

EXCELSSIOR EDUCATION SOCIETY'S
**K. C. COLLEGE OF ENGINEERING AND
MANAGEMENT STUDIES AND RESEARCH**



(Affiliated to the University of Mumbai)

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**Department of Computer Engineering
Academic Year 2023-24(Even Semester)**



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● Introduction to Topic

- In the dynamic landscape of modern organizations, the effective management of human resources is paramount to achieving strategic goals and maintaining a competitive edge. The Enhanced E-HR System emerges as a comprehensive solution, seamlessly integrating technology and human resource management practices to streamline processes, enhance efficiency, and foster a more strategic approach to workforce management.
- The Enhanced E-HR system serves as the central hub for all HR-related activities within an organization, providing a robust platform for managing employee information, recruitment, performance appraisal, training, and more. This system not only automates routine HR tasks but also empowers HR professionals with valuable insights through analytics, aiding in informed decision-making.
- In this digital age, Enhanced E-HR System With the advent of technology The HRMS consolidates and centralizes employee data, providing a secure and accessible repository for personal details, qualifications, and performance records.
- Facilitating employee development, it aids in planning, implementing, and tracking training programs to enhance skills and knowledge.
- As organizations continue to recognize the strategic importance of their human capital, it emerges as a critical tool in fostering a positive employee experience, ensuring compliance with regulations, and driving organizational success. This introduction sets the stage for exploring the various dimensions and functionalities of the Enhanced E-HR System, ultimately contributing to the evolution of modern HR practices within the organization.



● Need of Project

- The need for a Human Resources (HR) Management System stems from the growing complexity of modern organizations and the crucial role HR plays in managing human capital effectively. Here are some key points highlighting the necessity of such a system:
- A Human Resources (HR) Management System serves as a centralized hub for employee information, automating administrative tasks and enabling data-driven decision-making. By ensuring compliance with evolving regulations and streamlining processes like payroll and leave management, it empowers HR professionals to focus on strategic initiatives. Through intuitive self-service portals and enhanced communication channels, it fosters employee engagement and collaboration while adapting to organizational growth and complexity. In essence, it's a vital tool for modern businesses to optimize HR operations, promote transparency, and drive sustainable success through effective talent management
- Centralized Data Management: An Enhanced E-HR System provides a centralized platform to store and manage employee information such as personal details, job history, performance evaluations, training records, and benefits. This centralized database ensures data integrity, security, and accessibility.
- Streamlined Processes: Traditional paper-based HR processes can be time-consuming, error-prone, and inefficient. An Enhanced E-HR System automates routine administrative tasks such as payroll processing, leave management, and employee onboarding, thereby freeing up HR personnel to focus on strategic initiatives.



● Problem Statement

Inefficient and disjointed human resources (HR) management processes within our organization hinder productivity, compliance, and employee engagement. Manual handling of tasks such as employee data management, payroll processing, leave tracking, and performance evaluations results in errors, delays, and suboptimal decision-making. Lack of a centralized Enhanced E-HR System leads to data fragmentation, compliance risks, and difficulty in accessing real-time insights for strategic workforce planning. Moreover, the absence of streamlined communication channels and self-service options undermines employee satisfaction and engagement levels. To address these challenges and enhance organizational efficiency, there is a critical need for the implementation of a comprehensive Enhanced E-HR System that integrates seamlessly with existing workflows, ensures regulatory compliance, empowers employees, and enables data-driven decision-making processes.

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Literature survey In Tabular Format

Year	Associated Person/People	State of the System
1982	Walker A.J.	HRIS development: Project team guide to build effective personnel information system
1984	Beer et al	Defined HRM as those involved in complex decision.
1999	Robert b.	Calculating return on investment on HR
2005	Hufelid, M.A	Becker work force of cord card management Human capital to execute strategy
2006	Behuselid	Strategic HR management, from journal of management



● Algorithm for Project Development

1. Project Initiation:

- a. Define project Objectives: Create a Enhanced E-HR System which helps to maintain records of employee and improve communication.
- b. Provide performance reviews as well as track record of hours attended by employee
- c. Access resources and timeline feasibility

2. Planning and Design :

- a. Design the UI architecture for Admin, HR, Manager and Employee
- b. Create a database to maintain all the records and information
- c. Make a connection between all the different profiles

3. Development:

- a. Build different profiles and features regarding each profile
- b. Code in order for these profiles to interact.
- c. Implement for each profile to send, receive or update data accordingly

4. Testing:

- a. Test the app for functionality, user-friendliness and performance
- b. Address and fix any identified issues

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● **Algorithm for Project Development**

5. Development:

- a. Develop the program in order for it to receive, store or update data.
- b. Make improvements based on user suggestions.

7. Documentation:

- a. Documentation app architecture, design decisions and key features.
- b. Create instructions for user to easily operate.

8. Project Closure:

- a. Verify project completion and compliance with standards.
- b. Archive project data and records.

9. Post- Project Review:

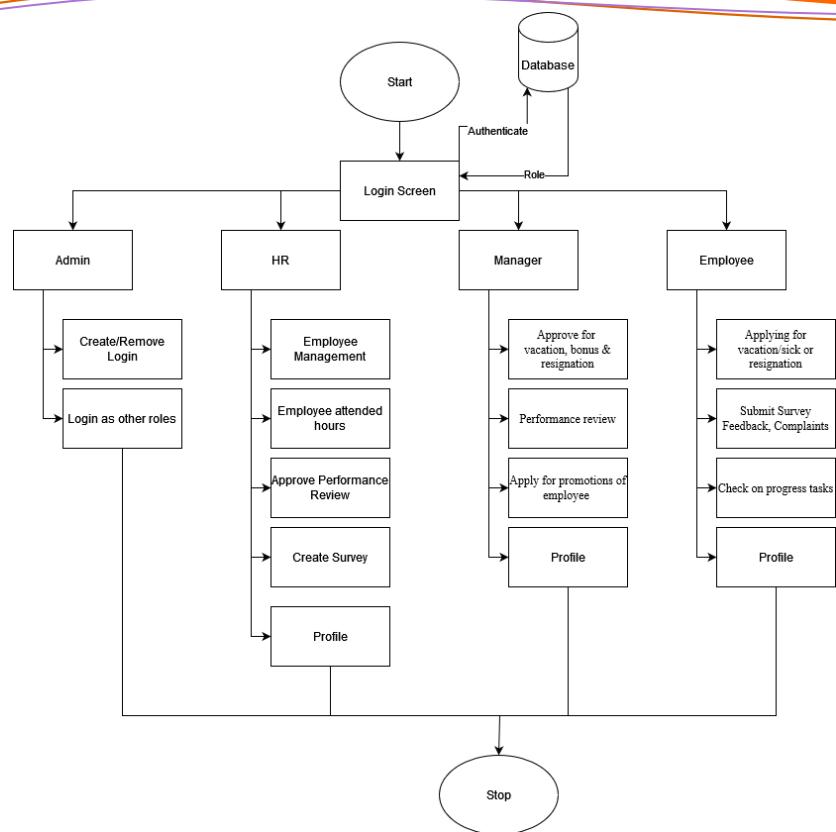
- a. Evaluate project performance against objectives.
- b. Identify areas for improvement and lessons learned.

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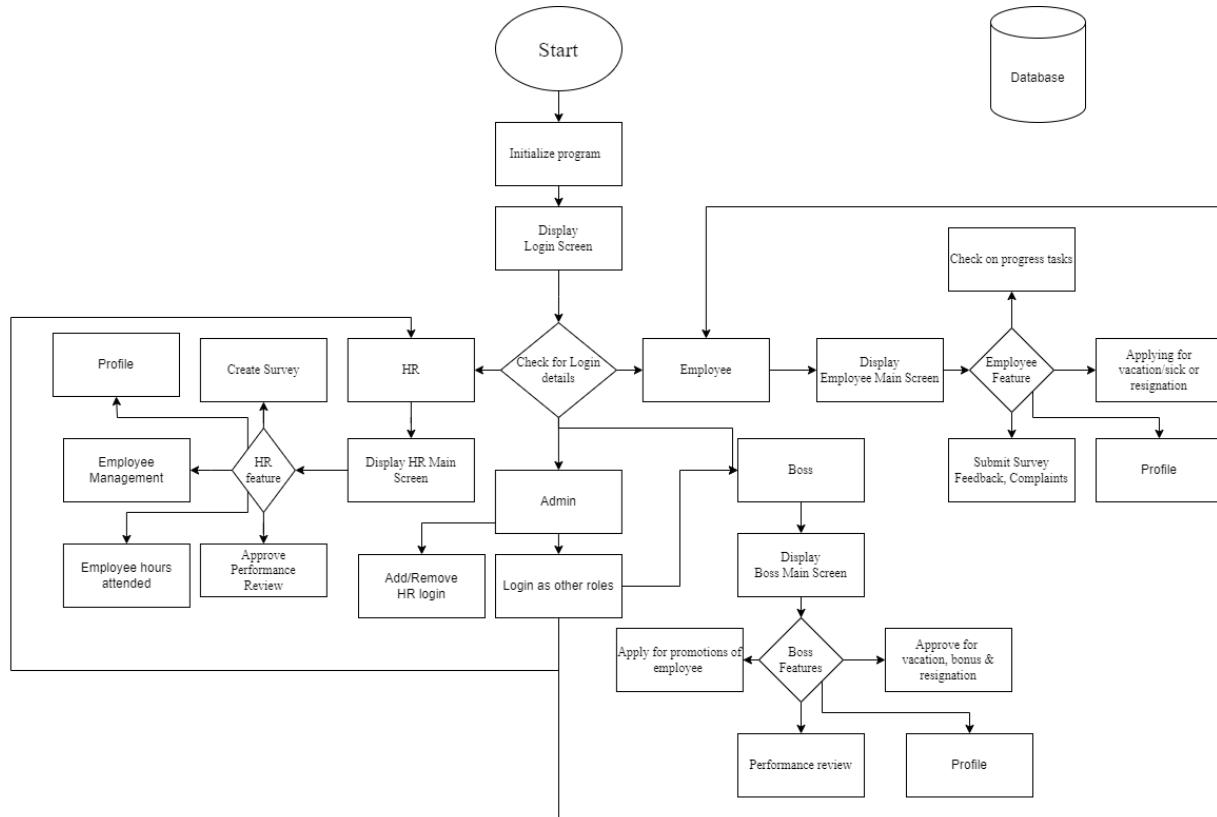
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● Block Diagram



Flow-chart



● Requirement Hardware and Software

Hardware :-

1. Minimum Requirements:
 - a) Processor:- Dual core processor @2.4Ghz
 - b) Ram:- 4GB Ram
 - c) Storage:- 2GB free space
 - d) Internet:- speed: 3mbps

1. Recommended Requirements:
 - a) Processor:- Quad core processor @2.8Ghz
 - b) Ram:- 8GB Ram
 - c) Storage:- 4GB free space
 - d) Internet: speed: 6mbps

Software :-

1. Minimum Requirements:
 - a) OS: Windows 10 22H2
 - b) Python: Version 3.11 with pil, firebase, firebase_admin and tkcalendar modules installed

1. Recommended Requirements:
 - a) OS: Windows 11 22H2
 - b) Python: Version 3.12 with pil, firebase, firebase_admin and tkcalendar modules installed



● Feasibility Study

1. Technical Feasibility:

- a) Python latest module required.
- b) Internet access required.

2. Economic Feasibility:

- a) Development costs are manageable within the allocated budget.
- b) Firebase is cost efficient database to use.

3. Operational Feasibility:

- a) The project aligns with the organization's capabilities and resources.
- b) Integration into existing operations is feasible.

4. Legal and Regulatory Feasibility:

- a) No significant legal barriers are foreseen, and compliance.

5. Scheduling and Time Feasibility:

- a) Project timelines allow for timely development and deployment.

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● Proposed Methodology

1. User Interface: -

- a. Intuitive design for employee self-service and admin dashboards.
- b. Responsive and user-friendly interface.

2. Database Management: -

- a. Centralized database for secure storage of employee data.
- b. Database management system for efficient data retrieval.

3. Application Logic: -

- a. Employee Onboarding: Digital forms and document submission.
- b. Attendance Tracking & Performance Records
- c. Performance Management: Goal setting, feedback mechanisms.
- d. Employee Self-Service: Leave requests and personal information.

4. Technologies Used: -

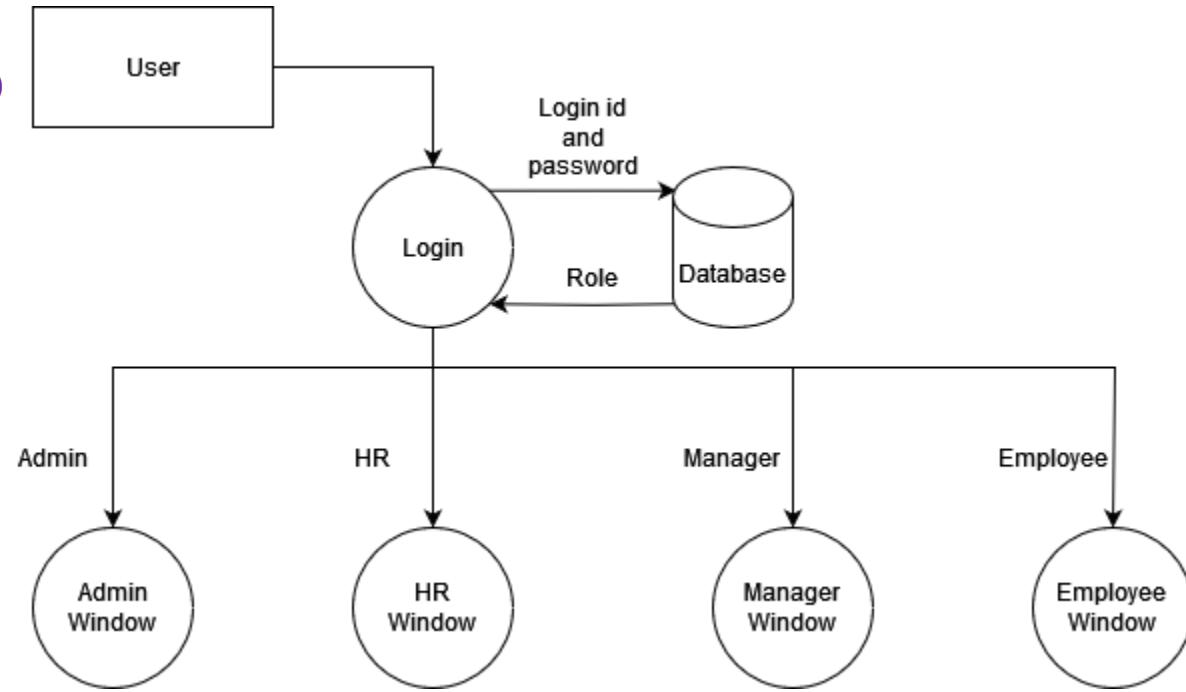
- a. Frontend: Python
- b. Backend: Python
- c. Database: Firebase

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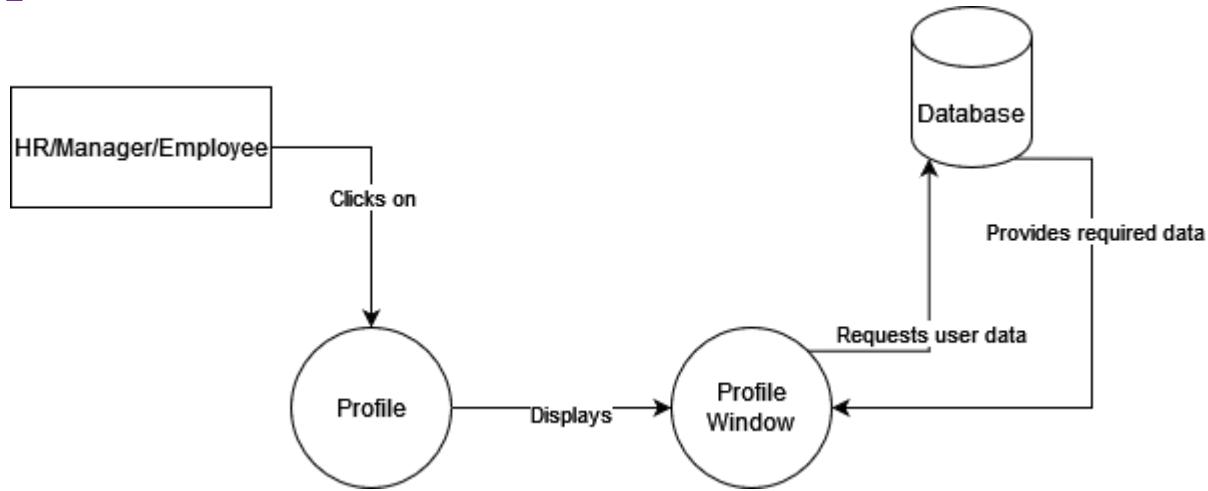
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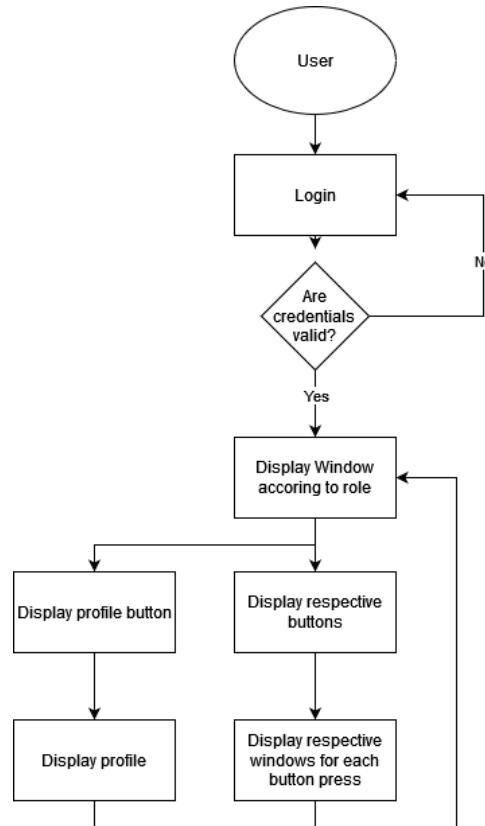
● Data Flow Diagram Level 0



● Data Flow Diagram Level 1



Activity Diagram



● Implementation Details/ Screenshots of GUI

Main Login:

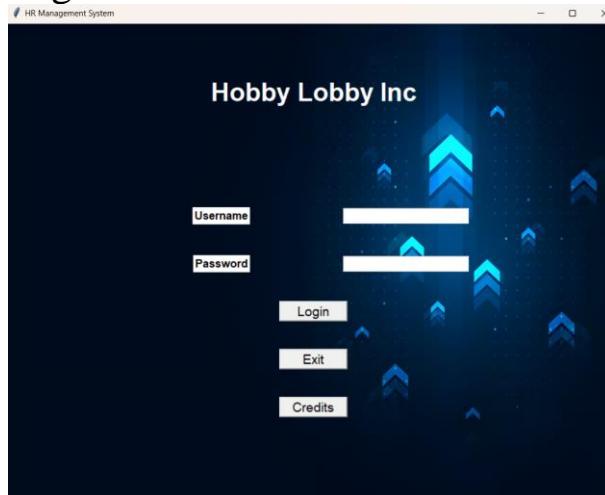
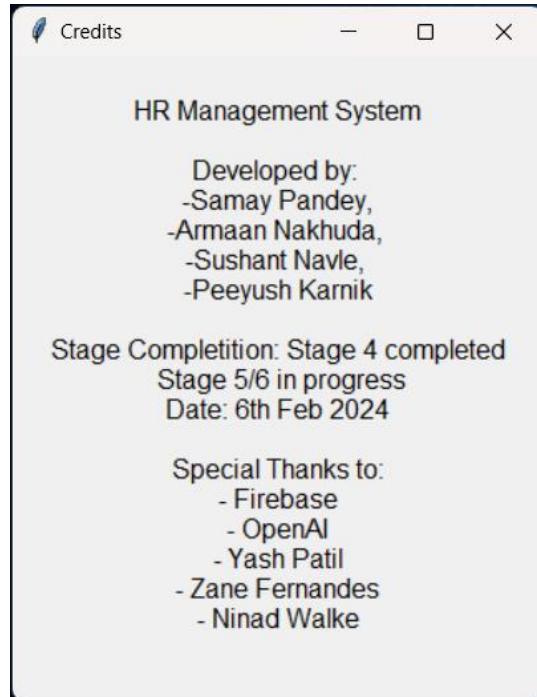


Figure 1

- The first page presented to the user upon opening the application, this page gives the input boxes to enter the username and password along with the login button and the exit and credit buttons.

There are 4 types of windows which will open following the user's login depending on what role has been assigned the user in the DB, the 4 types of logins are Admin, HR, Manager and Employee.





The Credits dialog which opens after clicking the credits button on the main login page.

Figure 2



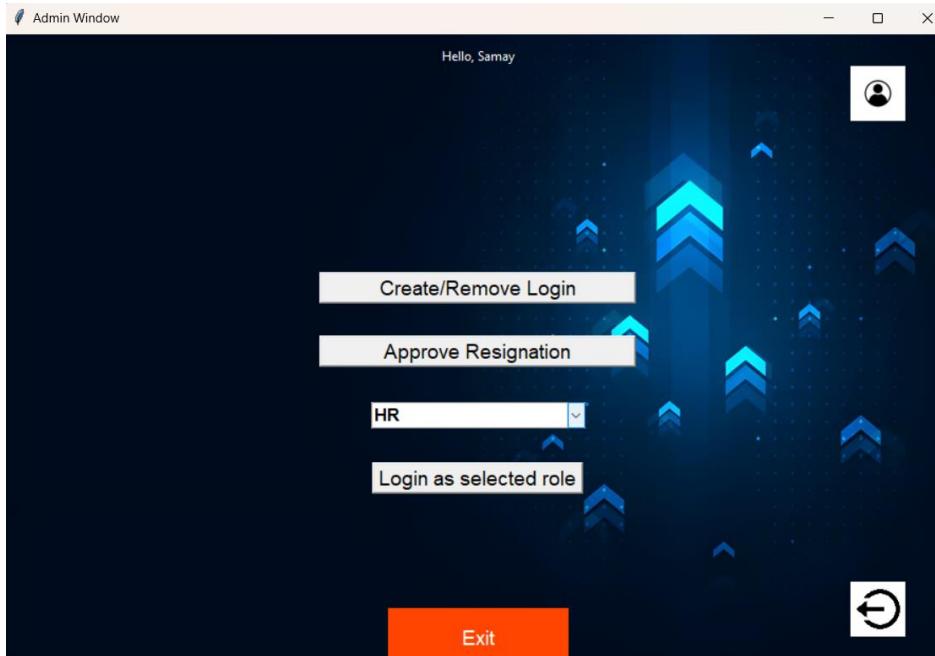


Figure 3

Create/Remove Login: This button will allow the Admin to add or remove logins of HR, Manager or Employee.

Login as Selected Role: The Admin will have an option to simulate as different levels of logins if he/she needs to view or test something as a different permission level.



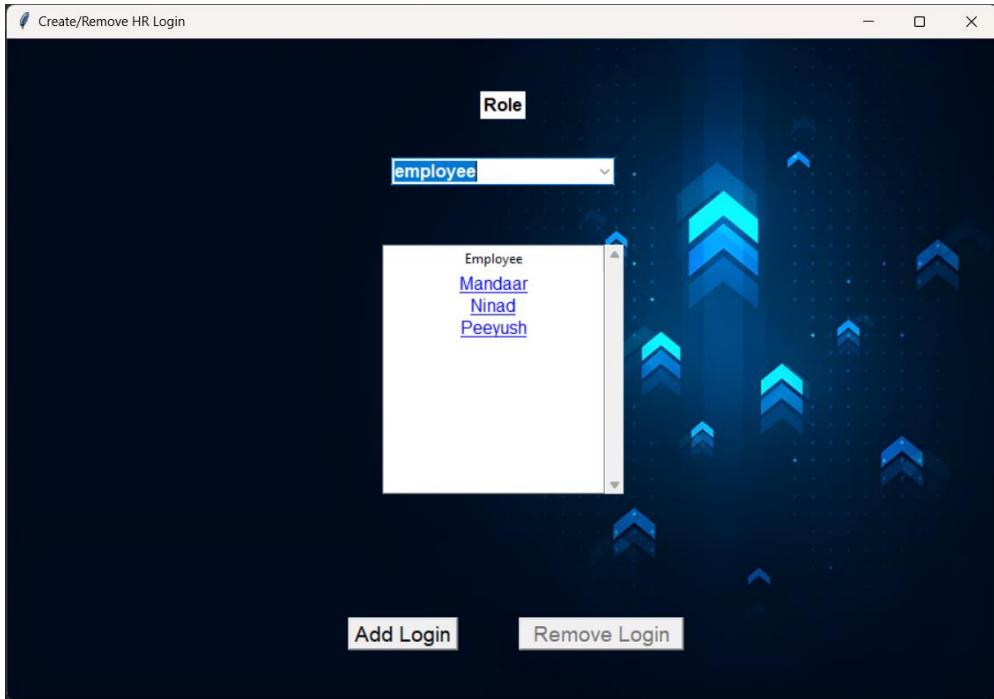


Figure 3

the first screen that is displayed to the user when the Create/Remove button is pressed, this screen gives the Admin the option to select the category of role so the logins of that role are shown, upon it being shown the Admin can select one role and delete it.

Clicking the Add login button, opens a new window



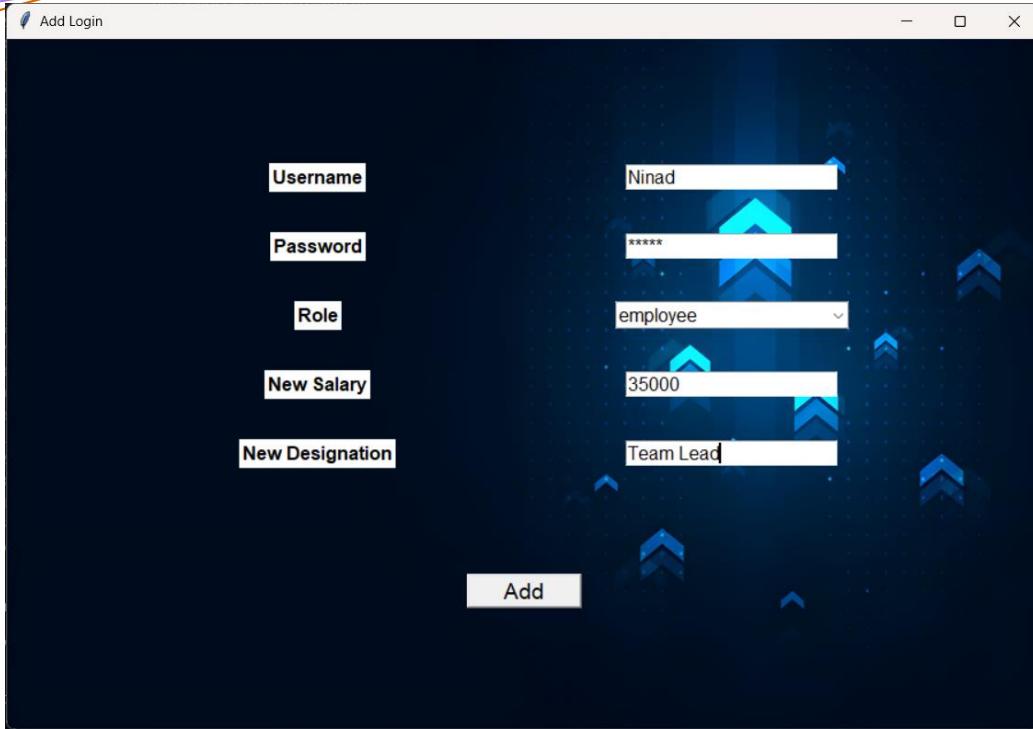


Figure 4



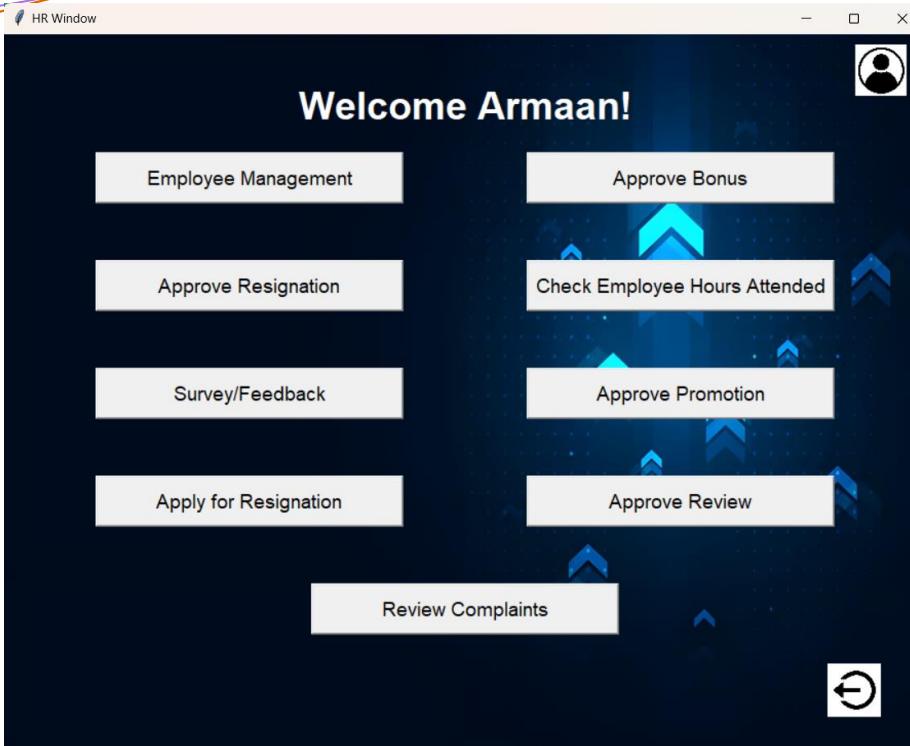


Figure 5

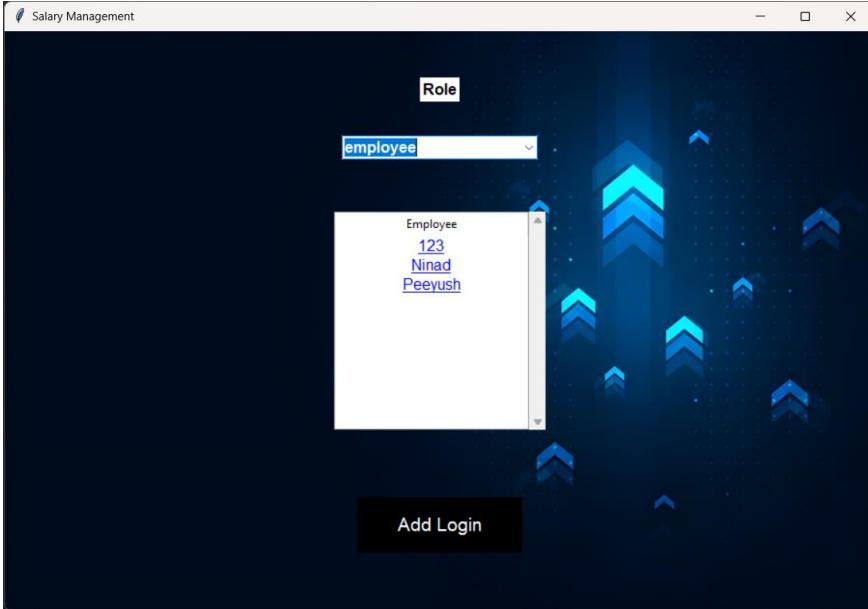


Figure 6

When the Employee Management button is clicked this window will appear to the user which includes a toggle to select the role between manager and employee, upon selecting the role all the logins within that role will show up in the list below, the user can then click on any name to show the details of the employee as shown.

The add login button will open a new window which allows to input the details for the new login as shown before.

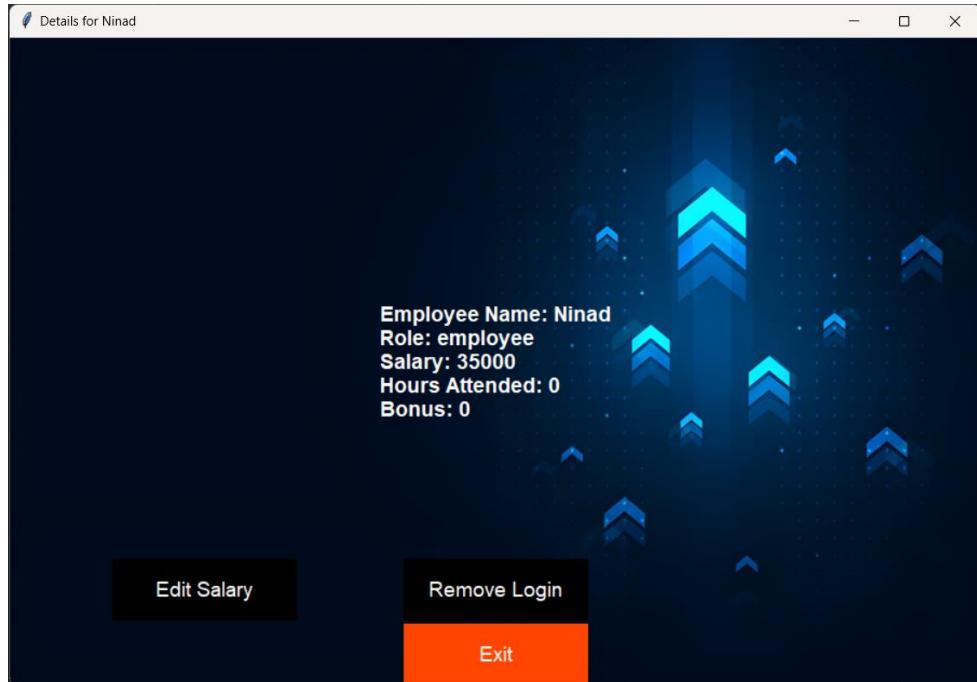


Figure 7

The details of the employee that was clicked is shown in a new window, along with the option to edit the salary and remove the specified login for the employee.



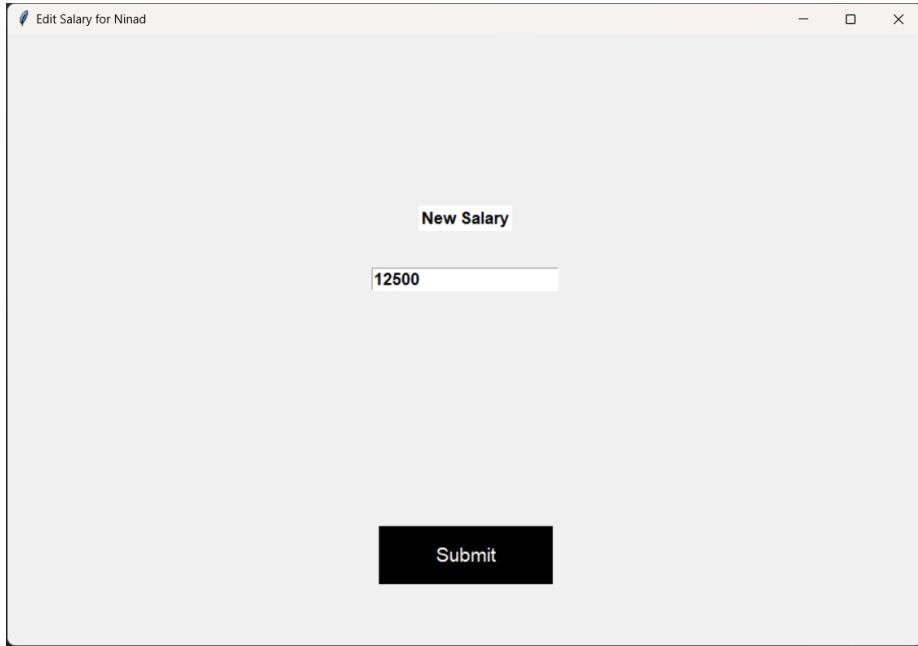


Figure 8

When the user clicks on edit salary button a new window will open asking for the input for the new salary of the Manager/Employee.



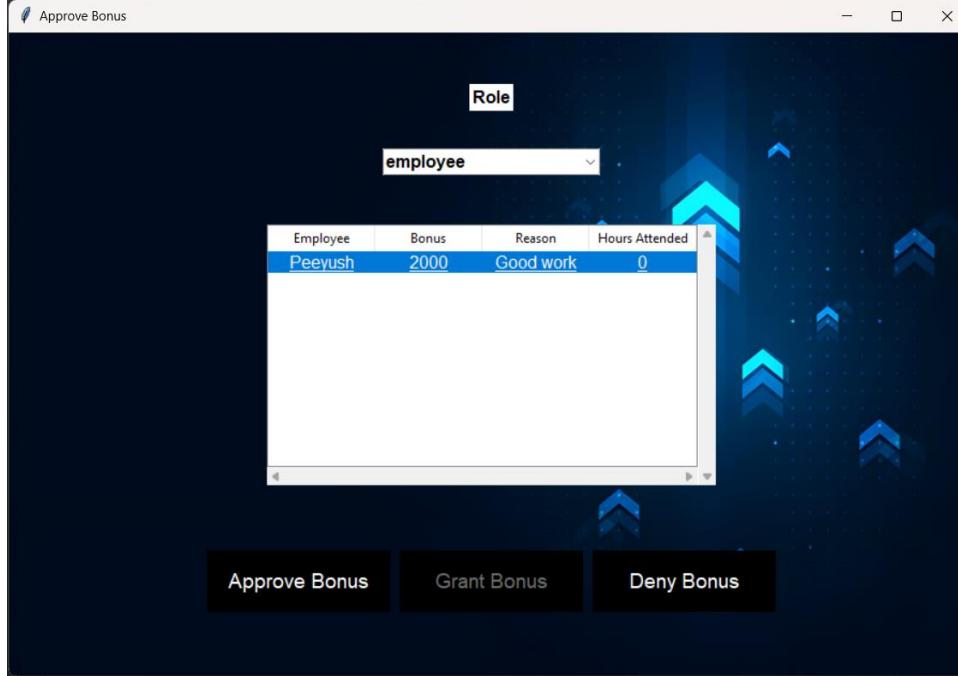


Figure 9

The Employee bonus is requested by the Manager and has to be approved by the HR, giving the HR two options to either approve or deny the request.



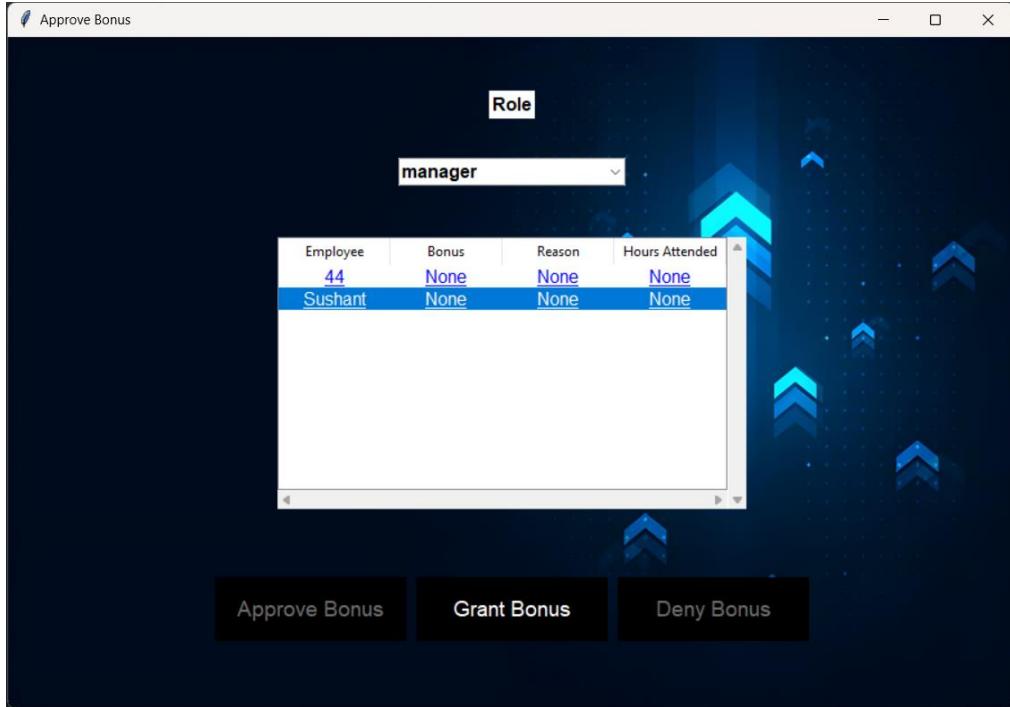


Figure 10



For Manager level the HR directly gives bonus on their discretion, therefore the grant bonus option is available which when clicked opens a new window

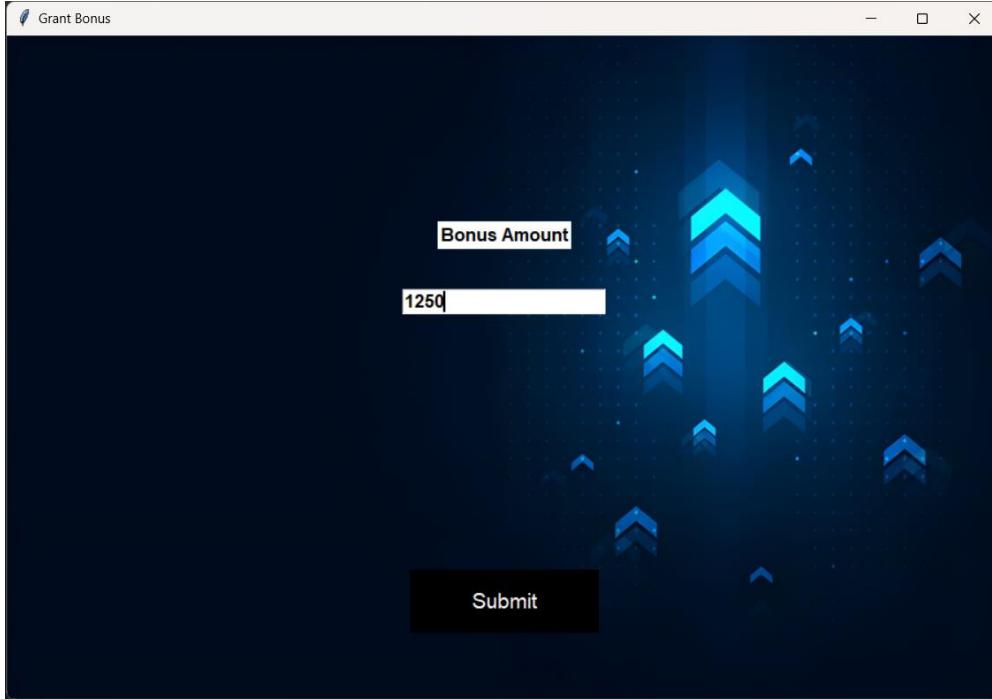


Figure 11



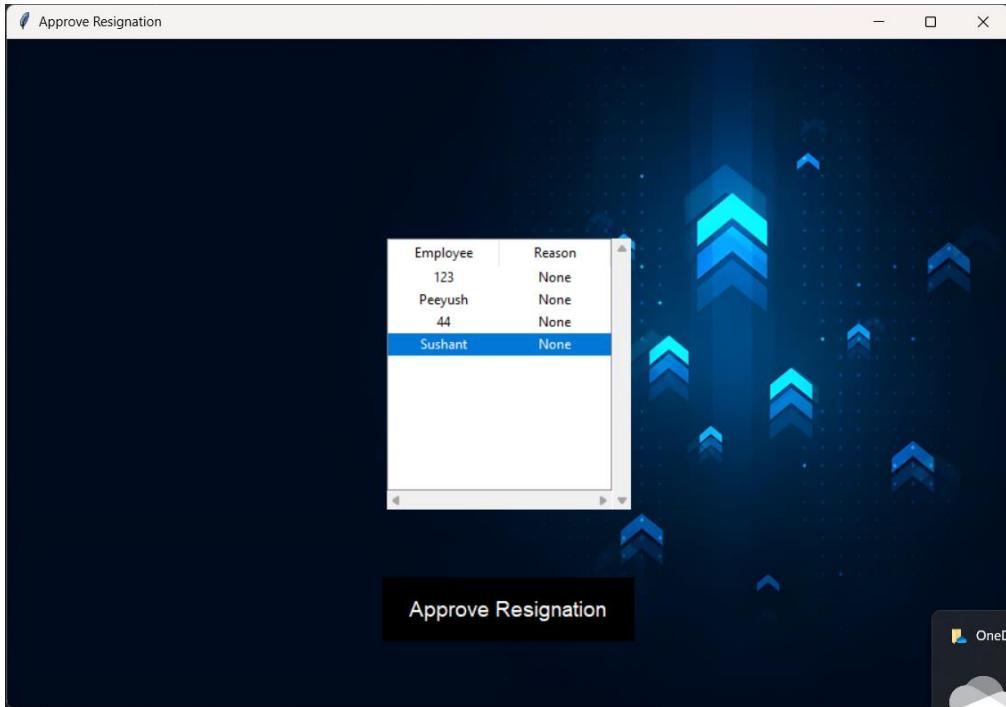


Figure 12

Upon clicking the Approve resignation button a new window shows up with the list of employees whose resignation approval is pending, upon clicking the respective employee the approve button highlights itself which can then be clicked to approve the resignation.



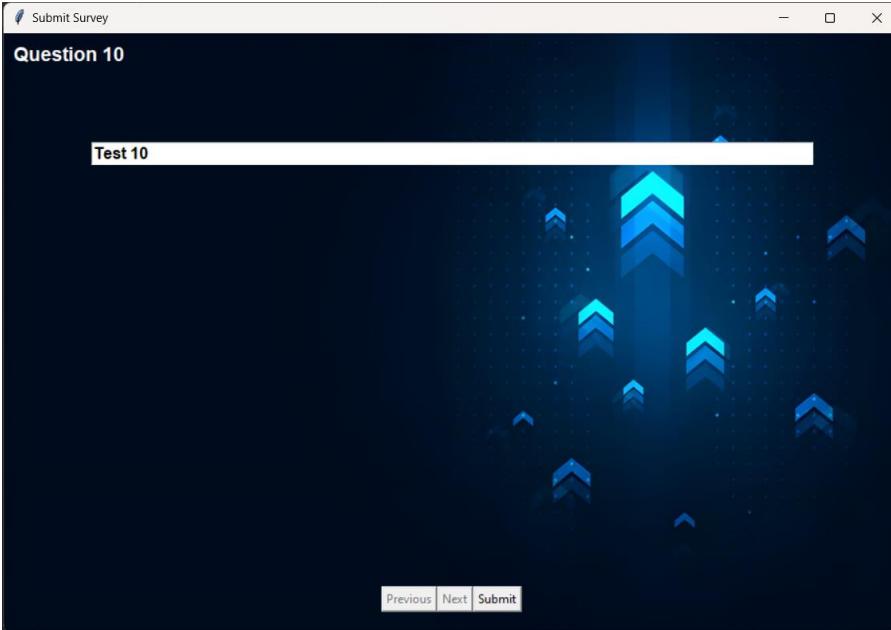


Figure 13

Show the last question of the survey along with the previous next and submit buttons to move between the questions and to assign the survey for the employees to fill it.



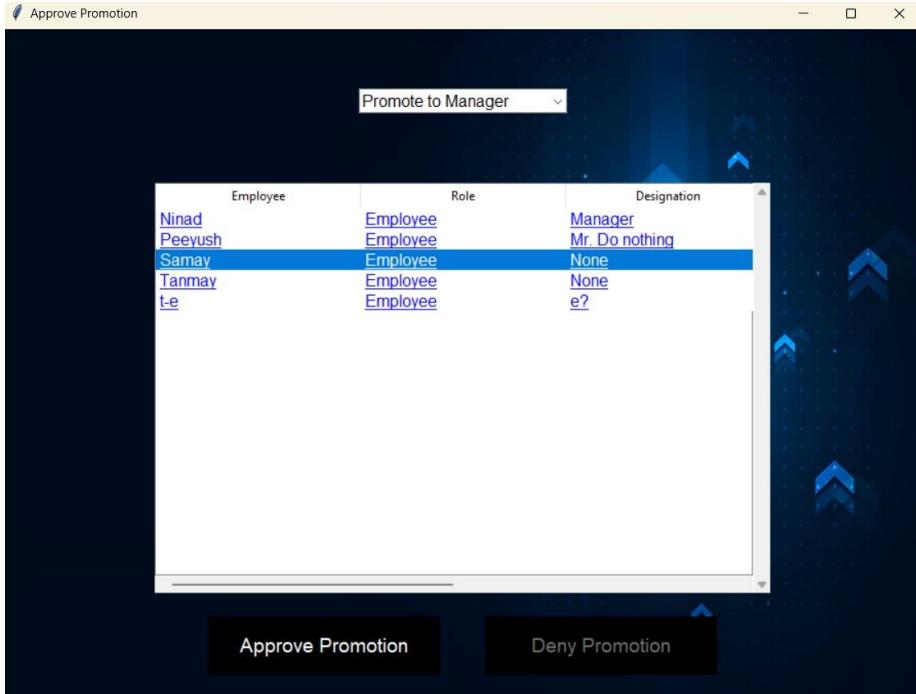


Figure 14



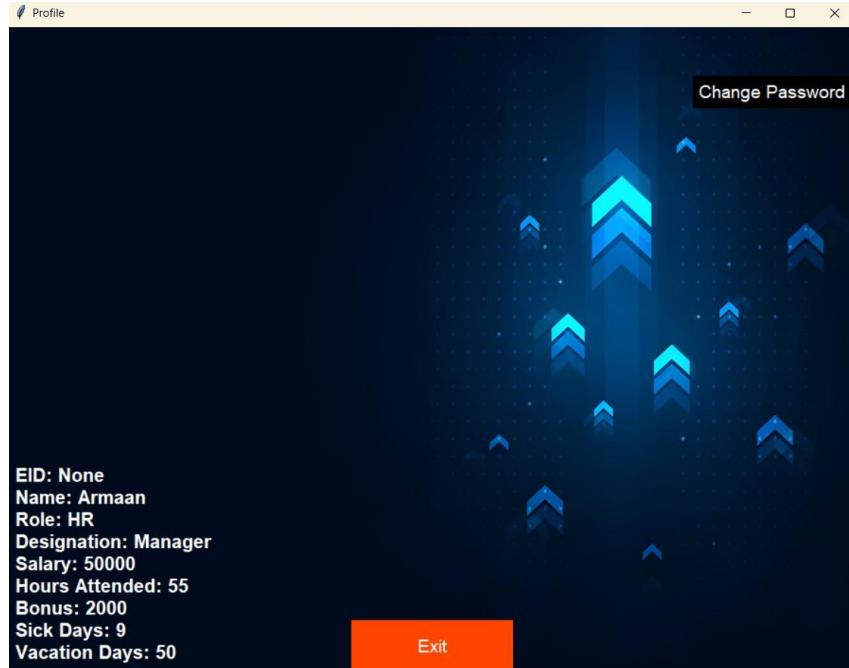


Figure 15

This Profile screen represents the details for the HR which shows the Name, EID, Role, Designation, Salary, Hours Attended, Bonus and Sick days leave/ Vacation days leave. The user is also able to change its password through this screen



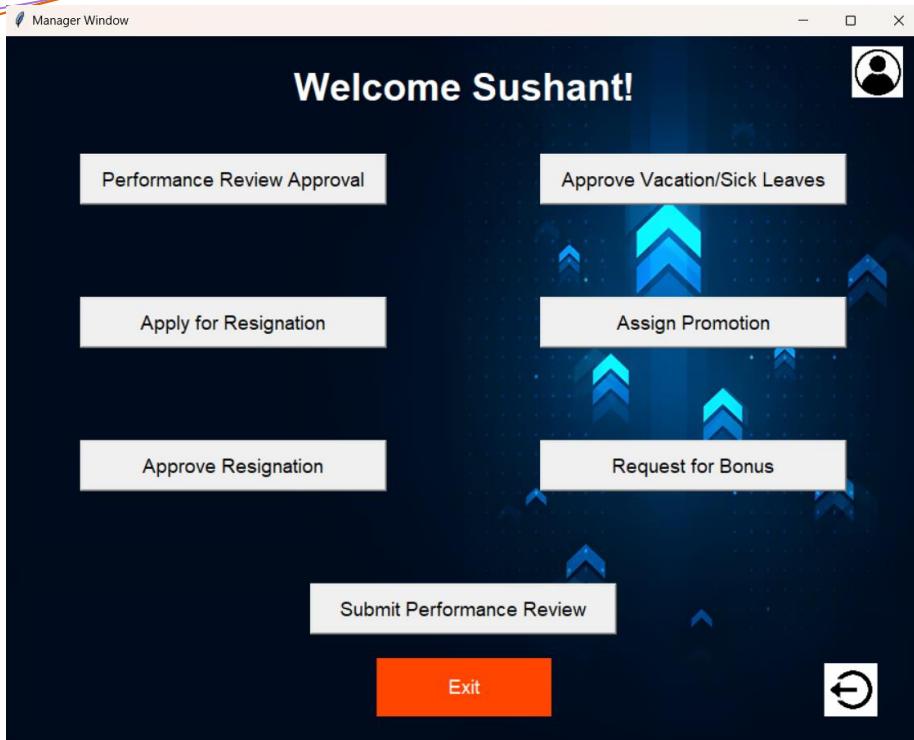


Figure 16



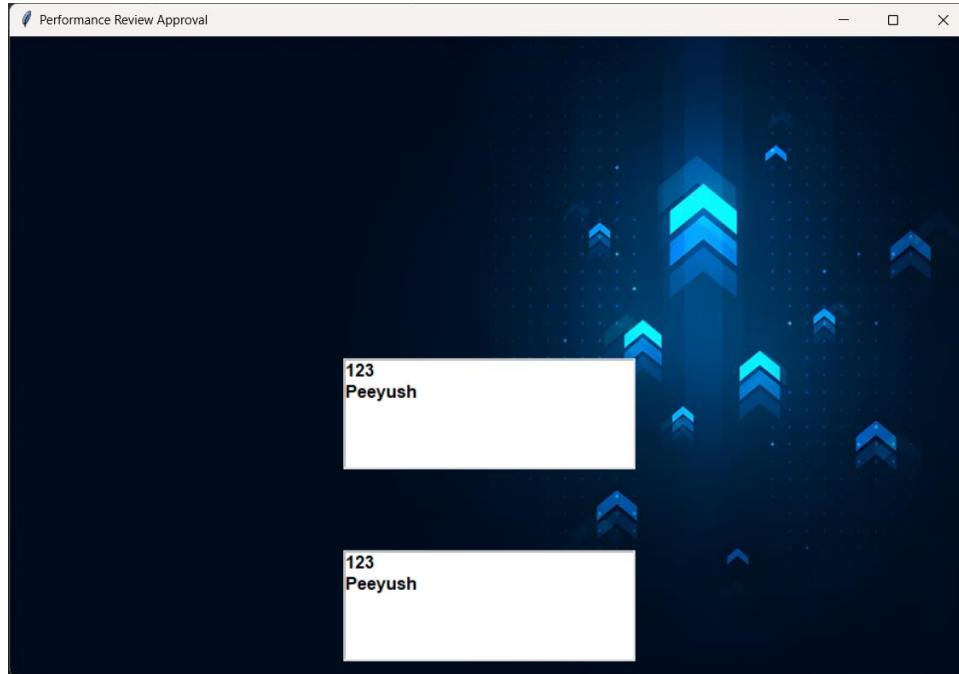


Figure 17

Opens a new window when the approve performance review button is clicked, this displays the list of employees who have filled their quarterly and annual reports separately, clicking each employee's name will give the information they have filled, that performance review can then be approved or denied by the manager.



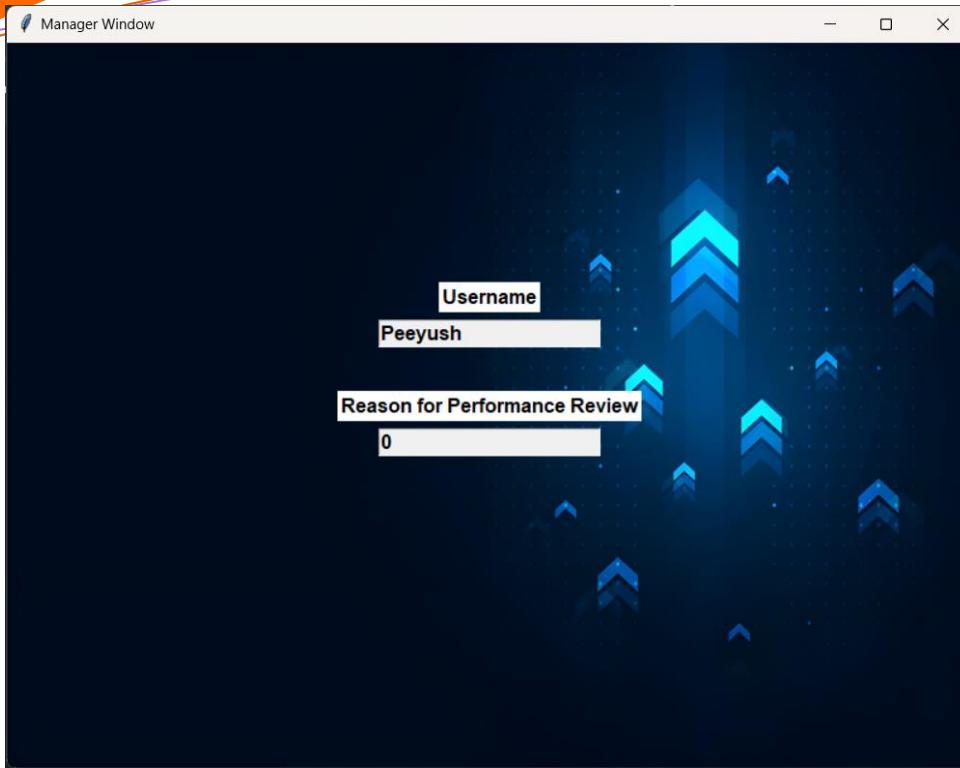


Figure 18

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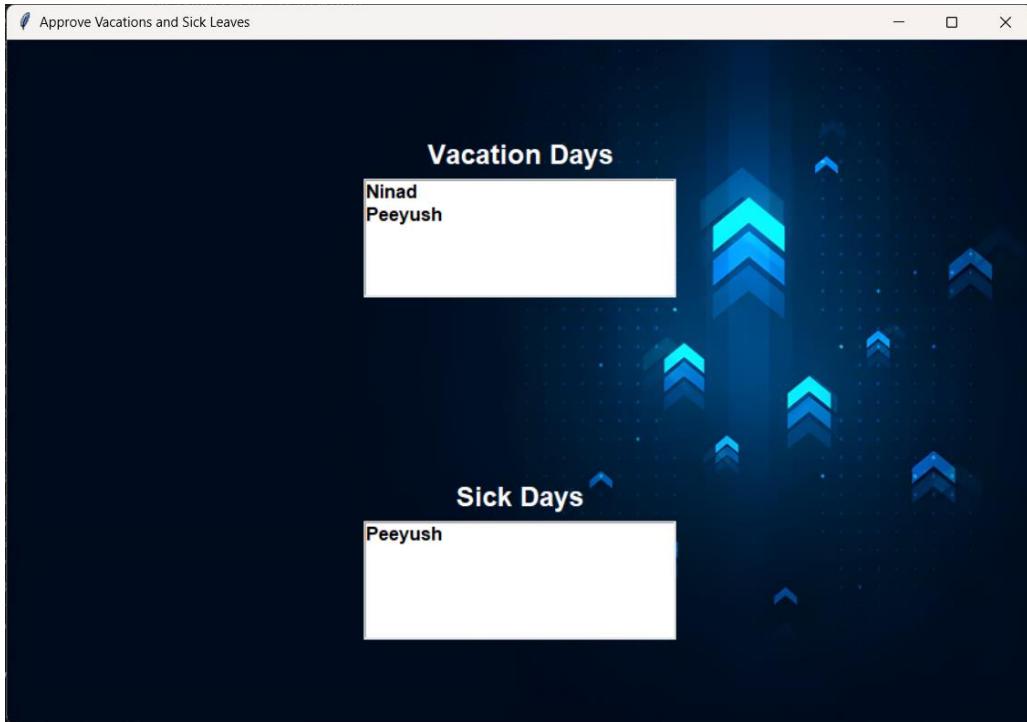


Figure 19



The list of employees whose vacation and sick leave approvals are still pending will be shown in separate list here, the Manager can then click on each user's name and view the details filled in

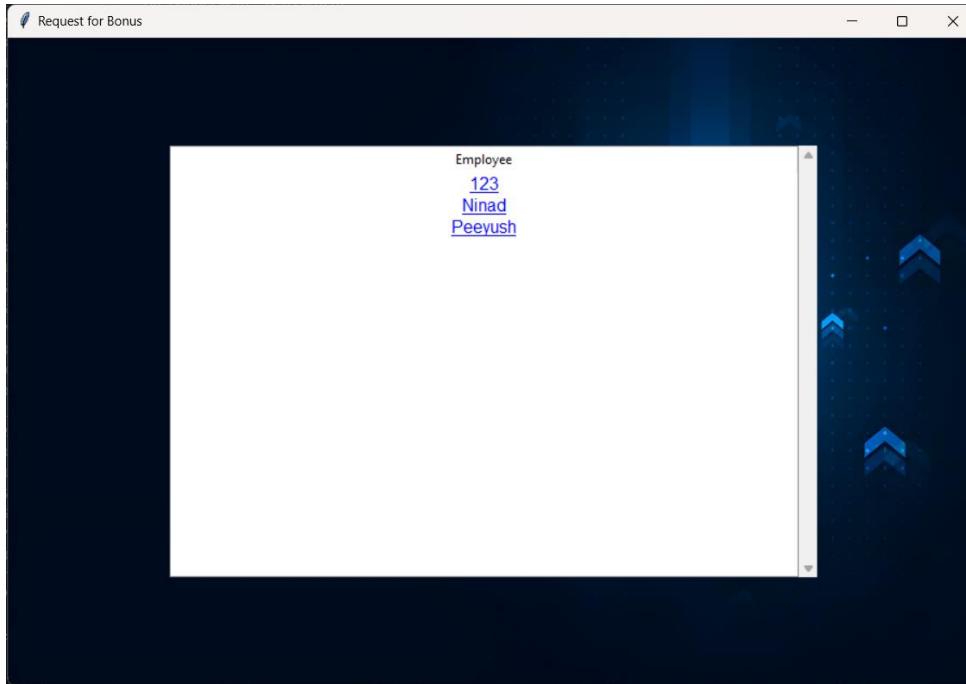


Figure 20

When the Request for bonus button is clicked a new window is created which gives the list for the employees which are clickable, upon clicking that window a new window is further created



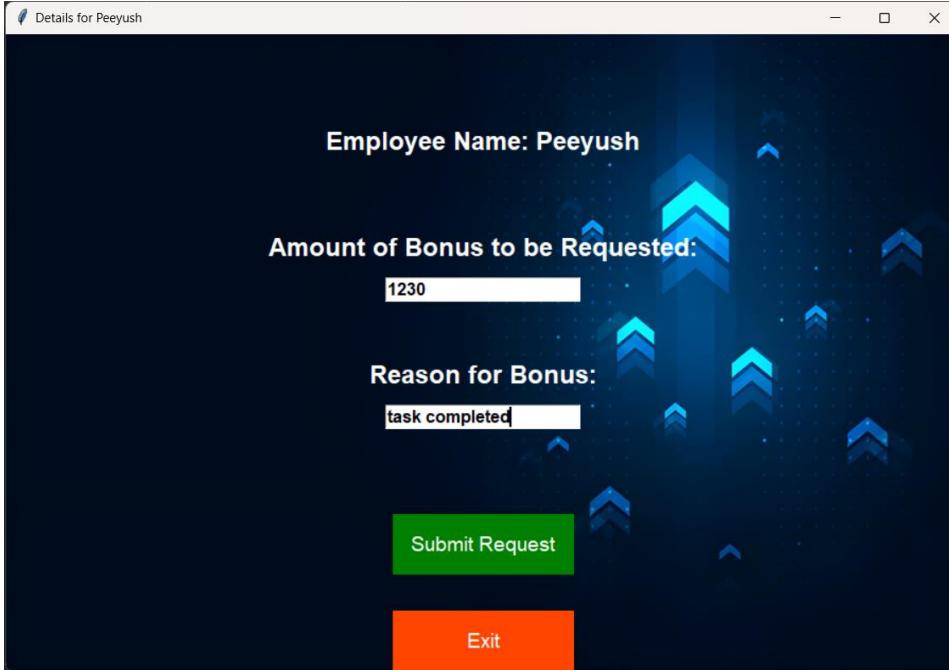


Figure 21

This new window gives the option for the amount of bonus to be requested by the manager for the employee along with the reason for this. There are also two buttons to submit the request or exit from that window.



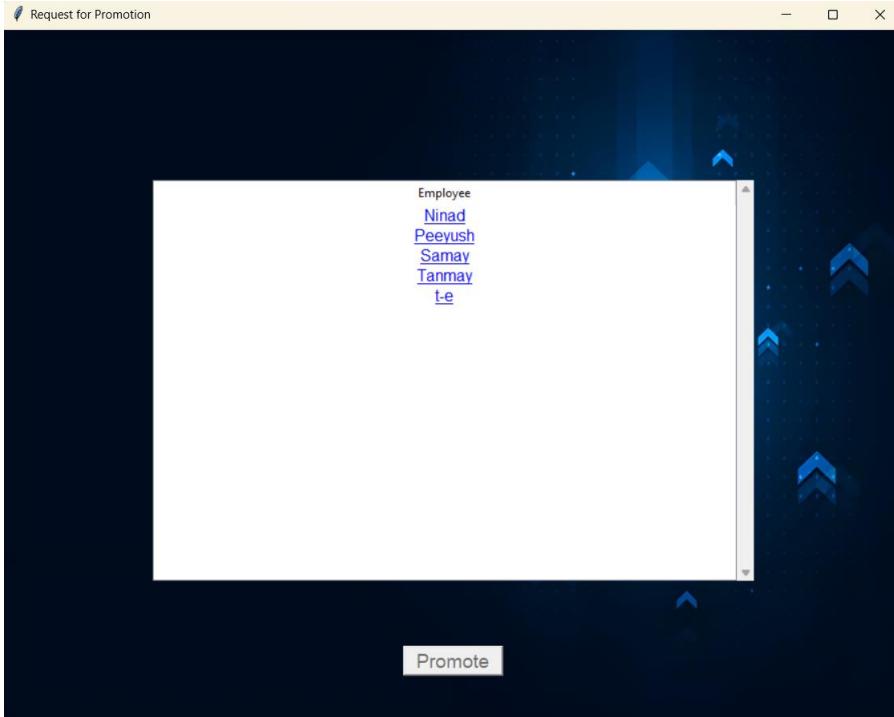


Figure 22

Upon clicking the Approve promotion button a new window shows up with the list of employees whose promotion approval is pending, upon clicking the respective employee the approve button highlights itself which can then be clicked to approve the promotion.



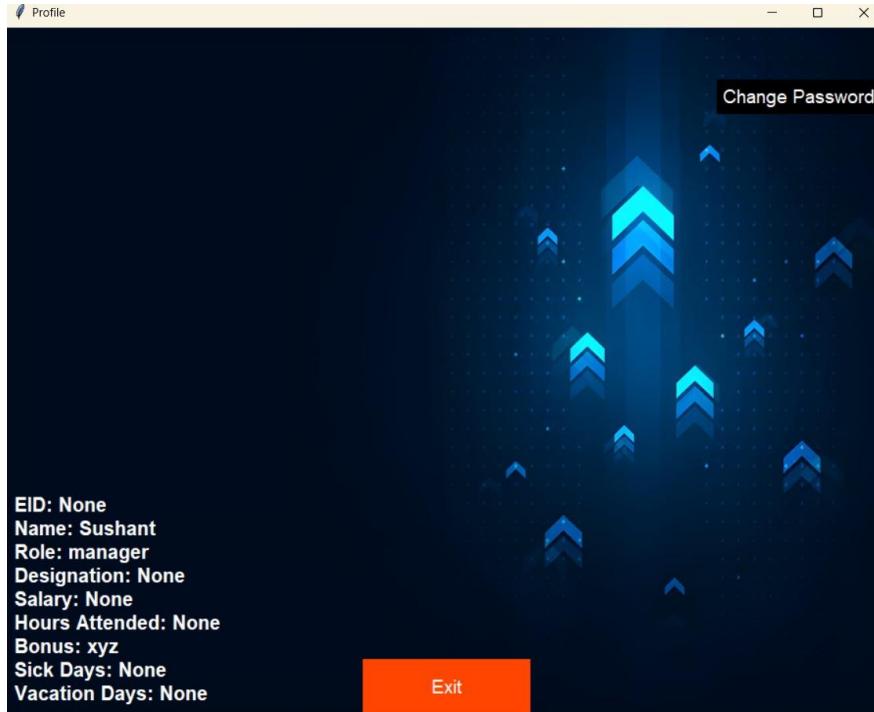


Figure 23



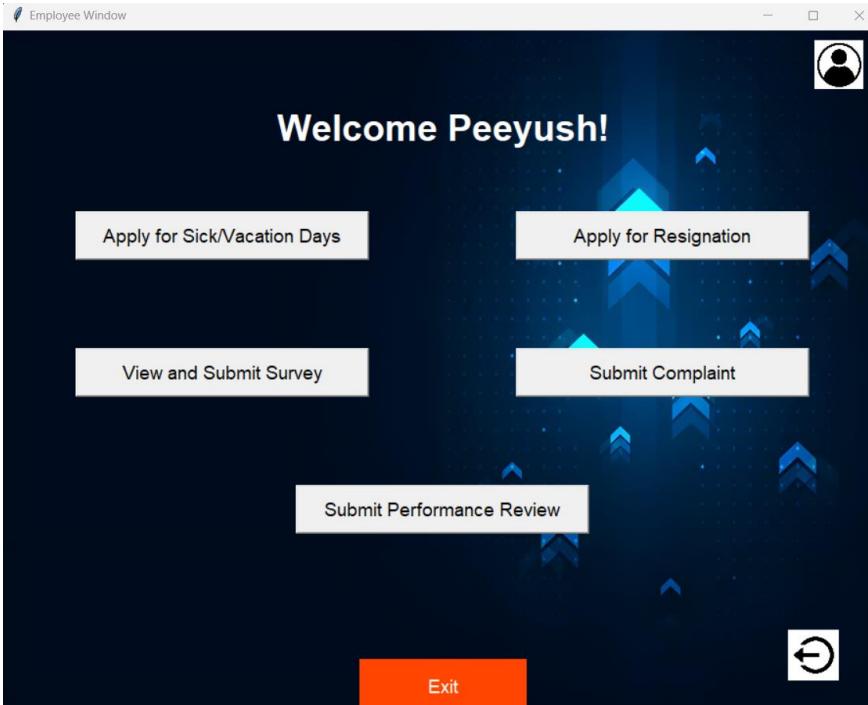


Figure 24

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The window shown to the employee role and permission level, it consists of options to Apply for sick/vacation days, apply for resignation, check view and submit surveys created by the HR, submit complaints of various things and submit their own performance review.

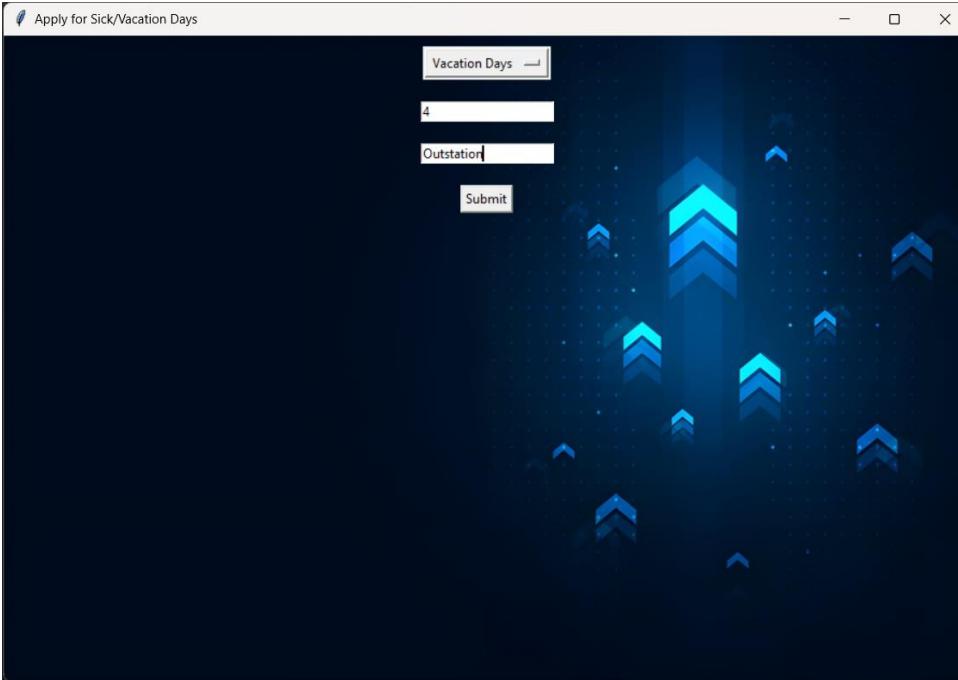


Figure 25

This window is opened when the employee clicks on the Apply for Sick/Vacation days button, it gives the employee the options to choose between the sick and vacation days request along with the number of days to be requested and the reason for the request.



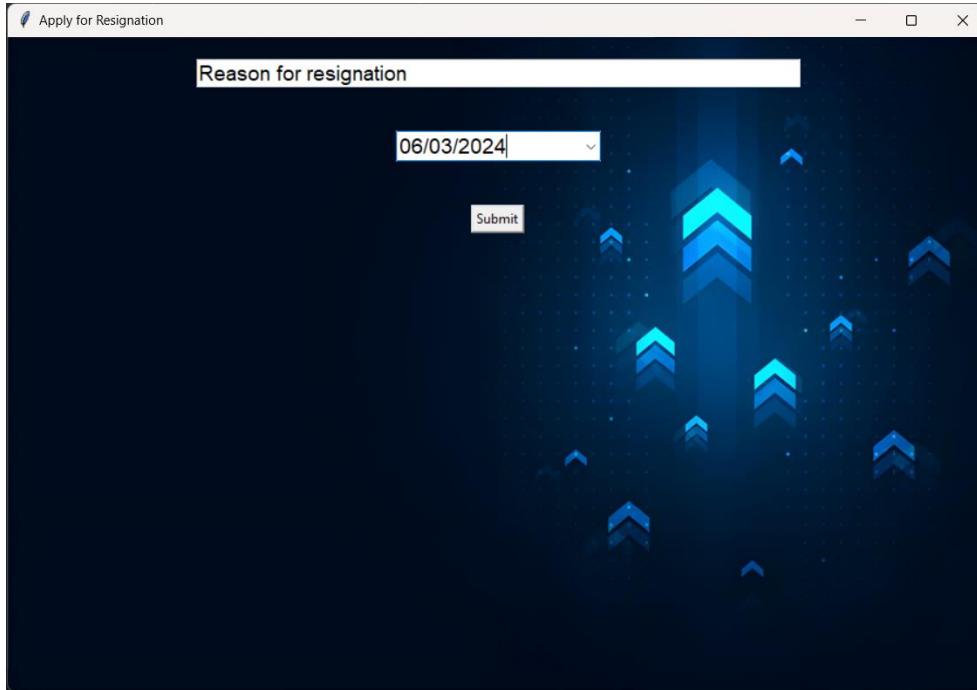


Figure 26



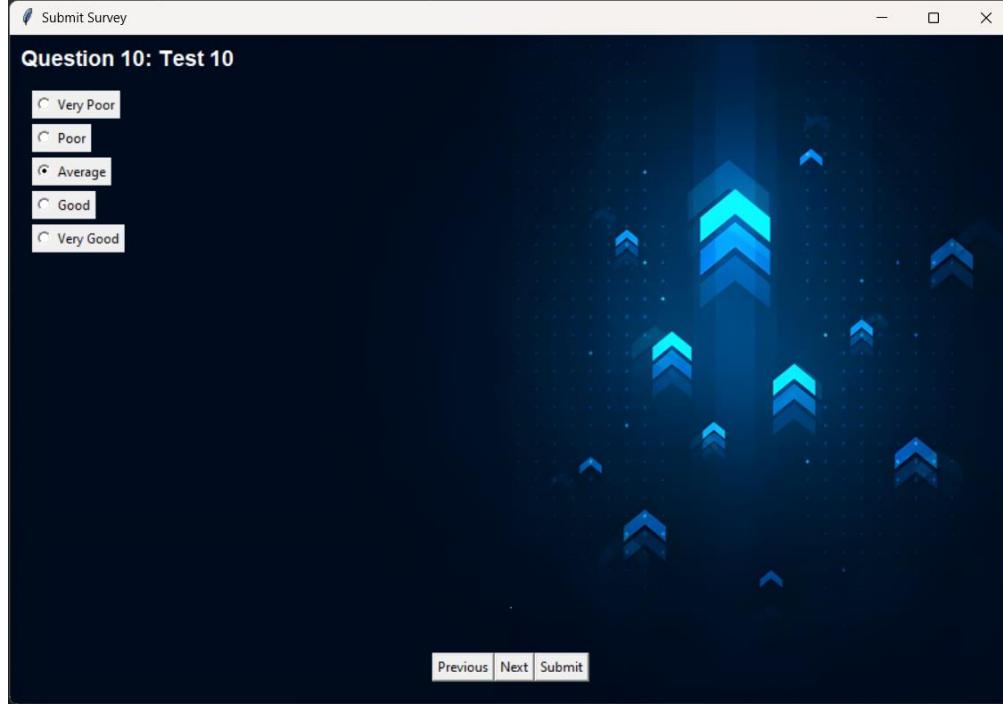


Figure 27



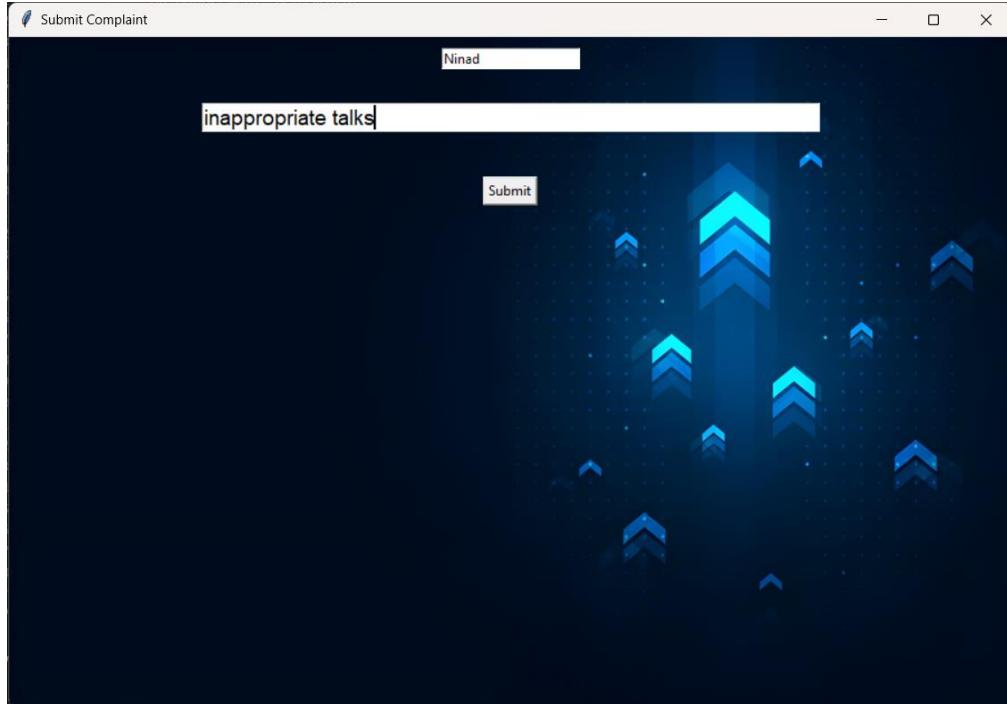


Figure 28



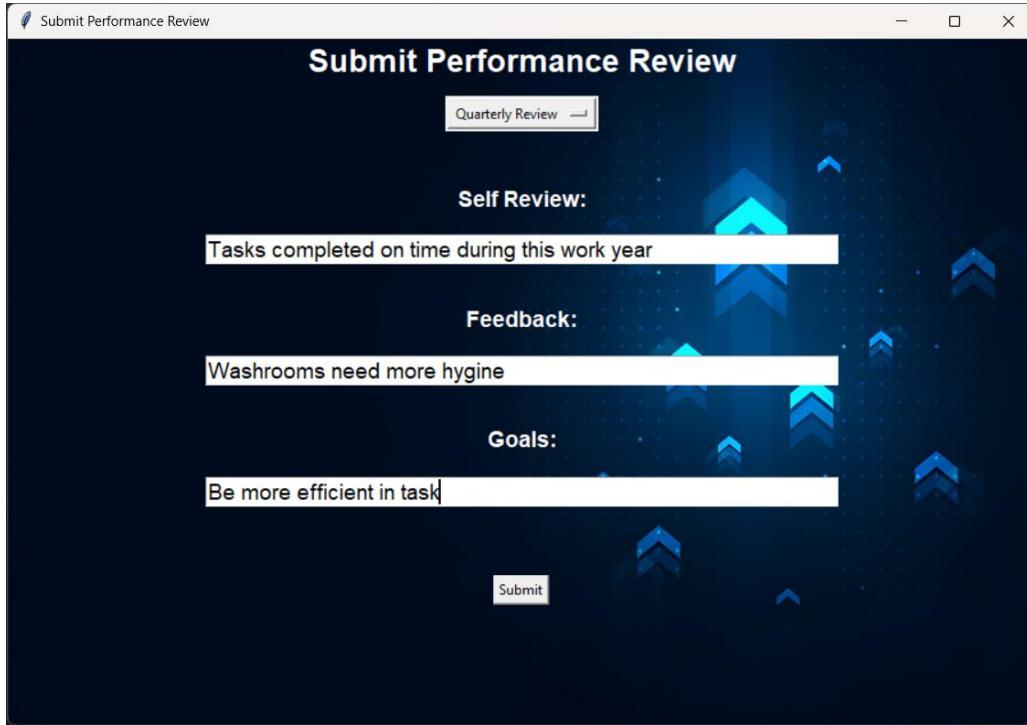


Figure 29



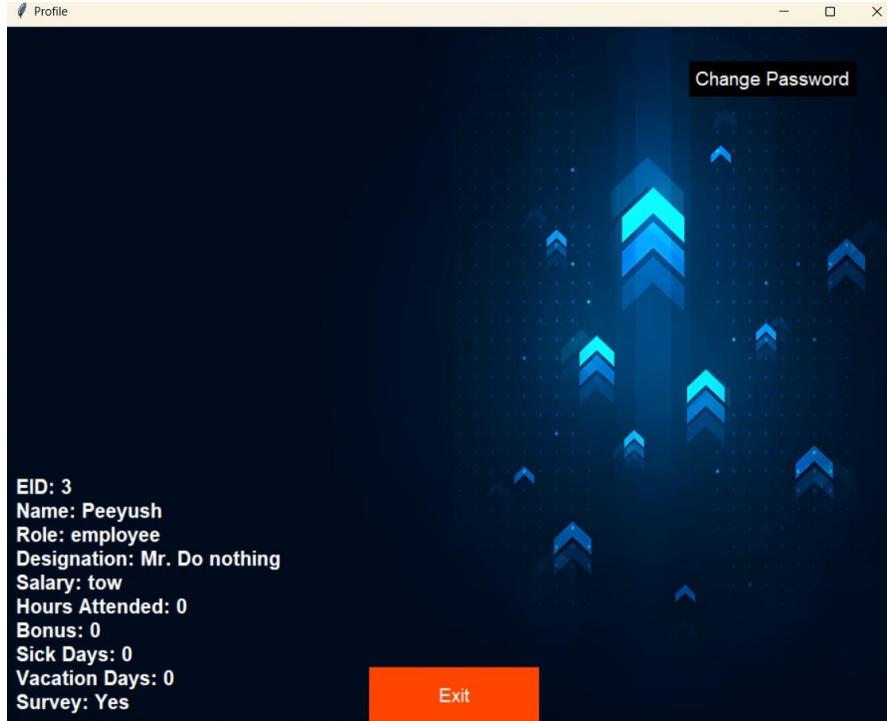


Figure 30



● DATABASE :

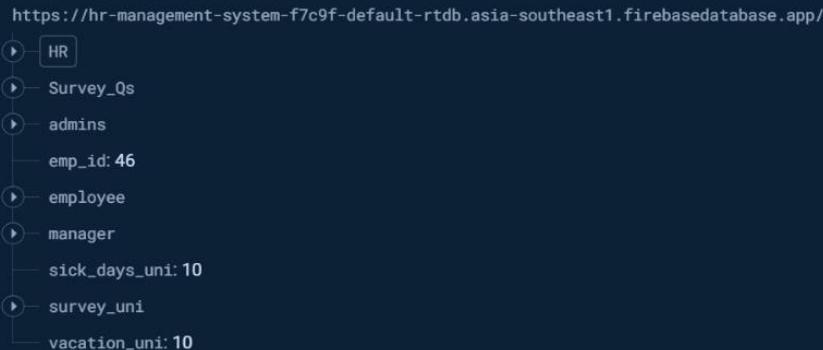


Figure 31

This is the complete structure of Database of Enhanced E-HR System which is made in Firebase Realtime Database. Firebase Realtime Database is a NoSQL database that stores data as JSON objects. Unlike relational databases, Firebase Realtime Database does not use tables with rows and columns. Instead, it uses a hierarchical structure of keys and values..



```
https://hr-management-system-f7c9f-default-rtdb.firebaseio.com/.json

- HR
  - Armaan
    - apply_for_vacation: 1
    - bonus: 2000
    - designation: "Manager"
    - emp_id: 1
    - feedback: 2
    - hours_attended: 55
    - password: "Nakhuda"
    - progress_on_task: 50
    - role: "HR"
```

Figure 32

For the HR role, it can retrieve different categories of data from both employee and manager. This role can also receive more details on a particular employee. Additionally this role is able to receive complains, bonus requests, approval resignation, Survey feedback etc. This is the highest role after admin in Hierarchy.



https://hr-management-system-f7c9f.firebaseio.com/.json

```
q8: "Test 9"  
q9: "Test 10"  
  
admins  
  Samay  
    emp_id: 0  
    password: "Pandey"  
    role: "admin"
```

Figure 33

The role of Admin is such that can overview the whole app from any profile or roles perspective in case of requirement. Although the admin has the access to every role and profile, this role cannot make any changes in the database through any roles. It's sole purpose is to manage the roles and different profiles. Additionally it can create or delete the profiles from the database.



https://hr-management-system-f7c9f-default-rtdb.firebaseio.com/.json

```
manager
  O m
  Sushant
    bonus: "1250"
    comment_for_promotion: "akwbaawbrw"
    designation: "mess maker"
    emp_id: 2
    password: "Navle"
  performance_review
    Quarterly Review
      role: "manager"
    salary: "30"
```

Figure 34

An Employee role is the only role which sends data first. It is updated as soon as the user logs in. This way the user is always updated with the latest change in the database. Also the Employee is capable of sending data in the form of Vacation leaves, Survey, Bonus request, Complains or etc. This is then received by Manager or HR in the respective case. And when this data is received and updated by the HR it's then send back to the Employee.



https://hr-management-system-f7c9f-default.firebaseio.app

```
employee
  Sairaj
    apply_for_vacation: 0
    bonus: 0
    designation: "User tester"
    emp_id: 58
    feedback: ""
    hours_attended: 0
    password: "Pai"
    progress_on_task: 0
    role: "employee"
    salary: "7000"
```

Figure 35

The role of Admin is such that can overview the whole app from any profile or roles perspective in case of requirement. Although the admin has the access to every role and profile, this role cannot make any changes in the database through any roles. It's sole purpose is to manage the roles and different profiles. Additionally it can create or delete the profiles from the database.



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The Github Repository of this Project with the Source code, Project Report and a copy of this PPT can be found at:
<https://github.com/Armaan4477/Backup-MP4>



● Certificates for the Research Paper :

Certificate of Publication



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