UNIVERSITY OF CALCUTTA

B.SC. (HONOURS) SEMESTER – VI EXAMINATION, 2023

(UNDER CBCS)

PROJECT WORK

SUBJECT CODE: CMSA

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Staff Leave Management System

Submitted by:

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CERTIFICATE

This is to certify that the project entitled "**STAFF LEAVE MANAGEMENT SYSTEM**" has been done and submitted successfully by the undersigned students, as part of their University of Calcutta curriculum for the 3-year undergraduate degree course in B.Sc. Computer Science (Hons.), under **Ms. Anwesa Datta**, presented for the 6th semester examination of the courses CMSA-CC-13-Pr & CMSA-CC-14-Pr, held on 4th August, 2022. Furthermore, this is an original piece of work, and meets all the necessary criteria, to be accepted as a project work submitted for a Bachelor's degree program in Computer Science.

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ACKNOWLEDGEMENT

We would like to express our sincere gratitude and appreciation to the professors of the Department of Computer Science, Bethune College, and our esteemed mentor, Ms. Anwesa Datta, for their invaluable guidance and support throughout our project.

First and foremost, we extend our heartfelt thanks to the Department of Computer Science, for providing us with the necessary resources and infrastructure to undertake this project. The department's commitment to fostering an environment conducive to learning and research has been instrumental in our success.

We would also like to express our deepest gratitude to our mentor, Ms. Datta. Her expertise in the field of database management systems and her dedication to our growth and development have been truly exceptional. Her guidance and insightful feedback have significantly contributed to the quality and effectiveness of our project. We are immensely grateful for her patience, encouragement, and continuous availability to address our queries and concerns.

Additionally, we would like to acknowledge our fellow classmates and team members who worked diligently and collaboratively throughout this project. Their commitment, enthusiasm, and diverse skills have made this journey both educational and enjoyable.

Furthermore, we would like to express our thanks to the authors of the textbooks, research papers, and online resources that served as valuable references for our project. Their contributions have expanded our knowledge and understanding of database management systems and web development, enabling us to deliver a comprehensive and well-rounded project.

Lastly, we extend our appreciation to our friends and family members for their unwavering support and understanding during the course of this project. Their encouragement and belief in our abilities have been a constant source of motivation.

In conclusion, we are truly grateful to our respective Professors, for their unwavering support and guidance. This project has been a remarkable learning experience, and their contributions have played a pivotal role in our growth as aspiring professionals. We are immensely thankful for their trust, encouragement, and the opportunity to work on this project under their mentorship.

Thank you.

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ABSTRACT

In our college, the current leave management process is conducted offline, with employees submitting leave requests via letters to the clerk, who then delivers them to the Principal. This manual system involves handling 13 different types of leaves, each with its own set of rules and conditions that employees must carefully consider before applying. Additionally, officials are responsible for managing and maintaining leave accounts. However, this offline approach can be unreliable and burdensome for all participants involved.

By transitioning to an online platform, we can establish a centralized repository for all leave data, along with the specific conditions and rules associated with each type of leave. This would eliminate the need for extensive paperwork and provide easy access to important information for both employees and administrative heads.

Implementing an online college employee leave management system would bring numerous benefits. It would streamline the process, reduce errors, save time, improve accuracy, provide employee self-service functionality, and offer valuable reporting and analytics features. The transition from the current offline system to an online alternative would enhance the overall efficiency and effectiveness of leave management within our college.

INTRODUCTION

DEFINITION:

The college employee leave management system efficiently handles the process of employees in a college applying for various types of leaves, ensuring smooth communication and notification to both the principal and their respective Head of Departments (HODs). The system, moderated by the admin, facilitates the seamless management of 12 distinct types of leaves, each with its own specific conditions. Additionally, the system encompasses tasks such as adding new employees, maintaining an up-to-date holiday list, transferring roles, and approving leaves as needed. With an online system, employees would have access to a self-service portal, allowing them to view their leave balances, submit leave requests, and track the status of their applications. This self-service feature empowers employees and reduces the need for unnecessary inquiries.

The system like its existing offline counterpart would enforce predefined leave policies, ensuring compliance with the **"*Leave rules of the Whole-time teachers of the government-aided colleges.*"** It would eliminate any confusion or ambiguity regarding leave entitlements and facilitate consistent application of leave rules throughout the institution.

DOMAIN DESCRIPTION:

The existing Leave Rules for Teachers and Principals of affiliated Colleges other than Government Colleges as they appear under heading 'LEAVE' under Part-II under Chapter VIII in the Calcutta University First Statute 1979, (with upto-date amendments) shall be replaced by the "Leave Rules of the Whole-Time Teachers of Government-aided Colleges (including erstwhile Sponsored Colleges) in the State" communicated through letters under (i) Memo. 762-Edn (CS) / 2L.10/08 dated 03.12.2009, and, (ii) G.O. No.163- Edn.(CS) / 2L-10/08 dated 17.02.2011 from Dept. of Higher Education, CS branch, Govt. of West Bengal.

Leave type	Description	Duration limits	Documents required	Combined with
Casual leaves	Full pay leaves.	14 days/year. Not more than 4 at a time. Combos: 7.	None.	None. Cannot be combined with Puja holidays
Medical leaves	Half pay leaves	Total accrual: 720 days.	Medical certificate.	Except casual and quarantine
Study leaves	Full pay, allowances if abroad. For	12 months at a time max., total 24 months	Undertaking.	Except casual

	teachers with at least 3 years of service.			
Special Study leaves	Full pay. For teachers with at least 2 years of service.	Max. 12 months	Undertaking.	Except casual
Earned leaves	Full pay and allowances, granted. 7 days prior notice	60 days at a time	Medical certificate if req.	Except casual and quarantine
Quarantine leaves		20 days max	Medical certificate	Except Casual, earned, medical, commuted
Maternity leaves	Only for female teachers. Full pay.	Pregnancy: 135 days Miscarriage: 6 weeks Adoption: 135 days	Medical certificate	Except casual
On-duty Absence	Absence from duty of a teacher with the permission of the Principal of the college			Except casual
Compensatory leaves	Given on working holidays.		None.	Except casual
Special-Disability leaves	Full pay and allowances. Disability caused while performing their service	24 months total,	Medical certificate.	Except casual
Leave not due	Debited on half pay leaves	360 total, 90 at a time	Medical certificate.	
Commuted leaves	2 half pay leaves are commuted to one full pay			Except casual and quarantine

MOTIVATION:

The main motivation was to overcome the limits of the existing offline system:

- Whenever an employee applies for a new leave, they are required to manually refer to the rules and their unofficial leave account to determine if they are eligible to apply for that specific leave type. This process is not only tedious but also unreliable, leading to ambiguity and confusion.

- To approve a leave, the administrator has to then look into the leave account and eligibility of the applicant and then convey the application, data and documents provided to the principal who then again reviews the application for their own satisfaction. This causes delay and is very time consuming.

- Employees may have limited visibility into the status of their leave requests, leading to uncertainty and the need for frequent follow-ups.

- The reliance on physical letters and manual processes necessitates extensive paperwork, leading to increased administrative workload and the potential for misplaced or lost documents.

Overall, transitioning from the existing offline leave management system to an online solution offers numerous benefits, including improved efficiency, accuracy, transparency, and accessibility. It minimizes manual efforts, reduces paperwork, and provides a user-friendly experience for employees, supervisors, and administrators.

SCOPE OF WORK:

Scope of Work for Online Leave Management System for College Employees using DBMS and Web Development

1. System Overview:

- A user-friendly web-based leave management system for college employees is designed.

- The system utilizes a database management system (DBMS) for efficient storage and retrieval of leave-related data, employee data and holiday lists.

2. User Roles and Permissions:

- Multiple user roles, such as employees, admin, principal and HOD, with appropriate access permissions and privileges are implemented.

- Employees are able to submit leave requests, view their leave balances, and track the status of their requests.

- Principal has the ability to review and approve/deny leave requests and HOD can view leave details for their respective departments.

- Admins have access to comprehensive leave data, reporting, and configuration settings.

3. Leave Types and Rules:

- Incorporate all relevant leave types as per the college's policies and guidelines.

- Implement rules and conditions specific to each leave type, such as maximum leave duration, eligibility criteria, and blackout periods.

- Allow employees to view the specific rules associated with each leave type while submitting requests.

4. Leave Request Management:

- Provide an intuitive interface for employees to submit leave requests, specifying the desired dates, leave type, and any additional comments.

- Implement a workflow for leave requests, allowing Principal to review and approve/deny requests in a timely manner.

- Send automatic email notifications to employees and supervisors regarding the status of leave requests.

5. Leave Balances:

- Develop a mechanism to track and update leave balances for employees.

- Allow employees to view their current leave balances and the history of leaves taken.

6. User Authentication and Security:

- Ensure secure user authentication mechanisms, including password encryption and secure session management.

- Implement role-based access control (RBAC) to ensure that users can only access authorized features and data.

7. Project Timeline and Deliverables:

- Create a detailed project plan outlining the development phases, milestones, and deliverables.

- Define specific timelines for each phase, including system design, database development, front-end development, testing, deployment, and user training.

8. Testing and Quality Assurance:

- Conduct thorough testing, including unit testing, integration testing, and user acceptance testing, to ensure the system functions as intended.

- Address any identified bugs or issues and perform rigorous quality assurance checks to ensure a stable and reliable system.

BACKGROUND AND REVIEW OF RELATED WORK

Several online leave management systems have been developed by students and software developers using technologies such as PHP, SQL, and JavaScript. However, all of these systems were primarily designed for office employees and HR departments, lacking the specific features and complexities required for a government-aided college leave system.

While there may be similarities in terms of roles and responsibilities between office employees and college staff, the leave management system for a government-aided college involves unique requirements and constraints. The complexities of leave types, rules, and regulations differ significantly, making it necessary to develop a more tailored and robust system.

One of the key distinctions is the level of strictness and adherence to leave policies and regulations in a college setting. Government-aided colleges often have specific guidelines and restrictions in place, dictating the eligibility criteria, maximum leave durations, blackout periods, and other conditions for different types of leaves. These rules need to be integrated into the leave management system to ensure accurate and compliant leave management.

Furthermore, the leave account system in a college environment is typically more intricate than in an office setting. College employees may have varying types of leaves available to them, such as casual leave, earned leave, medical leave, study leave, and more. Each of these leave types may have distinct rules and calculations for accrual, carry forward, encashment, and utilization. Designing a leave management system that can handle these complexities is crucial for accurate tracking of leave balances and calculations.

In addition to the intricacies of the leave account, the college leave management system must also address other factors unique to educational institutions. This may include considerations such as academic calendars, examination schedules, faculty workload, substitute arrangements, and leave approvals based on departmental requirements.

To meet these specific needs, it is essential to develop a comprehensive online leave management system that is specifically tailored to government-aided college environments. The system should incorporate the specific leave types, rules, and regulations of the college, ensuring that employees and administrators can easily navigate through the complex leave policies.

In conclusion, while various online leave management systems have been developed using PHP, SQL, and JavaScript, these systems may not adequately address the complexities and constraints specific to government-aided college leave management. To meet the unique needs of such institutions, a tailored and comprehensive system is required, incorporating the specific leave types, rules, and regulations while providing a user-friendly experience for employees and administrators.

METHODOLOGY

A user can login as an employee, HOD, Principal or Admin depending on the role assigned to it. All employees can login as employee when they're applying for leaves and viewing their leave details. Other login roles are only for the designated employees.

Principal's dashboard

- Approve/Decline leaves
- View leave history of all the employees

Admin's dashboard

- Manage leave type details
- Manage department details
- Manage employee details
- Update holiday list

Employee's dashboard:

- Apply for a leave
- View applied leave history
- View their own profile
- View the holiday list

DATA DICTIONARY:

employee: stores employee details

ATTRIBUTE	TYPE	NULL	DEFAULT	DESCRIPTION
emp_id	varchar(50)	NO	NULL	Primary key, employee id
emp_name	varchar(50)	NO	NULL	Employee's name
age	int(3)	NO	NULL	Age of the employee
gender	varchar(50)	NO	NULL	Gender of the employee
address	varchar(200)	NO	NULL	Address of employee
email	varchar(50)	NO	NULL	Email id of employee

role	varchar(50)	NO	NULL	Employee's role
username	varchar(50)	NO	NULL	Username for login
password	varchar(255)	NO	NULL	Encrypted password
contact_number	varchar(10)	NO	NULL	Contact number of employee
department	varchar(50)	YES	NULL	Employee's department
earned_leaves	int(11)	YES	NULL	Earned leaves left (in days)
medical_leaves	int(11)	YES	NULL	Medical leaves left (in days)
halfpay_leaves	int(11)	YES	NULL	Half pay leaves left (in days)
casual_leaves	int(11)	NO	NULL	Casual leaves left (in days)
study_leaves	int(11)	NO	NULL	Study leaves left (in days)
specialdisability_leaves	int(11)	NO	NULL	SD leaves left (in days)
leaves_applied	int(11)	YES	NULL	Total leaves applied for
years_of_service	int(11)	NO	NULL	Years served as an employee
desig_id	int(11)	YES	NULL	Foreign key references special role
employee_status	varchar(20)	NO	NULL	Suspended, on a leave etc.

compensatory: stores the compensatory leaves allocated to an employee which are allocated on the basis of no. of working holidays

ATTRIBUTE	**TYPE**	**NULL**	**DEFAULT**	**DESCRIPTION**
emp_id	varchar(50)	NO	NONE	Foreign key ref. employee
no_of_leaves	int(11)	NO	NONE	No. of leaves allocated at a time
expiration_date	date	NO	NONE	When the leave/leaves expires
leave_type_id	int(2)	NO	NONE	Foreign key ref. leavetype, Primary Key

leaves: stores details about the leaves applied for

ATTRIBUTE	TYPE	NULL	DEFAULT	DESCRIPTION
leave_id	varchar(30)	NO	NONE	Primary key, Unique Key
emp_id	varchar(50)	NO	NONE	Foreign key ref. employee, Primary Key
leave_type_id	int(2)	NO	NONE	Foreign key ref. leavetype, Primary Key
start_date	date	NO	NONE	Starting date of the leave
end_date	date	NO	NONE	Ending date of the leave
applied_on	date	NO	current_ timestamp()	When the leave was applied on
leave_status	varchar(50)	NO	NONE	Approved/declined/pending
documents	varchar(700)	YES	NONE	Required documents depending on the leave type

holiday list: stores the holiday details in the calendar year

ATTRIBUTE	TYPE	NULL	DEFAULT	DESCRIPTION
id	int(50)	NO	NONE	Primary key
title	text	NO	NONE	Holiday title
start_datetime	date	NO	NONE	Starting date of the holiday
end_datetime	date	YES	NONE	Ending date of the holiday

designation: stores the different types of designation details

ATTRIBUTE	TYPE	NULL	DEFAULT	DESCRIPTION
desig_id	varchar(50)	NO	NONE	Primary key
desig_name	int(11)	NO	NONE	Designation name
description	varchar(300)	NO	NONE	Designation description

leavetype: stores details about the various leave types

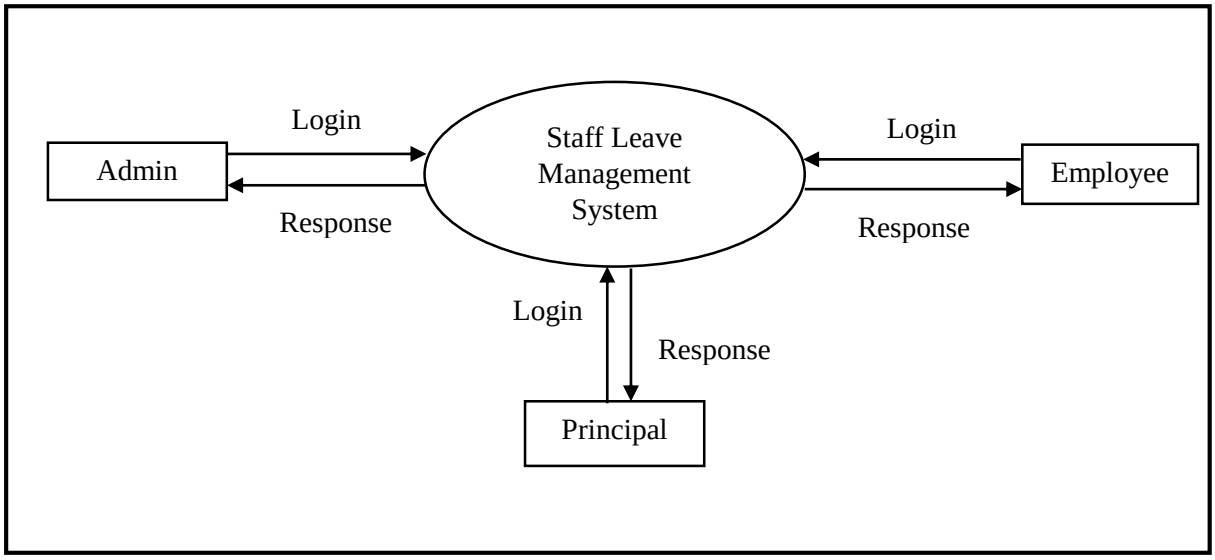
ATTRIBUTE	TYPE	NULL	DEFAULT	DESCRIPTION
leave_type_id	int(2)	NO	NONE	Primary key
name	varchar(30)	NO	NONE	Name of the leave type
description	varchar(100)	NO	NONE	Leave type description
paid	varchar(50)	NO	NONE	Whether it's a paid leave

special_role: stores login details about the various designation/special roles

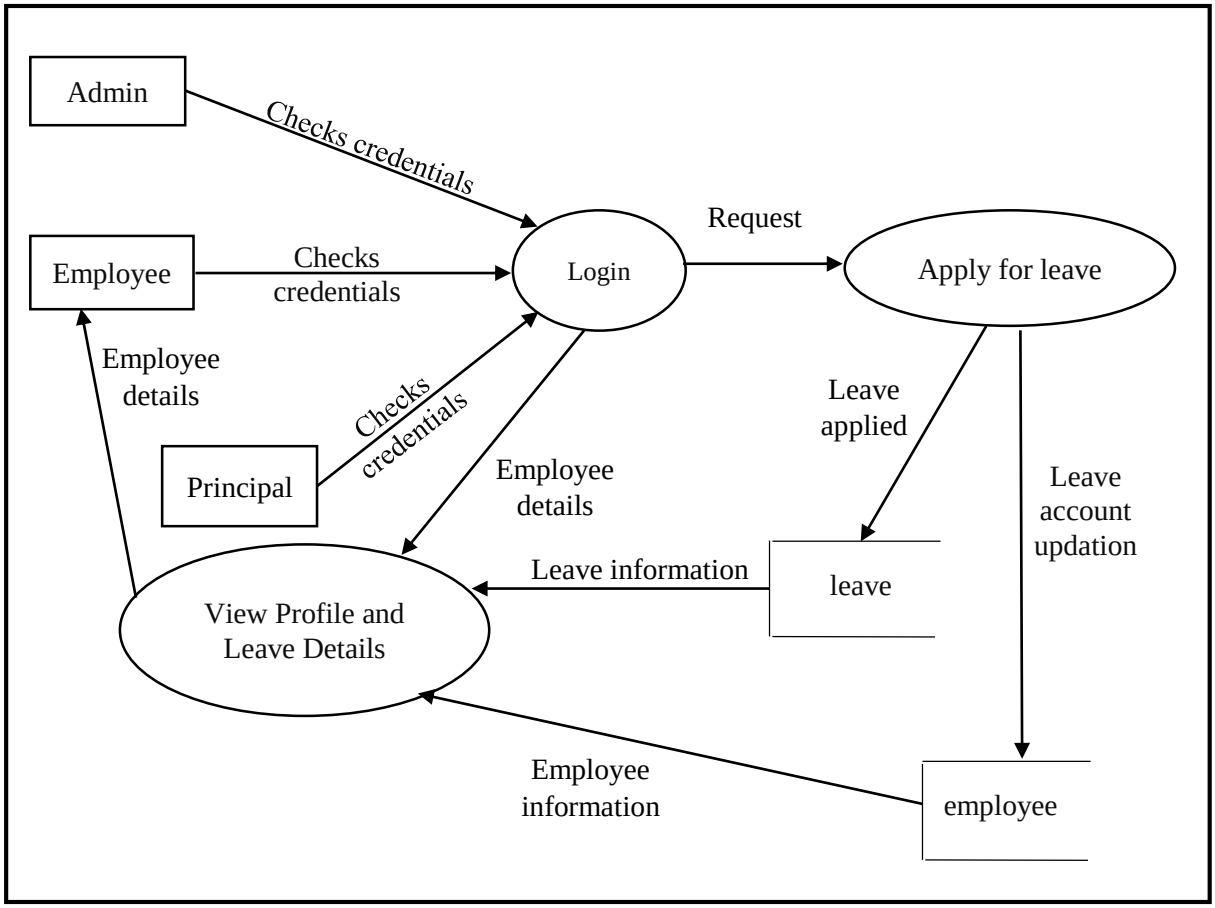
ATTRIBUTE	TYPE	NULL	DEFAULT	DESCRIPTION
emp_id	int(2)	NO	NONE	Primary key
desig_id	varchar(30)	NO	NONE	Foreign key ref. designation
username	varchar(20)	NO	NONE	Login username
password	varchar(30)	NO	NONE	Encrypted password
department	varchar(100)	YES	NONE	Department in case of HOD

DATA FLOW DIAGRAM OF THE SYSTEM:

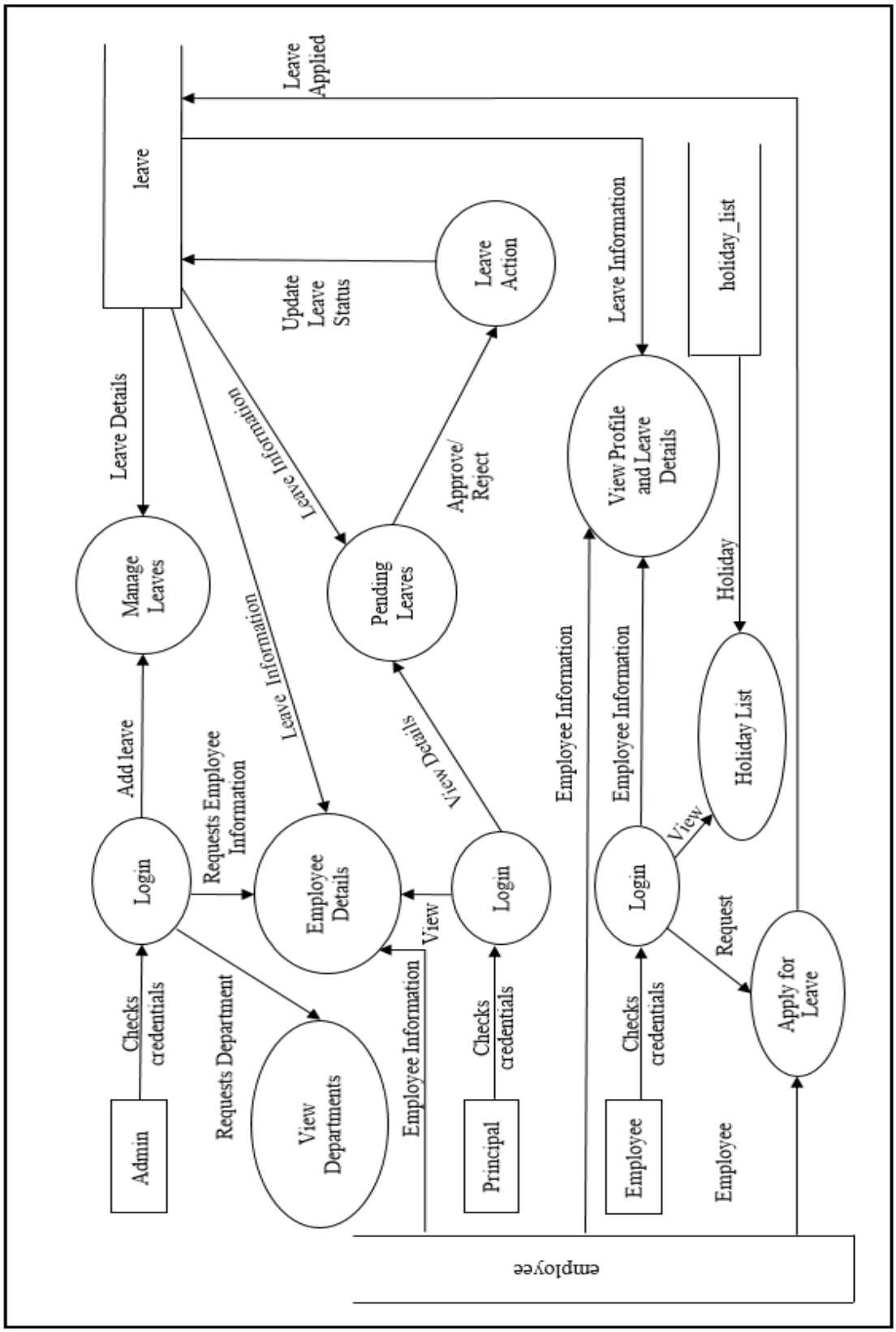
LEVEL 0 DFD (CONTEXT DIAGRAM):



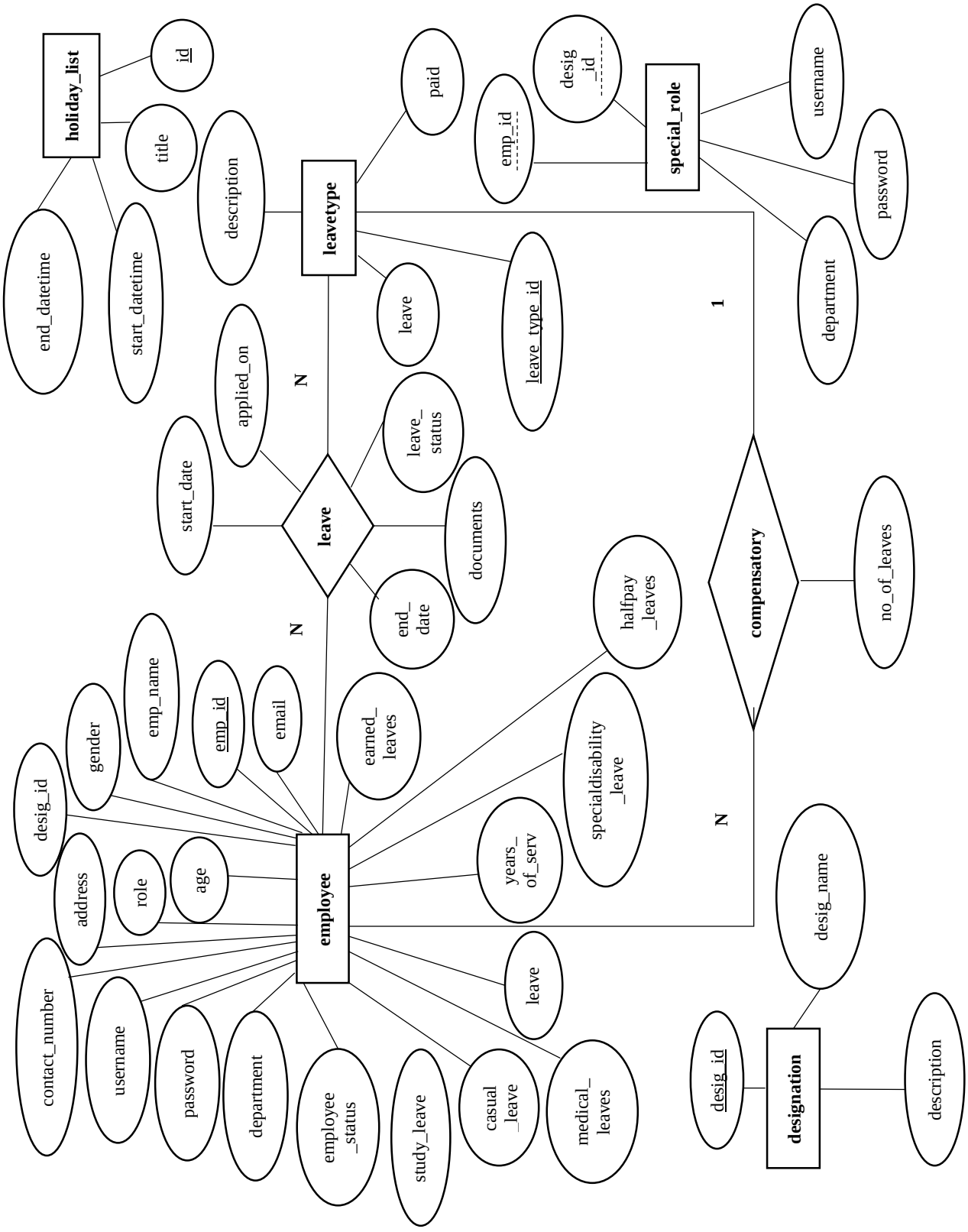
LEVEL 1 DFD:



LEVEL 2 DFD:


leave
Leave Applied
holiday_list
Leave Action
Update Leave Status
Leave Information
Leave Information
Approve/ Reject
Leave Details
Manage Leaves
Pending Leaves
View Profile and Leave Details
Holiday
Holiday List
Add leave
Requests Employee Information
Leave Information
View Details
Employee Information
Employee Information
Login
Employee Details
Login
Login
View
Checks credentials
Requests Department
View Departments
Employee Information
Checks credentials
Checks credentials
Request
Apply for Leave
Admin
Principal
Employee
Employee
employee

ENTITY-RELATIONSHIP DIAGRAM (ERD):



IMPLEMENTATION

Through the utilization of MySQL, the system effectively manages the complexities of leave accounts, including different types of leaves, accrual calculations and carry forward rules. This ensures accurate tracking of leave balances and eliminates errors and inconsistencies associated with manual calculations.

Furthermore, the integration of PHP has allowed for seamless communication between the front-end interface and the MySQL database, enabling real-time updates, automated notifications, and efficient data retrieval. The system's responsiveness and compatibility with different devices enhance accessibility and user experience, allowing staff members to conveniently access the system from their preferred devices.

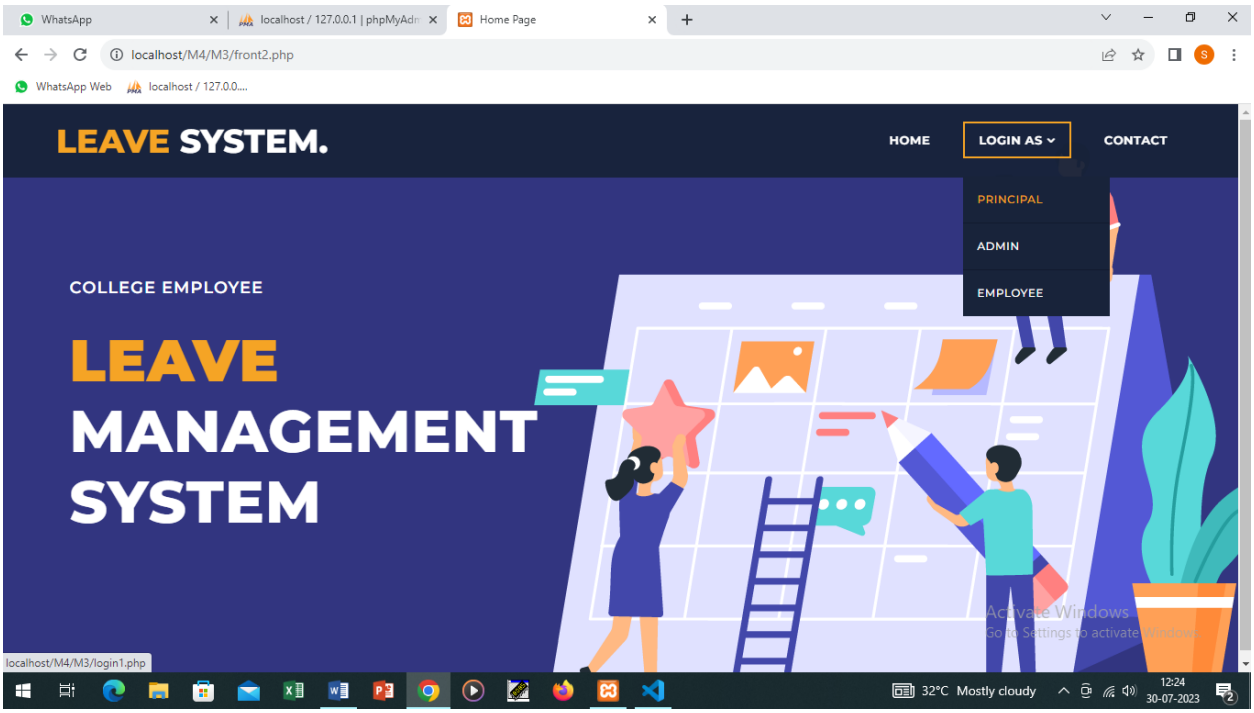
PHP has been utilized as a server-side scripting language in the leave management system, providing dynamic functionality and interacting with the database. With PHP, we have been able to handle user requests, process form submissions, validate input, and perform various server-side operations necessary for the system's functionality. Additionally, PHP integrates seamlessly with the database management system, allowing the retrieval, insertion, and modification of leave-related data.

To facilitate local development and testing, XAMPP, a popular open-source web server solution, has been used. XAMPP combines Apache as the web server, MySQL as the database management system, and PHP, providing an all-in-one solution that simplifies the setup and configuration of the development environment for the leave management system.

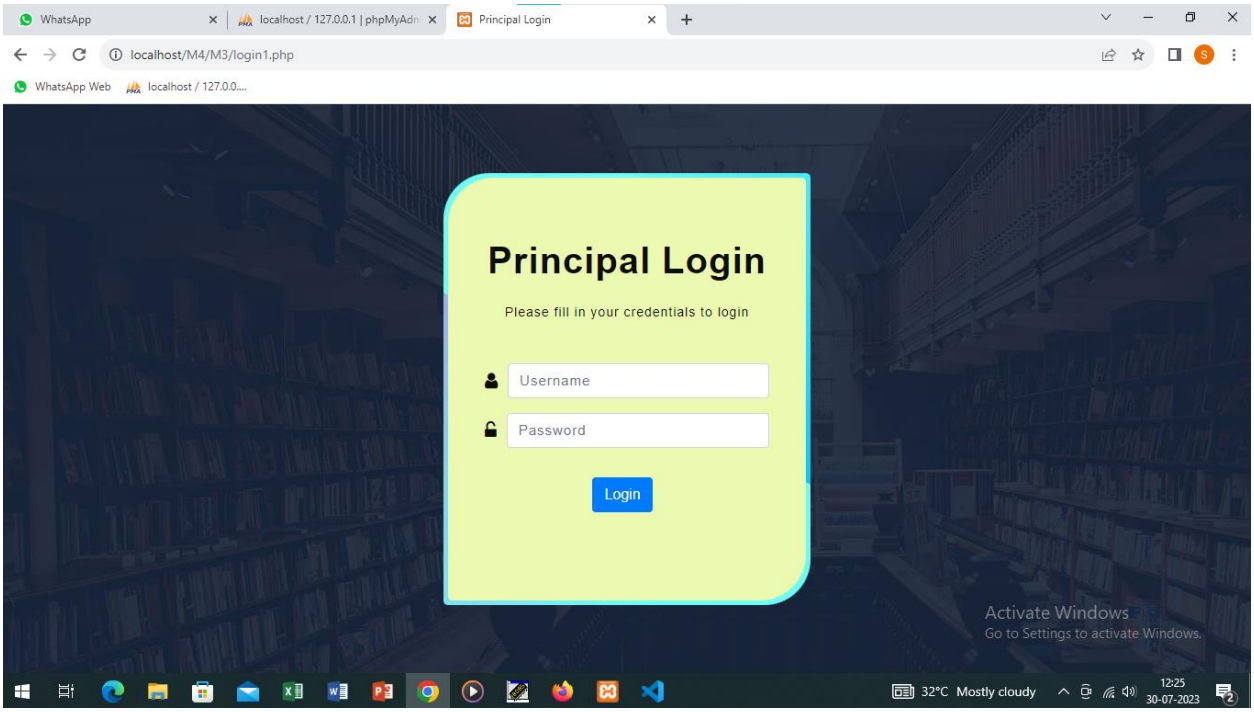
HTML and CSS play crucial roles in implementing the frontend of a leave management system, enabling the creation of a simple yet visually appealing design and user interface (UI).

RESULT AND DISCUSSION

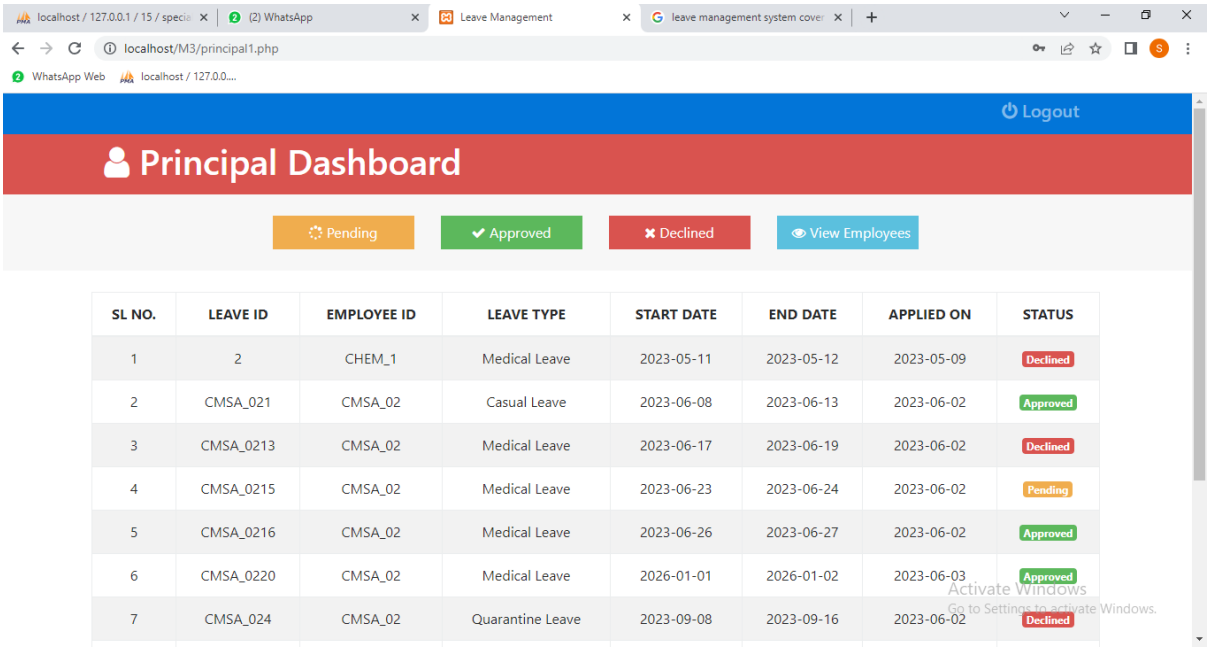
Home page:



Principal's login page:

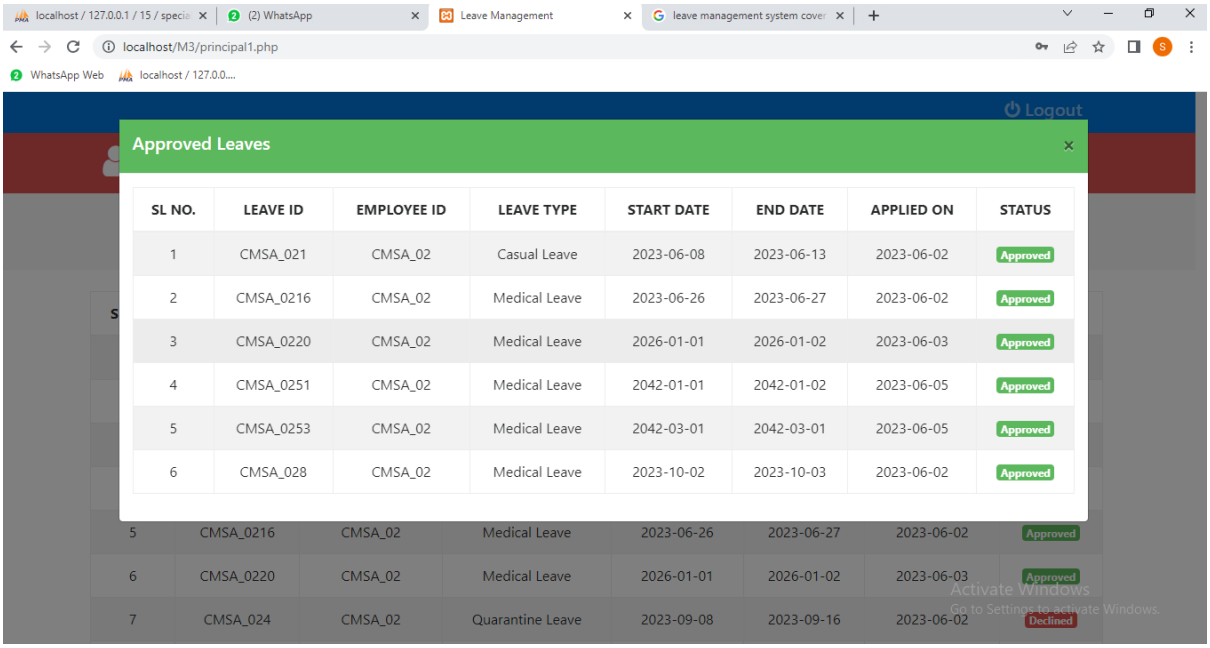


Principal's dashboard:



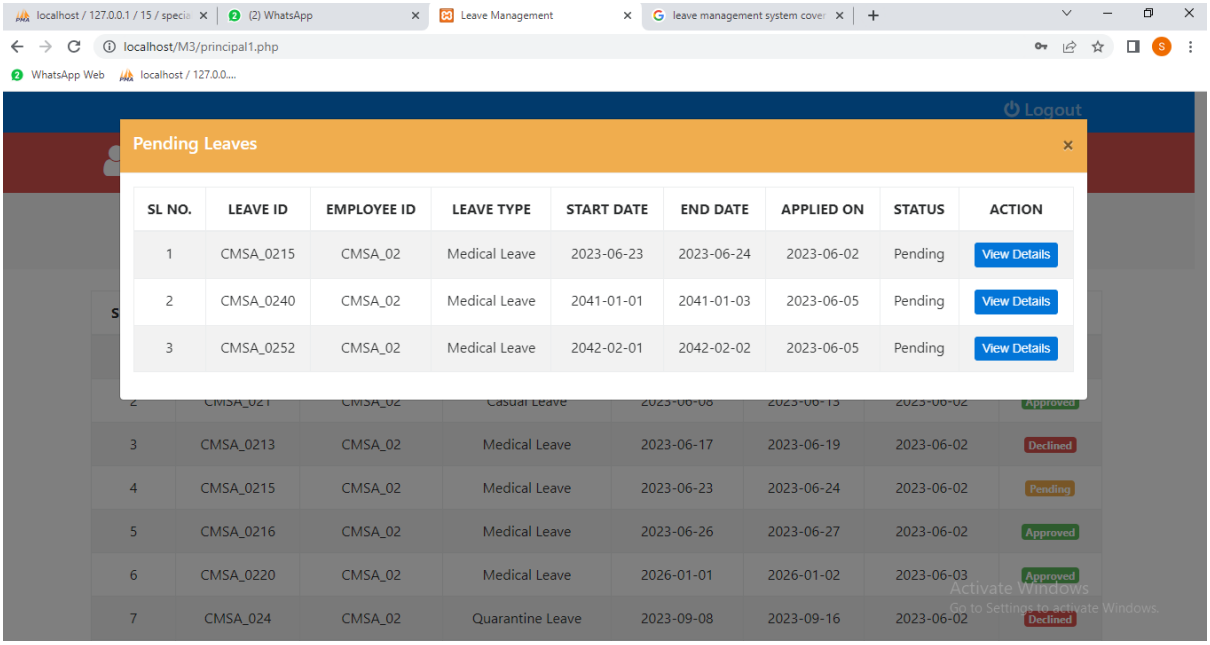
SL NO.	LEAVE ID	EMPLOYEE ID	LEAVE TYPE	START DATE	END DATE	APPLIED ON	STATUS
1	2	CHEM_1	Medical Leave	2023-05-11	2023-05-12	2023-05-09	Declined
2	CMSA_021	CMSA_02	Casual Leave	2023-06-08	2023-06-13	2023-06-02	Approved
3	CMSA_0213	CMSA_02	Medical Leave	2023-06-17	2023-06-19	2023-06-02	Declined
4	CMSA_0215	CMSA_02	Medical Leave	2023-06-23	2023-06-24	2023-06-02	Pending
5	CMSA_0216	CMSA_02	Medical Leave	2023-06-26	2023-06-27	2023-06-02	Approved
6	CMSA_0220	CMSA_02	Medical Leave	2026-01-01	2026-01-02	2023-06-03	Approved
7	CMSA_024	CMSA_02	Quarantine Leave	2023-09-08	2023-09-16	2023-06-02	Declined

Previously approved leaves as viewed by the Principal:

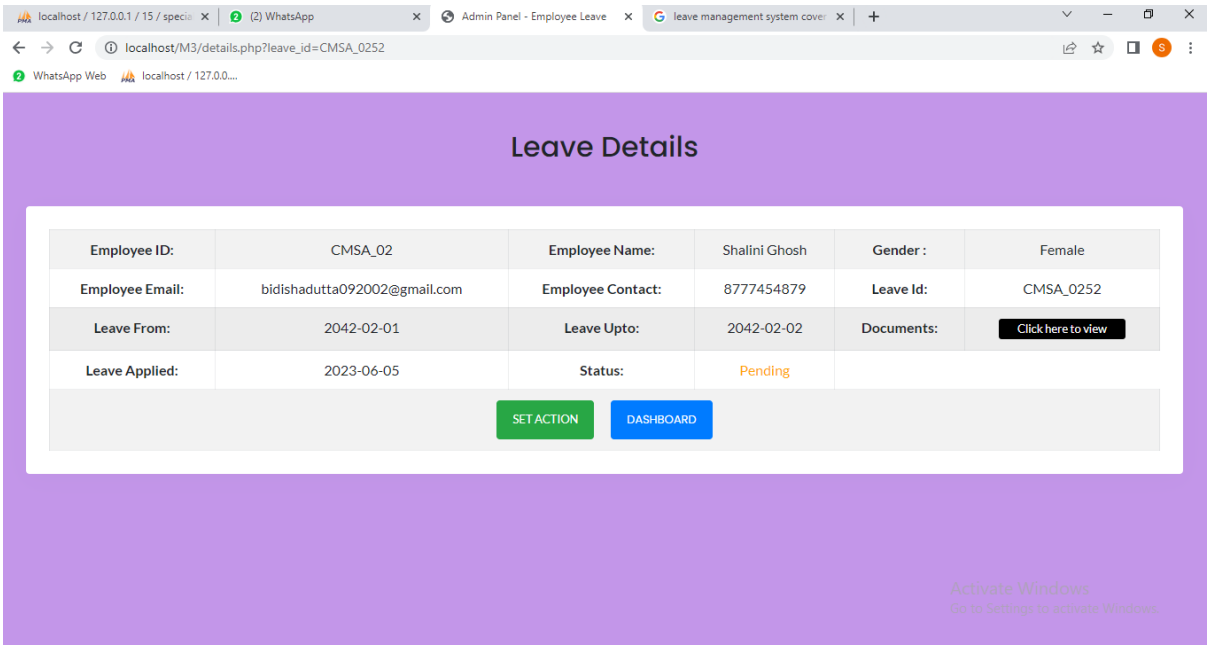


SL NO.	LEAVE ID	EMPLOYEE ID	LEAVE TYPE	START DATE	END DATE	APPLIED ON	STATUS
1	CMSA_021	CMSA_02	Casual Leave	2023-06-08	2023-06-13	2023-06-02	Approved
2	CMSA_0216	CMSA_02	Medical Leave	2023-06-26	2023-06-27	2023-06-02	Approved
3	CMSA_0220	CMSA_02	Medical Leave	2026-01-01	2026-01-02	2023-06-03	Approved
4	CMSA_0251	CMSA_02	Medical Leave	2042-01-01	2042-01-02	2023-06-05	Approved
5	CMSA_0253	CMSA_02	Medical Leave	2042-03-01	2042-03-01	2023-06-05	Approved
6	CMSA_028	CMSA_02	Medical Leave	2023-10-02	2023-10-03	2023-06-02	Approved

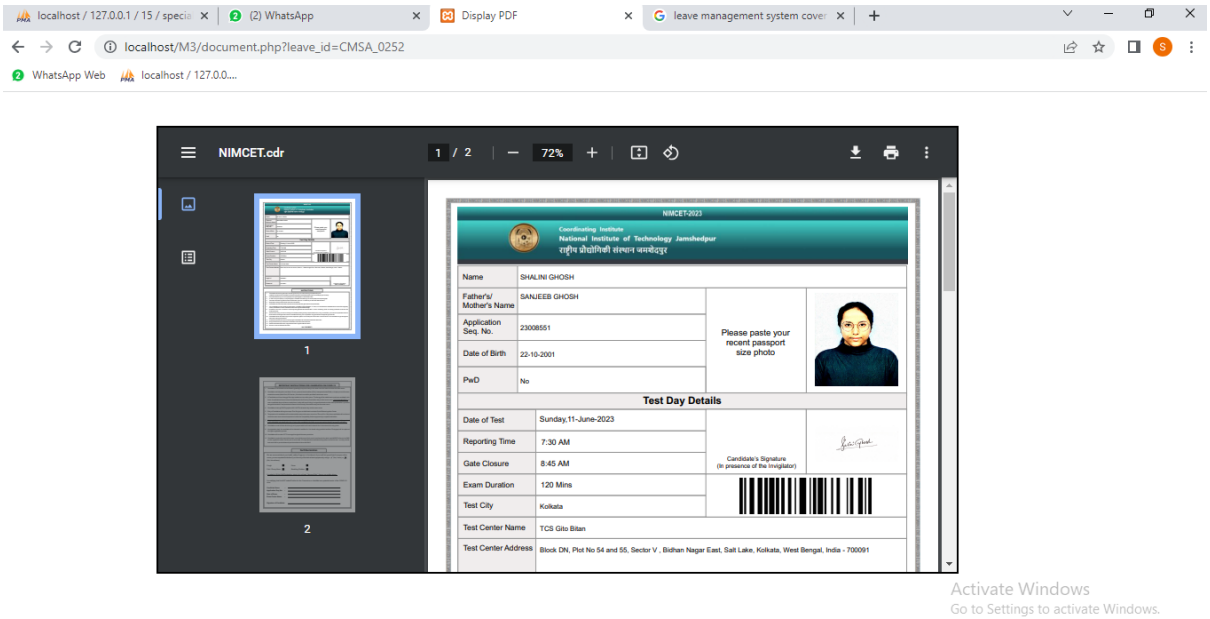
Pending leaves to be approved or declined by the Principal:



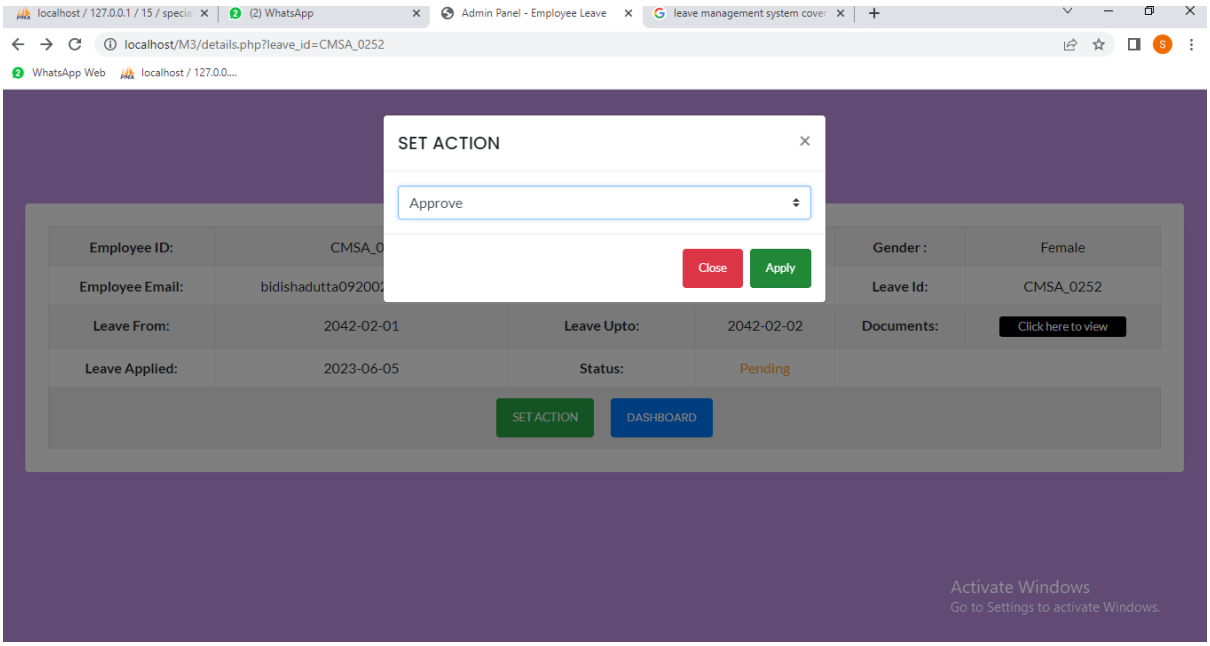
Leave details of an employee on clicking ‘View Details’ tab by the Principal:



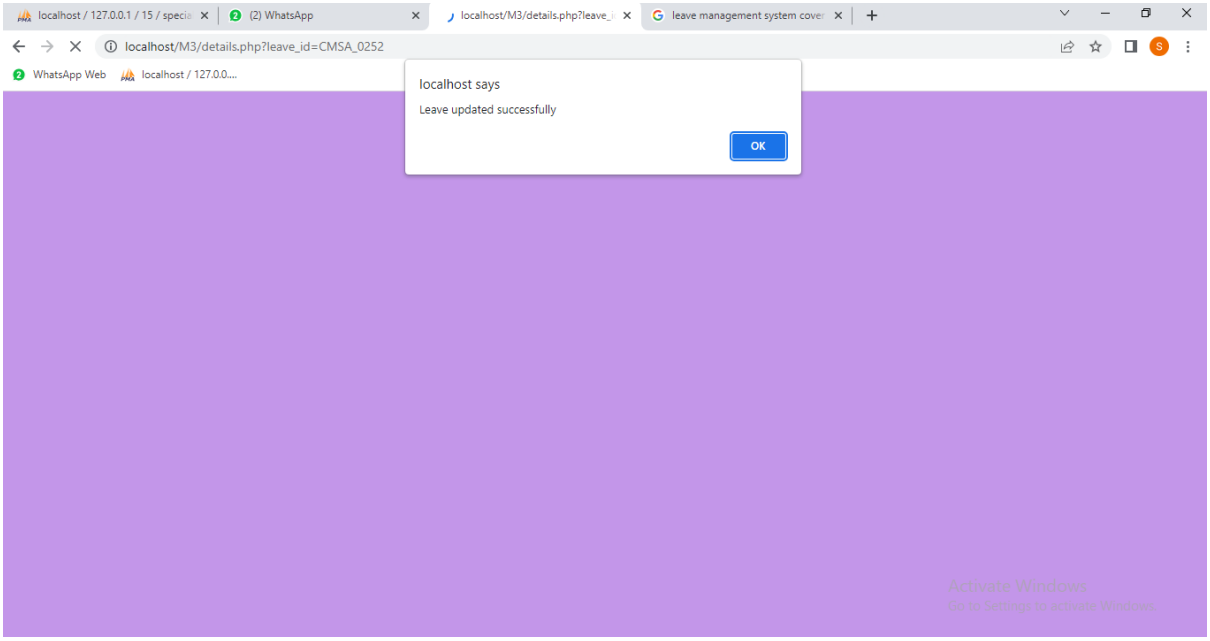
Medical document viewed by the Principal:



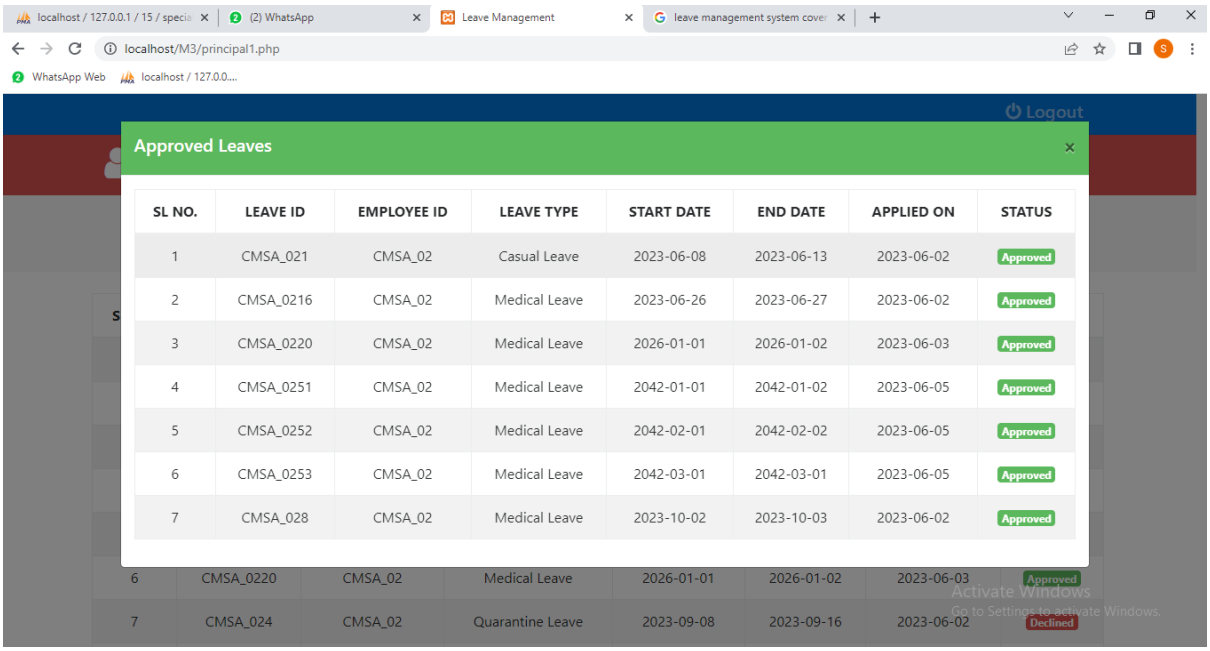
Action taken on a pending leave by the Principal:



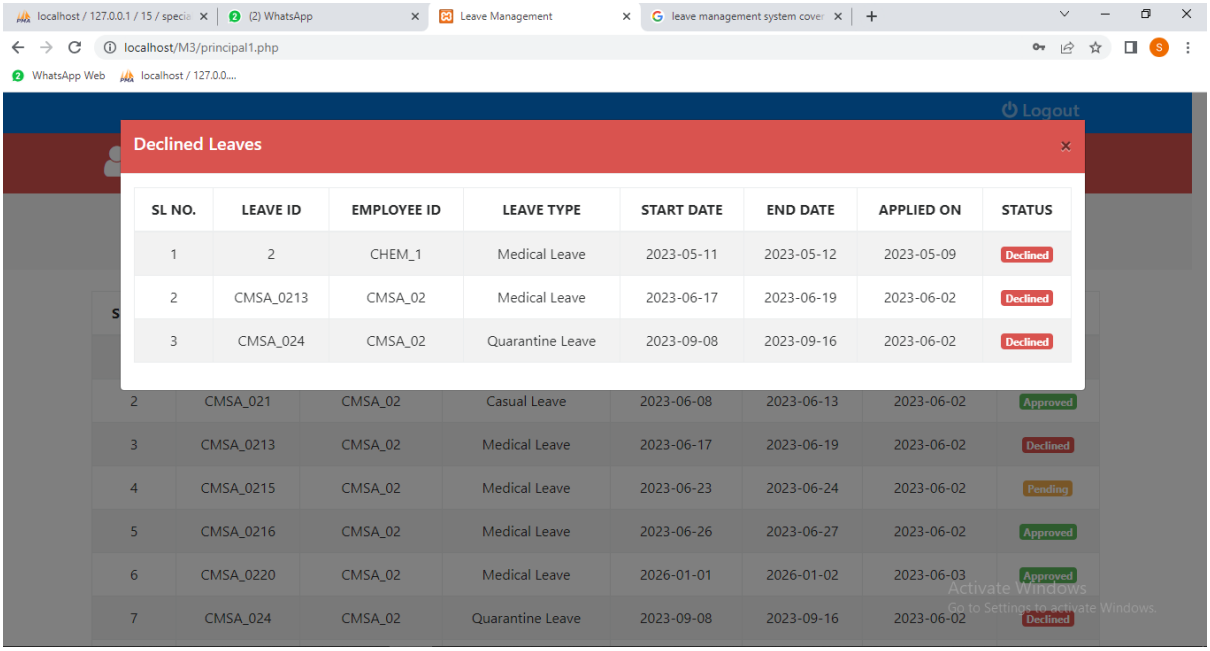
Alert message on approval/decline of a leave:



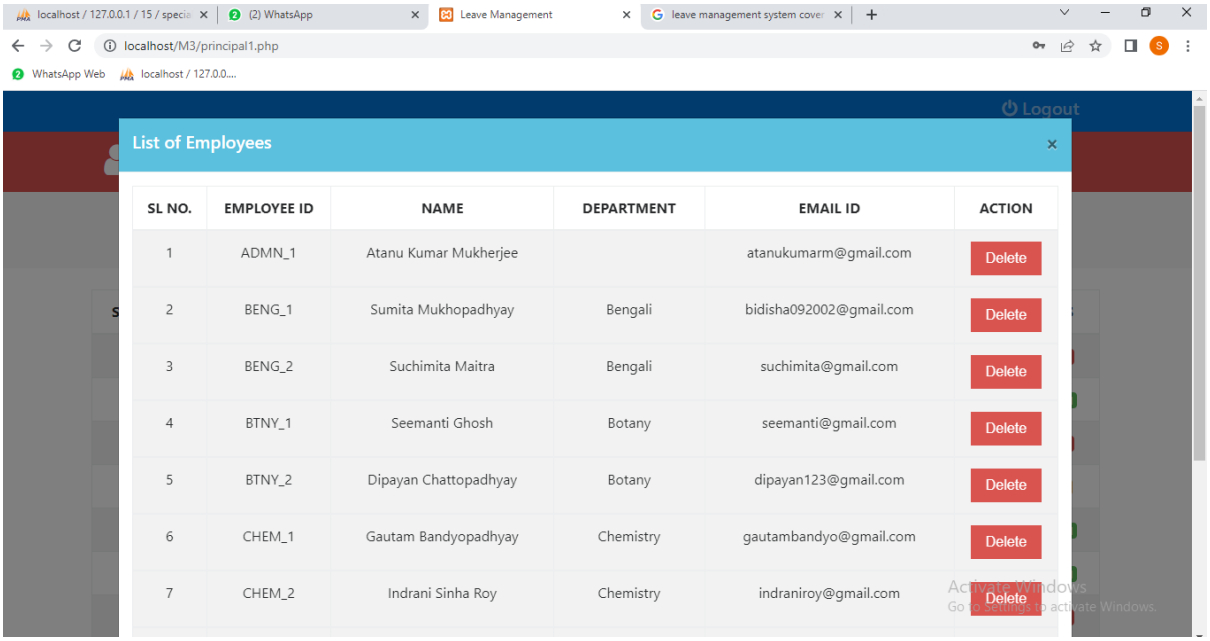
List of approved leaves updated:



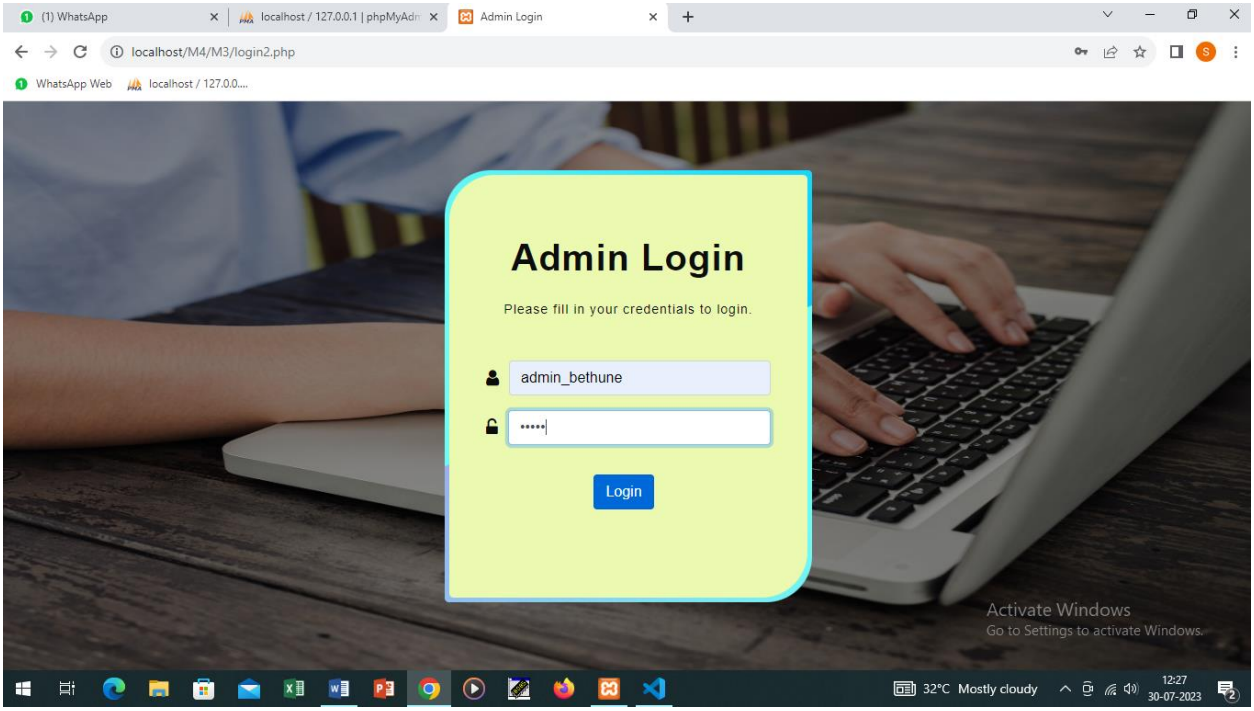
List of declined leaves:



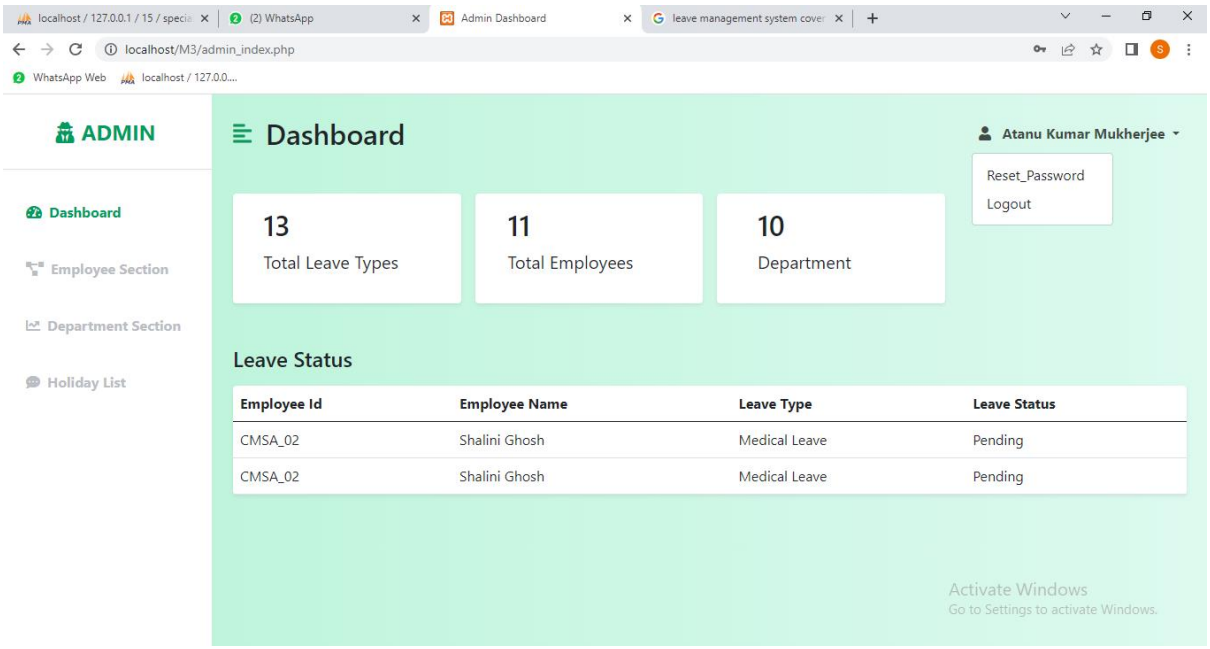
List of employees as viewed by Principal:



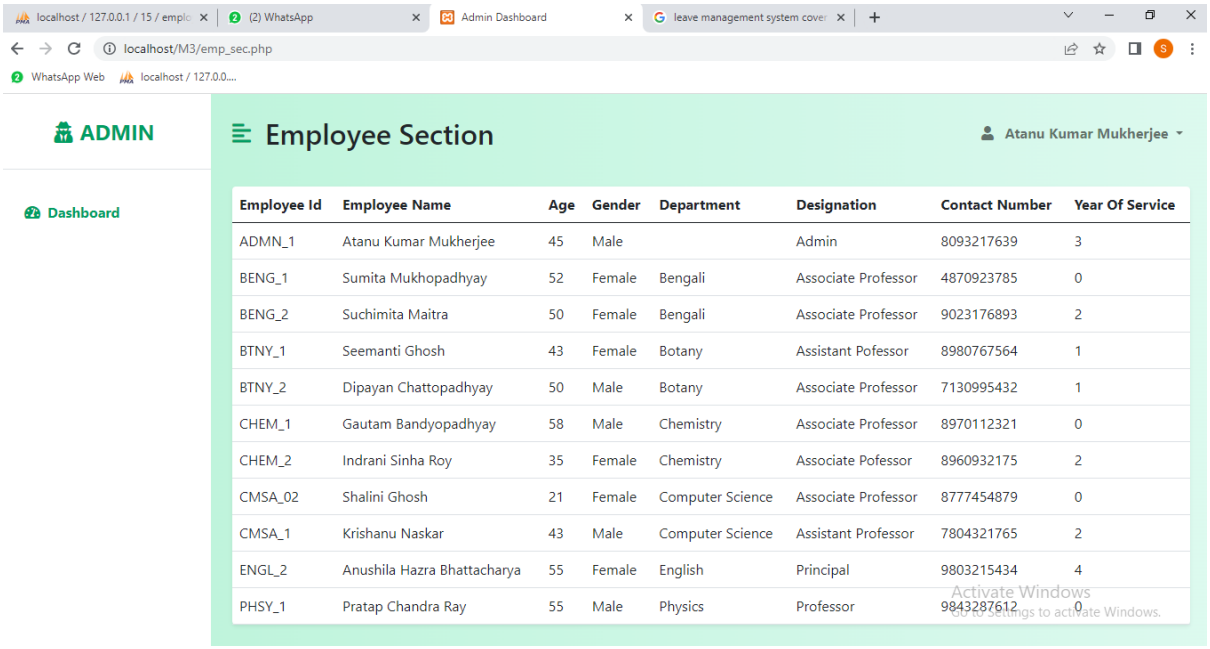
Admin’s login page:



Admin’s dashboard:

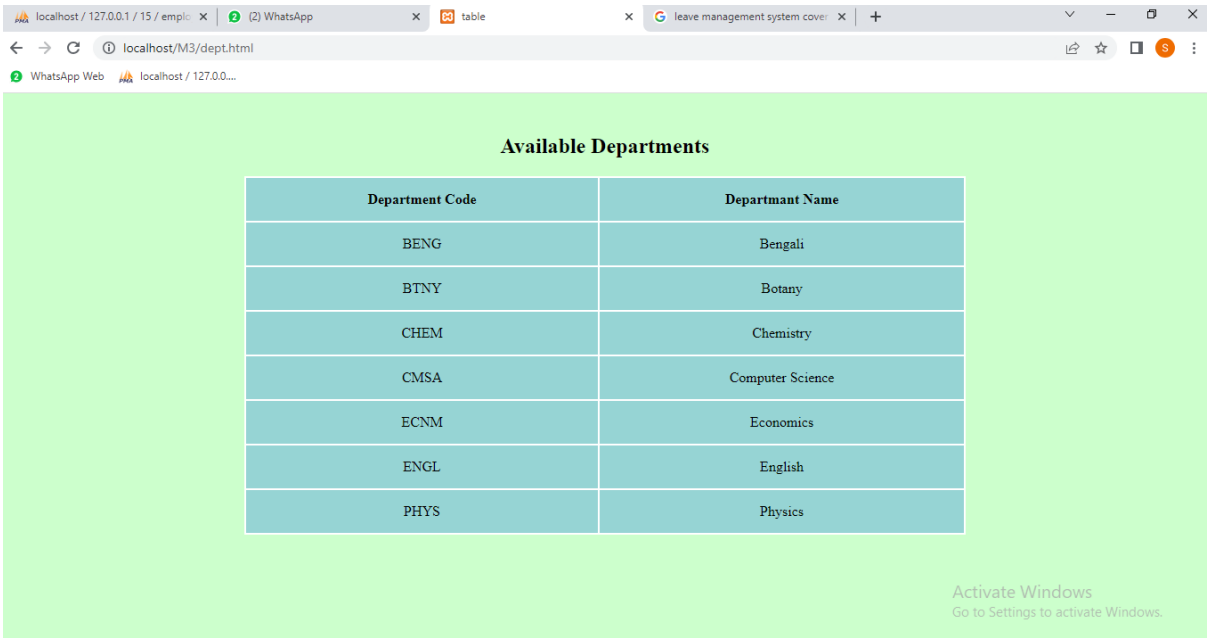


Employee section as viewed by the Admin:



Employee Id	Employee Name	Age	Gender	Department	Designation	Contact Number	Year Of Service
ADMN_1	Atanu Kumar Mukherjee	45	Male		Admin	8093217639	3
BENG_1	Sumita Mukhopadhyay	52	Female	Bengali	Associate Professor	4870923785	0
BENG_2	Suchimita Maitra	50	Female	Bengali	Associate Professor	9023176893	2
BTNY_1	Seemanti Ghosh	43	Female	Botany	Assistant Pofessor	8980767564	1
BTNY_2	Dipayan Chattopadhyay	50	Male	Botany	Associate Professor	7130995432	1
CHEM_1	Gautam Bandyopadhyay	58	Male	Chemistry	Associate Professor	8970112321	0
CHEM_2	Indrani Sinha Roy	35	Female	Chemistry	Associate Pofessor	8960932175	2
CMSA_02	Shalini Ghosh	21	Female	Computer Science	Associate Professor	8777454879	0
CMSA_1	Krishanu Naskar	43	Male	Computer Science	Assistant Professor	7804321765	2
ENGL_2	Anushila Hazra Bhattacharya	55	Female	English	Principal	9803215434	4
PHSY_1	Pratap Chandra Ray	55	Male	Physics	Professor	9843287612	0

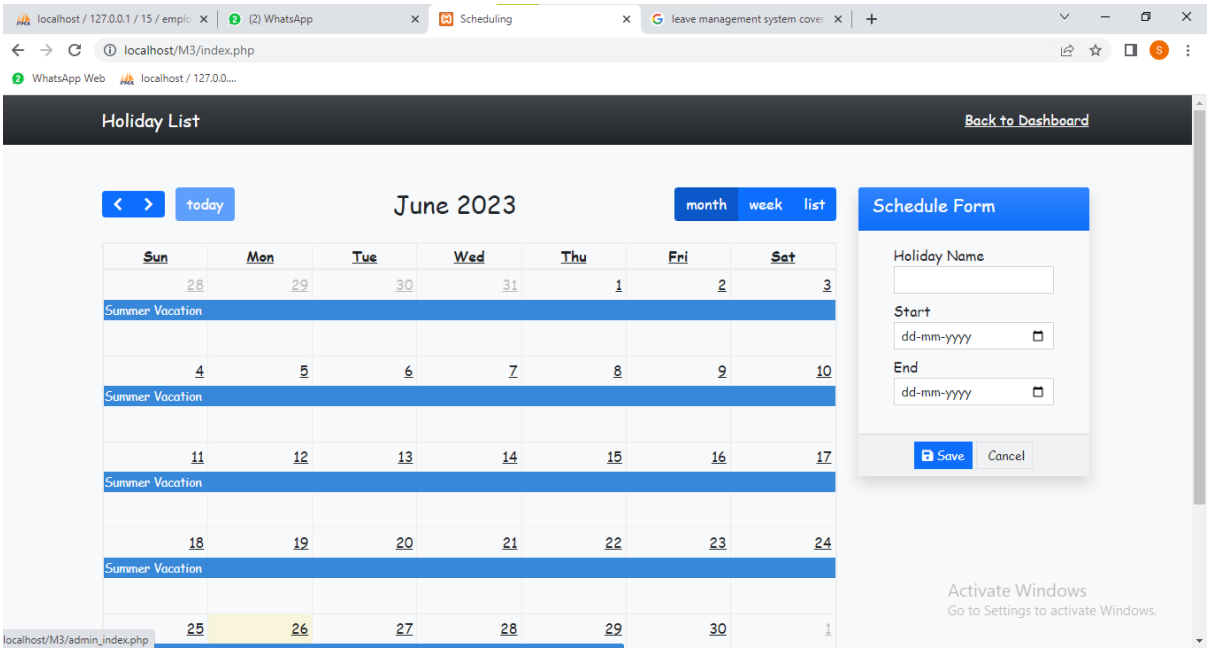
List of all departments:



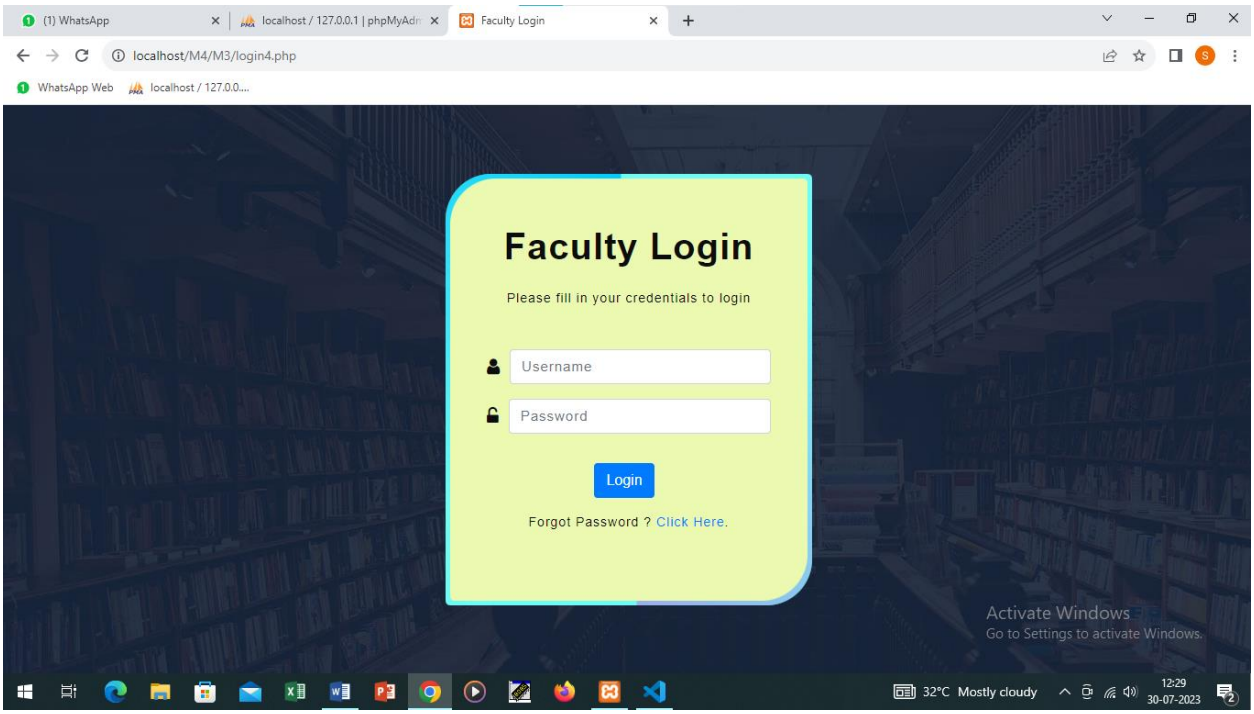
Available Departments

Department Code	Departmant Name
BENG	Bengali
BTNY	Botany
CHEM	Chemistry
CMSA	Computer Science
ECNM	Economics
ENGL	English
PHYS	Physics

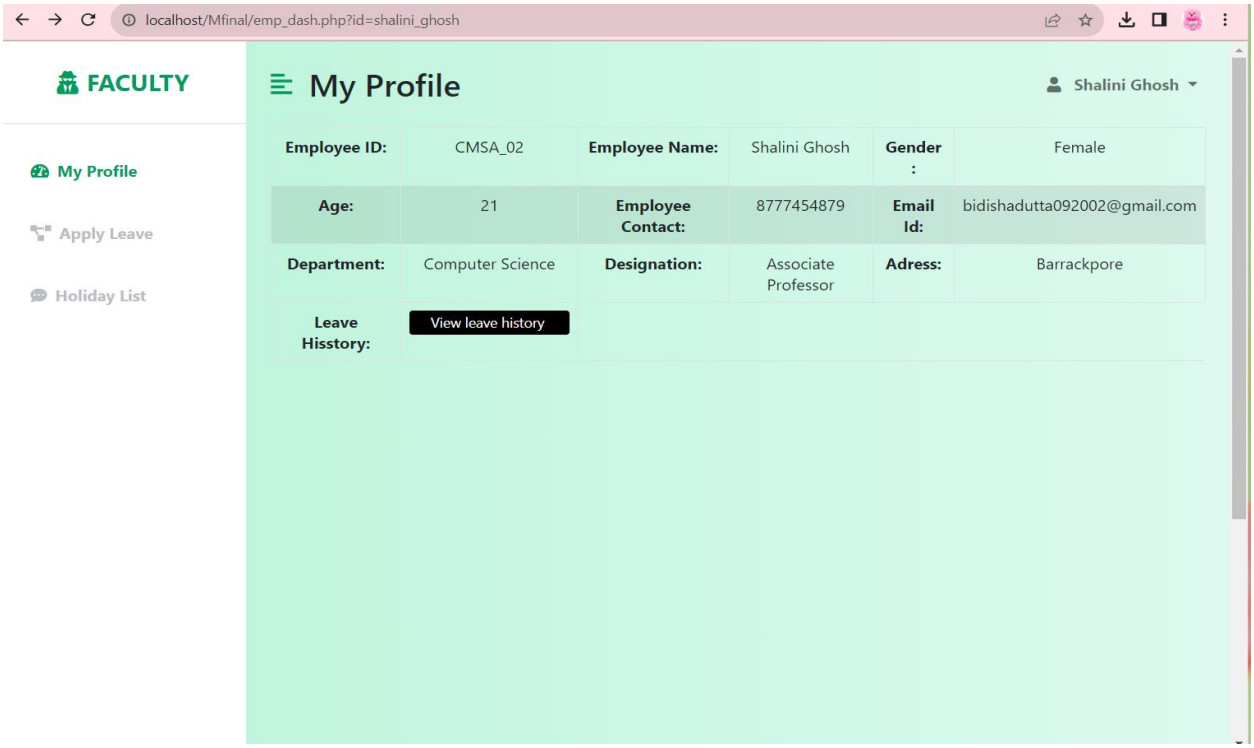
Holiday list to add or delete a holiday by the Admin:



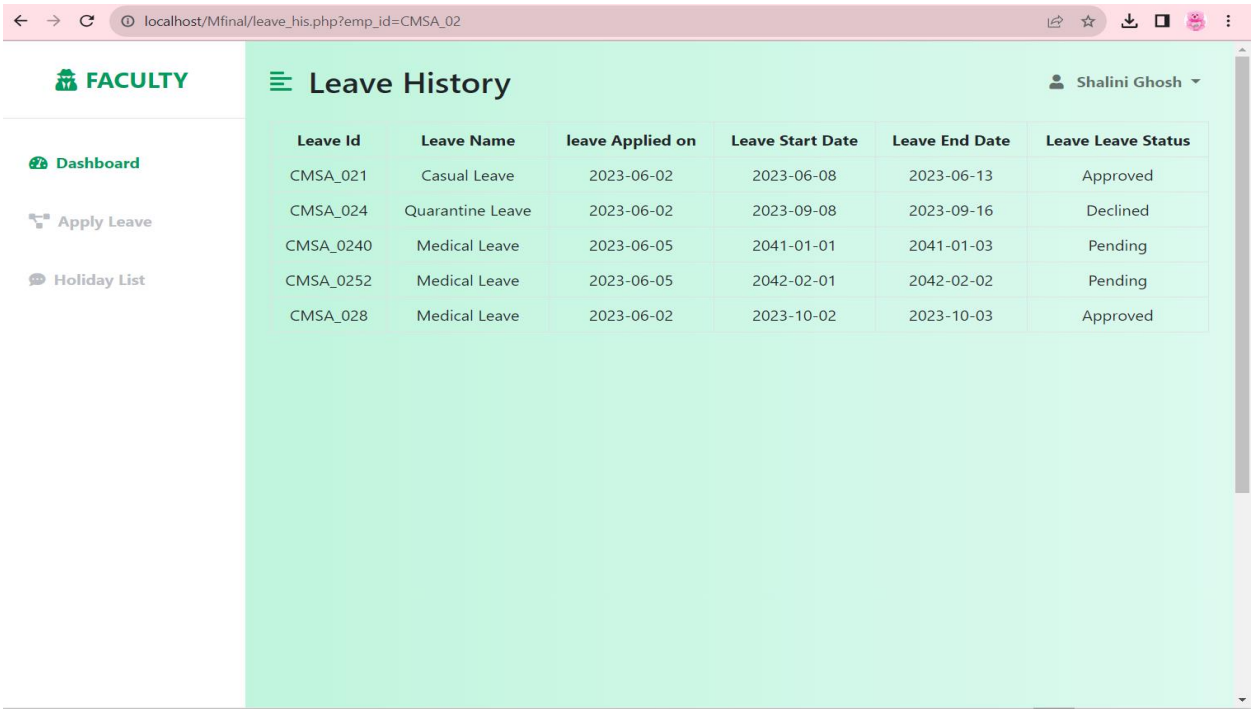
Employee's login page:



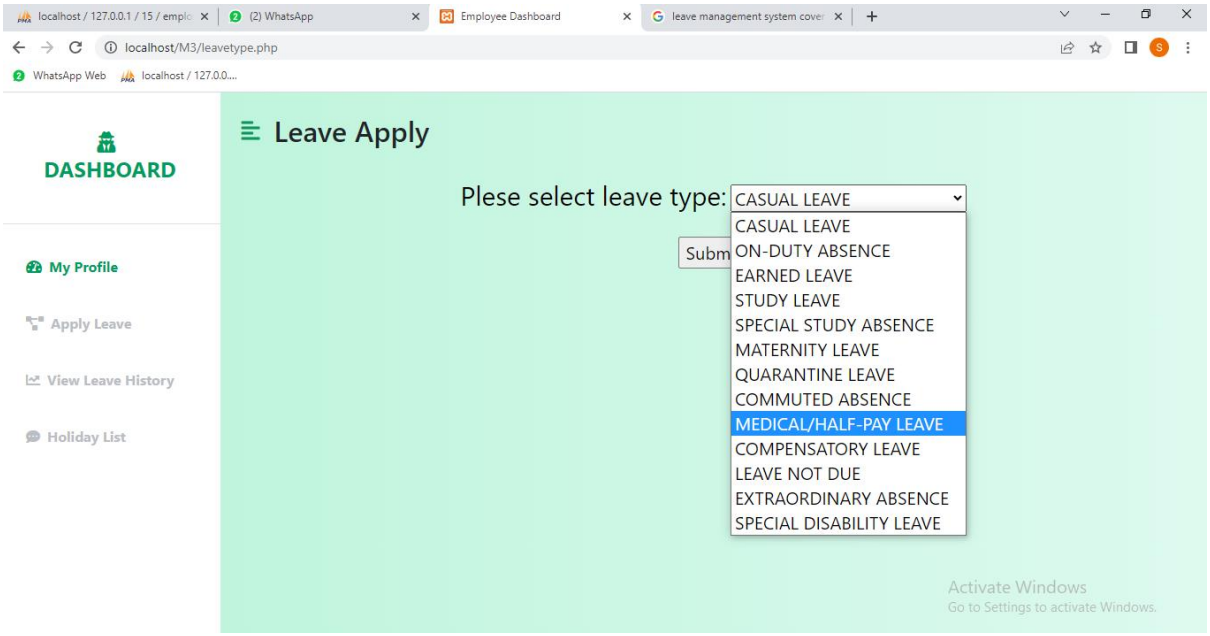
Employee’s dashboard:



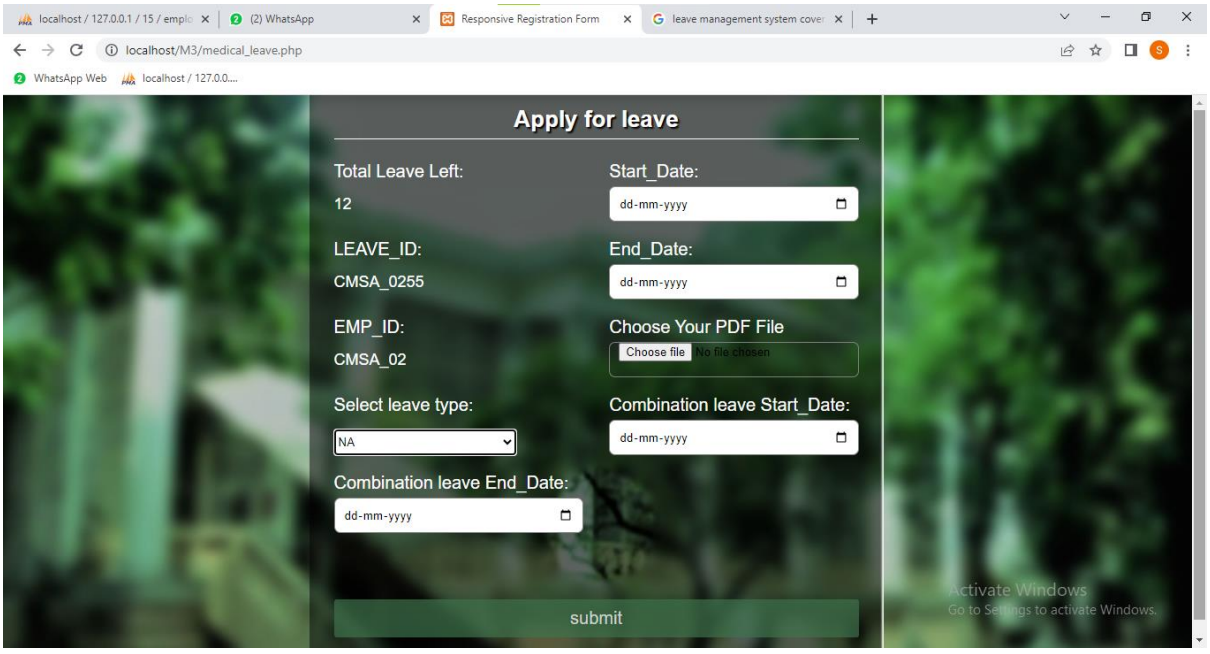
Employee’s leave history:



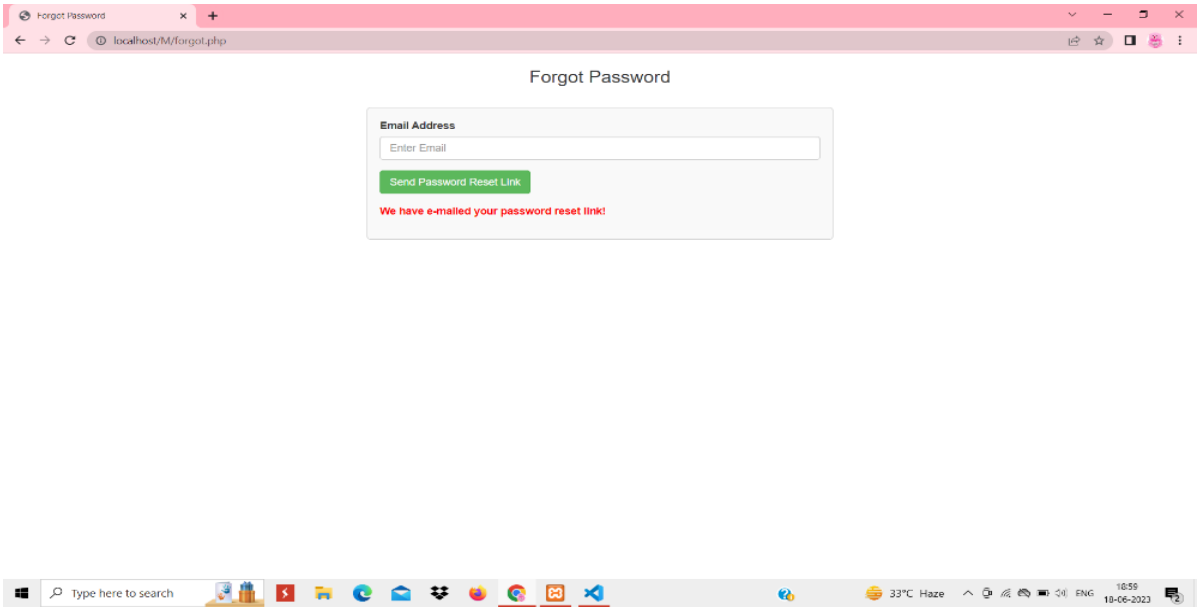
Types of leaves that can be applied by an employee:



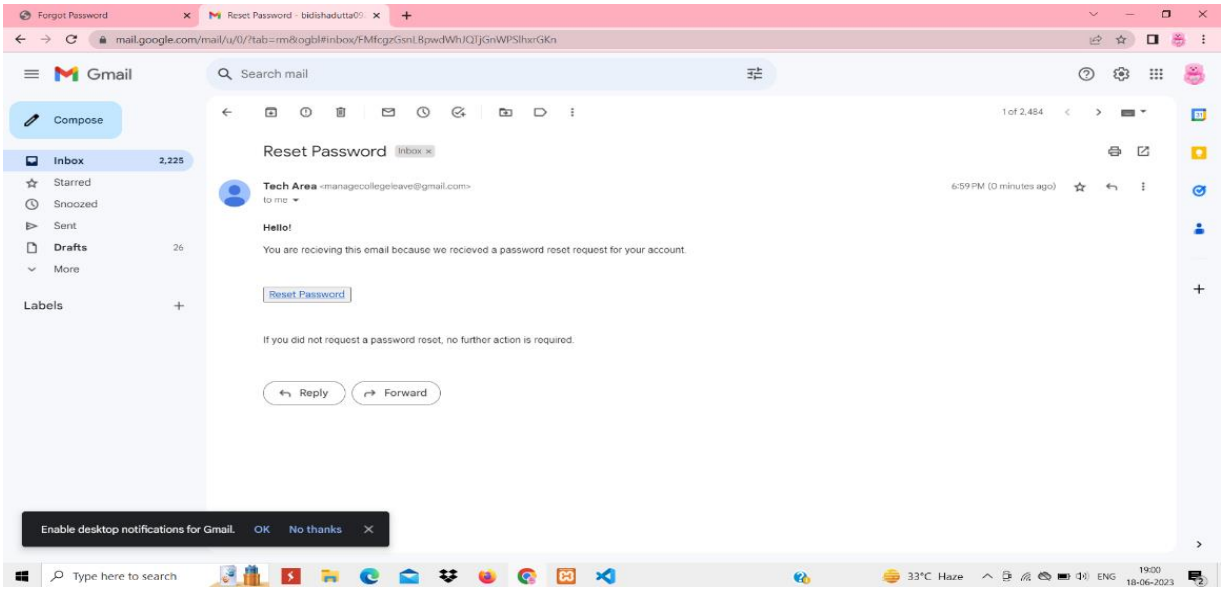
Form to apply a leave:



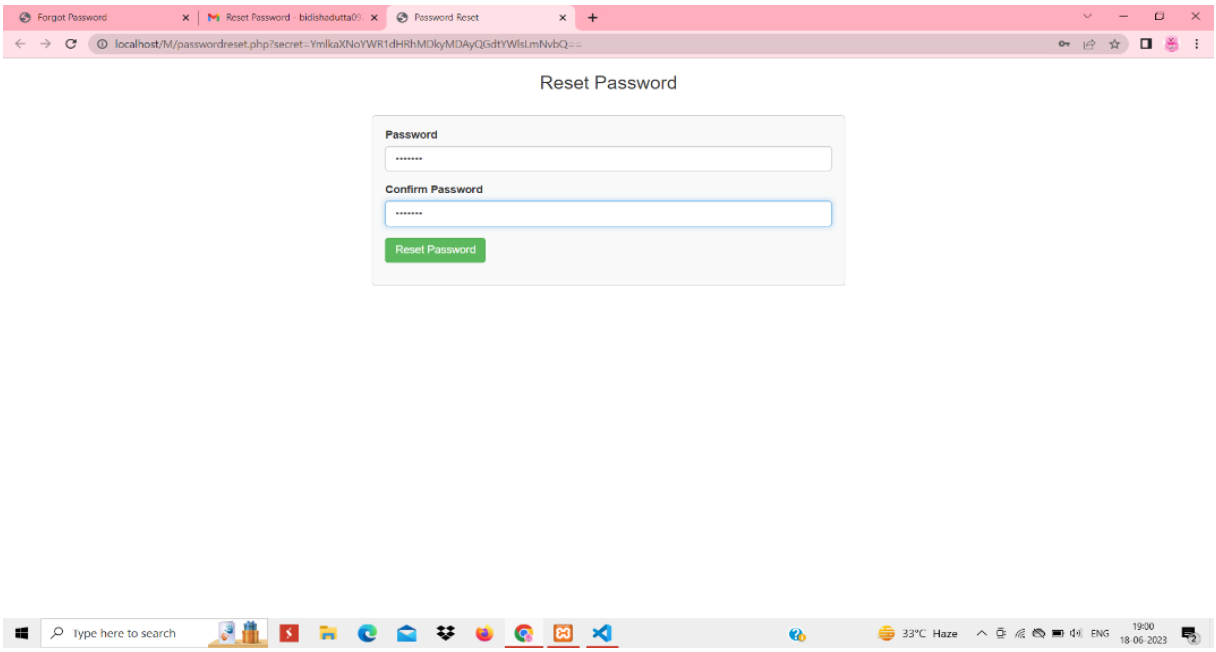
Login password reset of an employee:



Email received by the employee:



New password set by the employee:



LIMITATIONS

The limitations of our project are:

1. Employees who rely on mobile devices or tablets would not be able to access the system at all as mobile implementation of the project has not been carried out. The user would always require a desktop.

2. Only two leave types can be combined at a time according to the prevailing leave type combination rules.

3. No provisions for extension of leaves have been made.

4. While it provides basic reporting features, it has limited advanced analytics capabilities. Organizations seeking in-depth insights, such as leave patterns, trends, or forecasting, might need to rely on external tools or manual analysis.

5. The employee payroll system hasn't been connected with the leave management system.

CONCLUSION

In conclusion, the development of a leave management system for college staff using has been a significant project that aims to address the most of the specific needs and complexities of leave management in educational institutions. By leveraging the power of these technologies, the project team has successfully created a robust and decent system that streamlines the entire leave management process.

The implemented system offers numerous benefits to college staff, principal, HODs and administrators. It provides a user-friendly interface for employees to submit leave requests, view their leave balances, and track the status of their requests. Principal can efficiently review and approve/deny leave requests, ensuring smooth workflow management within their departments. Administrators have access to comprehensive leave data, enabling them to generate reports, analyze leave trends, and make informed decisions regarding resource planning.

Overall, the successful completion of this project signifies a significant improvement over the existing manual leave management processes in colleges. The implemented system optimizes efficiency, reduces paperwork, and minimizes errors, thereby saving valuable time for both staff members and administrators. It provides a centralized and secure repository of leave-related information, promoting transparency, accountability, and compliance with college policies and regulations.

As technology continues to evolve, future enhancements and updates can be incorporated into the system to cater to the changing needs of the college staff. Continuous support and maintenance of the system will ensure its long-term viability and reliability.

In conclusion, the leave management system developed using MySQL and PHP marks a substantial achievement in revolutionizing leave management processes for college staff. It sets a solid foundation for improved efficiency, accuracy, and convenience, contributing to a more streamlined and organized college environment.

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- Database System Concepts 6th Edition A. Siliberchatz, H.F. Korth, S. Sudarshan, McGraw Hill.
- PHP: The Complete Reference Steven Holzner