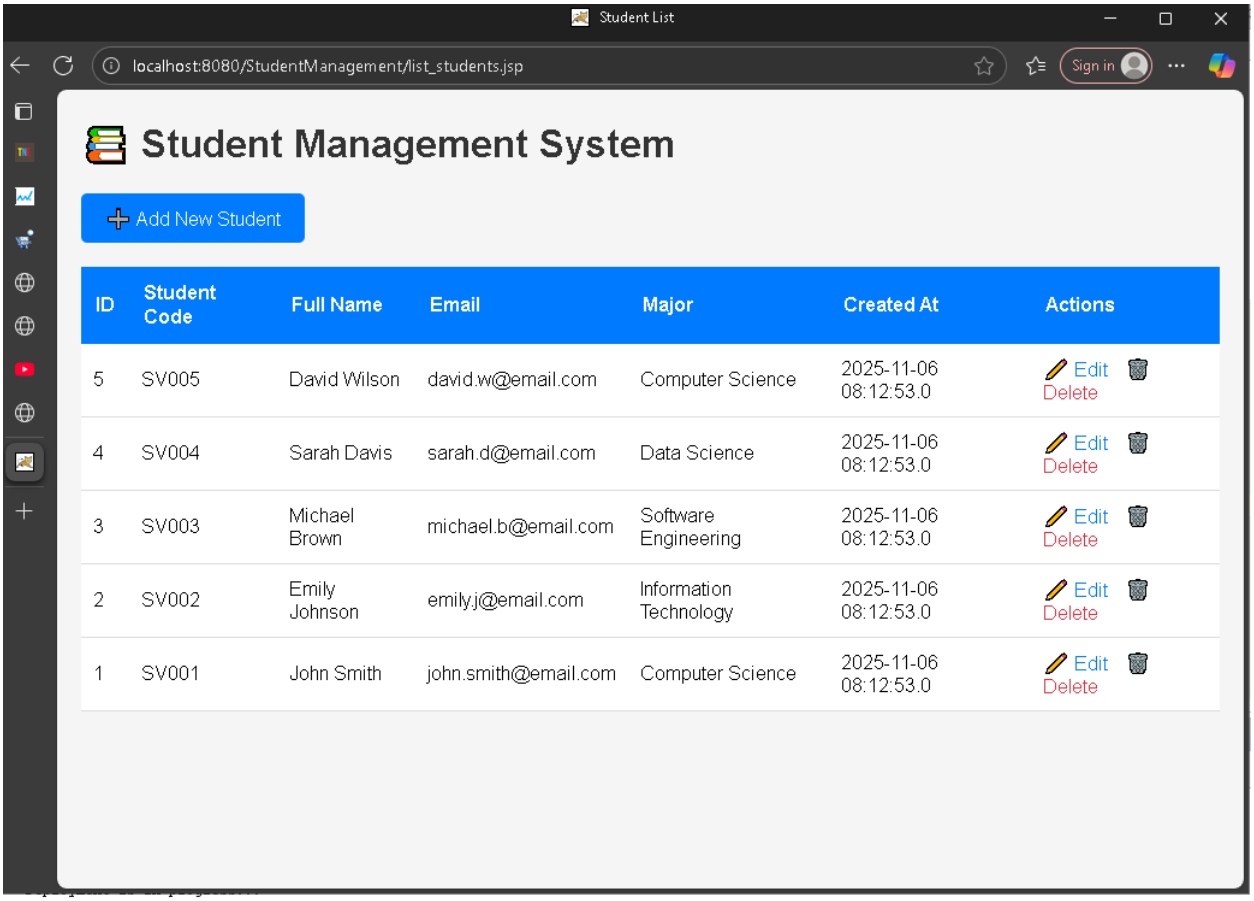
1. Display Student List



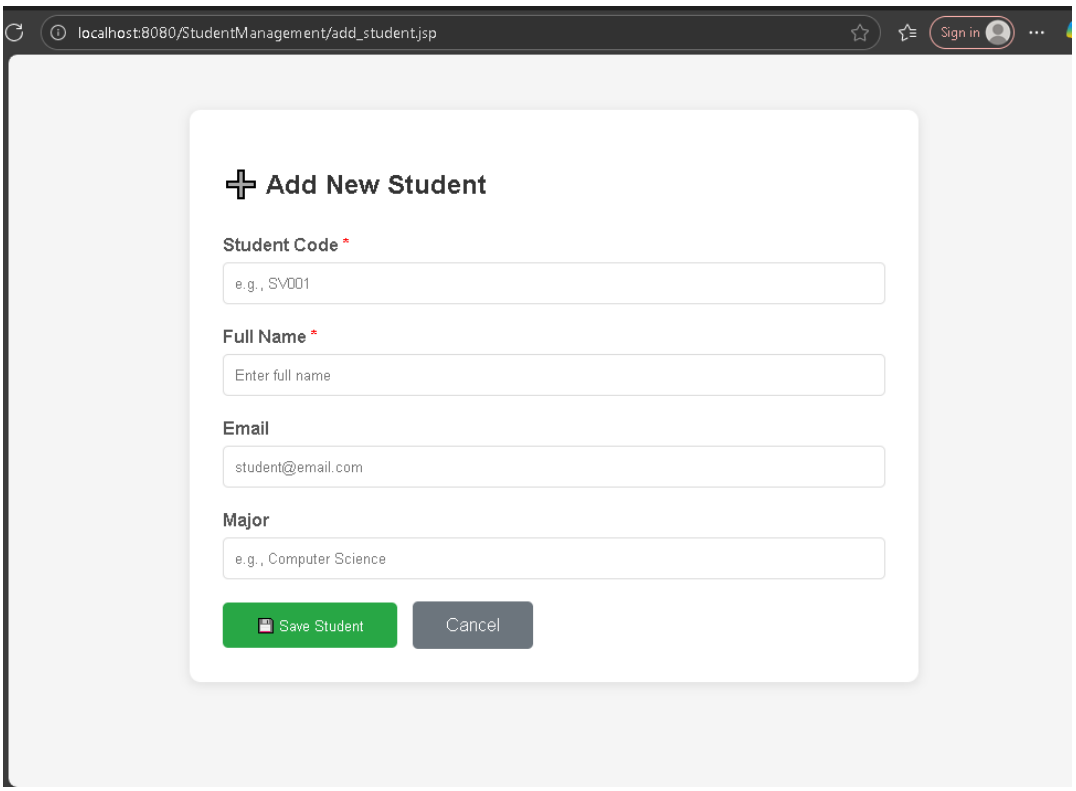
When the user accesses the list_students.jsp page, Tomcat compiles the JSP file into a Java servlet and executes it on the server. The page begins by importing the necessary java.sql classes and setting UTF-8 encoding to support Unicode text. It then defines the user interface using HTML and CSS, which provides a clean layout for displaying the student list and action buttons. Next, the JSP script connects to the MySQL database student_management using the JDBC driver (com.mysql.cj.jdbc.Driver) and the DriverManager.getConnection() method. A SQL query (SELECT * FROM students ORDER BY id DESC) is executed to retrieve all student records. The result set is processed in a while loop, and each row is dynamically printed into the HTML table using JSP expression tags (<%= ... %>).

The page also supports user feedback through messages—if redirected from another page with a message or error parameter, it displays a green success box or a red error box at the top. Finally, the code ensures that all database resources (ResultSet, Statement, and Connection) are closed properly in a finally block to avoid memory leaks.

As a result, list_students.jsp serves as the main view for displaying student data dynamically from the database, with interactive links to **Add**, **Edit**, and **Delete** student records.

2.1 Create Add Student Form

When the user opens the Add New Student page, Tomcat renders the JSP as an HTML form for inputting student information. The form uses UTF-8 encoding and styled CSS for a clean interface. It contains required fields for *Student Code* and *Full Name*, optional fields for *Email* and *Major*, and uses an HTML validation pattern ([A-Z]{2}[0-9]{3,}) to ensure proper student code format.
If the page is redirected with an error parameter (e.g., from process_add.jsp), a red error box appears at the top to notify the user.
When the form is submitted, data is sent via POST to process_add.jsp, which handles validation and database insertion.
The page also includes a Cancel button linking back to list_students.jsp.
As a result, add_student.jsp provides a user-friendly interface for entering new student data, performing basic client-side validation before submission, and displaying errors if necessary.

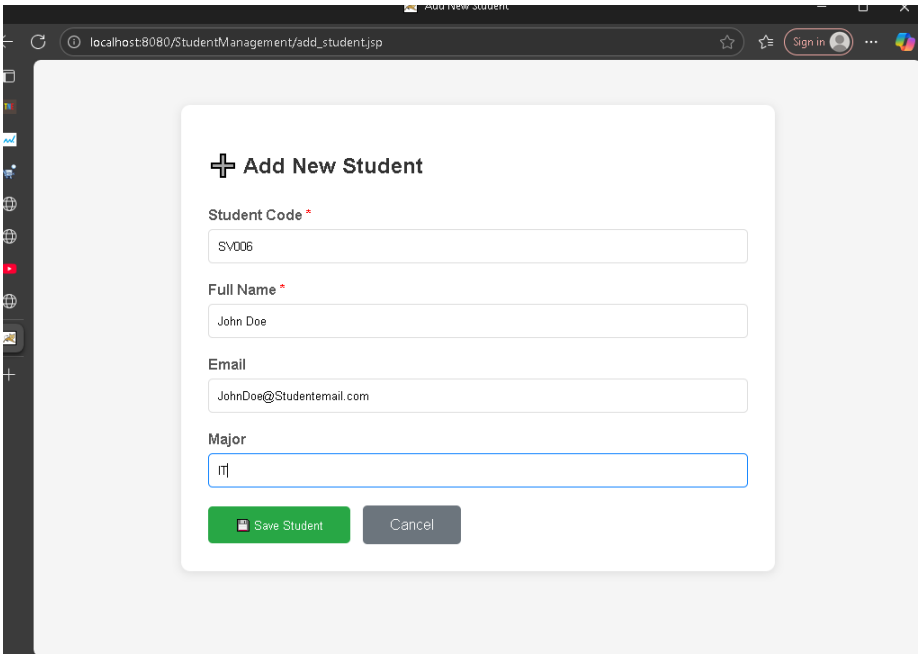


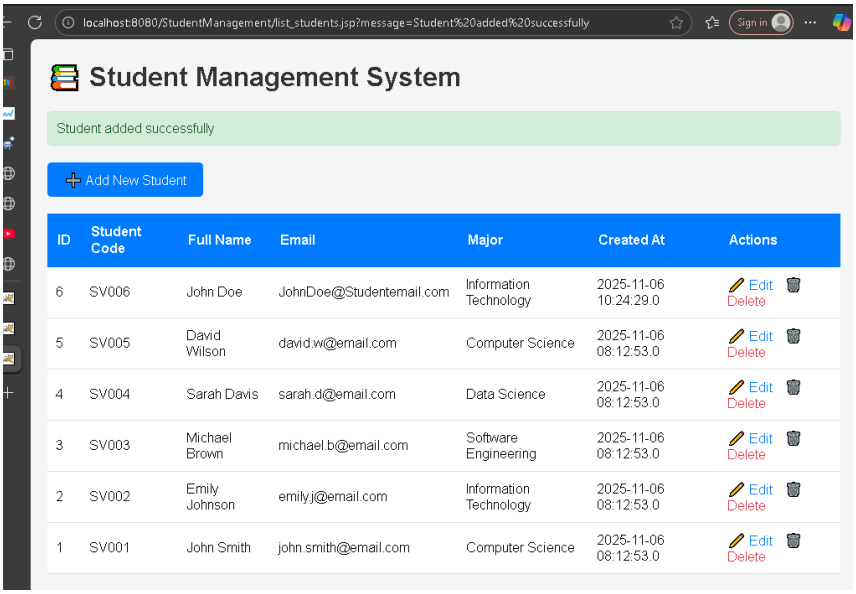
2.2 Process Add Student

When the user clicks the Add New Student, process_add.jsp is executed on the server.
The page retrieves input values from the form (student_code, full_name, email, major) and

checks for missing required fields.
If required fields are missing, it redirects back to add_student.jsp with an error message.
Otherwise, it connects to the student_management MySQL database using JDBC and executes an **INSERT** statement to add the new record.
If the operation succeeds, the user is redirected to list_students.jsp with a success message.
If the student code already exists or another SQL error occurs, it redirects with an appropriate error.
All database resources are closed properly at the end.

Valid data:

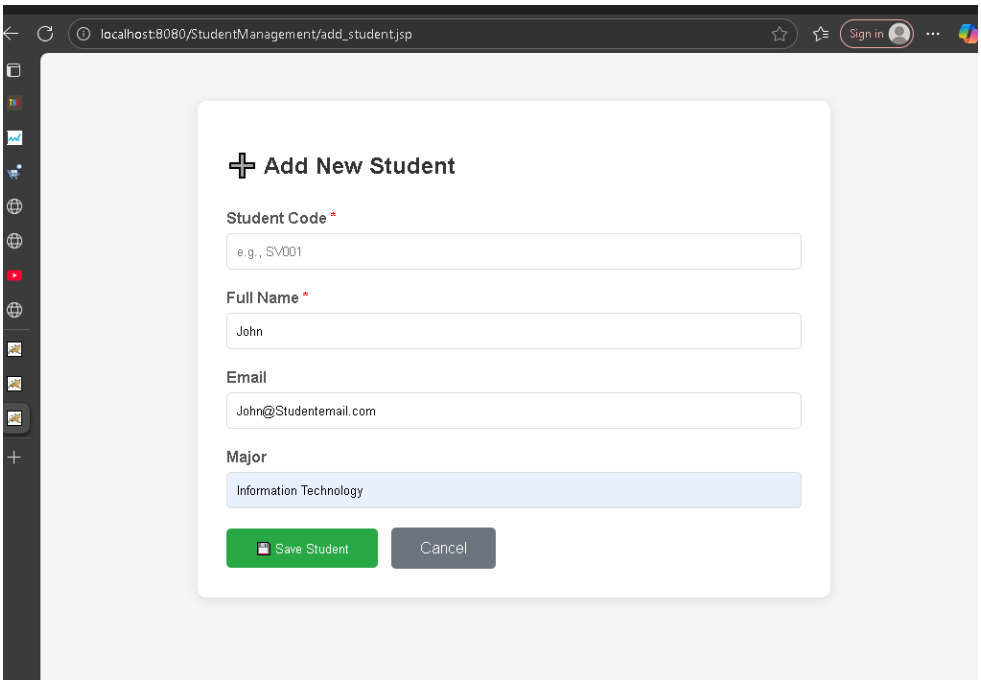


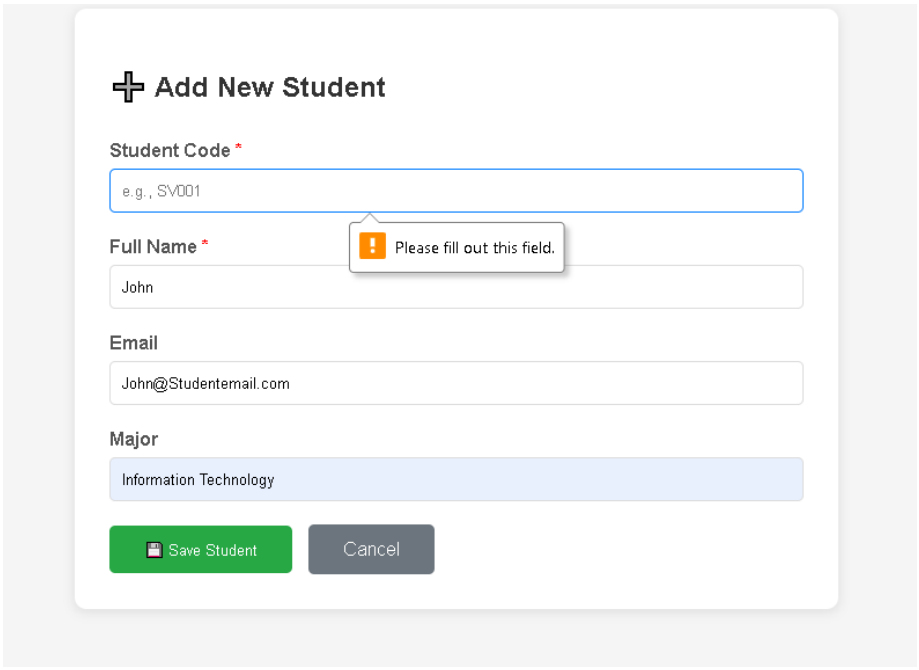


Redirects to list_students.jsp. The student appears at the top of the table. A green success message box at the top displays: “Student added successfully”.

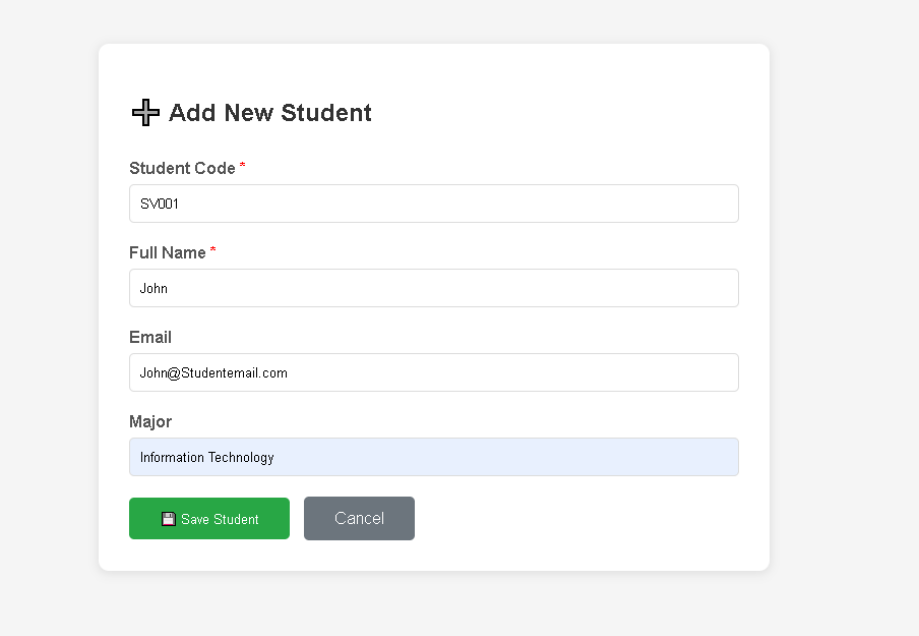
Empty Required Field:

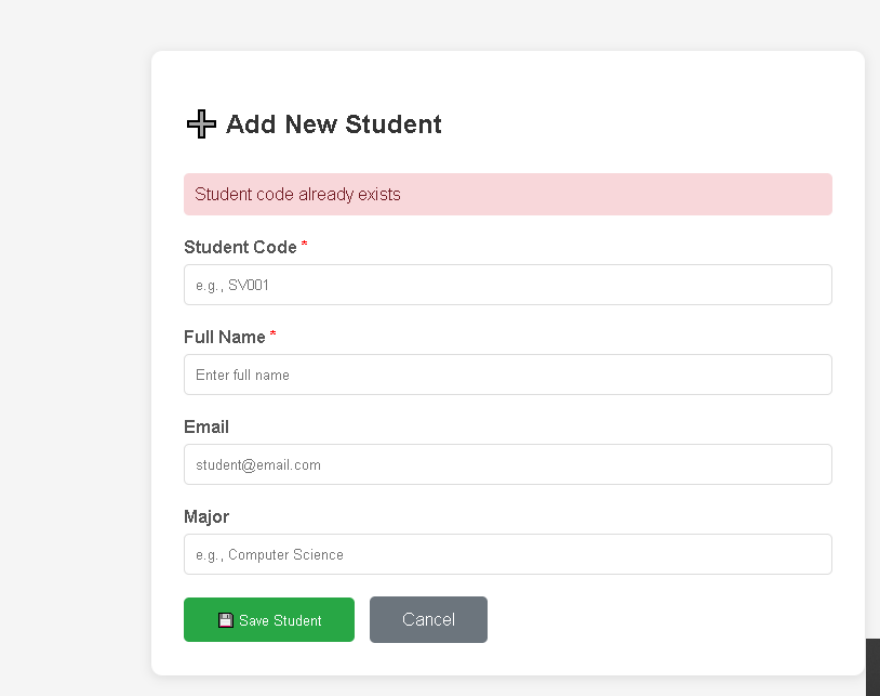
Redirects back to add_student.jsp. A error box appears showing: “**Please fill out this field**”. No data is added.





Duplicate Code





Redirects to add_student.jsp. A red error box appears with the text: “Student code already exists”. The database remains unchanged.

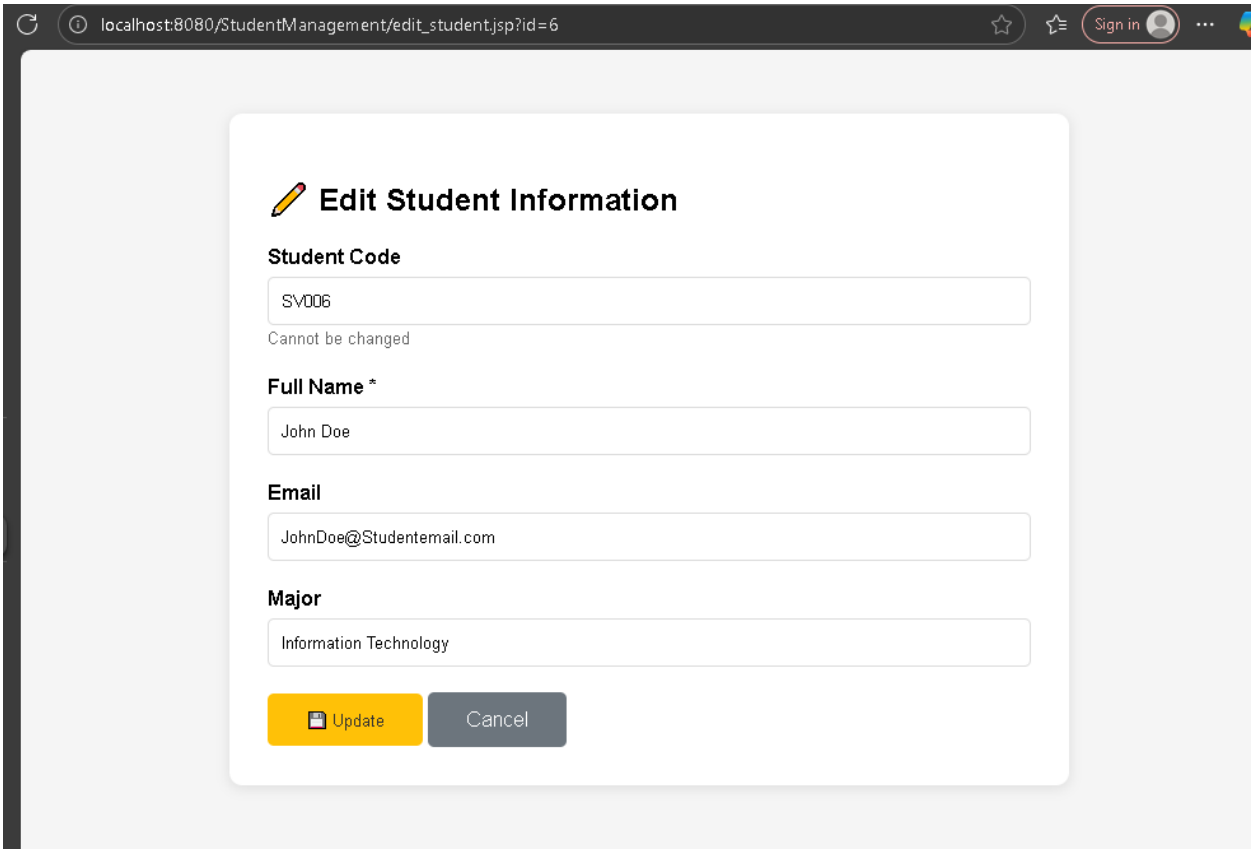
3.1: Create Edit Form

When the user accesses edit_student.jsp, Tomcat compiles and runs it to load the student data for editing. The page reads the student ID from the request parameter (?id=). If the ID is missing or invalid, it redirects back to list_students.jsp with an error message.

Next, the script connects to the student_management MySQL database using JDBC, retrieves the student's record with a SELECT * FROM students WHERE id = ? query, and fills the form fields with existing values. The student code field is read-only, while the name, email, and major fields can be edited.

If an error or invalid ID occurs, a red error box is displayed at the top of the page. The form then submits the updated information via POST to process_edit.jsp for processing and saving changes.

Overall, edit_student.jsp provides an interface for updating existing student details, ensuring proper validation and safe database access.



When the Edit Student button is clicked, the browser navigates to edit_student.jsp?id=.... The page loads the selected student's information from the database and displays it in a pre-filled form.

At the top, you can see the student's details such as Student Code, Full Name, Email, and Major. The Student Code field is marked as *read-only*, meaning it cannot be modified. The other fields are editable, allowing the user to update the student's information easily.

The layout is clean and centered, with labeled input boxes and two buttons — 💾 Update (to save changes) and Cancel (to return to the list). This confirms that the form correctly retrieves and displays the student's existing data for editing.

3.2: Process Update

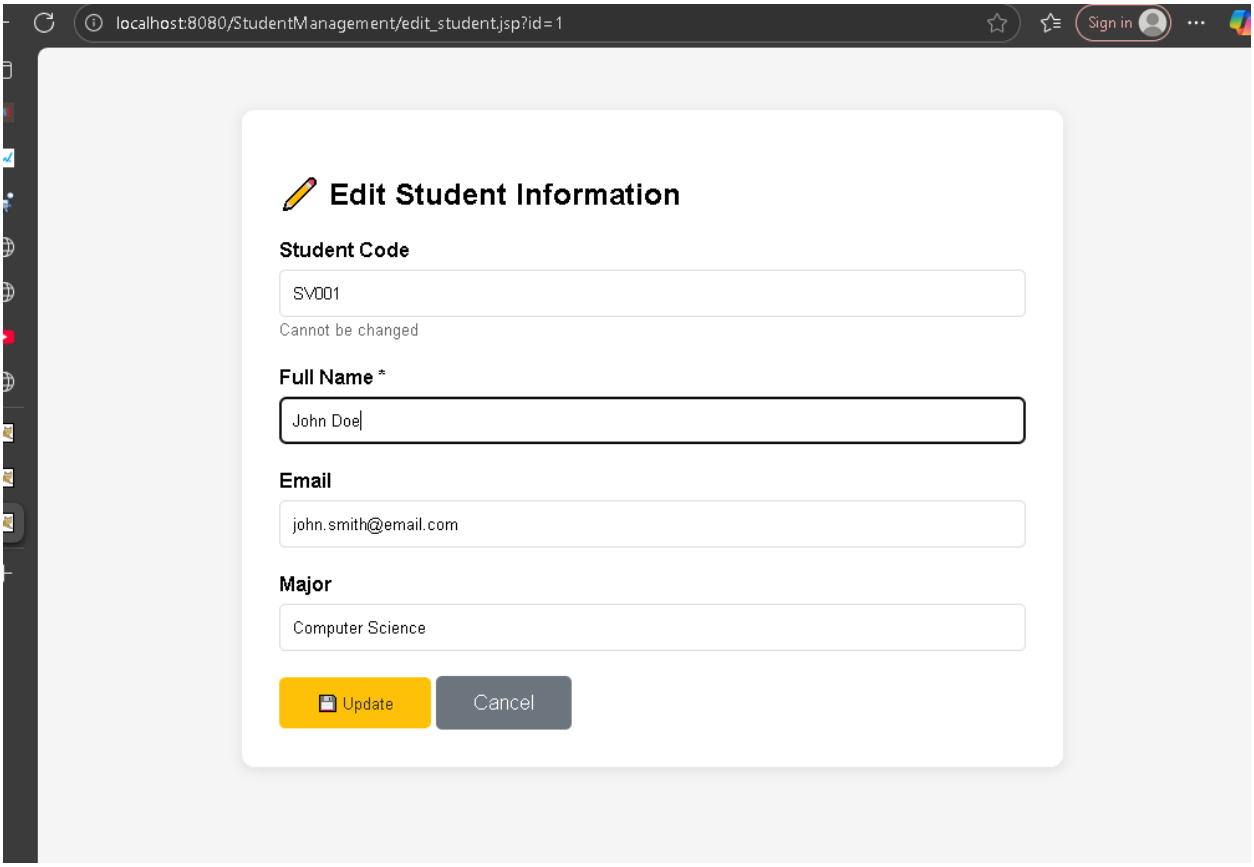
When the user submits the Edit Student form, this JSP page processes the update request. It retrieves the input values (id, full_name, email, major) from the form and validates them — ensuring that the ID and name are not empty.

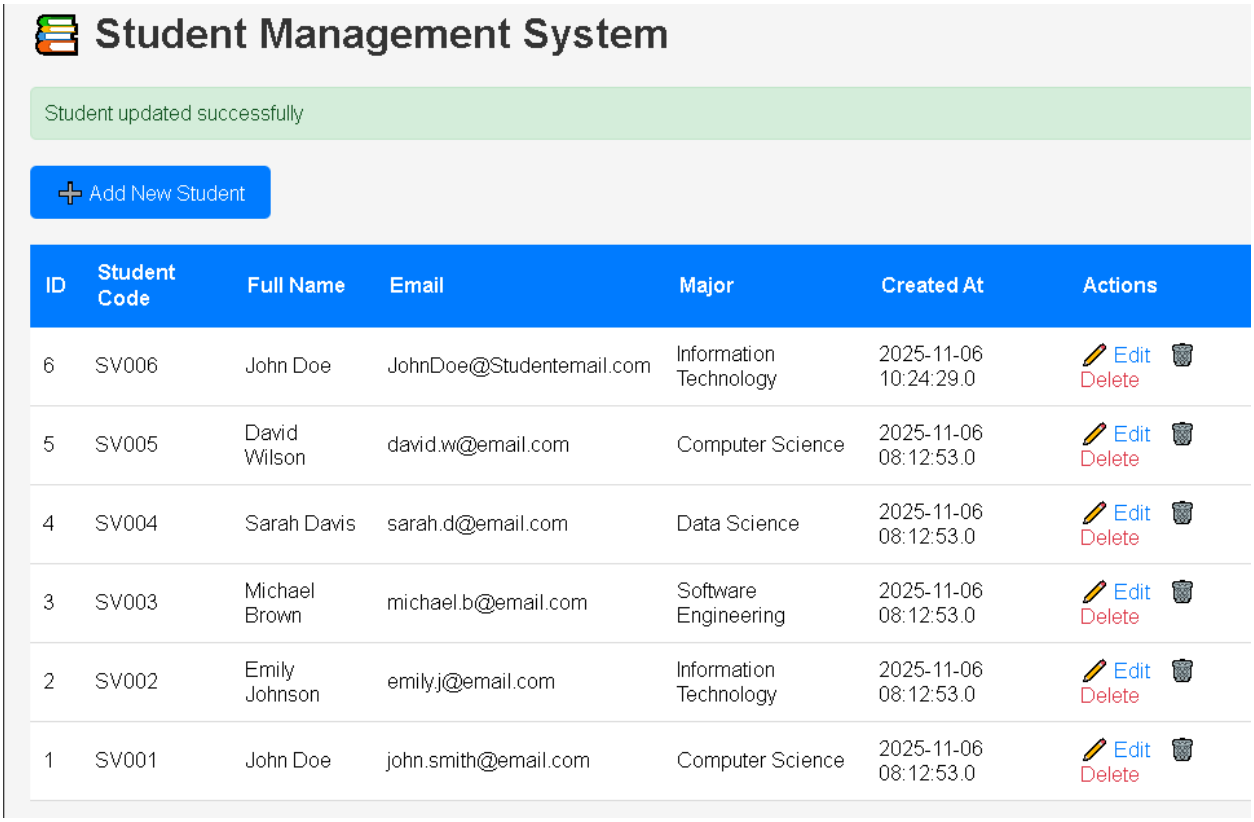
The code then connects to the student_management MySQL database using the JDBC driver and executes an SQL UPDATE query to modify the selected student's record. If the update is successful, the user is redirected to list_students.jsp with a success message. Otherwise, an error message is shown on the edit page.

All database resources are properly closed in the finally block to prevent memory leaks. This page ensures that only valid updates are applied and provides clear feedback to the user after submission.

Case

Change name from "John Smith" to "John Doe"

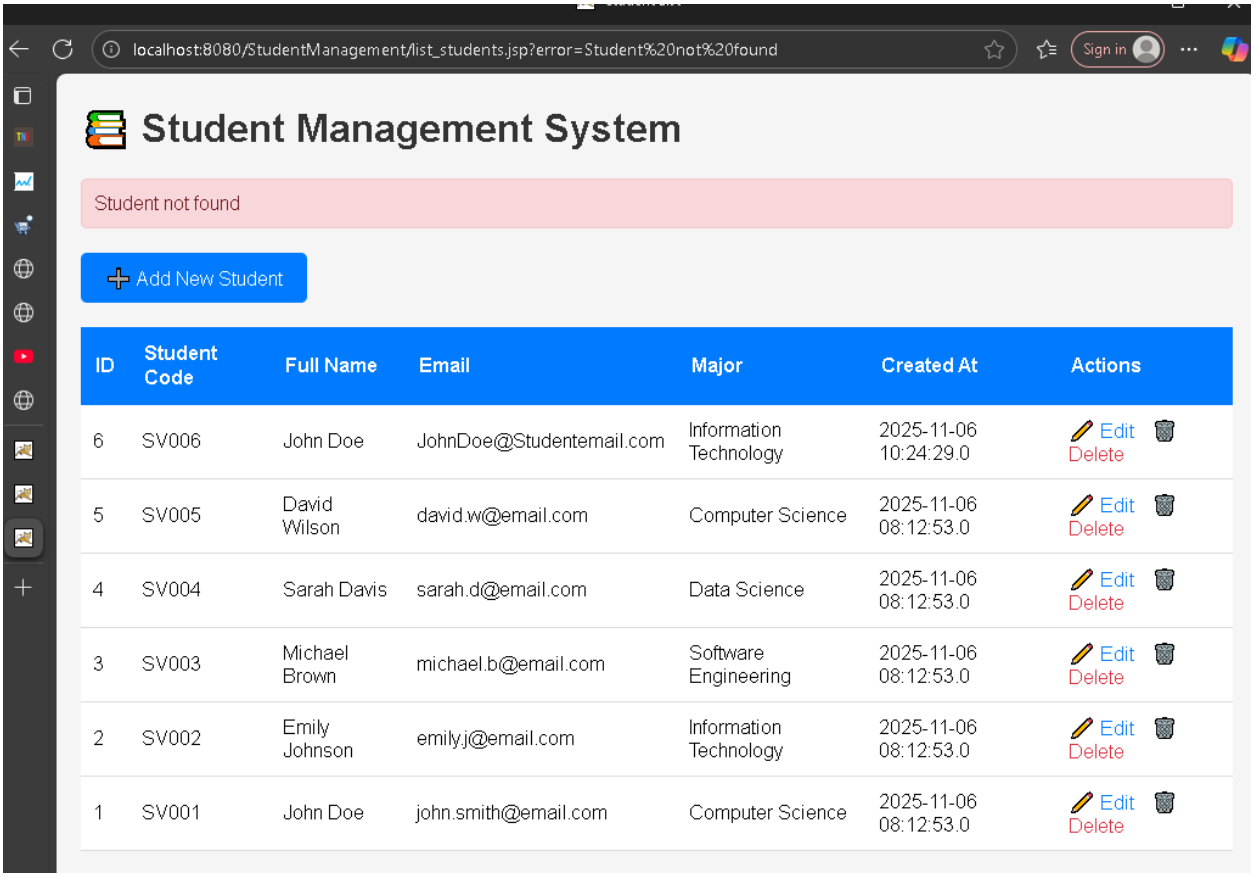




When changing the name from “John Smith” to “John Doe” and clicking Update, the system

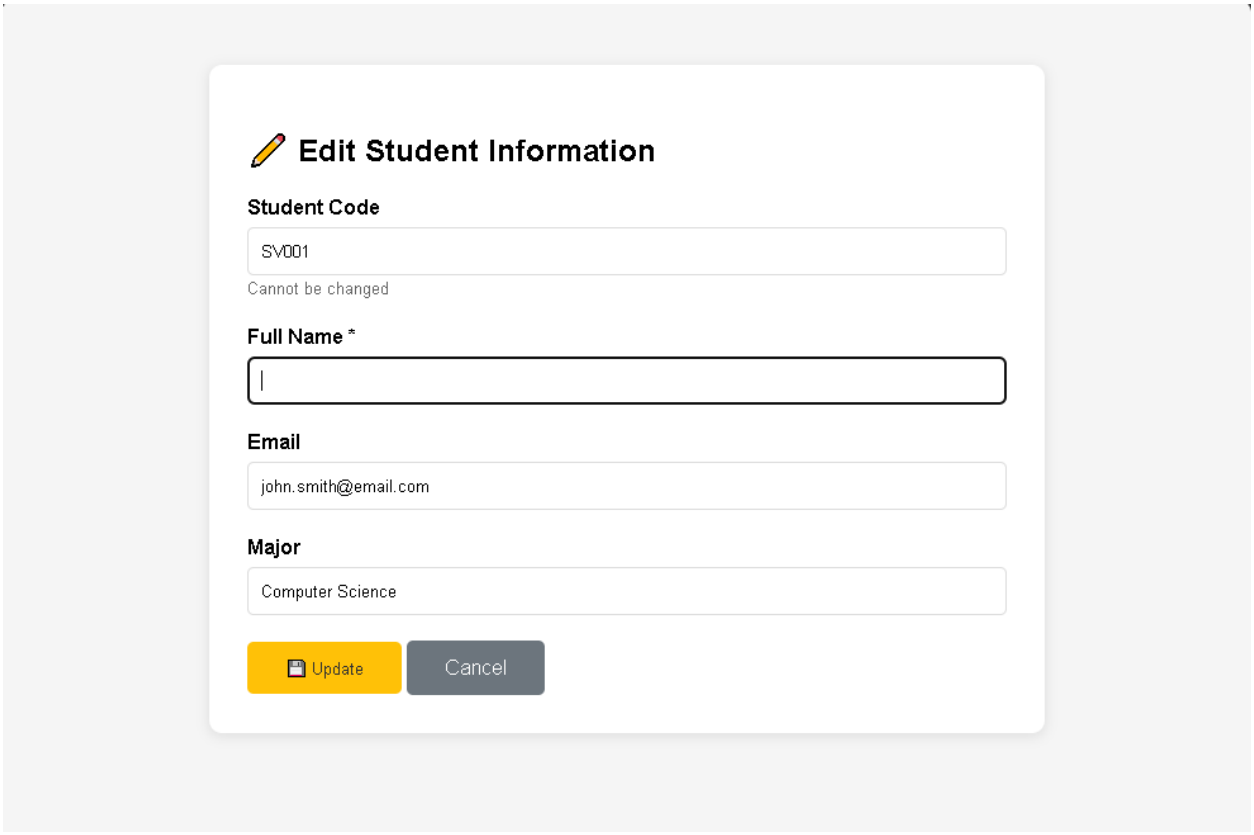
redirects to the student list page.
The success message “Student updated successfully” appears in a green box, and the list now shows John Doe instead of the old name.

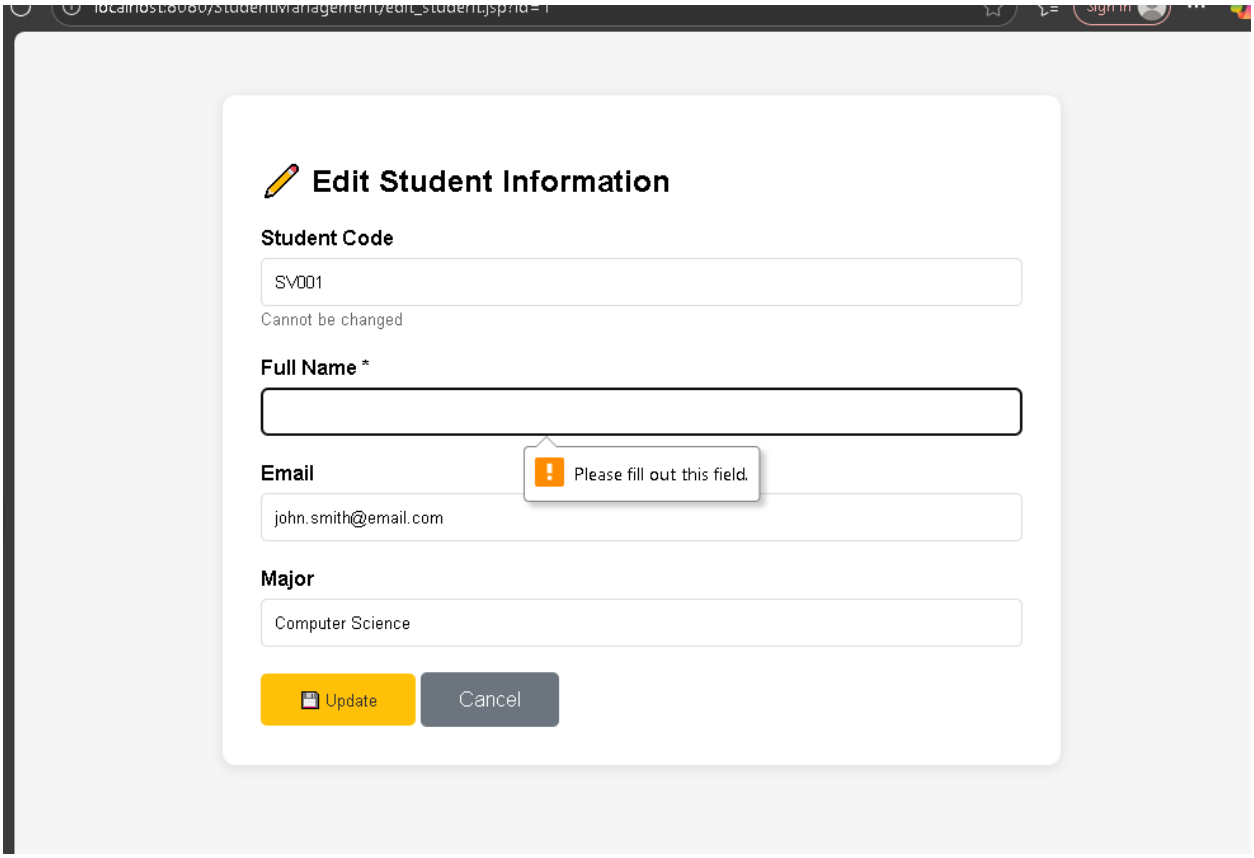
Access edit page with id=999



When trying to access the edit page with a non-existent ID (e.g., id=999), the system redirects back to the list page.
An error message “Student not found” appears in a red box at the top, and no data is displayed.

Submit with blank name


Edit Student Information
Student Code
SV001
Cannot be changed
Full Name *
Email
john.smith@email.com
Major
Computer Science
Update
Cancel


Edit Student Information
Student Code
SV001
Cannot be changed
Full Name *
Please fill out this field.
Email
john.smith@email.com
Major
Computer Science
Update
Cancel

When submitting the edit form with the **Full Name** field left blank, the system prevents the update.

The page displays an error message **“Please fill out this field”**, indicating that the name field must be filled before saving.

4.1: Implement Delete

When the user clicks “Delete”, the page retrieves the student’s id from the request and checks if it’s valid.
Then, it connects to the student_management database and executes:

DELETE FROM students WHERE id = ?

If the student exists, it redirects to list_students.jsp with a success message.
If no rows are affected, it shows “Student not found”.
The code also handles errors:

- Foreign key constraint → shows “Cannot delete: has related records”
- SQL or connection error → shows “Database error”

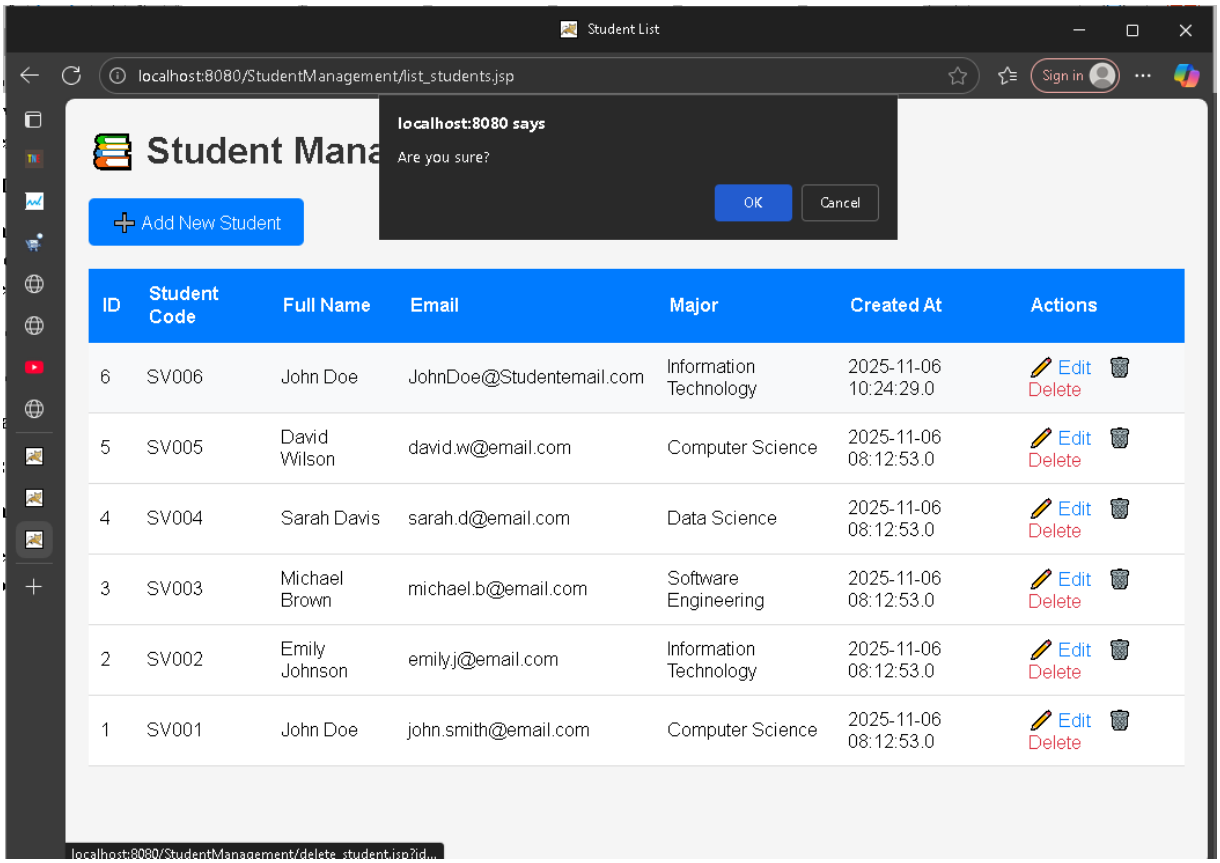
Finally, all database resources are closed properly to prevent leaks.

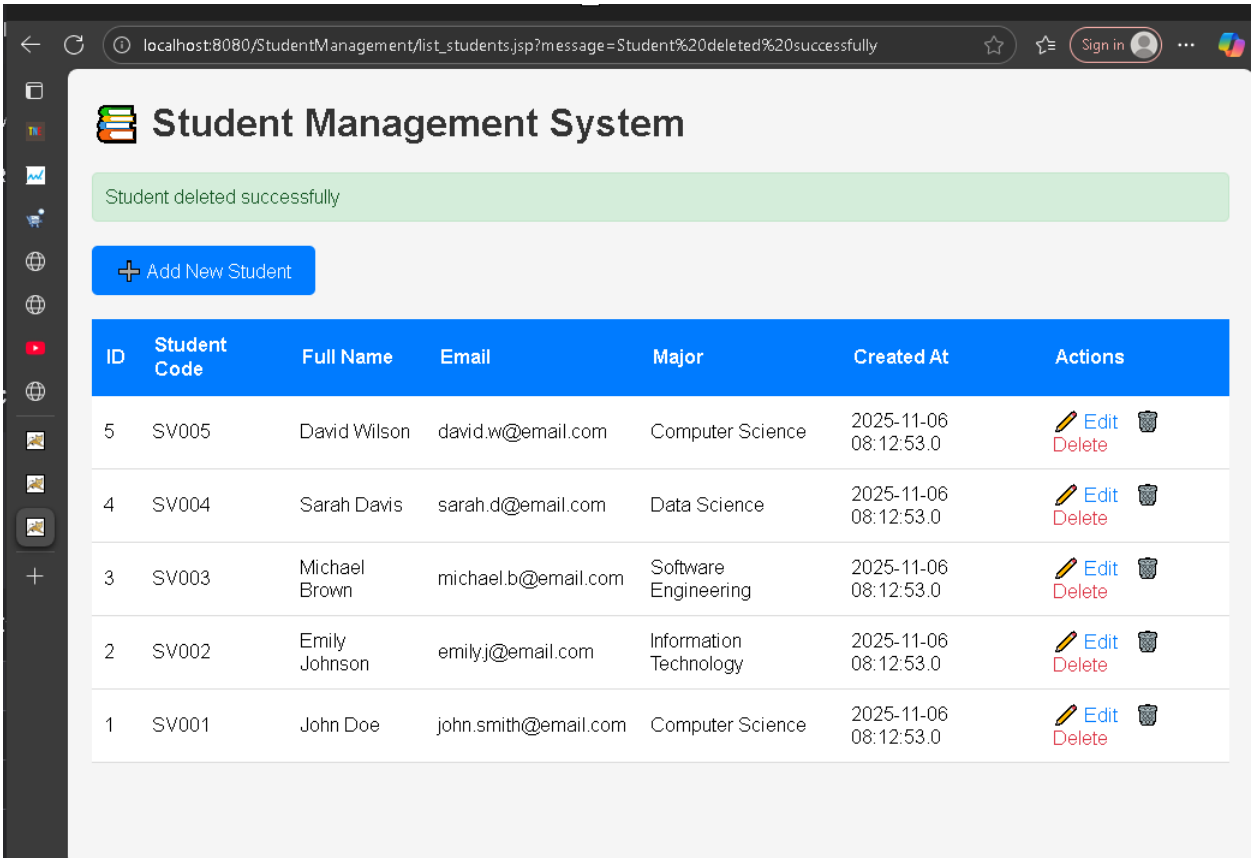
4.2: DELETE OPERATION

Enhance list_students.jsp to include a Delete feature for managing student records.

The table now allows users to easily delete students with confirmation and visual feedback through success or error messages.

Click “Delete” on *Test Student* → Confirm in dialog.
The student was successfully deleted and no longer appears in the table. A green success notification is shown at the top of the page.


Student List
localhost:8080/StudentManagement/list_students.jsp
Sign in
Student Mana
localhost:8080 says
Are you sure?
OK
Cancel
Add New Student
ID
Student Code
Full Name
Email
Major
Created At
Actions
6 SV006 John Doe JohnDoe@Studentemail.com Information Technology 2025-11-06 10:24:29.0 Edit Delete
5 SV005 David Wilson david.w@email.com Computer Science 2025-11-06 08:12:53.0 Edit Delete
4 SV004 Sarah Davis sarah.d@email.com Data Science 2025-11-06 08:12:53.0 Edit Delete
3 SV003 Michael Brown michael.b@email.com Software Engineering 2025-11-06 08:12:53.0 Edit Delete
2 SV002 Emily Johnson emily.j@email.com Information Technology 2025-11-06 08:12:53.0 Edit Delete
1 SV001 John Doe john.smith@email.com Computer Science 2025-11-06 08:12:53.0 Edit Delete


localhost:8080/StudentManagement/list_students.jsp?message=Student%20deleted%20successfully
Sign in
Student Management System
Student deleted successfully
Add New Student
ID
Student Code
Full Name
Email
Major
Created At
Actions
5 SV005 David Wilson david.w@email.com Computer Science 2025-11-06 08:12:53.0 Edit Delete
4 SV004 Sarah Davis sarah.d@email.com Data Science 2025-11-06 08:12:53.0 Edit Delete
3 SV003 Michael Brown michael.b@email.com Software Engineering 2025-11-06 08:12:53.0 Edit Delete
2 SV002 Emily Johnson emily.j@email.com Information Technology 2025-11-06 08:12:53.0 Edit Delete
1 SV001 John Doe john.smith@email.com Computer Science 2025-11-06 08:12:53.0 Edit Delete

Click “Delete” on *Test Student* → Click **Cancel** in the confirmation dialog.
The dialog closed, no deletion occurred, and the student record stayed in the table