Java Swing-Based Student Management System (SMS)

# 1. Problem Statement

In many educational institutions, managing student exams, tracking performance, and handling student registration is often done manually or using outdated systems. This leads to errors, inefficiencies, and poor user experience. The need arises for a simple, GUI-based Student Management System where administrators can register students and students can log in, take exams, and view results with ease.

# 2. Solution Overview

This project is a Java-based GUI application that offers an interactive Student Management System. It separates admin and student functionalities. The Admin can register students and view all results. Students can log in with their credentials, view available courses, take exams based on preloaded Java questions, and view their results.

# 3. Technologies Used

- Java SE  
- Java Swing (GUI)  
- Object-Oriented Programming (OOP)

# 4. Features

Admin Features:  
- Register students (Name and ID)  
- View all students' results  
  
Student Features:  
- Log in using name and ID  
- View available courses  
- Take exams (multiple-choice questions)  
- View their own results

# 5. Architecture Diagram

+---------------------+  
| Admin Panel |  
|---------------------|  
| - Register Student |  
| - View All Results |  
+---------------------+  
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+---------------------+ +---------------------+  
| Student Registry | <------> | Result Store |  
+---------------------+ +---------------------+  
 ^ ^  
 | |  
+---------------------+ +---------------------+  
| Student Panel | --------> | Question Bank |  
+---------------------+ +---------------------+

# 6. UML Class Diagram

+------------------+  
| Main |  
+------------------+  
| +main(String[]) |  
+------------------+  
  
+--------------------+  
| WelcomeScreen |  
+--------------------+  
| +WelcomeScreen() |  
+--------------------+  
  
+------------------+ +------------------+  
| AdminPanel | | StudentPanel |  
+------------------+ +------------------+  
| +AdminPanel() | | +StudentPanel() |  
+------------------+ +------------------+  
  
+---------------------+ +---------------------+  
| StudentRegistry | | Result |  
+---------------------+ +---------------------+  
| -students: Map<> | | -resultData: Map<> |  
| +registerStudent() | | +storeResult() |  
| +isValidStudent() | | +viewResultGUI() |  
+---------------------+ +---------------------+  
  
+------------------+ +---------------------+  
| Course | | Question |  
+------------------+ +---------------------+  
| +showCourses() | | -questionBank: Map<>|  
+------------------+ +---------------------+

# 7. Actor Diagram

+--------+ +------------+  
| Admin | | Student |  
+--------+ +------------+  
 | |  
 v v  
+-----------------------------+  
| Student Management GUI |  
+-----------------------------+

# 8. Use Case Diagram

Actor: Admin  
Use Cases:  
 - Register Student  
 - View All Results  
  
Actor: Student  
Use Cases:  
 - Login  
 - View Courses  
 - Take Exam  
 - View Result