code:

- **Error:** Module code is empty.
- **Handling:** Display a validation error message indicating that the module code must be entered. This ensures that the new module has a unique identifier.

2) Module Name:

- **Error:** Module name is empty.
- **Handling:** Display a validation error message indicating that the module name must be entered. This ensures that the new module has a descriptive name.

3) Module Credit:

- **Error:** Module credits are not entered.
- **Handling:** Display a validation error message indicating that the module credits must be entered. This ensures that the new module has an assigned credit value.

4) Add to Database:

- **Error:** One or more fields (module code, module name, or module credits) are empty.

- **Handling:** Display a validation error message indicating that all fields must be filled out before adding to the database. This ensures that incomplete module information is not added.

5) Remove Module:

- **Error:** No module is selected for removal.
- **Handling:** Display a validation error message indicating that a module must be selected for removal. This ensures that the admin can only remove an existing module.

Select Your Modules Page

Select Your Modules

Student : 2400026 - Kyle Willis

Year : Semester :

Modules you selected will appear in

Module Code	Module Name	Credits

Remove Module Confirm Module Selection Total Credits = 0

Select a module from the drop down

Module Code Module Name Credits

Add Module

Back to Menu

No Selection

Please select a record or records, then click Delete.

OK

Select Your Modules

Student : 2400026 - Kyle Willis

Year : Semester :

Modules you selected will appear in this table

Module Code	Module Name

Remove Module Confirm Module Selection

Total Credits = 0

Select a module from the drop down

Module Code Module Name Credits

Add Module

Back to Menu

Select Your Modules

Student : 2400026 - Kyle Willis

Year : Semester :

Modules you selected will appear in this table

Module Code	Module Name

Remove Module Confirm Module Selection

Total Credits = 0

Select a module from the drop down

Module Code Module Name Credits

Add Module

Back to Menu

1) Remove Module:

- **Error:** No module is selected for removal.
- **Handling:** Display a validation error message indicating that a module must be selected for removal. This ensures that the admin can only remove an existing module.

2) Year and Semester:

- **Error:** Year or semester was not selected from the dropdown list.
- **Handling:** Display a validation error message indicating that the year or semester must be selected.

3) Add module:

- **Error:** One or more fields (module code, module name, or module credits) are empty.
- **Handling:** Display a validation error message indicating that a module from the dropdown list must be selected. This ensures that incomplete module information is not added.

Group Report

Student Name	Contributions
Roberto James	GUI for Admin, setting Up Database
Tyoni Davis	Setting up Database, send Email function, Documentation
Dwayne Gibbs	Create knowledge base and connection file for Prolog and Python
Kemar Christie	GUI for Student, User Testing

Lesson Learnt

The lessons that we have learned collectively as a group are:

- Offloading Operation to another Language: A key takeaway from this course was the ability to offload specific tasks to a more suitable language. For instance, Python served as the primary interface for interaction and data management, while Prolog handled complex calculations
- Connecting to a cloud database and collaboration tools with Python: We learned the importance of connecting to a cloud database and utilizing collaboration tools with Python. This assignment required continuous interaction with a database, and instead of each member setting up a local database, we adopted an online database solution. This approach ensured that changes made by one team member were immediately visible to everyone, fostering seamless collaboration. Additionally, we became proficient in using Git and GitHub directly within Visual Studio's interface, which significantly streamlined our teamwork and made version control more efficient.
- Database interactions : Creating functions that interact with SQL databases and process data in Python.
- Creating GUI using tkinter: In order for the user to interact with the system the tkinter library was used to create a graphic user interface and display areas like the login screen, dashboard etc.
- Importance of Testing and Validation- Testing scenarios such as empty tables, incomplete grades, and GPA thresholds underscored the importance of validating input and validation alert at every stage to ensure the user knows what type of data should be entered.