PURBANCHAL UNIVERSITY
HIMALAYAN WHITEHOUSE INTERNATIONAL COLLEGE

PUTALISADAK, KATHMANDU

A Final Project Report

On

"Student Record Management System"

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Submitted To:

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CERTIFICATE OF APPROVAL

The Project entitled **"Student Record Management System"**, submitted by Ishwor Pokharel, Aayuscal Sedhai and Dharmaraj Patherkat in partial fulfillment of the requirements for the degree of "Bachelor of Information and Technology" has been accepted as a bona fide record of work carried out by them in the department.

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ACKNOWLEDGEMENT

ABSTRACT

The "Student Record Management System" is a comprehensive software application developed using Java programming language in Apache NetBeans, with SQL Connector for database integration. The system is designed exclusively for administrative use, offering a secure and efficient platform for managing student records. It features a user-friendly interface with various functional modules, including user authentication through a login and signup mechanism. Upon successful login, administrators can access the main menu, which offers five primary operations: New Registration, Record Management (Display, Update, Search, Delete), Fee Structure, Result Display, and Logout. The New Registration module allows the entry and storage of detailed student information in the database. The Record Management module provides functionalities to search, update, or delete student records seamlessly. The Fee Structure module tracks student fee payments and enables admit card generation for students with cleared dues. The Result module displays student academic performance in different courses. This project ensures data security, efficient record management, and an organized workflow for educational institutions. By using Java and database technologies, it provides a reliable and scalable solution for handling student information and administrative processes.

Keywords: Student Record Management System, Java, Apache NetBeans, SQL Connector, Database Integration, User Authentication, Registration, Record Management, Fee Structure, Result Display, Data Security, Scalable Solution.

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LIST OF ABBREVIATION

SRMS	Student Record Management System
IDE	Integrated Development Environment
SQL	Structured Query Language
UI	User Interface
JDK	Java Development Kit
OOP	Object Oriented Programming
DBMS	Database Management System
SDLC	System Development Life Cycle
MVC	Model-View-Controller
GUI	Graphical User Interface
DFD	Data Flow Diagram
ER	Entity-Relationship

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

1.1 Introduction

The "Student Record Management System (SRMS)" is a Java-based software application developed in Apache NetBeans Integrated Development Environment (IDE) with Structured Query Language (SQL) database integration using SQL Connector. The system is designed exclusively for administrative operations, offering a robust platform for managing student records efficiently and securely.

The primary goal of this project is to simplify the management of student records by providing a secure and organized system. It includes a login and registration feature for the administrator to ensure that only authorized person can access the system. Upon successful login, the administrator will be directed to a main menu where they can perform various operations related to student records.

This project aims to combine programming knowledge and problem-solving skills to create a useful tool for educational institutions.

1.2 Objectives

The project is with the main aim of meeting the following objectives:

- To develop a secure login and registration system for the administrator
- To enable efficient management of student records, including adding, viewing, editing, searching, and deleting.

1.3 Scope

The "Student Record Management System (SRMS)" is designed to streamline and automate the administrative processes of educational institutions. The primary focus is to provide an efficient and secure platform for managing student information, thereby reducing the reliance on manual record-keeping methods. The scope of this project includes the following key areas:

1. User Authentication: There is secure login and signup functionality to ensure that only authorized administrators can access the system.

2. Student Registration: There is efficient entry and storage of student details, including

personal, academic, and contact information in the database.

3. Record Management: Search, display, update, and delete student records to maintain accurate and up-to-date information.

4. Fee Structure Management: Tracking student fee payment status. Generating admit cards for students who have cleared their dues.

5. Result Management: Displaying student results for different courses, enabling administrators to manage academic performance data.

6. Data Security: Integration with SQL database to ensure secure data storage and retrieval.

7. Efficient User Interface: Developed using the Apache NetBeans IDE with a palette-based design for multiple frames, providing an intuitive user interface (UI).

By integrating Java, SQL Connector, and JDK, the SRMS provides a comprehensive solution for educational institutions to efficiently manage student records, maintain data security, and enhance administrative productivity.

1.4 Problem Statement

Educational institutions face challenges in managing large volumes of student data, including registration details, academic records, fee payments, and result tracking. Manual record-keeping methods are time-consuming, error-prone, and inefficient, leading to data inconsistencies and security risks. Our project "Student Record Management System (SRMS)" addresses these issues by providing a secure and automated solution for efficient student information management, ensuring accurate record maintenance and streamlined administrative operations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Research based on similar project

The development of a Student Record Management System (SRMS) aligns with ongoing advancements in educational management software. Numerous research studies and projects have highlighted the significance of automating administrative functions in educational institutions. This section reviews similar projects to understand their methodologies, features, and contributions.

Gupta and Sharma (2020) developed a web-based application for student information management, which emphasized data security and accessibility. The project utilized Java and MySQL for backend operations, similar to the SRMS presented in this report. Their work demonstrated improved efficiency in data handling and retrieval processes in educational environments. [1]

Khan et al. (2019) proposed a desktop-based student management system integrating SQL for secure data storage. Their system offered modules for student registration, fee management, and result processing, which are also key features of the SRMS in this project. They highlighted how the automation of record management tasks minimizes administrative errors and reduces processing time. [2]

Patel and Desai (2021) explored the benefits of Java-based applications for educational institutions, emphasizing the platform's compatibility, security, and scalability. Their research reinforced the suitability of using Java programming and database integration for managing student information effectively. [3]

These research works collectively validate the relevance of SRMS as an effective solution for educational record management. By integrating Java, SQL Connector, and the NetBeans IDE, this project builds upon previous research while contributing a scalable and secure platform for administrative operations.

2.2 Related Theory

The "Student Record Management System (SRMS)" is based on several fundamental concepts and theories from software development, database management, and object-oriented programming (OOP). These theories form the foundation for designing, implementing, and managing the functionalities of the project.

1. Object-Oriented Programming (OOP): Our project is developed using Java, which follows the principles of OOP. OOP helps in organizing the code by using classes and objects. Important concepts like encapsulation (hiding data inside classes), inheritance (reusing code from parent classes), and polymorphism (using methods in different ways) make the system more efficient, secure, and easy to maintain.

2. Database Management System (DBMS): The project uses SQL as a database to store and manage student information, such as registration details, fee records, and results. The use of SQL ensures that data can be easily saved, retrieved, updated, and deleted. It also helps in keeping data secure and organized.

3. The system follows the MVC architecture, which separates the program into three parts. The Model manages data and database operations, the View handles the design and user interface, and the Controller connects the two by processing user actions. This makes the project well-structured and easier to maintain.

4. Software Development Life Cycle (SDLC): The system was developed following the agile model of SDLC, involving phases such as planning, designing, coding, testing, and deployment. This approach ensured that the system was continuously improved based on feedback and testing outcomes.

5. Graphical User Interface (GUI) Design Principles: The use of palette-based frame design in NetBeans ensured that the system provides a user-friendly and intuitive interface for administrators. Clear navigation, error handling, and input validation were prioritized during development.

By incorporating these theoretical principles, the SRMS ensures a robust, scalable, and efficient solution for educational institutions, enabling streamlined administrative operations and secure data management.

CHAPTER THREE: SYSTEM ANALYSIS

The "Student Record Management System (SRMS)" was developed to address the challenges educational institutions face in managing student data manually. Our system offers secure and efficient ways to handle student registration, record management, fee payment tracking, and result display. The development process involved analyzing the requirements for a centralized system that ensures accurate data management and reduces administrative workload.

3.1 Requirement Analysis

Requirement analysis is a crucial part of system development, as it helps in understanding the needs of the system and its users. For the "Student Record Management System (SRMS)," the requirements are categorized as user, functional, and non-functional requirements.

i. **User Requirements**

The system is exclusively for administrators, who are responsible for managing student records. The system must allow secure login and signup to prevent unauthorized access. It should be simple and user-friendly, minimizing the need for technical expertise.

ii. **Functional Requirements**

- Login/Signup: Admins can securely log in using valid credentials or sign up if they are new users.
- New Registration: Admins can enter and save student information such as registration number, personal details, and academic information.
- Record Management: The system allows admins to search, display, update, and delete student records.
- Fee Management: Admins can track fee payment status and generate admit cards for students who have cleared their dues.
- Result Display: Admins can view and manage students' academic results across different courses.
- Logout: Admins can securely exit the system to terminate access.

iii. **Non-Functional Requirements**

- Data Security: The system must securely store and retrieve data using SQL database integration.

- Performance: The system should handle operations efficiently without delays.

- Scalability: The system must support an increasing number of student records as the institution grows.

- Usability: The interface must be simple and intuitive, developed using Apache NetBeans palette for better design.

3.2 Feasibility Study

A feasibility study helps determine whether the system is technically, operationally, and economically viable. Below are the key feasibility factors considered for SRMS:

i.   **Technical Feasibility**

- The project was implemented using Java programming language in Apache NetBeans IDE, integrated with SQL Connector for database management and JDK for runtime support.

- These technologies are open-source, well-documented, and compatible with educational systems, making development and maintenance technically feasible.

ii.   **Operational Feasibility**

- The system simplifies administrative tasks like student registration, record updates, fee tracking, and result display.

- It reduces human errors and ensures accurate data management.

- The user-friendly GUI allows admins to navigate the system with ease, improving operational efficiency.

iii.   **Economic Feasibility**

- Since open-source tools like NetBeans and SQL Connector were used, development costs were minimal.

- The system saves time and resources by reducing manual administrative efforts.

- It provides long-term cost savings by ensuring better record management and data security.

iv. **Schedule Feasibility**

The project was developed within the planned timeframe using an iterative development model. Each phase, such as requirement gathering, system design, coding, testing, and deployment, was completed as scheduled. But if we get more times, we can make this project more advanced. Below is a Gantt chart showing our project timeline:

Starting Date: 2024/10/10   Ending Date: 2025/02/29

	WEEK														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Research and Literature review	■														
Project proposal preparation		■	■												
System Design			■	■	■										
Environment Setup				■	■	■									
Implementation of Login & Registration system					■	■	■	■	■	■					
Implementation of core features							■	■	■	■	■				
Testing and debugging										■	■	■			
Documentation and user guide												■	■	■	
Project complete															■

Figure 1: Gantt Chart

CHAPTER FOUR: SYSTEM DESIGN

The System Design phase focuses on creating the architecture and structure of the Student Record Management System (SRMS). It defines how different components of the system interact and how data flows between them. A well-structured design ensures that the system functions efficiently, securely, and is easy to maintain.

4.1 SDLC Model

The Software Development Life Cycle (SDLC) is a step-by-step process used to plan, develop, test, and maintain software. It ensures that the software is high quality, meets user needs, and is delivered on time.

In our **Student Record Management System (SRMS)** project, we adopted the Agile Model for development. The implementation followed these steps:

1. **Sprint Planning:** We identified the core functionalities like login/signup, student management, fee structure, and result management.
2. **Iteration 1:** We developed and tested the Login & Signup module.
3. **Iteration 2:** Implemented Student Record Management, including adding, updating, and deleting student details.
4. **Iteration 3:** Designed and integrated Fee Structure Management.
5. **Iteration 4:** Developed Result Management and implemented security features.
6. **Final Testing & Deployment:** Performed debugging, testing, and final deployment.
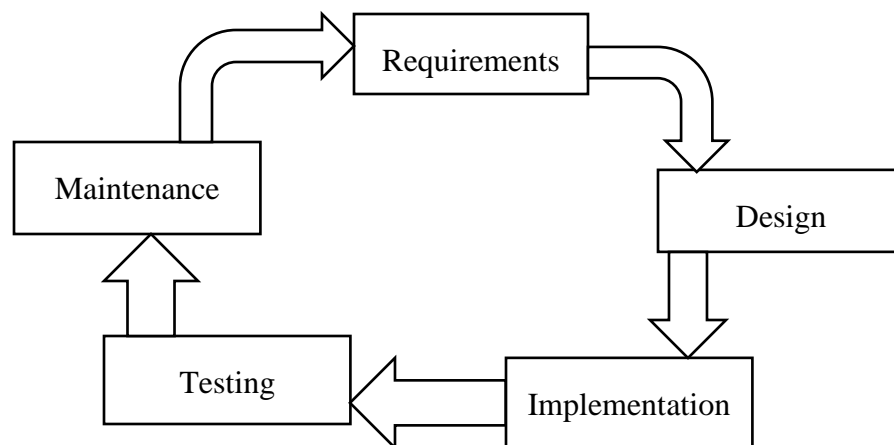
Figure 2: Agile SDLC Model

4.2 DFD

DFD stands for Data Flow Diagram. It's a graphical representation that illustrates how data flows through a system or process. DFDs consist of processes, data stores, data flows, and external entities.
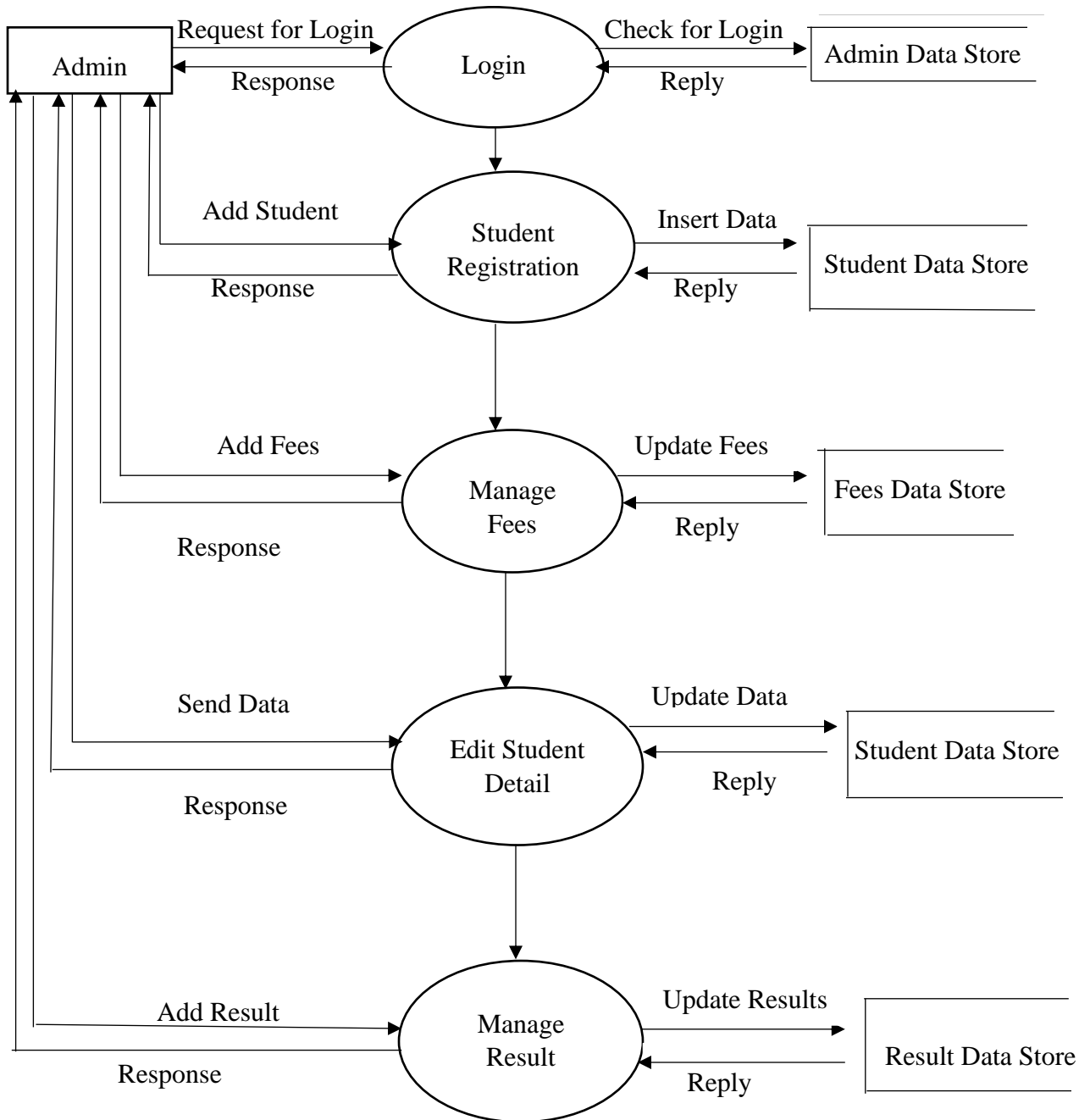

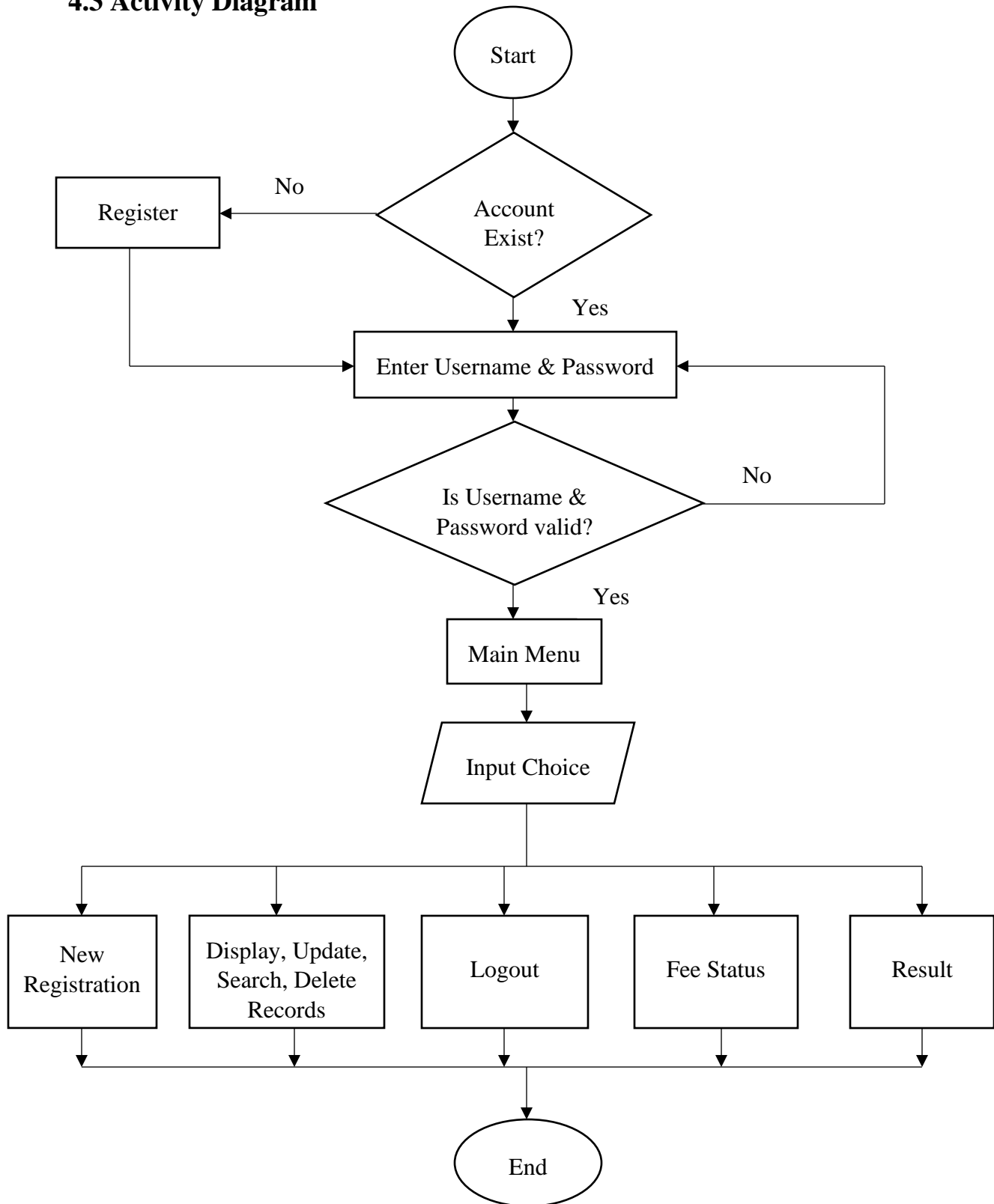*Figure 3: One level DFD of SRMS*

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4.3 Activity Diagram

Figure 4: Activity Diagram

4.4 Use Case Diagram

The use case diagram is usually referred to as behavior diagram used to describe the actions of all user in a system. All user describe in use case are actors and the functionality as action of system. The Use case diagram is a collection of diagram and text together that make action on goal of a process. In Student Record Management System there is an only one actor Admin can do all the activities to run the system.
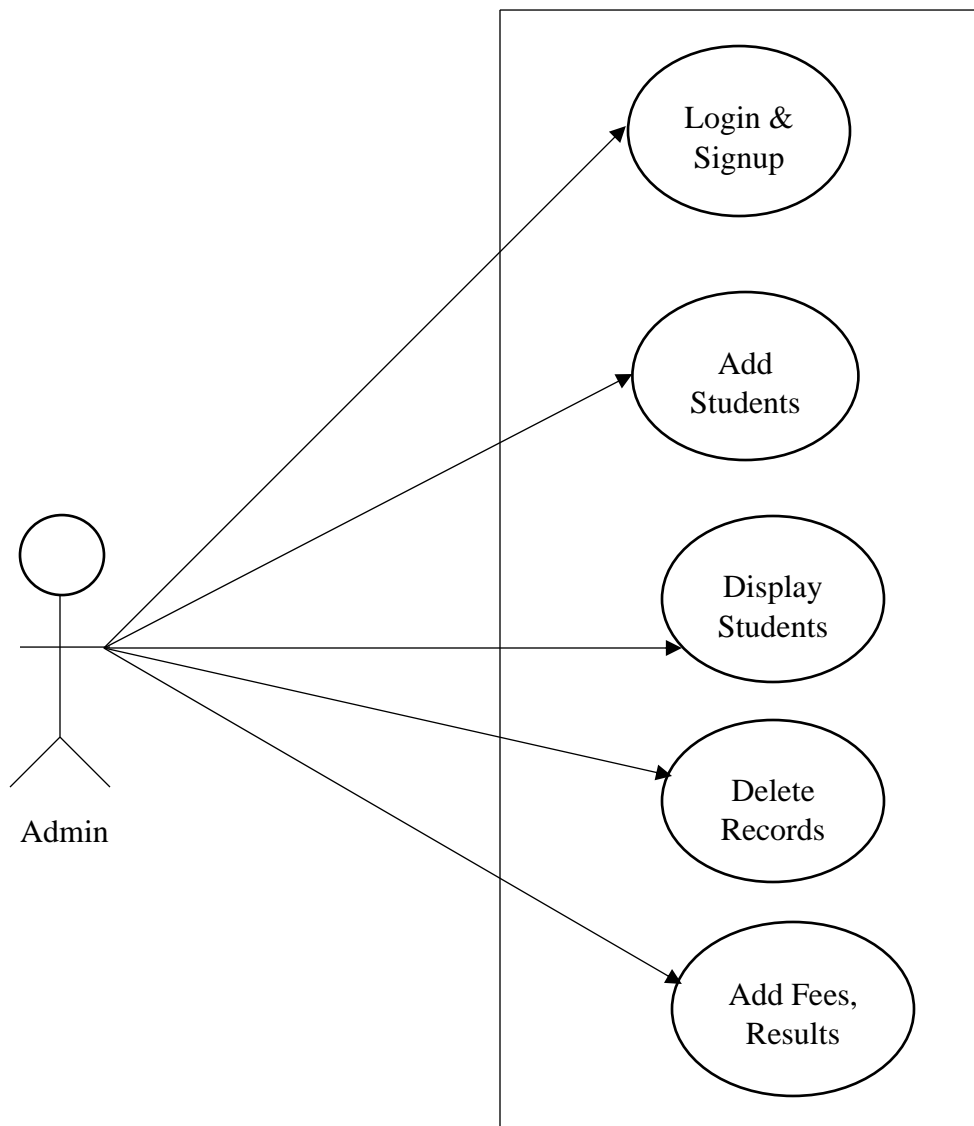
Figure 5: Use Case Diagram

4.5 ER Diagram

An Entity-Relationship (ER) Diagram is a visual representation of a database structure that shows the relationships between entities. Entities are objects or concepts (like students, admin, or fees) that store data, while relationships define how these entities interact with each other.
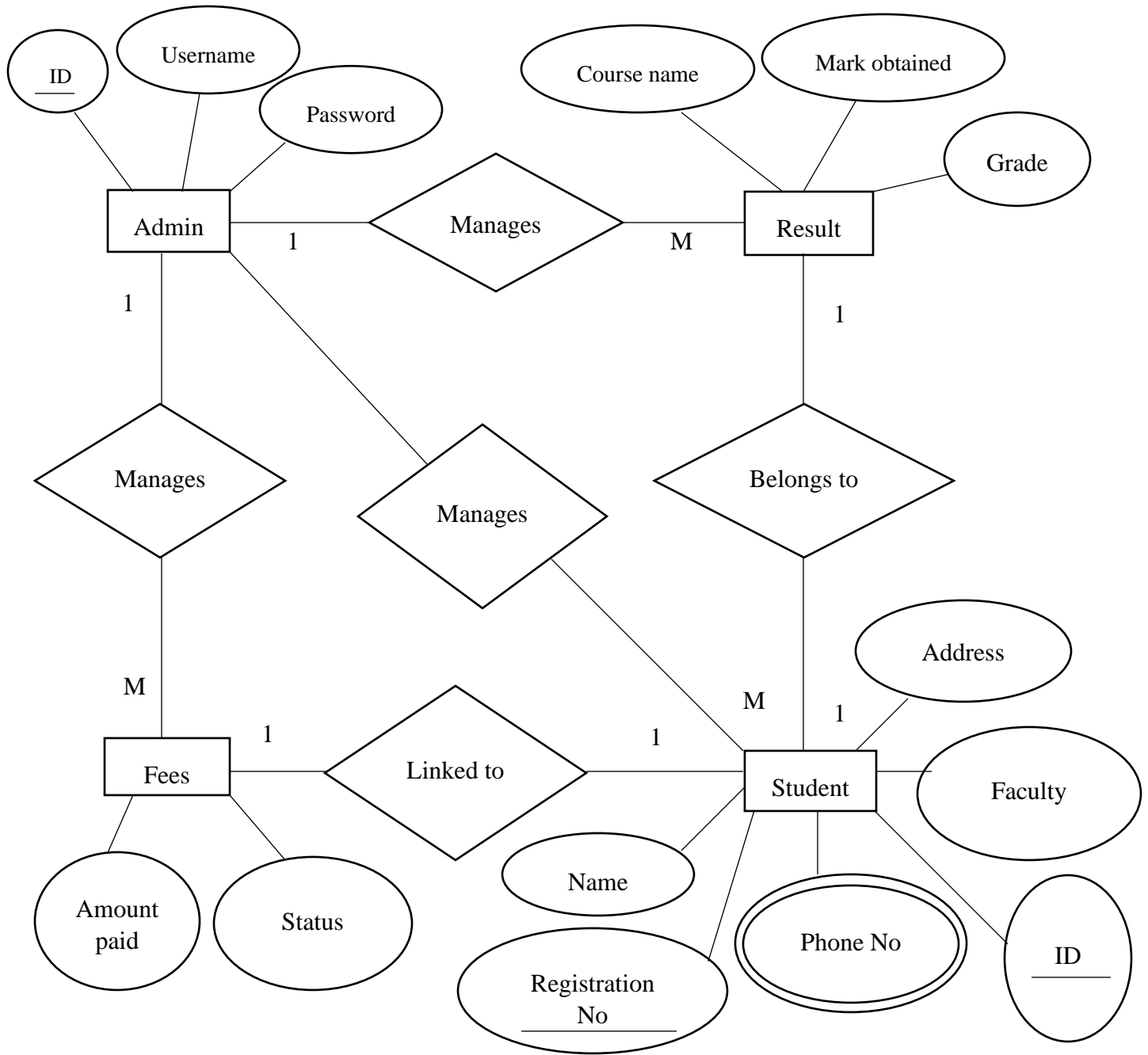

Figure 6: ER Diagram

CHAPTER FIVE
IMPLEMENTATION AND TESTING

5.1 Implementation

Implementation is the stage where the project is transformed from design to a working system. The Student Record Management System was developed using Java programming language in Apache NetBeans. SQL Connector was used to connect the system with the database.

Here is a key Implementation details of our project "Student Record Management System".

1. **User Interface:**

   In our project we designed multiple frames using the NetBeans Palette for features like Login, Registration, Record Management, Fee Structure, Result Display, and Logout. Different components such as text fields, combo boxes, and buttons were carefully aligned to create user-friendly interfaces.

2. **Database Integration:**

   We connected the system to an SQL database using the SQL Connector for seamless data operations. Created key tables such as student, fees, and results to store necessary information.

3. **Core Functionalities Implemented:**

   - Login and Signup: It secures authentication for admin access using encrypted passwords.
   - New Registration: It enables the admin to enter and store student details in the database.
   - Record Management: It allows searching, updating, and deleting student records.
   - Fee Management: It tracks student fee status and generates admit cards if fees are fully paid.
   - Result Display: It fetches and displays course results for each student.
   - Logout: Ends the session and returns to the login screen.

5.2 Testing

Testing is important to identify and fix errors before deployment. The system was tested using different techniques to ensure its reliability and accuracy.

Here are some testing details of our project:

1. **Functional Testing:**

   - It checked whether each module works correctly.
   - Verified that student data is accurately saved, updated, displayed, and deleted.
   - Ensured that only paid students can generate admit cards.

2. **Usability Testing:**

   - It evaluated the user interface for simplicity and ease of navigation.
   - It ensured that frame layouts and form fields were properly aligned.

3. **Database Testing:**

   - It ensured data consistency and integrity between the application and the database.
   - Checked whether data insertion, deletion, and updates reflected correctly in the database tables.

4. **Security Testing:**

   - It verified the security of the login system by testing password validation and restricted access to admin functionalities.

5. **Performance Testing:**

   - It verified that the system handles multiple data entries without delays or crashes.

The successful implementation and thorough testing of the SRMS ensured that the system operates efficiently, securely, and meets the objectives of the project.

CHAPTER SIX: CONCLUSION

6.1 Conclusion

The **"Student Record Management System (SRMS)"** was successfully developed using Java programming language in Apache NetBeans, with database connectivity provided by SQL Connector. The system provides an efficient platform for managing student records, including registration, record updates, fee management, and result tracking. The project aimed to replace traditional, manual methods with a computerized system to reduce time consumption and improve accuracy.

The system enables the admin to securely manage sensitive student data and offers functionalities such as generating admit cards based on fee status and displaying student results. The user interface is simple and user-friendly, making it easy for the admin to navigate through different features.

During the project, several challenges were encountered, particularly in database connectivity and designing user interfaces. These challenges were resolved through debugging and testing. Overall, the project met its objectives, and the system functions efficiently as expected.

6.2 Future Enhancement

Although the current version of SRMS fulfills its primary goals, there is room for further improvement. We can improve the system by adding features like multiple user roles for teachers and students, allowing each role specific access. The system can be connected to a cloud database for better remote access. Automated notifications for fee reminders and result updates can make the system more efficient. Developing a mobile version would improve accessibility. Adding advanced security features and optimizing performance will make the system more reliable and faster for larger educational institutions.
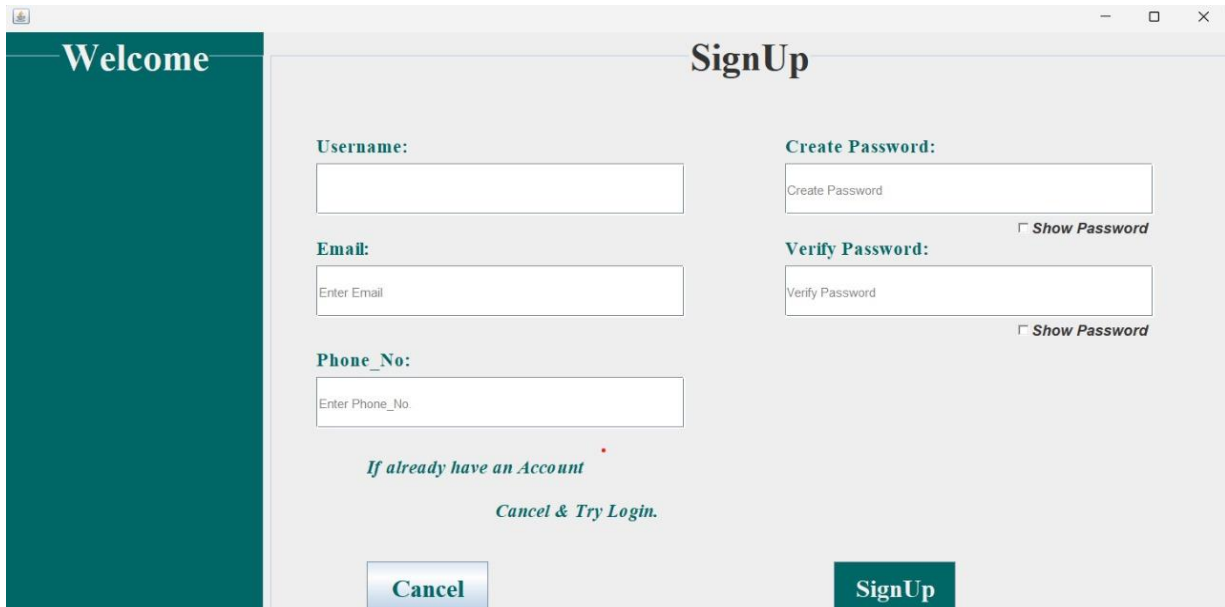
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[2] Khan, M., Ali, S., & Hussain, T. (2019). Desktop-based student management system using SQL database. International Journal of Computer Science, 15(2), 45-52.

[3] Patel, H., & Desai, M. (2021). Java-based applications in educational management: A review. Educational Technology Journal, 18(4), 78-89.
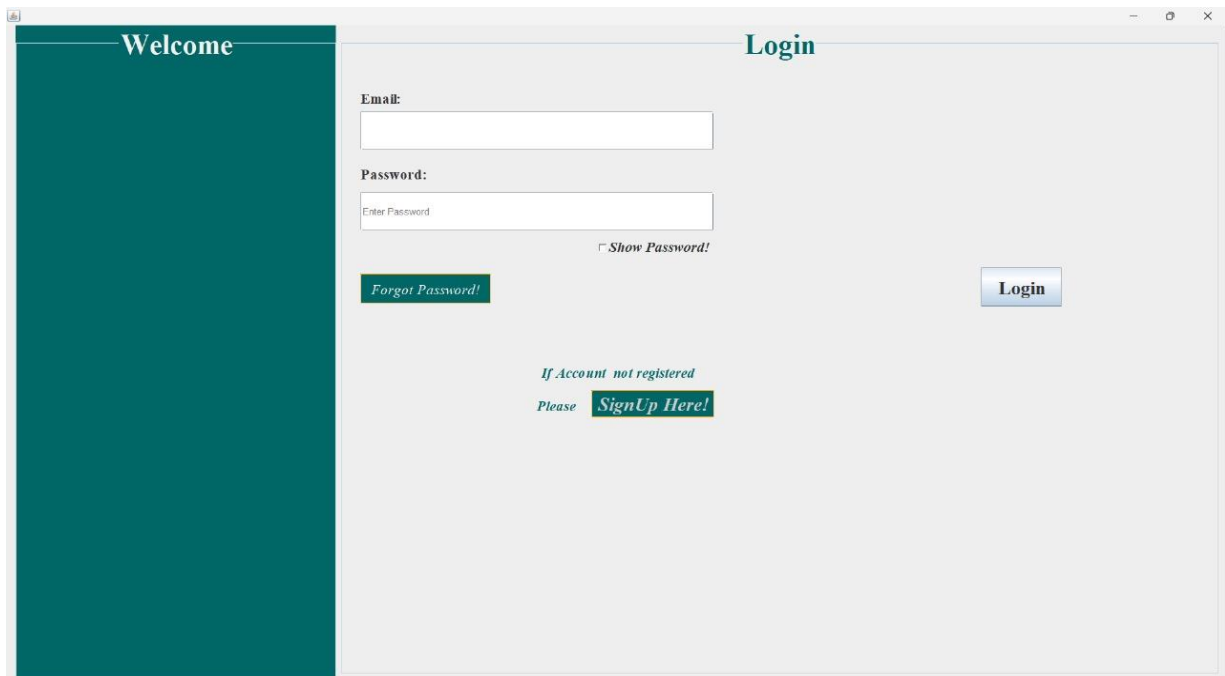
APPENDIX

Figure 7: Signup

Figure 8: Login

Figure 9: Registration

Joined Year	Faculty	Program	Registration_...	Sem/Year	Name	Roll_No	Phone_No	Father's Name	Mother's Name	Gender	Address
2025-03-01	Sc.&Tech	BIT	034-3-2-0...	I / III	Ishwor P...	1	98424013...	Ram	Sita	Male	KTM
2020-06-18	Sc.&Tech	B.Tech	034-3-2-0...	I / I	Mona Shr...	2	98442138...	Mohan	Manisha	Female	BKT
2024-01-10	Managem...	BHM		II / III	Prarthana...	3	98443166...	Badri	Shobha	Female	Jaisidewal

Figure 10: Display Records

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XYZ COLLGE
Office of The Examination Management
Kathmandu, Nepal

Sem./Year: I / I   Result of: **BIT**
                        Symbol No: **33990**

Congratulation! You are pass.

Name: **Ayuscal Sedhai**   Grade/Mark-Sheets

S.N.	Subjects	Credit Hour	Mark/Grade Obtained
1	C_Program	3	80
2	FOIT	3	80
3	Social	3	60
4	Math	3	90
5	TC	3	40
6	PROJECTS	2	70

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Grand Total: B+

Figure 11: Display Result

XYZ COLLEGE
OFFICE OF THE EXAM MANAGEMENT
KATHMANDU,NEPAL

ADMIT CARD	
name	Ayuscal Sedhai
registration_no	034-3-2-03946-2022
roll_no	33990
Faculty	Sc.&Tech
program	BIT
name_of_camp	HWHI College

S.N.	Course Code	Credit Hour	Course Title
1	BIT255CO	3	C_Program
2	BIT256HS	3	Social
3	BIT257CO	3	Math
4	BIT258CO	3	FOIT
5	BIT259HS	3	TC
6	BIT259HS	2	PROJECTS

Figure 12: Admit Card

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