# Project Report: Student Record Management System (JavaFX)

## 1. Introduction

The Student Record Management System is a desktop-based application built using JavaFX. It demonstrates the use of a custom linked list data structure to store, manage, and manipulate student records. This project also incorporates a simple login system for security.

## 2. Objectives

- To design and develop a simple student management system.  
- To implement core data structure concepts (Custom Linked List).  
- To provide functionalities like Add, Update, Delete, View, and Save student records.  
- To create a GUI-based desktop application using JavaFX.

## 3. Features

- Login system with username and password authentication.  
- Add new student records.  
- Delete existing student records using roll number.  
- Update student details.  
- View all stored student records.  
- Save student records to a text file.

## 4. System Design

The project consists of the following major components:  
1. Student Class – Represents student details (Name, Roll No, Course).  
2. Node Class – Represents each node in the custom linked list.  
3. CustomLinkedList Class – Implements operations like Add, Delete, Update, View, and Save.  
4. StudentRecordApp Class – Contains the JavaFX-based GUI and integrates login and student operations.

## 5. Technologies Used

- Programming Language: Java  
- Framework: JavaFX  
- Data Structure: Custom Linked List  
- File Handling: Text File (students.txt)

## 6. Code Explanation

The system is implemented with JavaFX for the frontend and a custom linked list for backend data storage. The login system is hardcoded with username 'admin' and password '1234'. After successful login, users can perform student management operations. All data is handled dynamically using a linked list and can be saved to a file.

## 7. Conclusion

This project successfully demonstrates the use of JavaFX for GUI development and custom data structures in Java. It provides a practical implementation of linked lists in real-world applications such as student record management. The system can be further enhanced by integrating databases and advanced authentication mechanisms.