

Employee monitoring & tracking System

Group no-04

Lab Section-08

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Introduction

An employee management system is a distributed system developed to maintain the employee details and the company workflow process systematically. Employee engagement systems are structured to accurately monitor, assess, and control the working hours of workers and to efficiently utilize the human resources. As a business, employees are a true asset. Managing them is no doubt a challenging task, especially when the number of employees increases, it's even harder to control the entire workforce. Also in the time of the pandemic, a lot of companies have shifted their work online. With such problems in mind we have come up with the employee monitoring and tracking system. Through our system, a company can manage their huge number of employees by tracking their workflow data and attendance. As a result, desk-job employees from distant areas can do their job without the hassle of transport. Also good employees can be recruited from all over the world. This system will increase the productivity rate of the employees as every task can be scheduled and worktime, attendance, activity details of the employees will be documented.

Motivation

Our motivation came from the recent pandemic as many desk-job workers lost their jobs due to not being able to physically attend their workplace. Also many companies shifted to online but couldn't manage their numbers of employees. This gave us an idea that we can build a system which will solve all the problems a company has to face after shifting their office based work to online. Hence, the employees can continue their work from home without any hustle and the supervisors can monitor their workflow.

System Requirements

Project Sponsor: Reshad Karim Navid, Managing Director , Managing Director of Nest Security Services

Business Need:

This system is for monitoring the workflow; worktime, attendance, activity details being documented of the employees working in the office and managed by the admins through organizing, adding or removing

the consensual user. Also notifying the employees about new tasks & progress, alongside a manual review system for supervisors.

Business Requirements:

There will be two types of users in this system - general employees and supervisors.

The general employees are the users whose work will be monitored within their given work-time while the supervisors will be in charge of monitoring, updating and reviewing their tasks.

This system is compatible with any devices and supports Windows, Mac, Linux, Android, iOS, and Chrome operating systems. By this product, supervisors can know what the employees are doing and what projects are being worked on. This is especially true for businesses with remote employees, outsourced teams, or workers that are on the computer all day.

- The supervisors can see employee attendance, web and app engagement time, screenshots along with screen recordings, and website history reports throughout the working time.
- The supervisors can make an account for the employees manually after getting their data and also update their task according to their workflow.
- Employees will get notification when a certain task is assigned to them and also see the progress and duration of each task.
- All the employees' workflow data (time spent in each software, attendance, engagement level etc.) will be present in a single page for the supervisors to easily monitor.
- Screenshots and screen recordings are only taken when employees indicate they're working and can be deleted to maintain privacy. The screenshot feature, with optional time interval settings, can be enabled or disabled for each user. Privacy of personal data will be maintained.
- Certain number of employees can be supervised by an established number of supervisors.
- The supervisors will also update the time required to invest in the tasks given to the employees.
- There is a feedback system for the supervisors to give reviews to certain employees assigned under them after completing individual tasks.
- The contact information of the supervisor will be visible in the software to the respective employees so that they can consult with their respective supervisor and vice-versa.
- Online or offline, the work progress will be monitored and recorded. Even if the employees are working offline or get disconnected, the software will continue to track the progress. Once back online, this information will be synced to the employees account.

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- After completion of a task, the employee can turn in his work and mark the task as done which will then be monitored and evaluated by the supervisor.
- Supervisor will make the payment transaction to the bank accounts of the employee.

Business Value:

- This system helps a company in improving the productivity and attendance of employees working from home.
- Monitoring how much time employees spend working at the computer vs. away, as well as, how long their breaks last.
- By this system, a company can save money by not renting big workplaces/offices for only computer-based activities.
- Utilizing this product, a company can hire international employees benefiting both the firm and the employees.
- Schedule and planning can be done easily through this software.
- Easy to use and increases the time efficiency.

Business Constraints:

- Employees' consent to use their information in the system.
- Getting permission from the government to use this system in a business company.
- Training a group of supervisors and employees to use and update the system properly.
- Task needs to be rescheduled if an employee fails to complete it on time.
- Employees may feel the stress of getting monitored while working.

Requirement Analysis

Functional Requirements:

1. System:
 - 1.1. The system will record data (attendance, work-time, work progress etc.) of the employee and show it to both the employee and his/her supervisor.
 - 1.2. The system will give notification alerts to employees when their duty time starts.
 - 1.3. The system will give notifications to the employees when a new task arrives and when there is a deadline.
 - 1.4. The system will start recording data of the employee when s/he begins her work.
 - 1.5. The system will give notifications to the supervisor when a task is completed by the employees.

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- 1.6. System will record the usage of each application of the employee during the work time.
- 1.7. The system can prioritize external applications, upon manual selection by the supervisor, and monitor the usage time by the employee.
2. Employees:
 - 2.1. The employees using this software will have to login to their respective accounts.
 - 2.2. The Employees can set alarm and timestamps to increase the efficiency of their workflow.
 - 2.3. All employees will have a feedback category and the supervisors can provide feedback and suggestions to the employees.
 - 2.4. Employees can also see their workflow data.
 - 2.5. All the tasks given to the employee will have a starting time and a deadline; tasks exceeding the deadline will be reported to the supervisor respectively.
 - 2.6. Employees will get payment on their respective bank accounts and a payslip will be emailed after getting the payment.
3. Supervisors:
 - 3.1. The supervisors using this web app will have to login to their respective accounts.
 - 3.2. Supervisor will create accounts for employees.
 - 3.3. The supervisor will check attendance.
 - 3.4. All the soft resources can be distributed to the employees, individually, by the supervisor.
 - 3.5. The supervisor will also update the time required to invest in the tasks given to the employees.
 - 3.6. Supervisor will give feed-back to their employee after monitoring his/her workflow.

Non-functional Requirements:

1. Operational:
 - 1.1. The system should be able to run on PCs, Tablets, Smartphones, Ipads etc.
 - 1.2. The system should be able to work on any web browser.
 - 1.3. The system will show insights to the supervisors in the form of intuitive graphic reports and charts. Simple & Easy to understand.
 - 1.4. The system should connect to printers.

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- 1.5. The database of the system will be managed using MongoDB.
- 1.6. Google Analytics will be used to track and report website traffic for further improvements and gathering necessary data.
2. Performance:
 - 2.1. The system can run on any device with minimum requirements.
 - 2.2. The user should be able to load the system within 2 millisecond.
 - 2.3. The system should be able to handle 500 users requests at a time.
 - 2.4. The whole system should be updated within every 10 milliseconds.
3. Security:
 - 3.1. The system should include safeguard from viruses.
 - 3.2. Only the supervisors and authorities should be able to access the employees personal information.
 - 3.3. All the users' personal information should be protected by the system.
4. Cultural & Political:
 - 4.1. The system should comply with the Digital Security Act of Bangladesh.
 - 4.2. The system should be in both English and Bangla language.
 - 4.3. The system will be visually updated according to any National or International holiday.

Project Scenario

Let's say, Mr. Atif newly joined a private business Company as a graphics designer. Due to the pandemic and lockdown, the office enrolls employees to a 'work from home' system. As a result Mr. Atif works from home and has been assigned by a supervisor. The supervisor creates an account for Mr. Atif after getting the required credentials and hands it over to him. After logging in, Mr. Atif finds his homepage where there are tabs to give attendance, check notifications, check his own experience (performance), to-do task, currently working task and upcoming deadlines. The supervisor will check his attendance on a regular or weekly basis (according to the company policy) and assign tasks for him with a deadline. Before starting the assigned task, Mr. Atif will enable the monitoring software, which will monitor the amount of time he's spending on graphics designing softwares during his work-time. The software can also take screenshots or record screens if the company wants to. After completing the task, the supervisor

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will review and give necessary feedback if any changes are required or work is incomplete. Otherwise, the supervisor will add "experience ratings" which will be on Mr.Atifs profile so that future new supervisors can see his productivity level and assign tasks on that basis. The supervisor also gets notification when his/her employee submits a work and starts monitoring the necessary data.

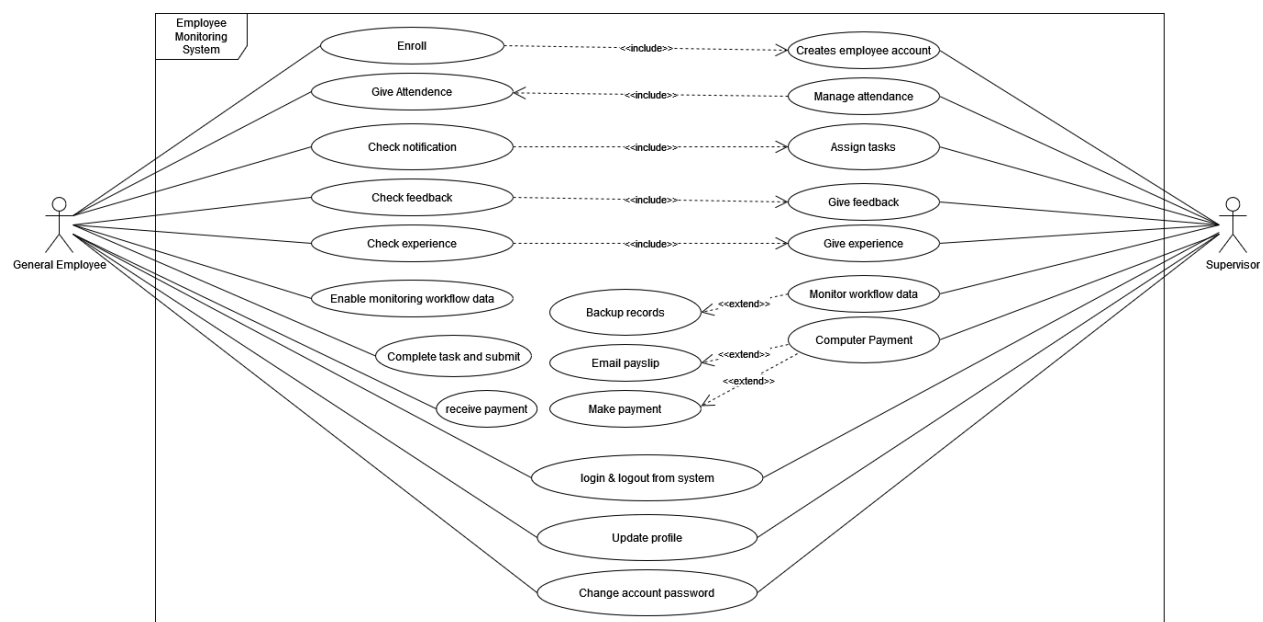
The supervisor manually pays the payment of Mr. Atif and tells the system that his payment is done alongside sending the payslip. The system sends a push notification to Mr. Atif after the payment is done and sends the payslip via email automatically.

USE-CASE Diagram

A **use case diagram** is a graphical depiction of a user's possible interactions with a system. A use case diagram shows various use cases and different types of users of the system. The use cases are represented by ellipses whereas the actors are shown as stick figures.

Here we can see in this figure, there are 2 types of users, general employee and supervisor. The supervisor will enroll the employee to the system and after logging in the employee will be redirected to the home page where they can give their attendance, check notification, check experience and also check the assigned tasks through notification. The employee will select a task and start working on it. The employee will enable the monitoring feature of the software that will store data of the task he/she is working-on in the database. The supervisor can manage the employees by checking and updating their attendance, salary and experience. Supervisor can also create accounts for the employees with their credentials. The supervisor can also assign and update tasks, monitor and also give feedback on those tasks. All work of the Supervisor will be stored in the database.

There are 2 types of actors here, general employee and supervisor

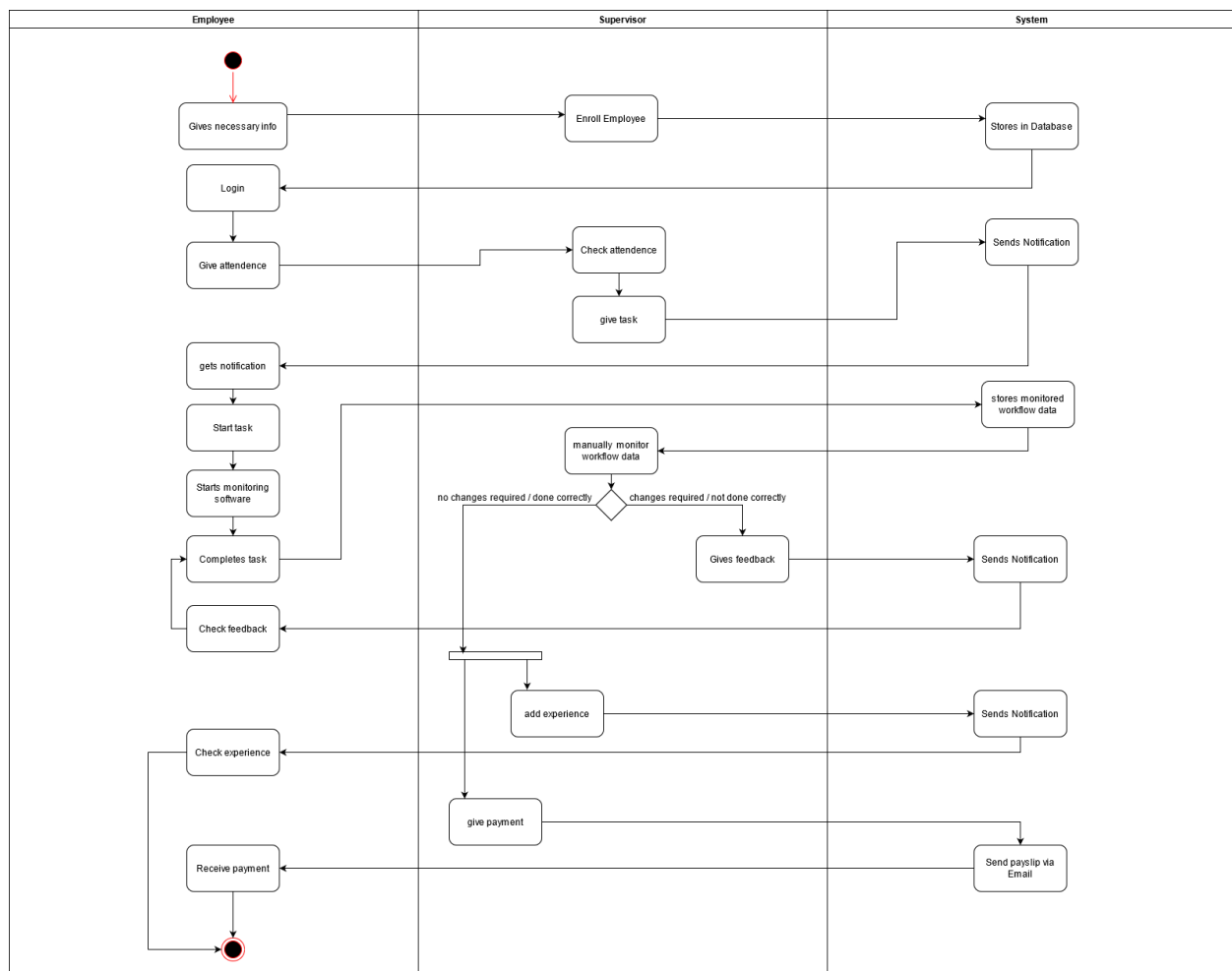


Activity Diagram

An activity diagram is a **behavioral diagram** i.e. it shows the workflow of the system. The sequential and parallel activities of the objects of the system are portrayed in the following diagrams.

At first the employee will give necessary information to the supervisor for setting his/her account. The supervisor will create the employee's account and the employee can login with the required credentials. The employee can give his/her attendance and also check notification for assigned tasks. The supervisor will check attendance and also assign tasks to the employee.

When the employee starts the task he/she will also enable the monitoring feature of the software which will monitor all the necessary data of his/her workflow. The supervisor will give feedback on the work for necessary changes and if the task is complete will add experience to the employee. After the task is completed the supervisor will give payment to the employee manually and send payslip to the system. The system will send the payslip via email to the employee.



Sequence Diagram

The sequence diagrams portray how the interaction between the user and system would be like.

Sequence Diagram for Login System:

The sequence diagram for the login system shows how a user can log in to the system. The user first enters their username and password in the Login page. The credentials are then checked in the Account Database. The accounts will be verified first and then the user will be logged in to their respective page. If credentials are valid, the user is redirected to the Home page. If the credentials are invalid, the system informs the user.

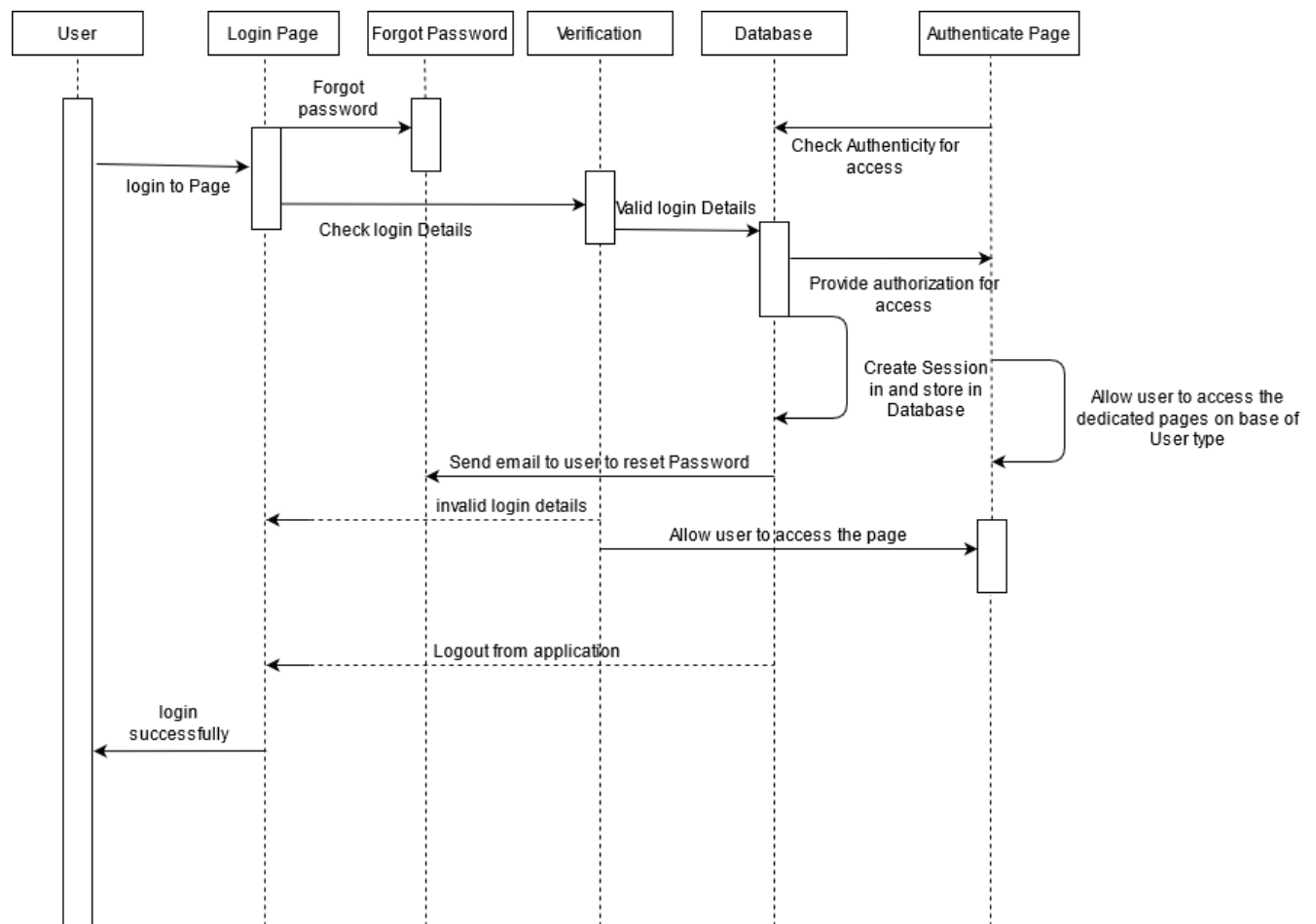


Fig: Sequence Diagram for Login System

Sequence Diagram for Supervisor:

After logging in, the supervisor can manage the employees by checking and updating their attendance, salary and experience. Supervisor can also create accounts for the employees with their credentials. The supervisor can also assign and update tasks, monitor and also give feedback on those tasks. All work of the Supervisor will be stored in the database .

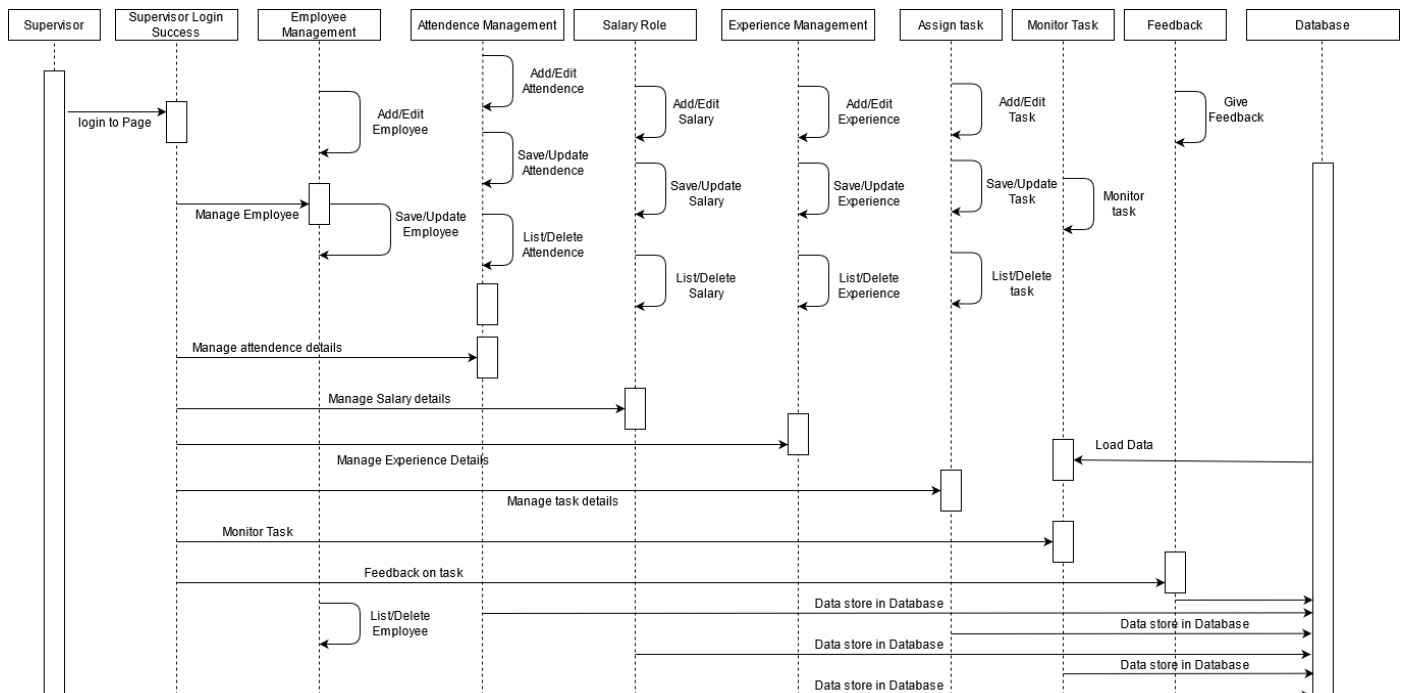


Fig: Sequence Diagram for Supervisor

Sequence Diagram for Employee:

After logging in, the employee will be redirected to the home page where they can give their attendance, check salary, check experience and also check the assigned tasks. The employee will enable the monitoring feature of the software and start the selected task that will be stored in the database. The employee will also check the feedback given by the supervisor. All their works will be stored in the database

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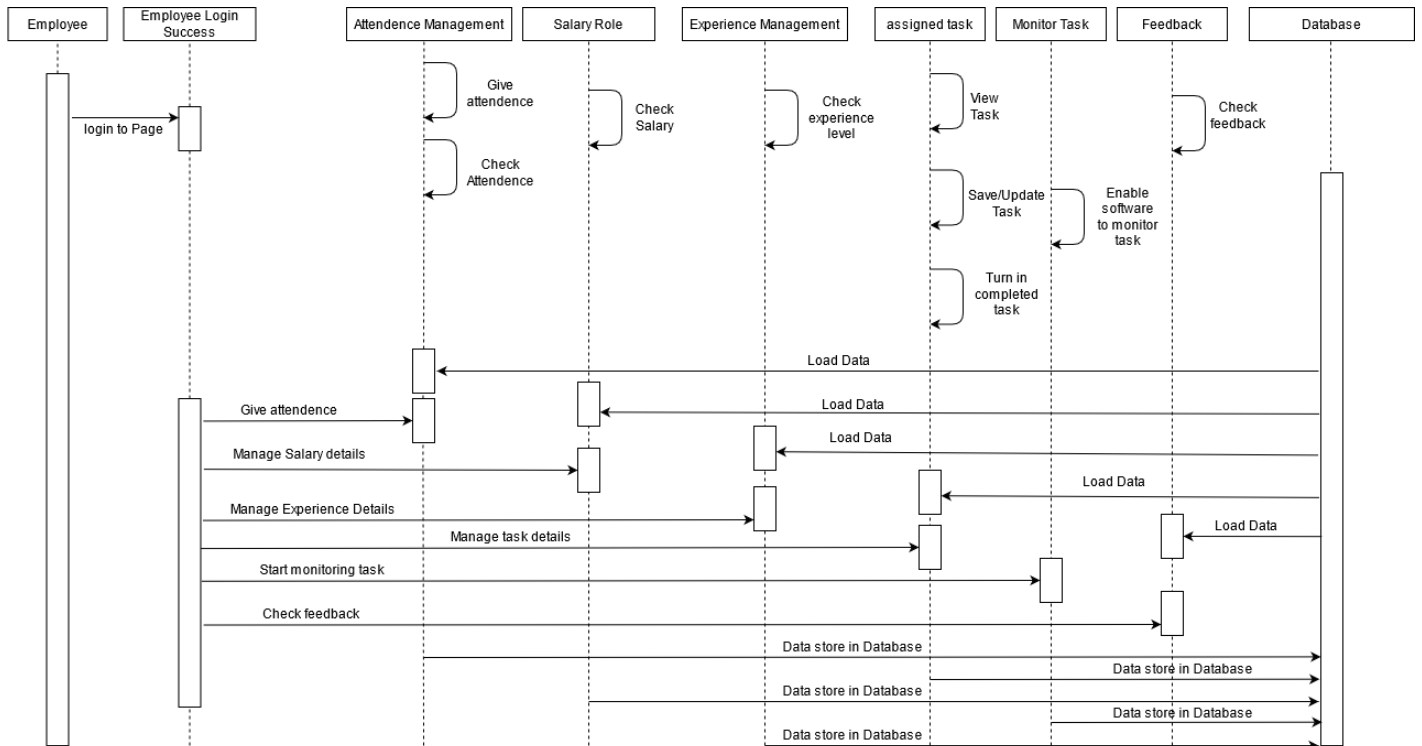


Fig: Sequence Diagram for Employee

State Machine Diagram

The state machine diagram shows the states of the objects in the system.

State machine Diagram for Login System:

After opening the system the user can login in the “Login” state of the Login Page. If the user has an account then after entering the username and password, the credentials will be verified in the “Verification” state. By checking the account database the system will check if the information filled out by the user is valid or not. If the login is valid then the page will move on to its next state “Home” where the user gets to enter the Homepage of the system. If the login is not valid then the user will be taken back to the Login state. If the user does not have any account, he/she will request for account creation to the admin by sending proper requisites. The account will be created by the admin/supervisor updating the database. If the details are correctly filled out then

the system will go to the next state which is “Database Updated” where the account information is updated.

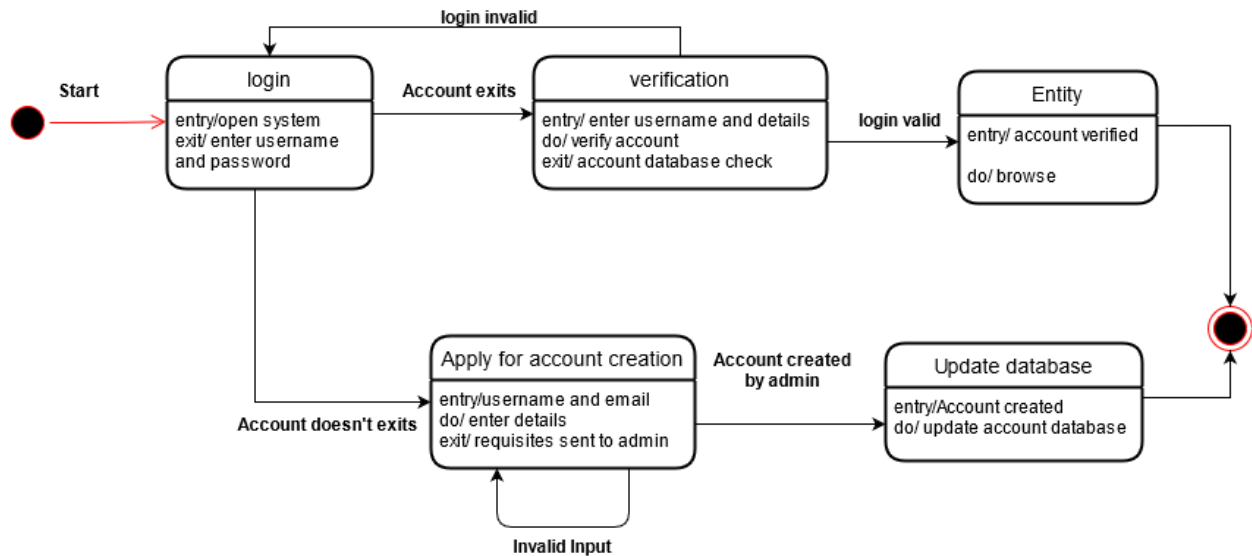


Fig: State machine Diagram for login

State Machine Diagram for assigning task by the Supervisor:

After logging in, the supervisor can search employees using their credentials and can assign tasks to them respectively. The assigned task data will be stored in the database which can be further updated. The supervisor can also monitor the task by checking monitored data stored by the employee and also check the stats of the employee. If a task is completed as requested the supervisor will add/update experience on the employee according to their service. If a task is not completed on time or has flaws the supervisor can give feedback on what to change and later recheck the task status.

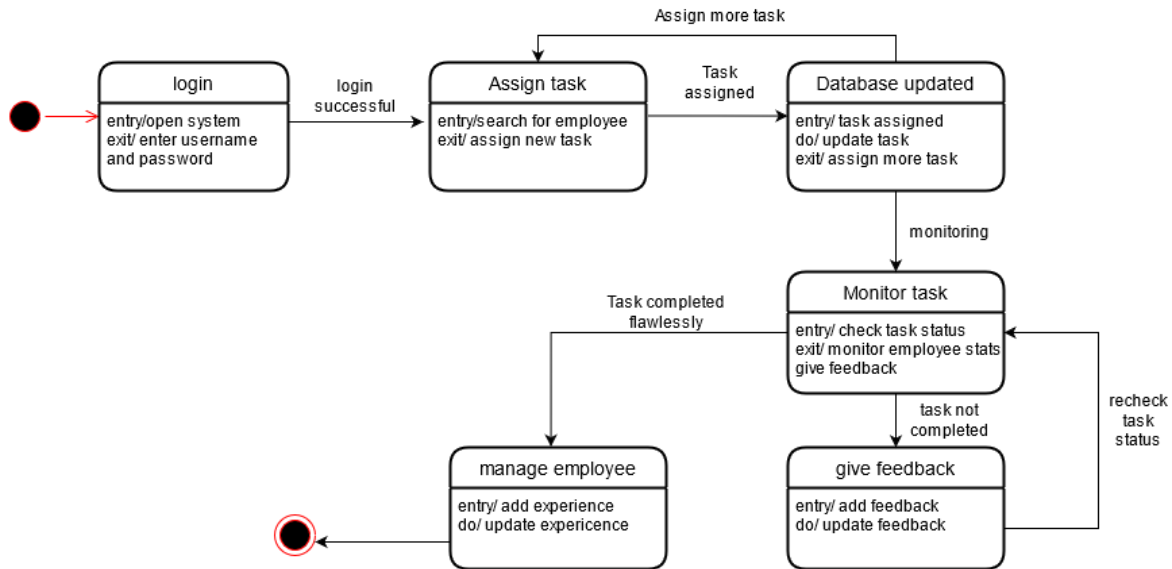


Fig: State machine Diagram for assigning task by the Supervisor

State Machine Diagram for the Employee:

After logging in, the employee will be redirected to the home page where they can give their attendance, check salary status, check experience status, check feedback, and also check the assigned tasks. The employee will select a task and start working on it. The employee will enable the monitoring feature of the software that will store data of the task he/she is working-on in the database. The employee will also check the feedback given by the supervisor. All their works will be stored in the database.

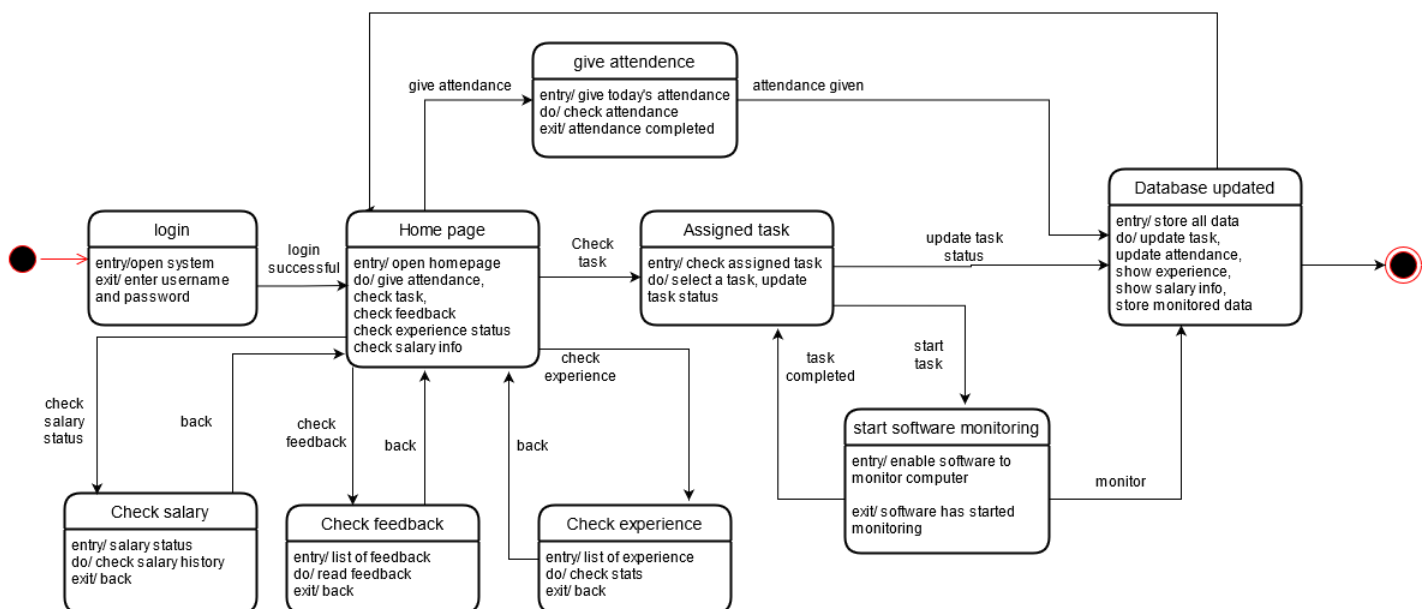


Fig: State machine Diagram for for the Employee

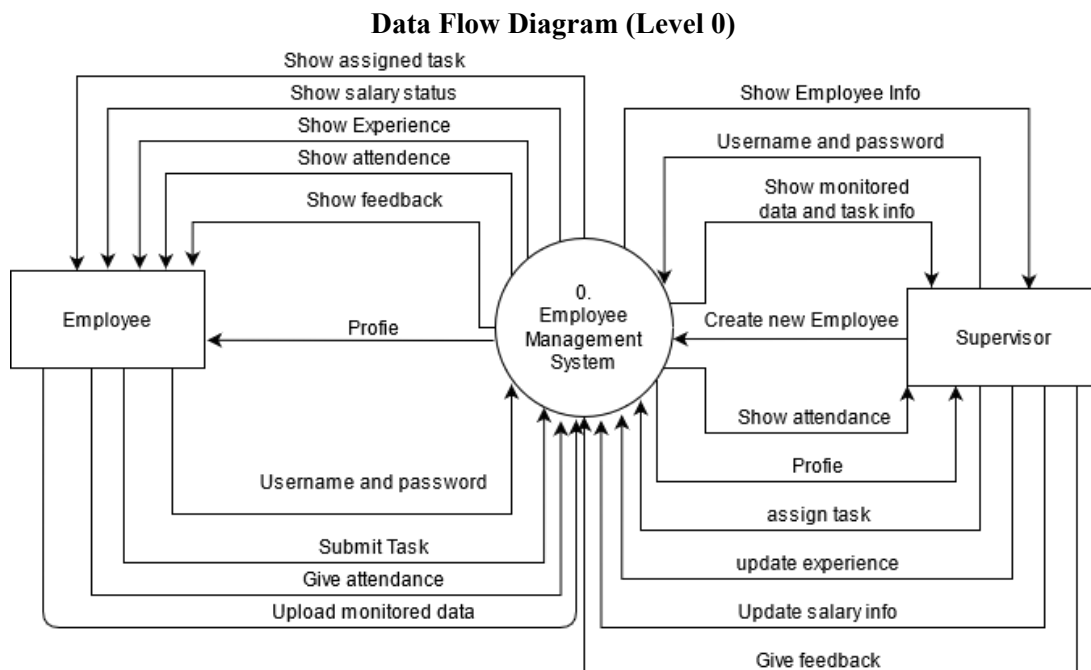
Data Flow Diagram

A data flow diagram (DFD) is a diagram that represents the data flow in a system and the processes that take place in the system to transfer data.

Data Flow Diagram (Level 0):

In the following Level 0 DFD, employees can login with their username and password and will be redirected to their homepage(profile). he/she can see their assigned task and feedback in the notification and also their salary status, attendance status and experience in their profile. The employee can give attendance. The employee will upload monitored data by enabling the monitoring feature of the software that will store data of the task he/she is working-on in the database.

After logging in, the supervisor can search employee info using their credentials and can assign tasks to them respectively. The supervisor can create new accounts for the employee. He/she can update the experience of the employee and also update the salary info. The supervisor can also see the attendance and past experience of the employee and lastly give feedback to them. The diagram will show all the work of the Supervisor and Employee in this system.



Data Flow Diagram (Level 1):

In the following Level 1 DFD,

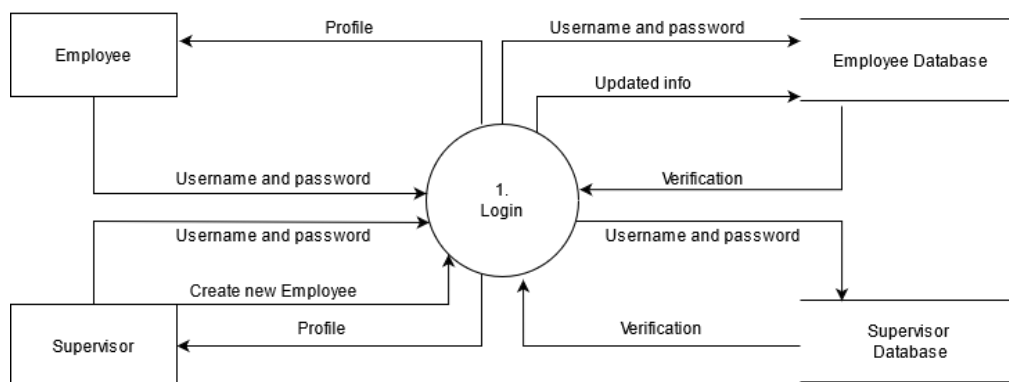
The Login diagram shows that during the login, the user enters the username and password into the system and after cross-checking the credentials in the Account database, the Login process returns the user's profile.

In the task System Diagram, the supervisor can search employee info using their credentials and can assign tasks to them respectively. Which will send a notification to that employee and the employee will submit the task after completing it and monitored data will also be uploaded in the database which the supervisor can monitor later-on.

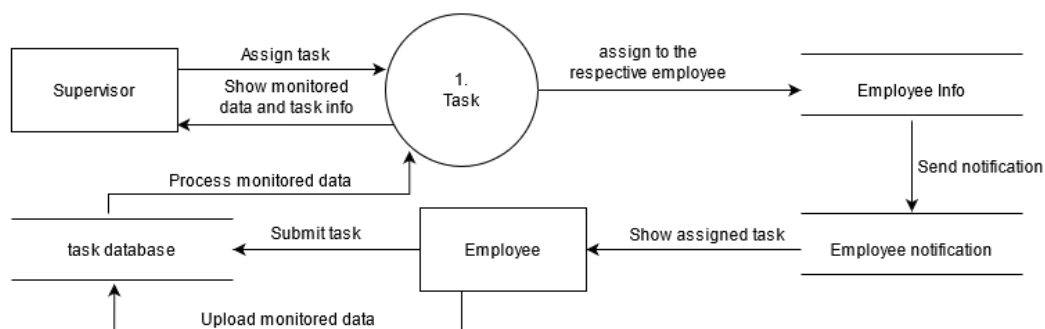
In the attendance Diagram, the employee will give their attendance after logging in which will be stored in the employee database and can be supervised by the supervisor later-on.

In the Home/profile Diagram, The employee can see all the necessary information such as experience, attendance etc. The supervisors can also update this information alongside their own information and view them.

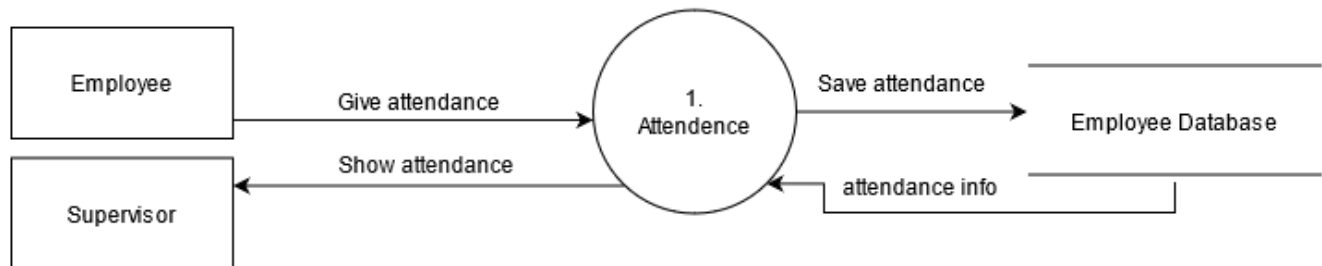
DFD Level 1 Login System



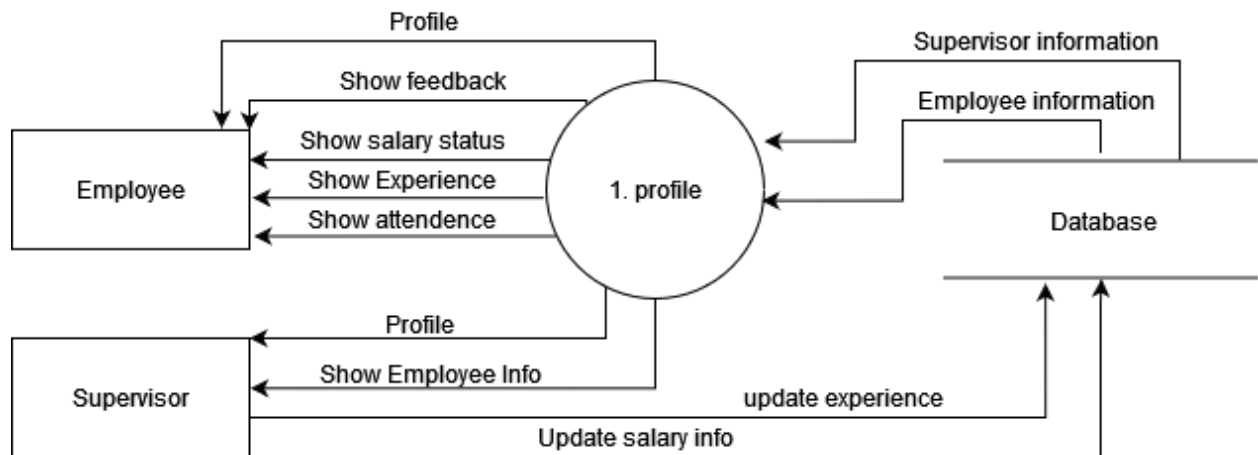
DFD Level 1 Task System



DFD Level 1 Attendance System



DFD Level 1 Home/Profile



Windows Navigation Diagram

The Window Navigation Diagrams of this system display the basic structure of the interface which is presented down below.

After clicking the login button in the landing page, the system takes the user to the Login Form. After filling out the form and then clicking the submit button, if all the information filled out by the user is valid it takes the user to a window called homepage. If the information is invalid then a window with Invalid Credentials text will show up. In this window there is a button named “Retry”. After clicking the button it will take the user back to the login form. There is a hyperlink named “Forgot Password”. If the user clicks “Forgot Password” hyperlink, it takes the user to a form which recovers a password. In this form there is a button that needs to be clicked after filling it out which will lead the user to the Login Form again. After clicking the button the user will get the login form again. There is a button called “Logout” after clicking that button the user will be taken back to the landing page.

Employee Login and Logout

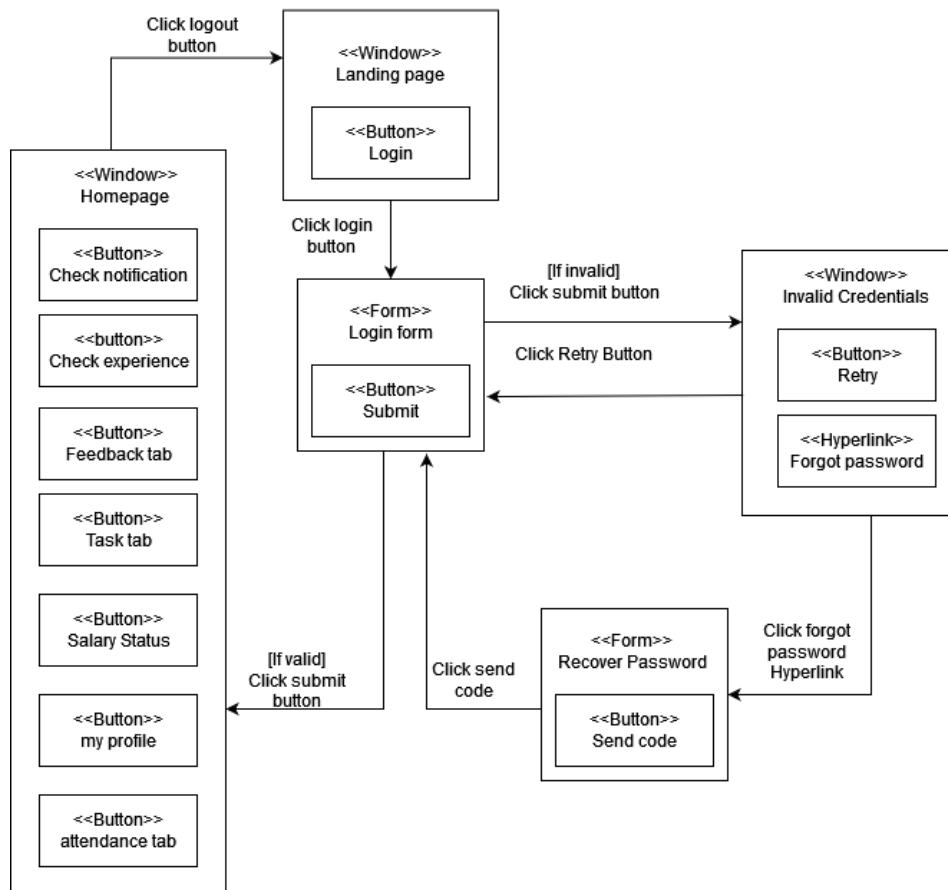
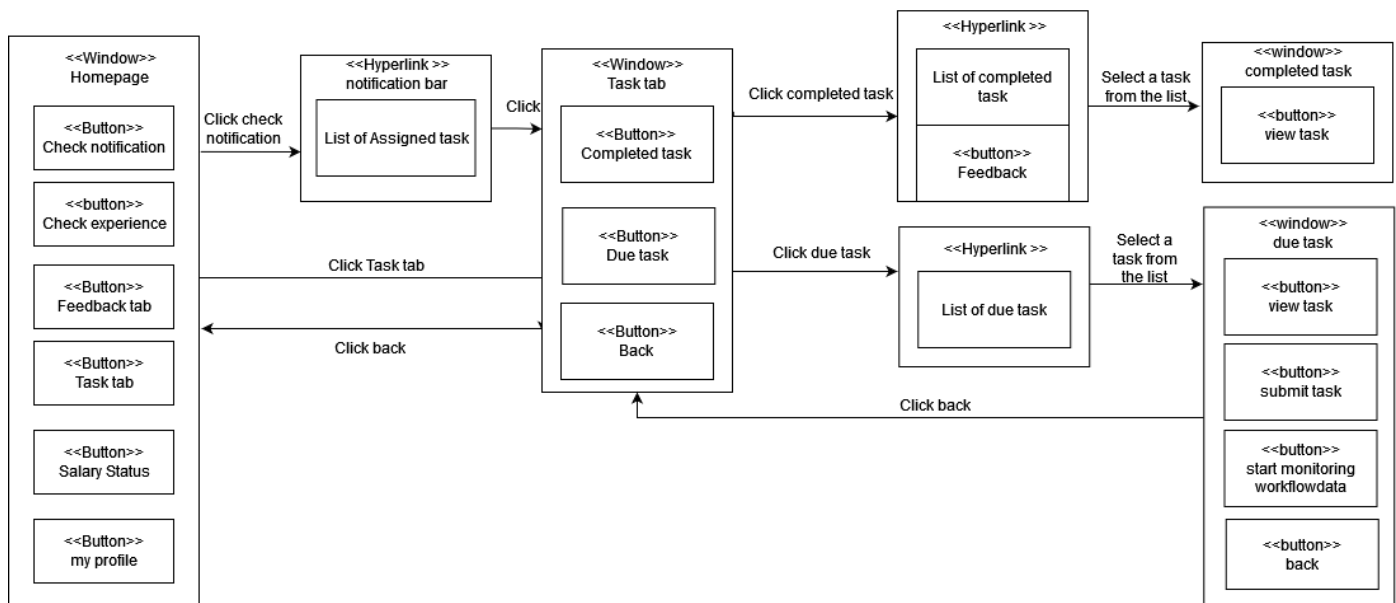


Fig: Windows Navigation Diagram of Employee Login and Logout

Employee Checking assigned task:

In the homepage of the employee, if a task is assigned to the employee, the employee will be notified by a red marking in the notification tab. After checking the notification tab the employee will be redirected to the task tab window where he will find “completed task” and “due task” buttons. The due task will be marked with a light gray color to notify the employee that he has new tasks assigned to him. The employee can click any of the “due task” and “completed task”. After clicking the due task the employee can view the list of all the assigned due tasks and after selecting a task the employee can view the necessary details of the certain task, submit it and also start monitoring the workflow data. The employee can

Employee Checking Assigned tasks



Employee Attendance:

Here, in the employee attendance tab we can see that after clicking the attendance tab from the homepage, the employee will be redirected to the “attendance tab” window where he can submit today’s attendance which will redirect to a report saying “today’s attendance has been marked”. The employee can also click the “list of attendance” where he may see the list of the dates he was present and absent alongside the percentage of him being present. By clicking the “back” button he will be redirected to the “Attendance tab” window.

Employee Attendance

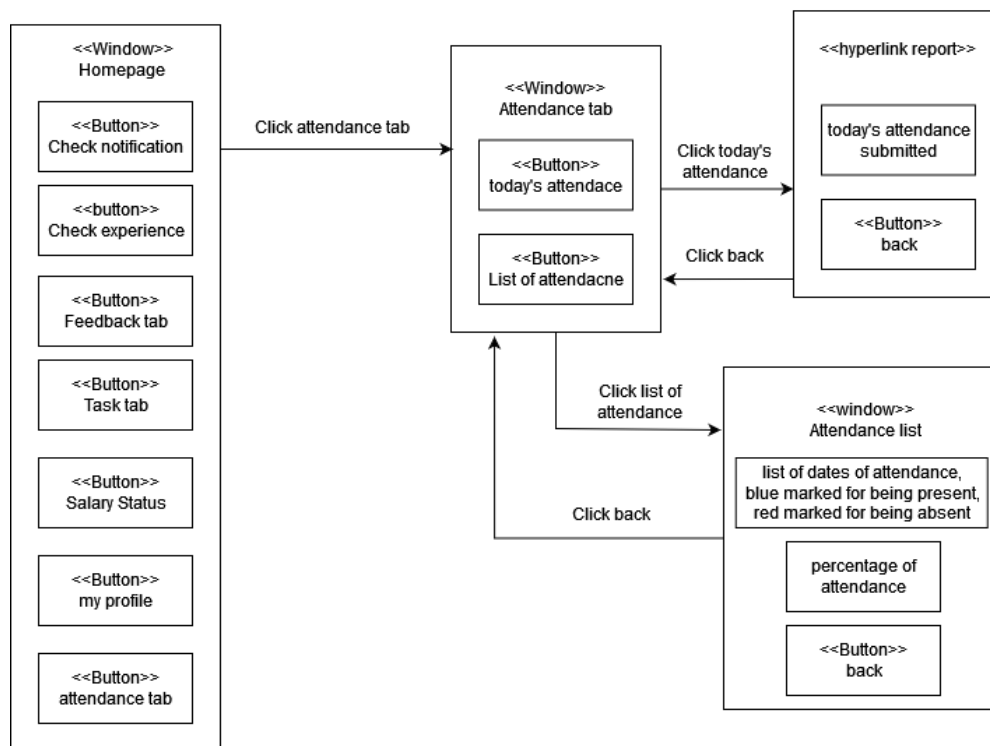
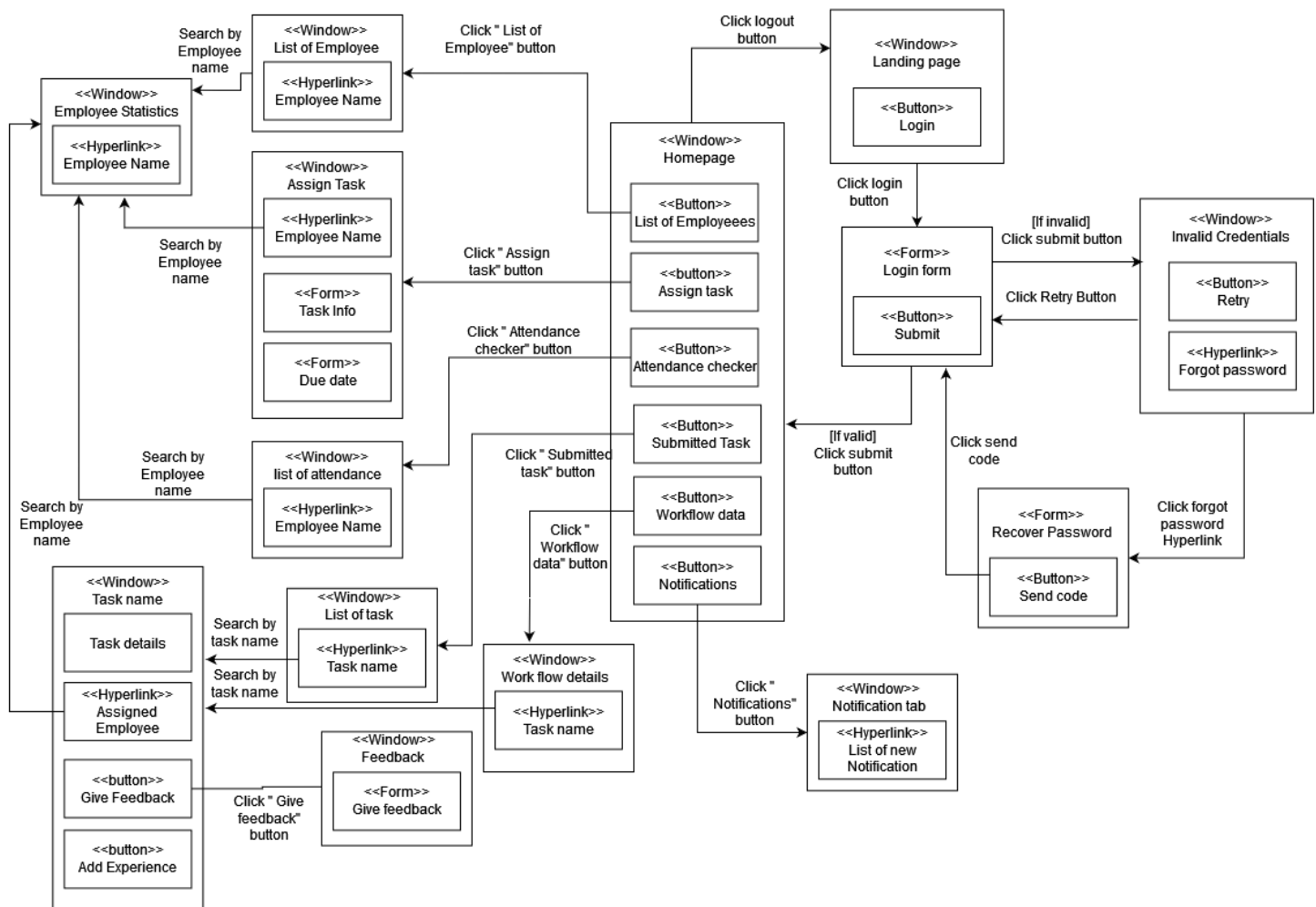


Fig: Windows Navigation Diagram of Employee attendance

Supervisor Windows Navigation Diagram:

Here, in the Supervisor Navigation Diagram, after Logging in successfully , the supervisor will be redirected to the homepage where he will see the buttons of “list of employees”, assigned tasks, attendance checker, Submitted task, workflow data and the notifications. The supervisor can check the employee details after searching their name in the list of employees which will redirect to the “list of employee” window. Again the employee can check the attendance which will be sorted date-wise by clicking the Attendance checker button. The employee can assign tasks to the employees by Clicking the assign task button which will redirect to the “assign task” window. Then he has to fill up the necessary details of the task with necessary documents and with a due date. However, the supervisor can monitor the workflow data of any task by clicking the “workflow data” button and searching the task by it’s name. The supervisor can also give feedback and add experience to the assigned employee of the task. All the pages are interlinked with the “Employee Statistics” page.

Supervisor Navigation Diagram



Conclusion

Our software is made with an intent in mind to aid all the growing companies in Bangladesh and increase the employment rate as most people cannot take the hassle of moving from one district to another for a job. Desk-job employees from distant areas can do their job without the hassle of transport. Also good employees can be recruited from all over the world. We aim to make employee monitoring a hassle-free process for businesses by providing helpful information regarding the features, usage, and the best optimization of our software. Our System is easy to use. All the aspects of the system makes it user friendly, intuitive and more practical. Besides, the database of the system also holds records of all the task and login infos also keeping it secure and reliable. It makes work easier and smarter and it is a big step towards digitalization as everything can be done online hence increases efficiency.