Bachelor of Computer Applications (BCA) Programme

Project Report

BCA Sem VI
AY 2021-22

Employee Management System(EMS)

by

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Project Guide by:
Prof. Nidhi Desai

SDJ INTERNATIONAL COLLEGE

C E R T I F I C A T E

This is to certify that Mr./Ms. **Suvagiya Parin H, Mangukiya Gaurav M, Lukhi Rushabh D** examination number **2019066062, 2019066021, 2019065920** has satisfactorily completed his/her project work entitled **EMPLOYEE MANAGEMENT SYSTEM** as partial fulfillment of requirements for BCA Sem VI, during the academic year 2021-22.

Date: 04/04/2022
Place: Surat

(Aditi Bhatt)
I/C Principal
SDJ International College,
Surat

ACKNOWLEDGEMENT

We have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals. we would like to extend our sincere thanks to all of them.

We are highly indebted to our **I/c Principal Dr. Aditi Bhatt**, **Head of Department Dr. Vaibhav Desai**, **Project guide Prof. Nidhi Desai** and all other Assistant professors of SDJ International College for their guidance and constant supervision as well as for providing necessary information regarding the project and also for their support in completing the project. Their constant guidance and willingness to share their vast knowledge made us understand this project and its manifestation in great Depth and helped us to complete the assigned task on time.

I would like to express my gratitude to SDJ international college for the kind support and encouragement.

Our thanks and appreciation also go to our colleagues in developing this project and people who have willingly helped me out with their abilities.

Thank you very much,

2019066062 Suvagiya Parin
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2019065920 Lukhi Rushabh

I N D E X

1. Introduction

1.1 Project Summary

Employees Management System is a web application for effectively managing employees. In companies handling employee data is the most important factor, so EMS provides functionalities like scheduling important meetings, events and managing employees' leave, salary, attendance, working hours with effective sorting and filtering techniques. This system provides a portal for employees to interact with the company and track their daily data like attendance, leave, salary, working hours. EMS frontend is built using Reactjs, which is a javascript library. EMS Backend provides an Application programming interface (API) that is built using Nodejs, Expressjs, MongoDB. When user requests for EMS frontend will load on the web browser window and API will provide data on user needs.

1.2 Project Technical Profile

Project Name:	EMS (Employee Management System)
Project Definition/Aim:	The main aim of the project is to provide better functionalities for managing employees' data.
Develop for:	Small companies who can not afford to make software to manage their employees.
Front End:	Javascript, Reactjs with redux
Backend:	Javascript, Nodejs, Expressjs, MongoDB (API)
Other Technologies:	Bootstrap 5, Material UI, fullcalendar
Documentation tools:	Google docs
IDE:	Visual studio code
Software type:	Web Application
Project Guide:	Prof. Nidhi Desai
Submitted By:	1. Suvagiya Parin H. 2. Mangukiya Gaurav M. 3. Lukhi Rushabh D.

2. Scope & Planning

2.1 Scope

- The scope of this system is very large, it can be used in multiple companies. Using EMS they can manage their employee data and they do not need to set up this system because it maintains multiple companies' data at a time through a web interface.

2.1 System Functional Requirements

Home page

R1: Provide an interactive home page with redirect links to different pages.

For companies or company portal

R1: LOGIN, REGISTER with OTP, and JWT token authentication

- Company can create an account and by login get access to other functionalities for managing employees.

R2: Dashboard

- Provide statistics of employees on the dashboard.

R3: View and Update profile and password

- Company can view their profile and also can update it.
- If the company updates the email reverify the email.

R4: Manage Departments

- Company can view, add, update, and delete departments in this module.

R5: Manage Designations

- Company can view, add, update, and delete designations in this module.

R6: Manage Employees

View employees

- shows a list of employees with search and sorting functionality.

Add employees

- The company can add employees by login into the company portal as soon as the company adds a new employee. Employees must get credentials for the employee portal.

Update employees

- Company has access to update employee details.

leaving employees

- When employees leave provide a field to add leaving date.

Replace manager

- If the manager leaves a company, an old manager can be replaced with a new manager.

R6: Scheduler

- Provide calendar UI and by clicking date company can add events and employees must be able to view events added by the company.
- The company can edit and delete events.

R7: Attendance

- Provide functionality to filter employees and start their shift and also view old attendance records.
- Provide a list of employees who have started a shift today and as well as provide a list of employees who have not started the shift today.

R8: Mange leaves

- Employees can request by login into the employee portal. Show a leaves list and provide the functionality to accept and reject requests.
- Show a list of employees who are on leave today.
- Provide functionality to view old leaves records of particular employees.

R9: Salary

- Filter employees and calculate the salary of employees between two dates by shift calculated by the company, and employee.

For employees and employee portal

R1: Login

- When a company adds employees. The employee will get autogenerated id and password for the employee portal.

R2: view company profile

- Employees can view the company profile.

R3: view my profile and update password

- View employee detail and their manager detail

R3: Schedular

- View events added by the company.
- Employees also can add public and private events.

R4: Attendance

- Employees also can start their shift.
- Show list of attendance records

R5: leaves

- Request for leave
- View old leave records

R6: Salary

- Cout salary according to shift stared by company or employee.

2.1 Other Non-Functional Requirements

Performance and scalability. How fast does the system return results? How much will this performance change with higher workloads?

Portability and compatibility. Which hardware, operating systems, browsers, and their versions does the software run on? Does it conflict with other applications and processes within these environments?

Reliability, availability, maintainability. How often does the system experience critical failures? and how much time is it available to users against downtimes?

Security. How are the system and its data protected against attacks?

Localization. Does the system match local specifics?

Usability. How easy is it for a customer to use the system?

2.2 Feasibility study

This system is designed to help small companies to manage their employees with functionalities like adding, and managing employee data like leave, salary, attendance, and event calendar after the technical, economic, operational, legal, and schedule evolution of the project we have found the risk of this project and decided to spend time on this project or not, But this project is very useful for small businesses with current functionality. These all factors can be handled so we are going to work on this project.

Technical Feasibility

In the technical feasibility study we have found the requirement of hardware and software that can be fulfilled by us.

Economic Feasibility

In the economic feasibility study we analyze the cost of the project and in the first phase, all requirements can be fulfilled with a minimal amount.

Operational Feasibility

In the Operational Feasibility study we analyze some factors like can we maintain this project operation easily and after compilation of the project will it be easy to maintain.

2.3 Timeline chart

Work task	**Dec**		**Jan**				**Feb**				**March**			
Week	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1 Requirement Gathering & Analysis														
1.1 Learn Javascript														
1.2 requirement gathering														
1.3 requirement analysis														
2 Modeling														
2.1 identify proposed project profile														
2.2 identifying objectives														
2.3 scope definition														
3 System design														
3.1 Design system flow														
3.2 database design														
3.3 company portal design														
3.4 employee portal design														
4 coding														
4.1 API architecture setup														
4.2 API coding														
4.3 API integration with frontend and implementation of cicd pipeline GitHub														
5 Testing														
5.1 unit testing														
5.2 navigational testings														
5.3 functional testings														
5.4 environmental testings														

2.4 Future development

- Verification with OTP and token
- Employee salary reports
- Employee leave and attendance reports
- Take attendance by face recognition

2.5 Description of Tools and Technology Used

1. **RecatJs**

- React. js is an open-source JavaScript library that is used for building user interfaces specifically for single-page applications. It's used for handling the view layer for web and mobile apps. React also allows us to create reusable UI components.

2. **Redux**

- React-Redux is the official React binding for Redux. It allows React components to read data from a Redux Store, and dispatch Actions to the Store to update data. Redux helps apps to scale by providing a sensible way to manage the state through a unidirectional data flow model. React Redux is conceptually simple.

3. **NodeJs**

- Node. js (Node) is an open-source development platform for executing JavaScript code server-side. Node is useful for developing applications that require a persistent connection from the browser to the server and is often used for real-time applications such as chat, news feeds, and web push notifications.

4. **ExpressJs**

- Express is a web application framework for Node. js that allows you to spin up robust APIs and web servers in a much easier and cleaner way. It is a lightweight package that does not obscure the core Node.

5. **What is API?**

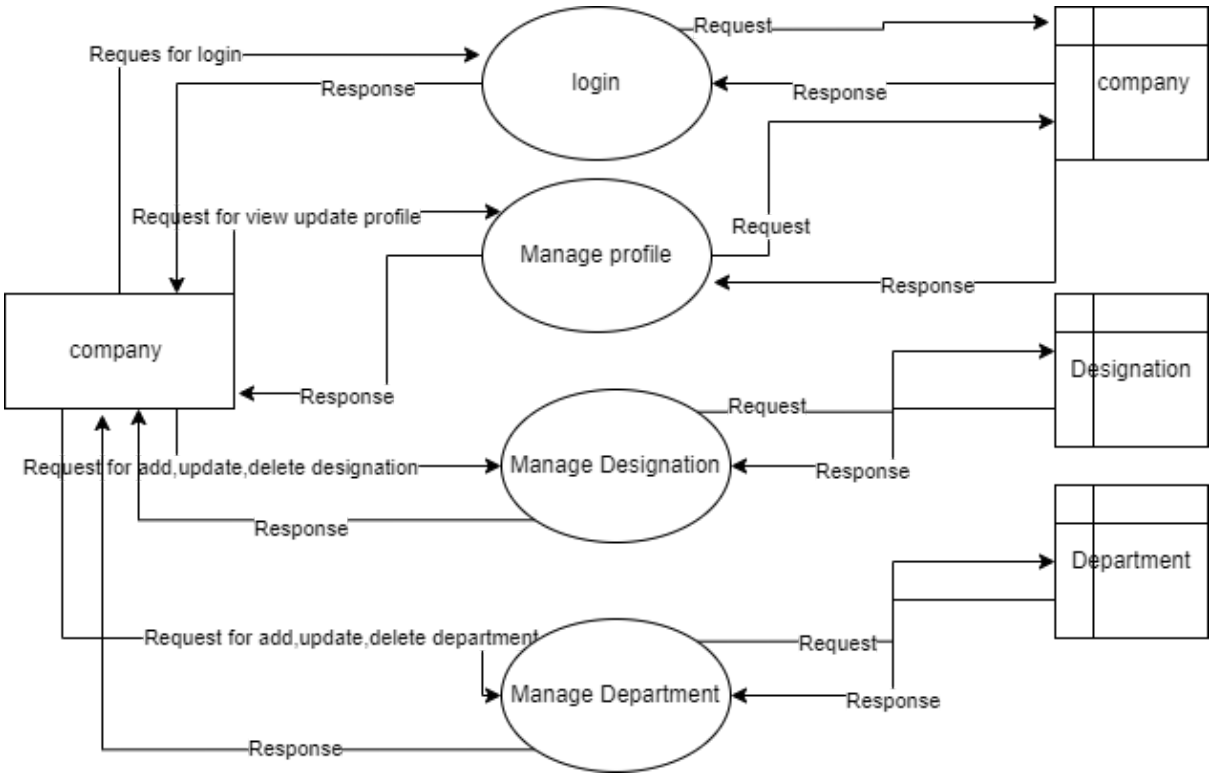
- An API (Application Programming Interface) is a set of functions that allows applications to access data and interact with external software components, operating systems, or microservices. To simplify, an API delivers a user response to a system and sends the system's response back to a user.

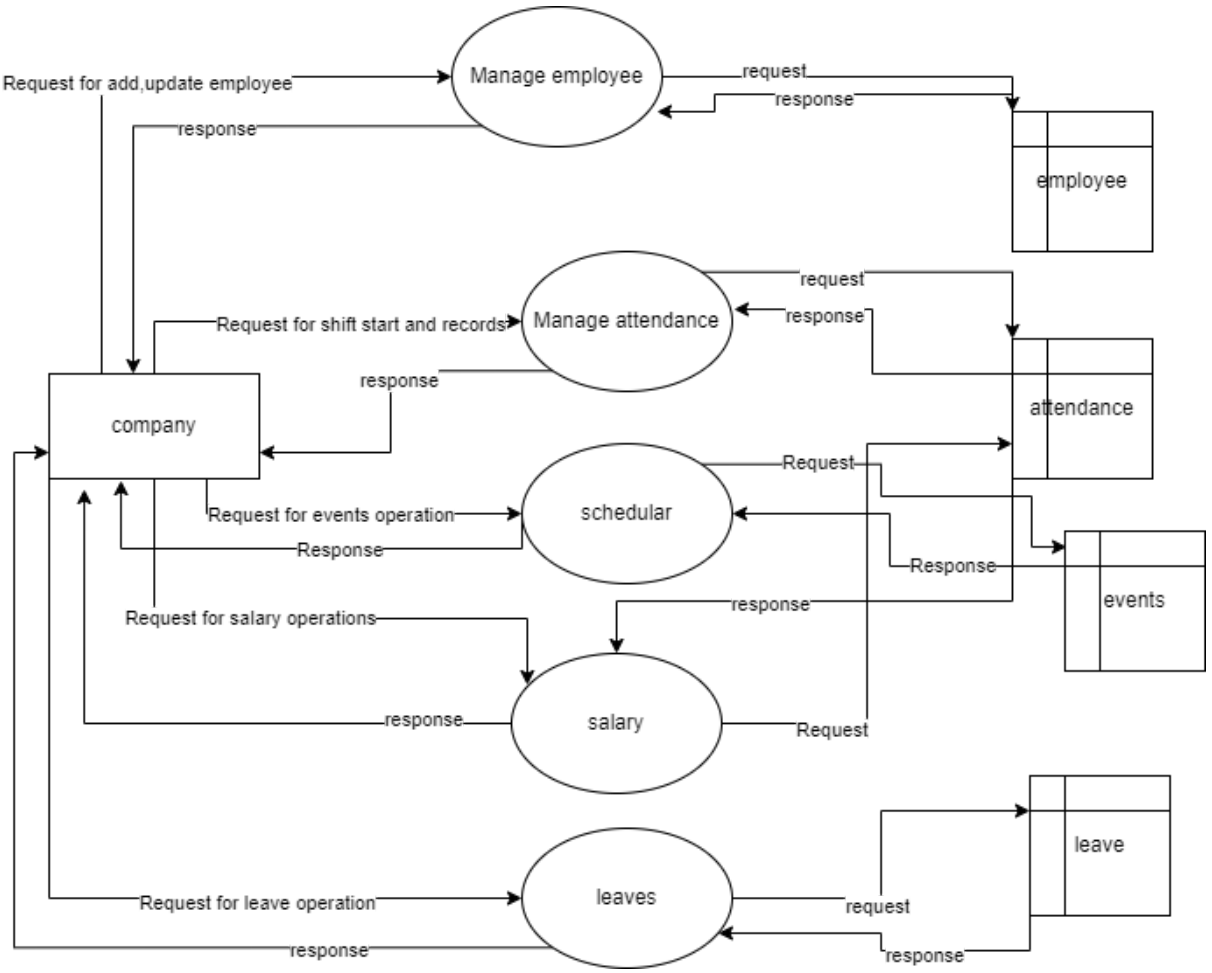
3. Designing

3.1 Data flow diagram

Context level DFD

First level DFD




Request for add,update employee
Manage employee
request
response
response
employee
request
Request for shift start and records
Manage attendance
response
response
attendance
company
Request
Request for events operation
schedular
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Request for salary operations
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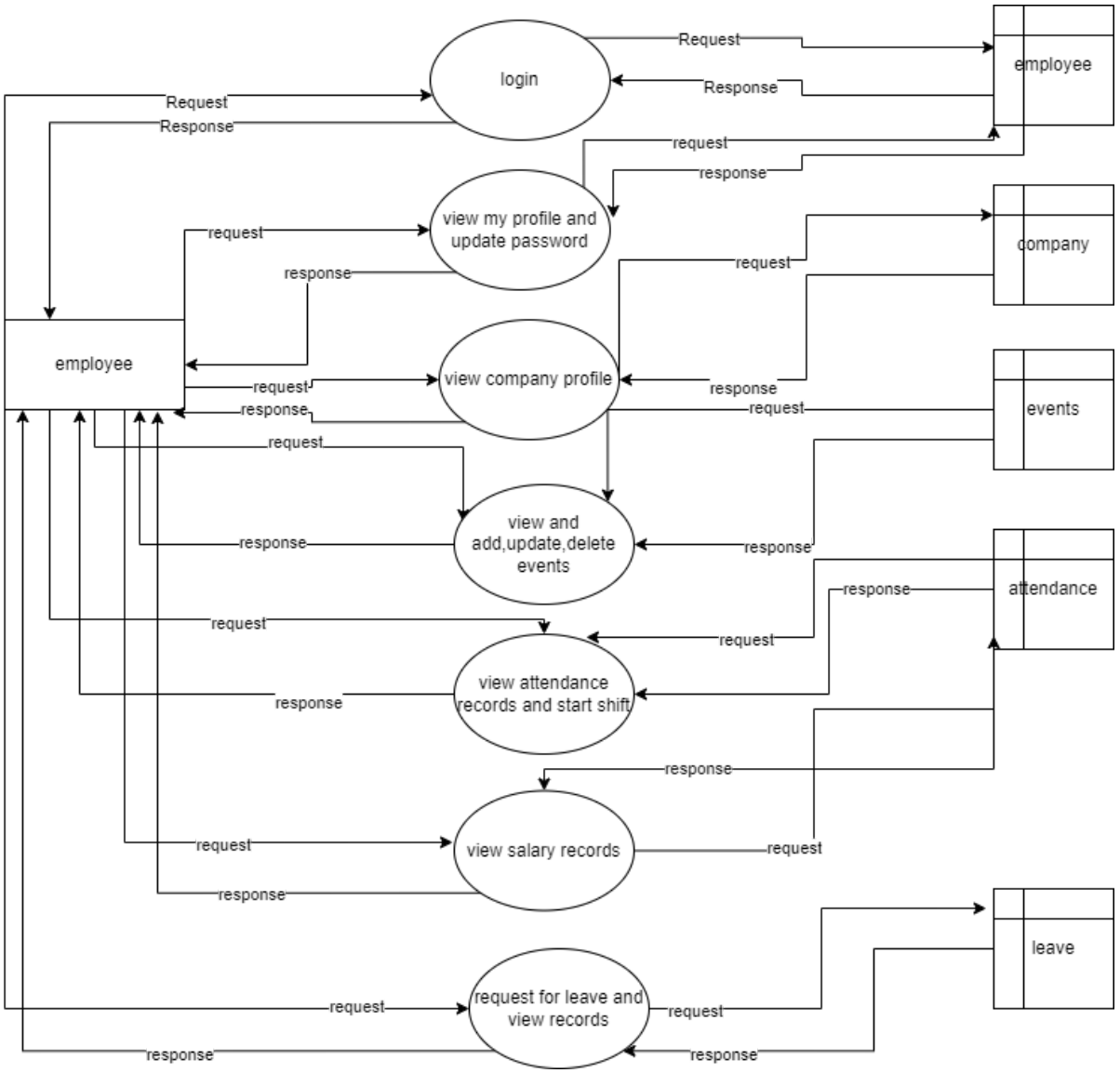
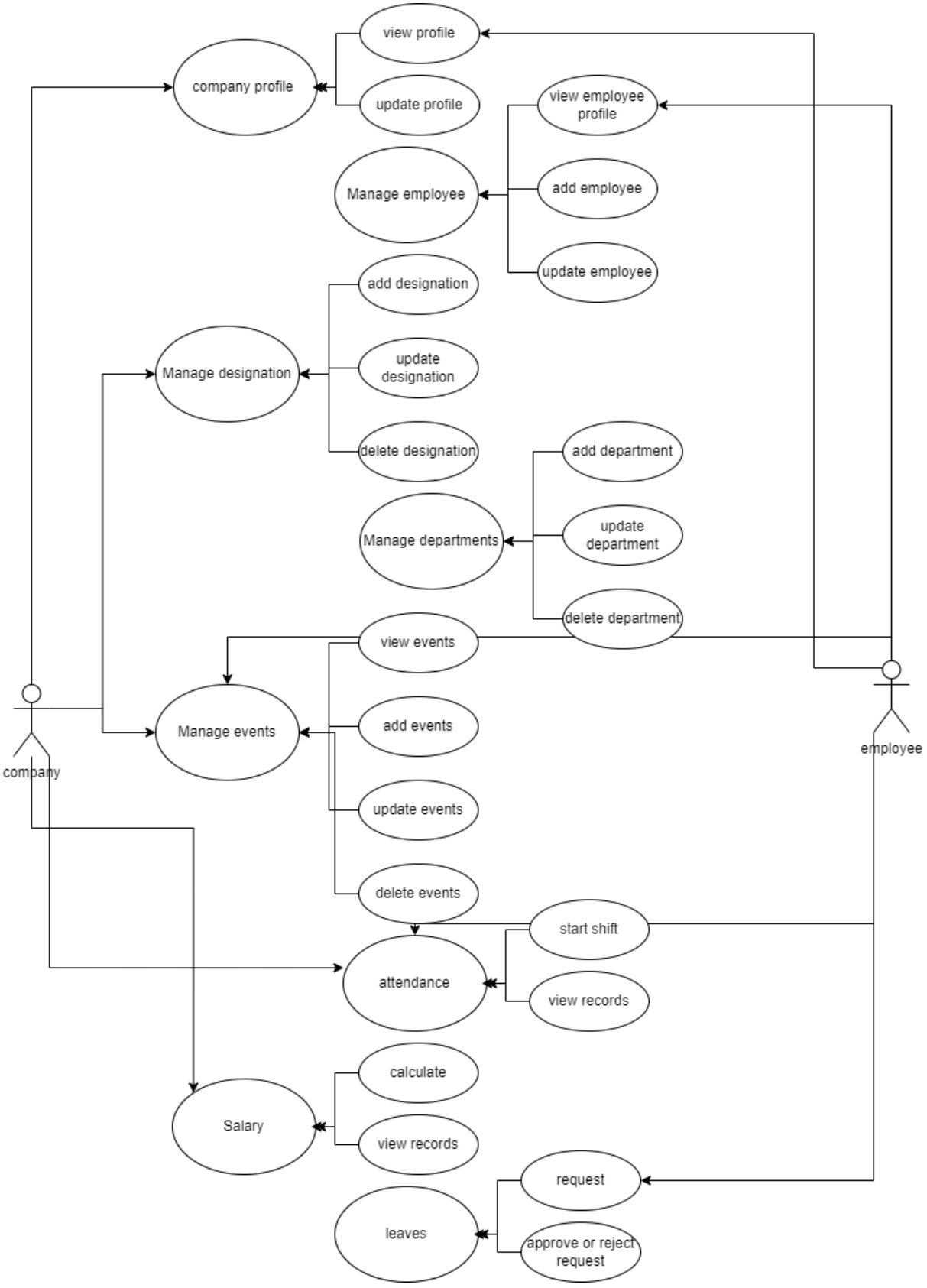
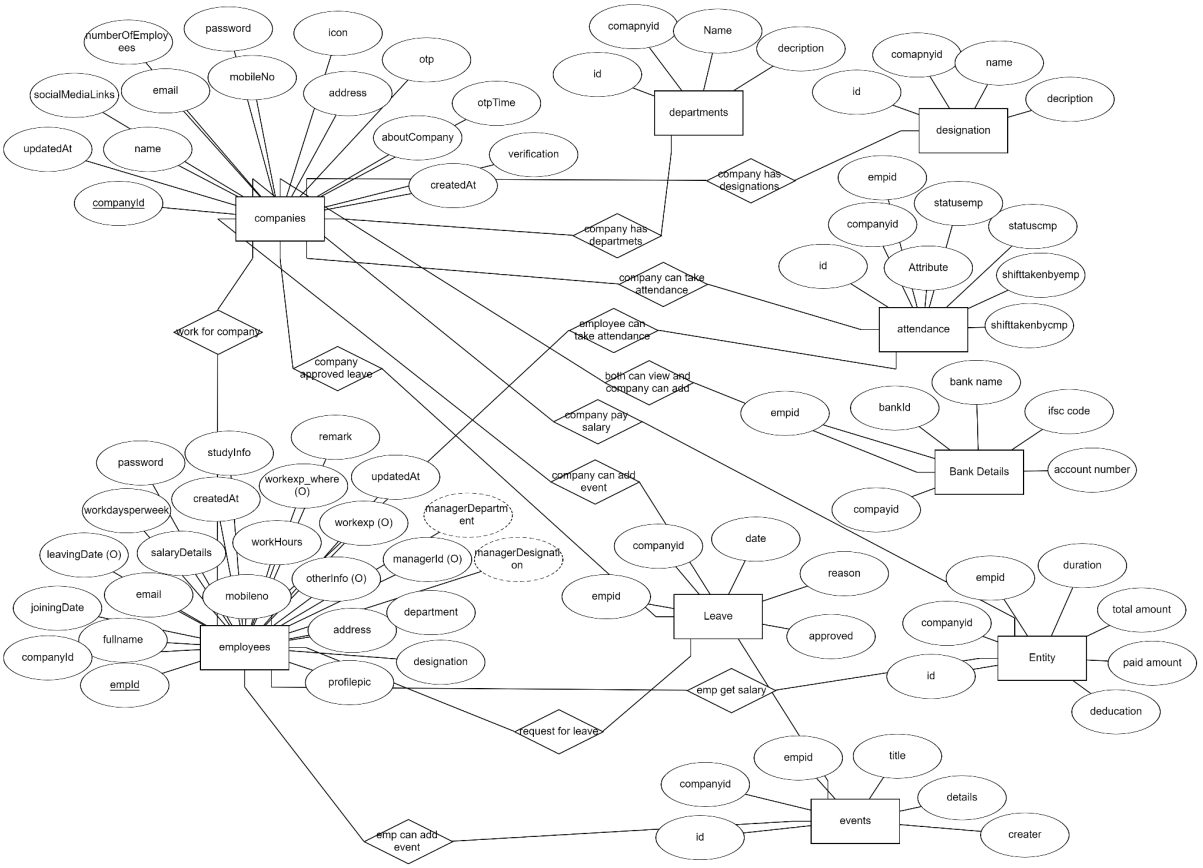

login
Request
Response
employee
Request
Response
request
response
view my profile and update password
request
response
company
request
employee
view company profile
request
response
response
request
events
request
view and add,update,delete events
response
response
attendance
response
request
request
view attendance records and start shift
response
response
view salary records
request
request
response
leave
request for leave and view records
request
response
response

3.2 Use Case Diagram



3.3 ER Diagram



3.4 Database design

1. Companies

NAME	DATATYPE	CONSTRAINT	DESCRIPTION
`id`	ObjectID	PK	Company id
`name`	string	Required	Company name
`email`	string	Required	Company email
`mobileno`	number	Required	Company mobileno
`address`	string	Required	Company address
`password`	string	Required	Company password
`about company`	string	Required	Company information
`icon`	string	Required	Company icon
`numberOfemployee`	number	Required	Number of employees
`links`	Object Array		Company links
`CreatedAt`	date	Required	Creation time
`UpdatedAt`	date		Updation time
`Registrationverification`	boolean	Required	Verification status
`otptime`	number	Required	Otp generation time
`OTP`	number	Required	Otp is sent to user

2. Employees

NAME	DATATYPE	CONSTRAINT	DESCRIPTION
`id`	ObjectID	PK	Employee id
`fullname`	string	Required	Employee name
`email`	string	Required	Employee email
`mobileno`	number	Required	Employee mobileno
`address`	string	Required	Employee address
`profilepic`	string	Required	Employee picture
`designation`	ObjectID	FK	Reference designations
`department`	ObjectID	FK	Reference departments
`workexp`	number		Number of months
`workexp_where`	string		Details about where emp worked
`studyinfo`	string	Required	Study information
`remark`	string		Remark if any
`otherdetails`	string		Other details
`companyid`	ObjectID	FK	Reference companies
`createdAt`	date	Required	Creation time
`updatedAt`	date		Updation time
`joiningdate`	date	Required	Joining date
`leavingdate`	date		Leaving date
`password`	string	Required	password
`workhours`	number	Required	Working hours daily
`hourlysalary`	number	Required	Per hour salary
`currency`	string	Required	Currency
`gender`	string	Required	Gender
`attendancestatus`	boolean	Required	Status of shift

3. Departments

NAME	DATATYPE	CONSTRAINT	DESCRIPTION
`id`	ObjectID	PK	department Id
`Companyid`	ObjectID	FK	Reference companies
`departmentname`	string	Required	Department name
`description`	string	Required	Department description

4. Designations

NAME	DATATYPE	CONSTRAINT	DESCRIPTION
`id`	ObjectID	PK	Designation Id
`Companyid`	ObjectID	FK	Reference companies
`Designationname`	string	Required	Designation name
`description`	string	Required	Designation description

5. Attendance

NAME	DATATYPE	CONSTRAINT	DESCRIPTION
`id`	ObjectID	PK	Attendance Id
`Employeeid`	ObjectID	FK	Reference employees
`Companyid`	ObjectID	FK	Reference companies
`Date`	date	Required	Attendance date
`Statuscmp`	Boolean		Status shift
`Statusemp`	Boolean		Status shift
`shiftyTakenByEmployee`	Object array		Object array of shifts
`shiftyTakenByCompany`	Object array		Object array of shifts

6. Events

NAME	DATATYPE	CONSTRAINT	DESCRIPTION
`id`	ObjectID	PK	Event Id
`Companyid`	ObjectID	FK	Reference companies
`Employeeid`	ObjectID	FK	Reference employees
`Title`	string	Required	Event title
`Start`	date	Required	Event start time
`End`	date	Required	Event end time
`allDay`	Boolean		All day event
`Url`	string		Redirect link
`Backgroundcolor`	string		Color
`type`	string	Required	Event type public or private
`Iscompany`	Boolean	Required	Added by a company or not
`Bordercolor`	string		Color

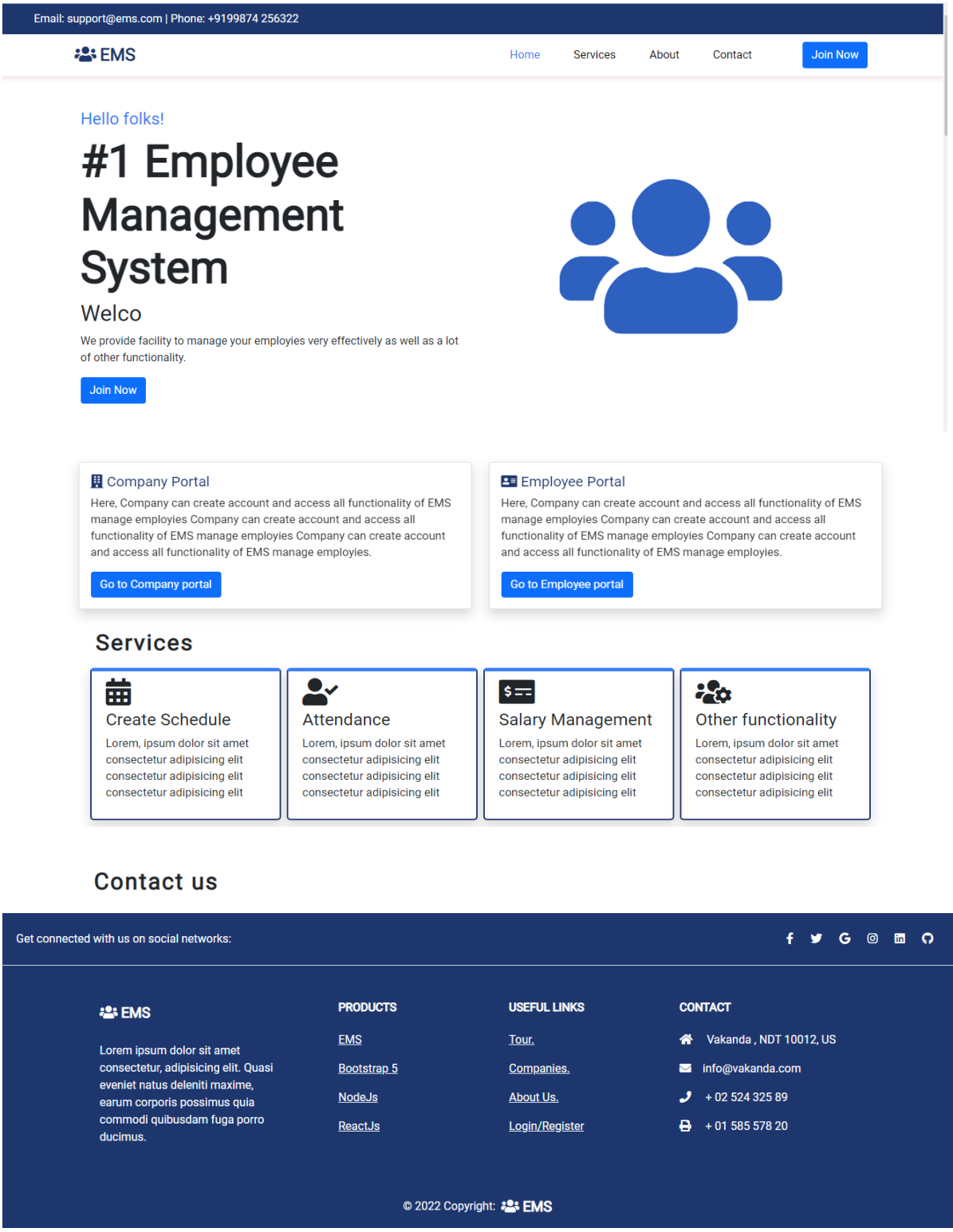
7. Eventtype

NAME	DATATYPE	CONSTRAINT	DESCRIPTION
`id`	ObjectID	PK	Eventtype Id
`Companyid`	ObjectID	FK	Reference companies
`Type`	String	Required	Event type holiday or meeting
`Backgroundcolor`	String	Required	Color

8. Leaves

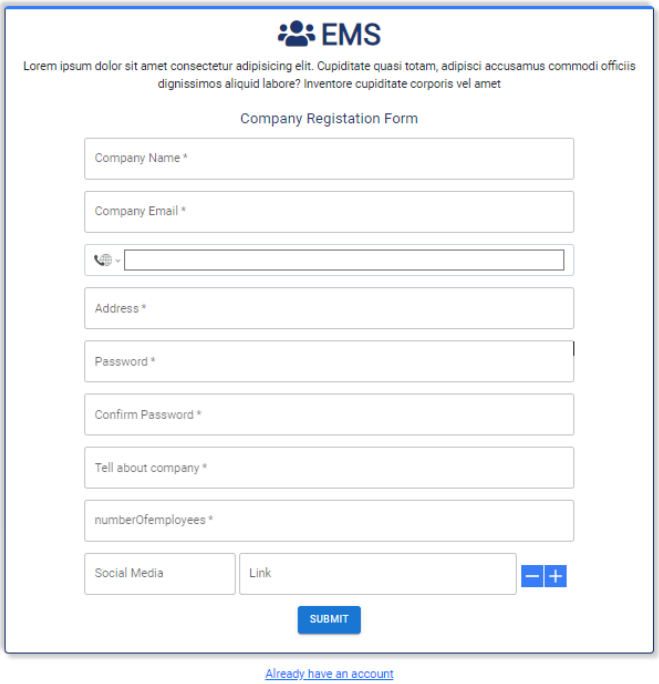
NAME	DATATYPE	CONSTRAINT	DESCRIPTION
`id`	ObjectID	PK	Leave Id
`Companyid`	ObjectID	FK	Reference companies
`Employeeid`	ObjectID	FK	Reference employees
`Startdate`	Date	Required	Start date
`Enddate`	Date	Required	End date
`Halfday`	Number	Required	Number of half-day
`Fullday`	Number	Required	Number of full-day
`Reason`	String	Required	Reason for leave
`Status`	Boolean	Required	Leave status

3.5 User interface



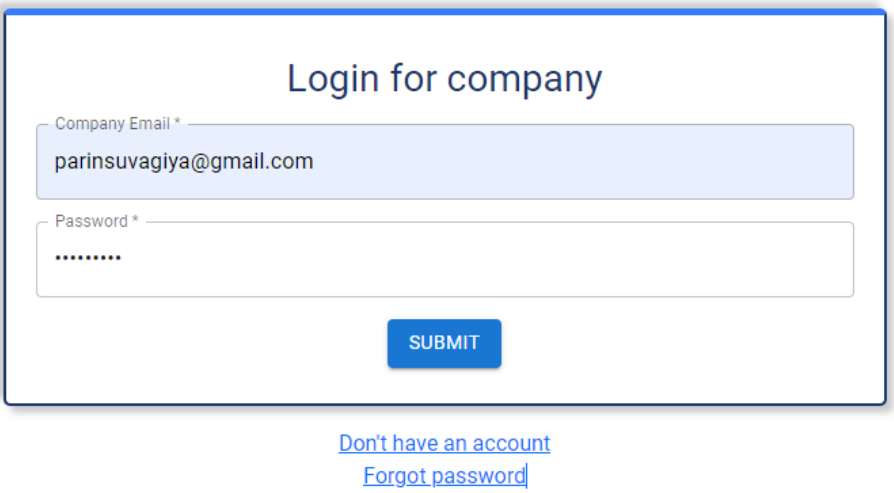
3.5.1 Home page

This is the home page of ems.



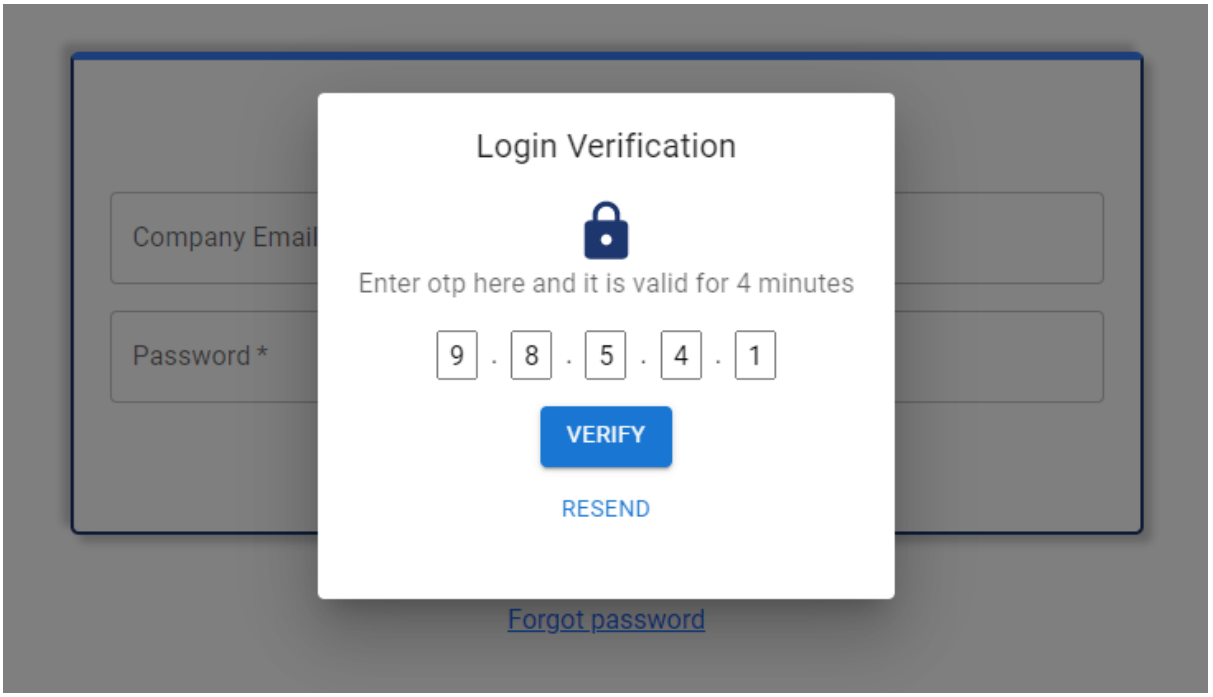
3.5.2 Company registration page

Company registration form



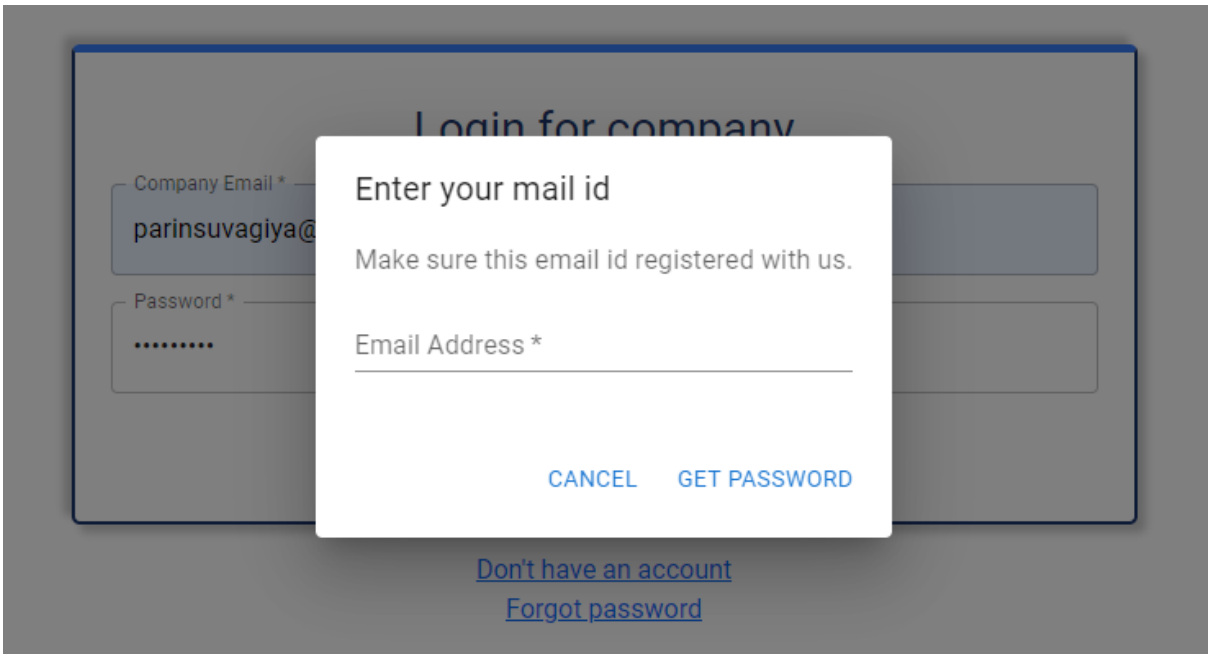
3.5.3 Company Login

Company login form



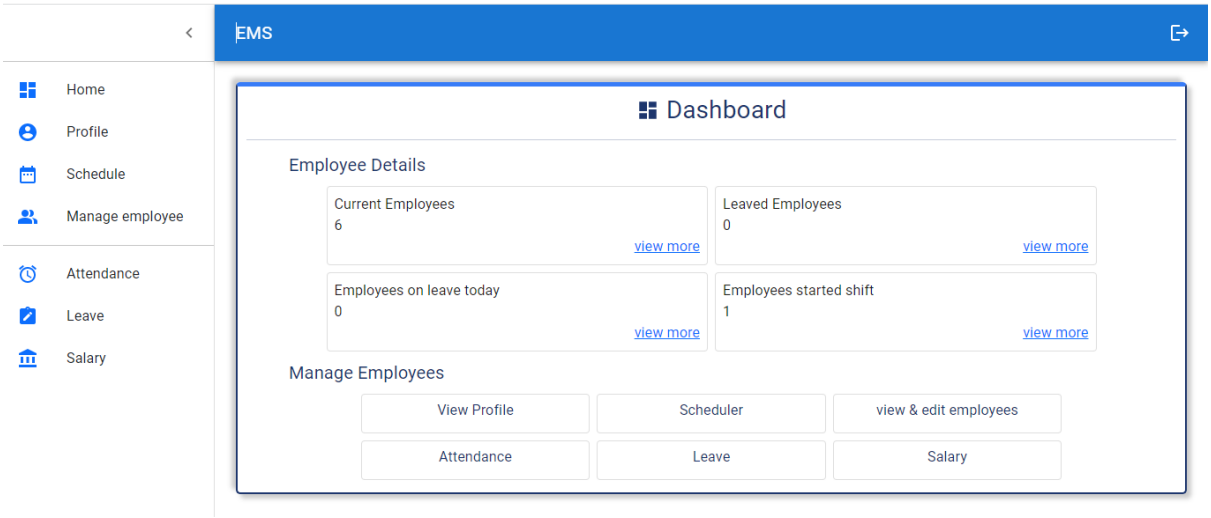
3.5.4 verify OTP

Verify Otp page



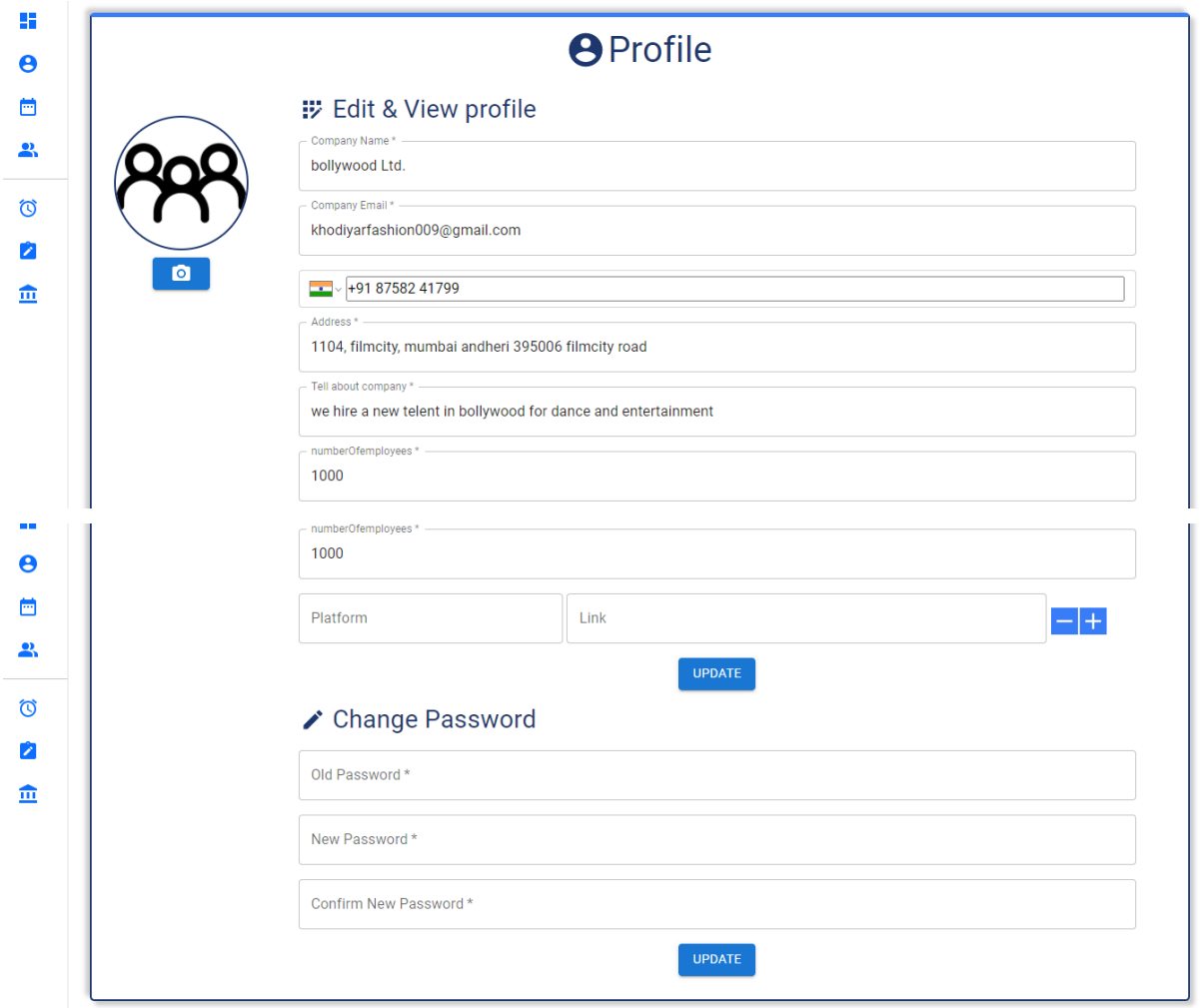
3.5.4 forgot password

Forgot password page



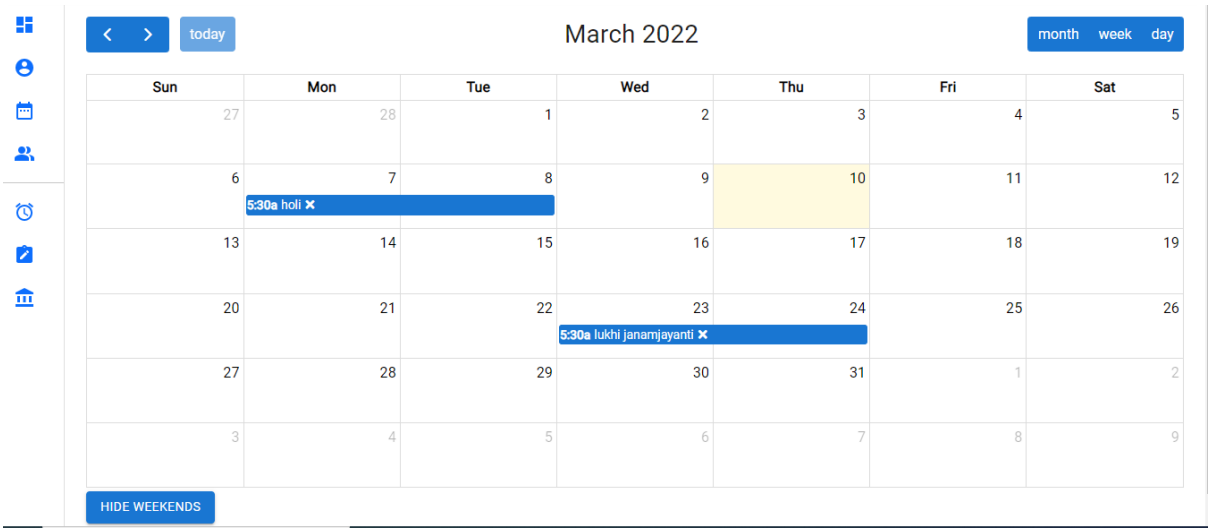
3.5.5 company dashboard

Company dashboard page it shows some statistics and redirects links.



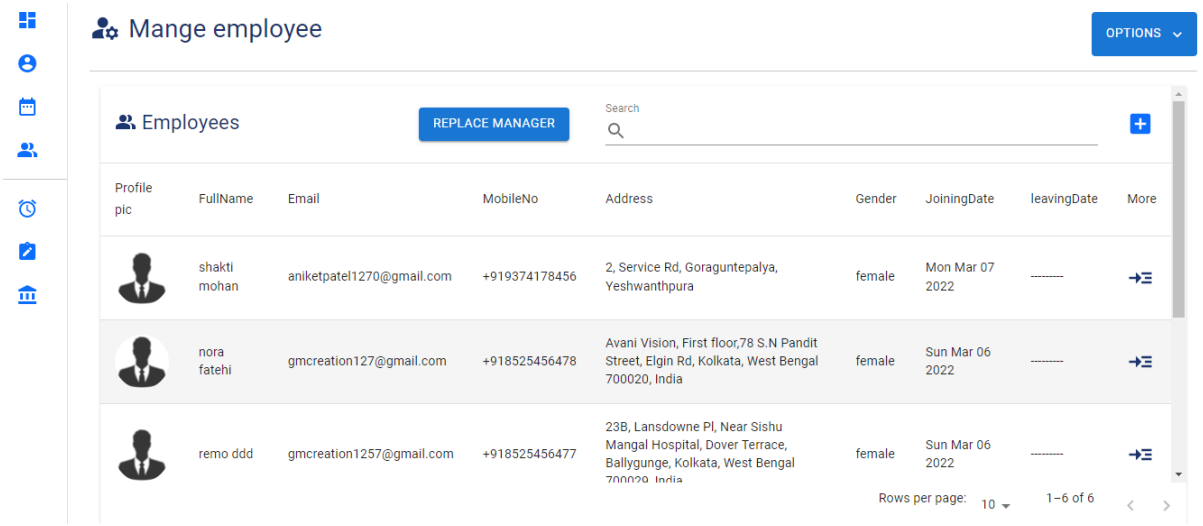
3.5.6 company profile & edit profile

Company profile page view, update company profile



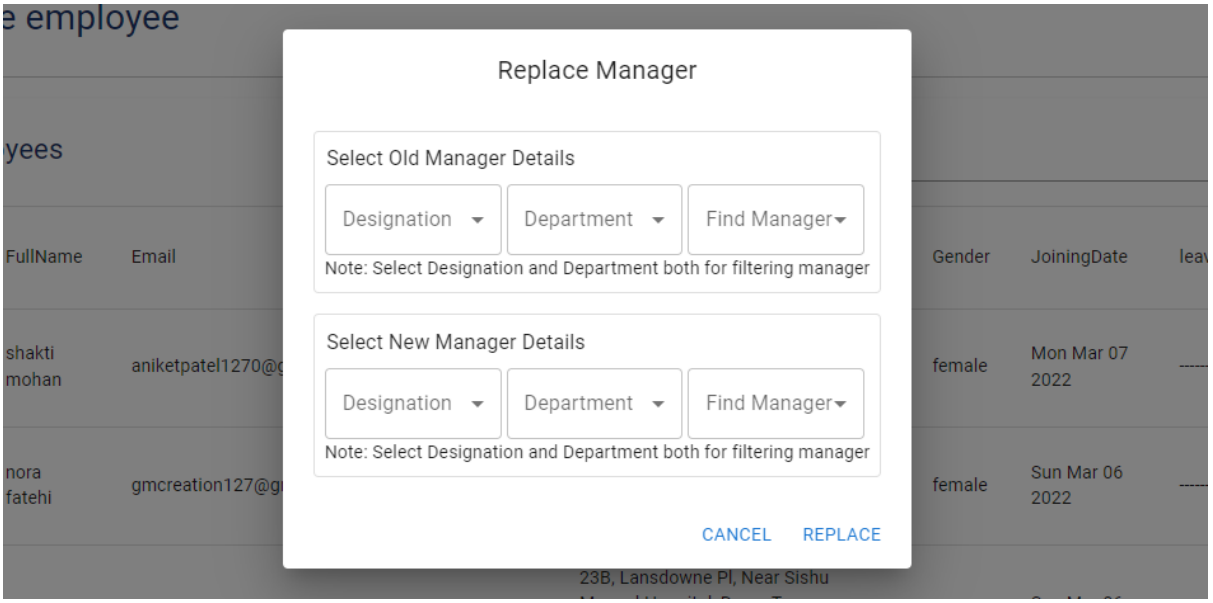
3.5.7 Schedular

Company scheduler add, update, delete event



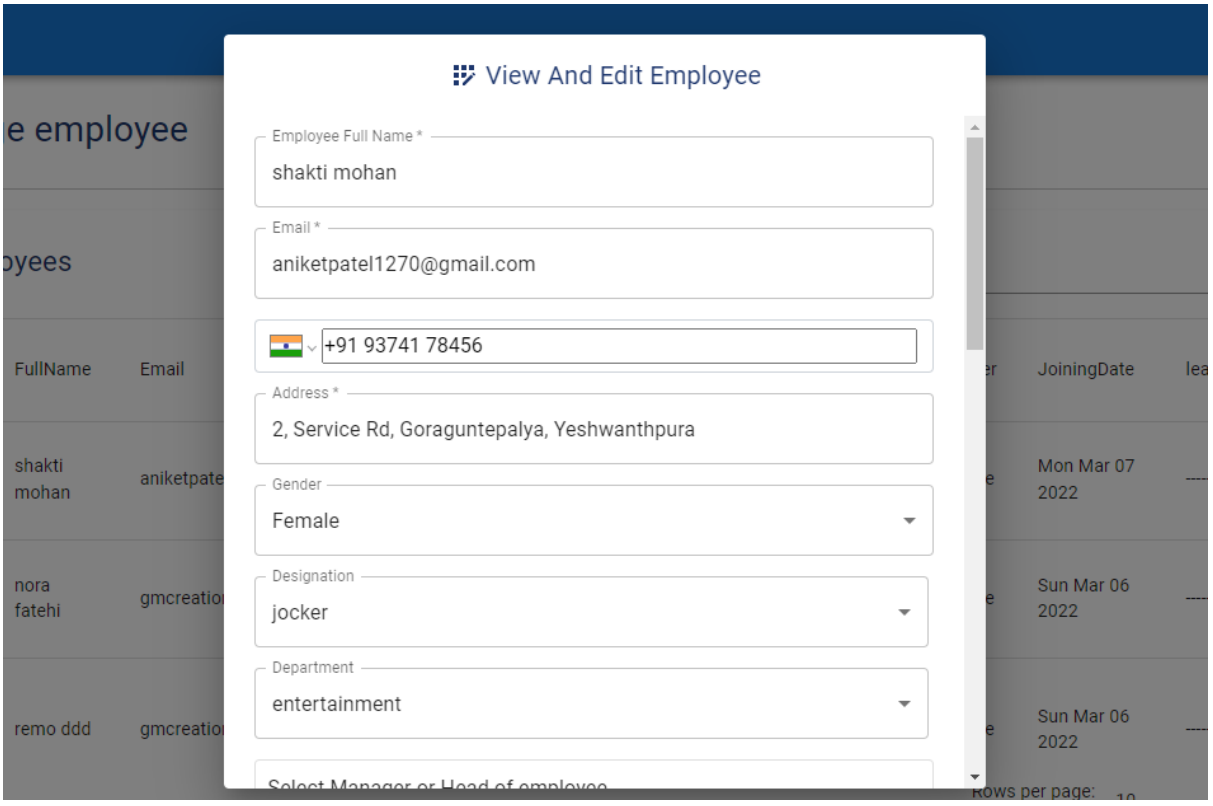
3.5.8 View employees

View, edit employee profile



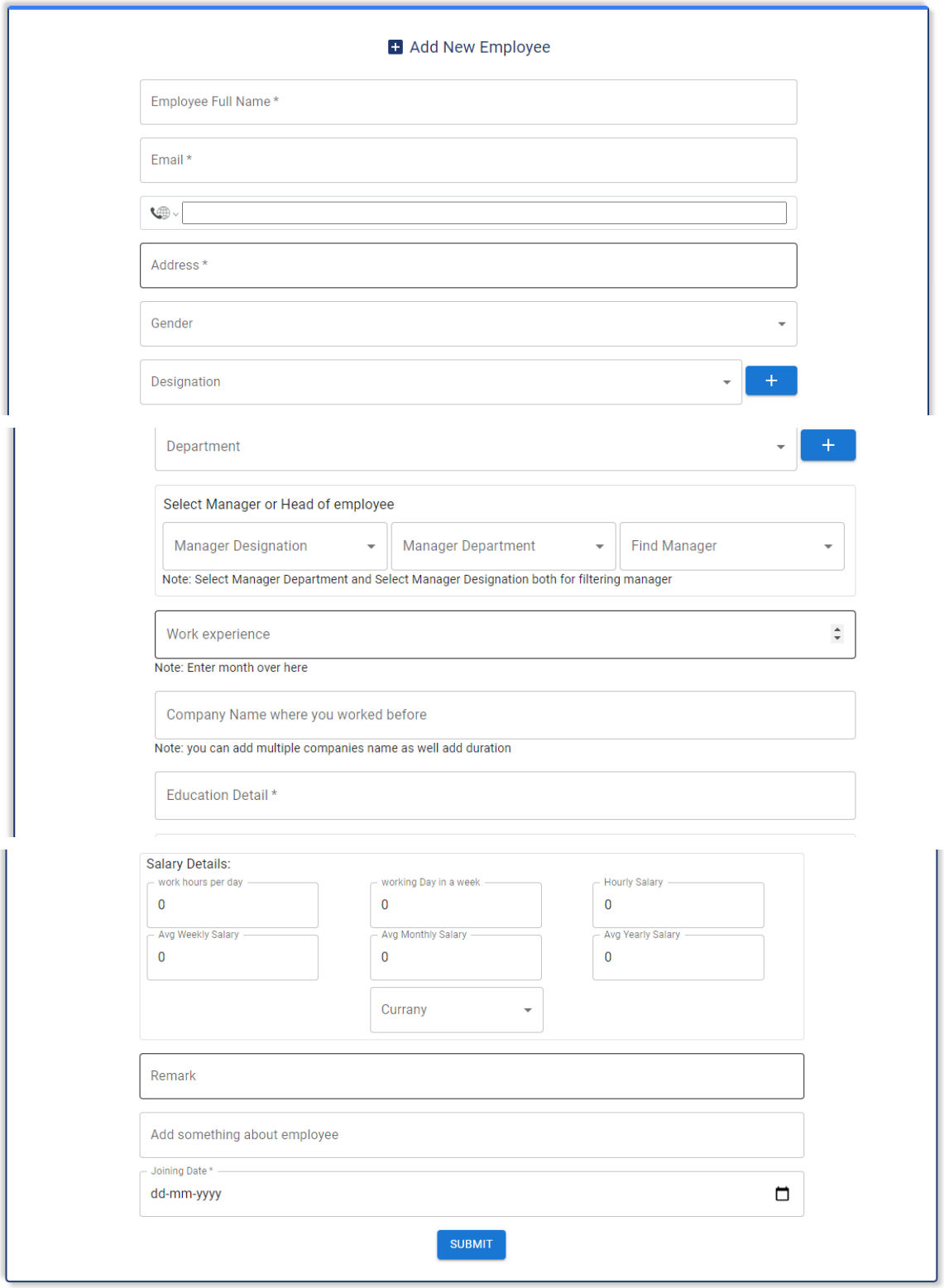
3.5.9 Replace manager

Update manager of employees



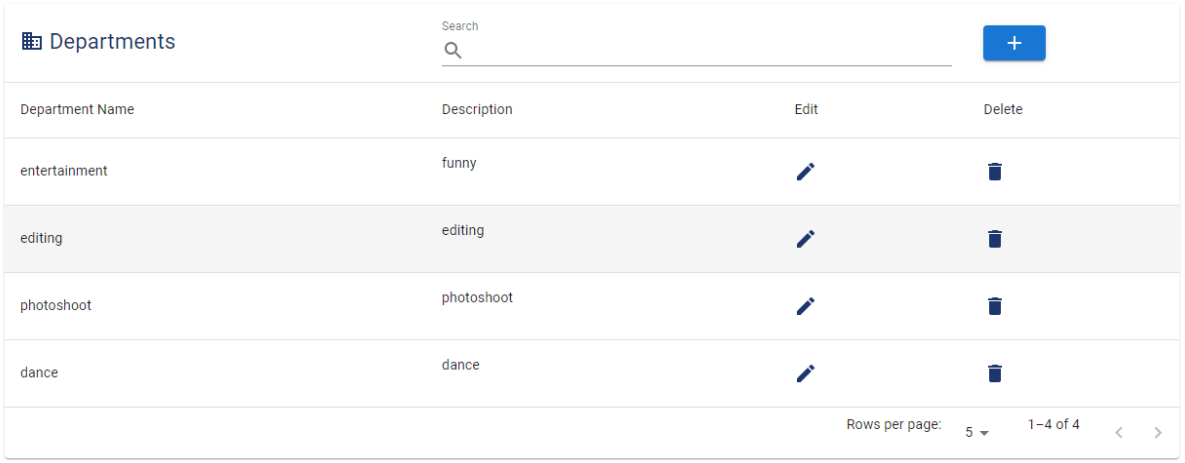
3.5.10 Edit employee

Edit employee profile

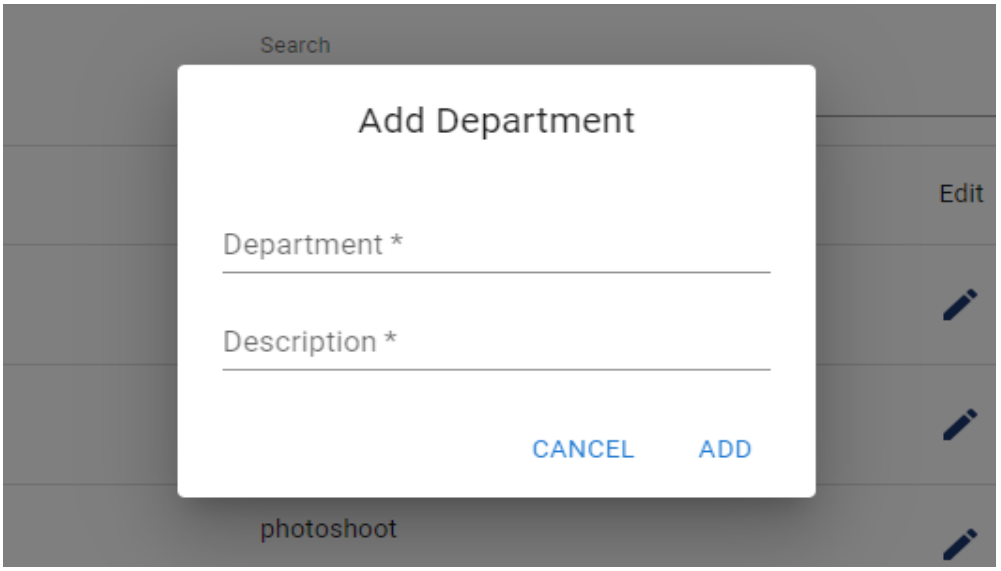


3.5.11 Add employee

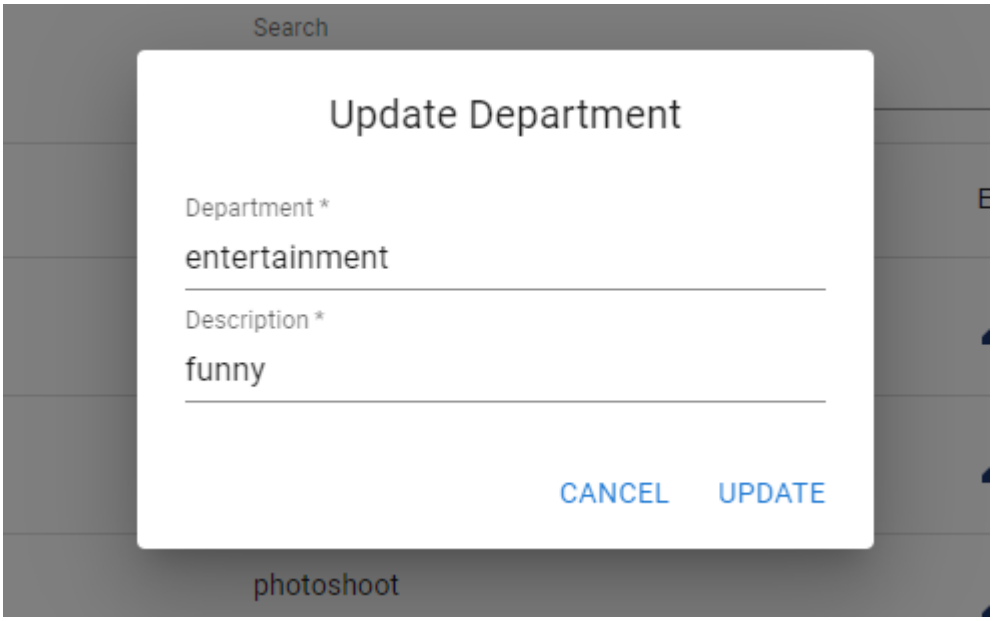
Add new employee



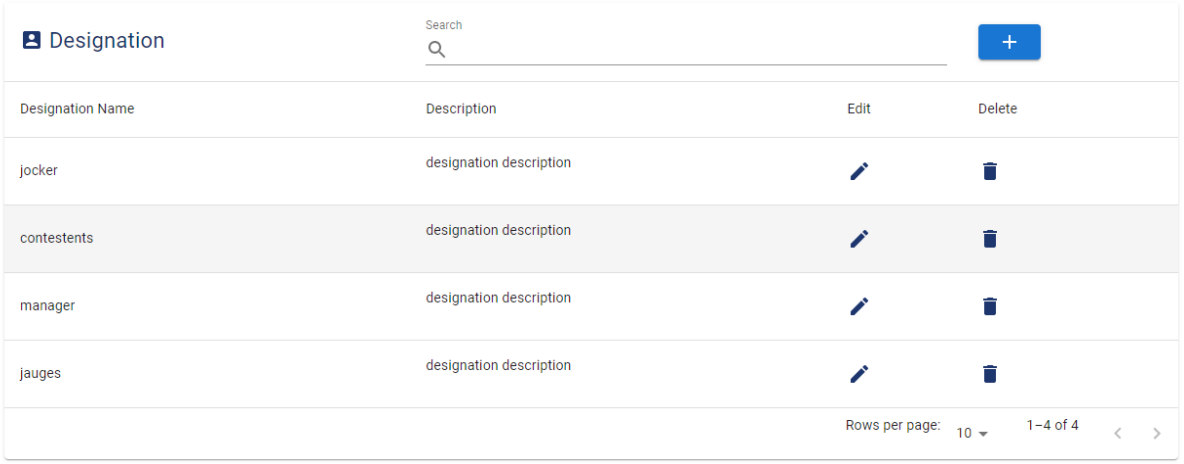
3.5.12 view Departments



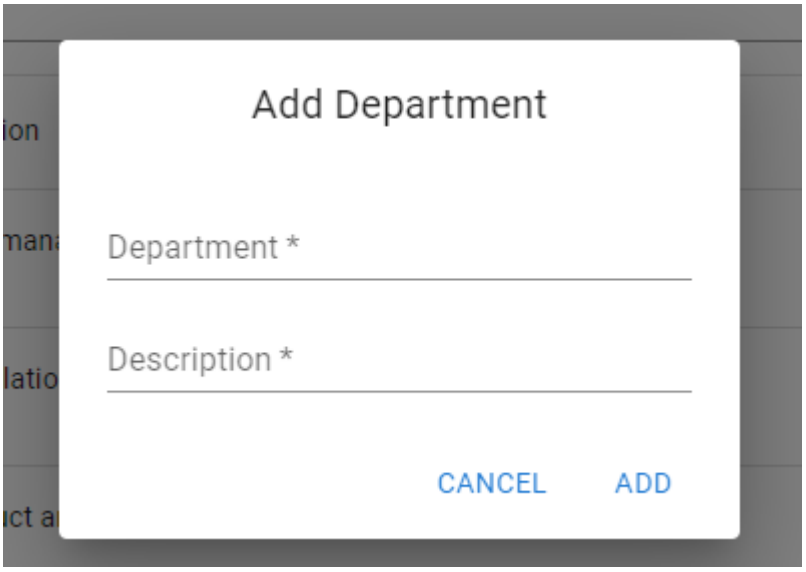
3.5.13 Add Departments



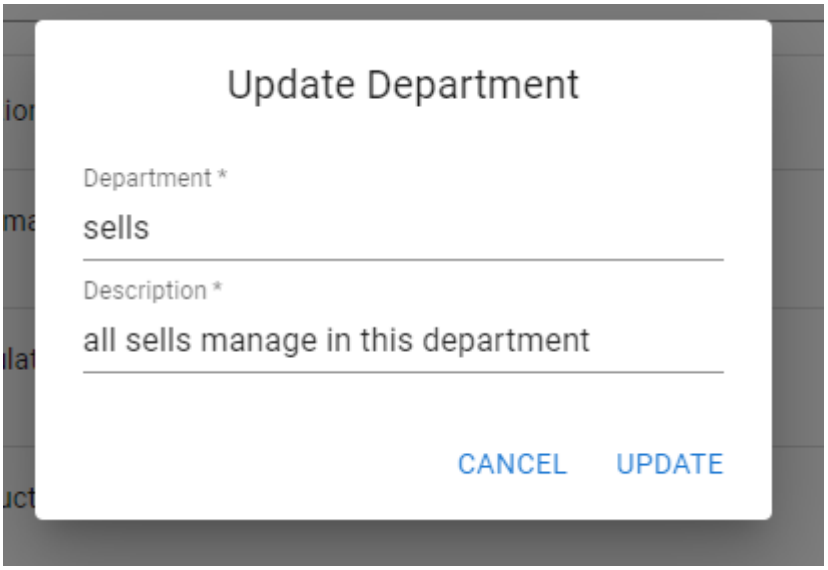
3.5.14 Update Department



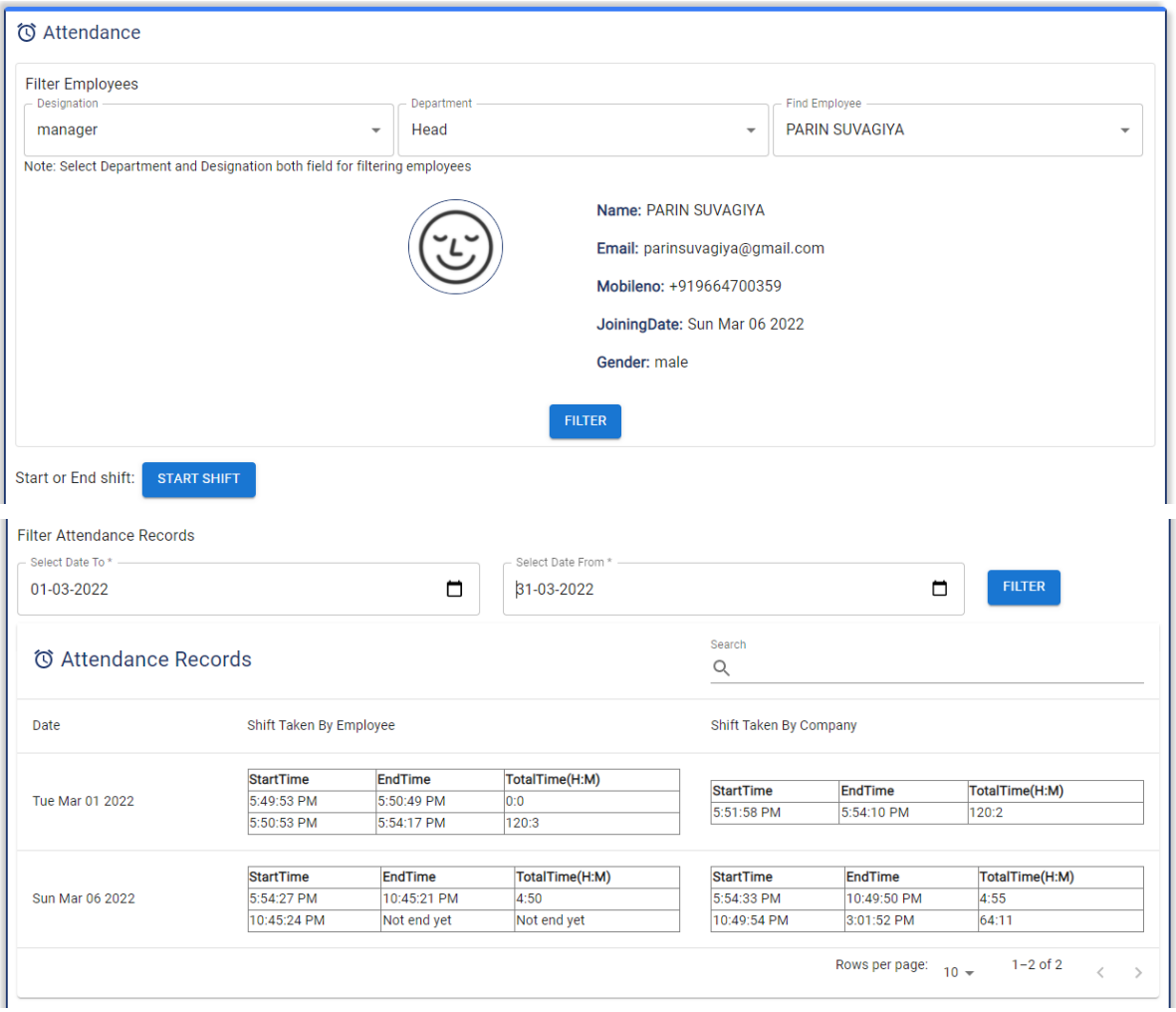
3.5.15 view designations



3.5.16 Add designations

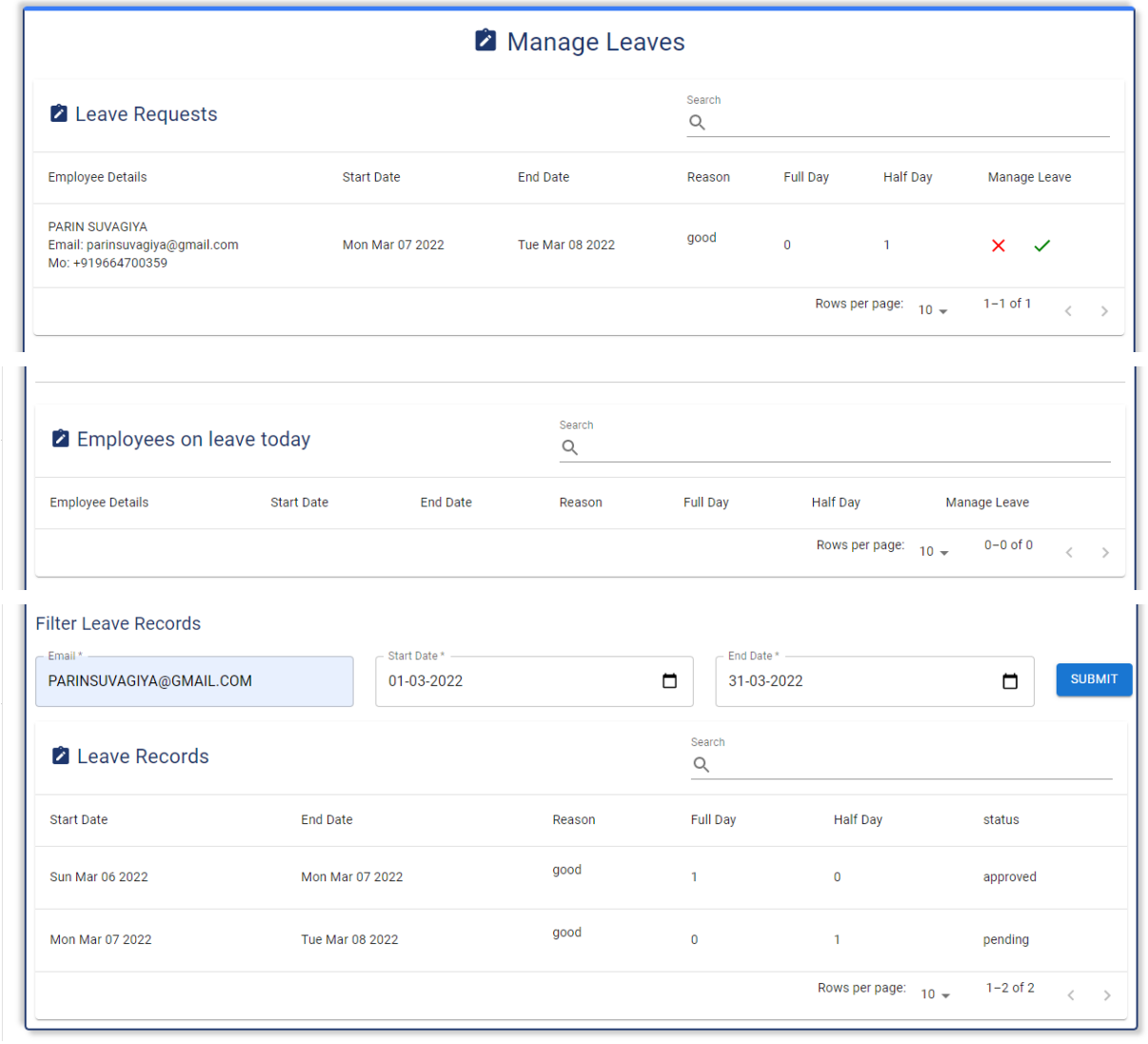


3.5.17 Update Designations



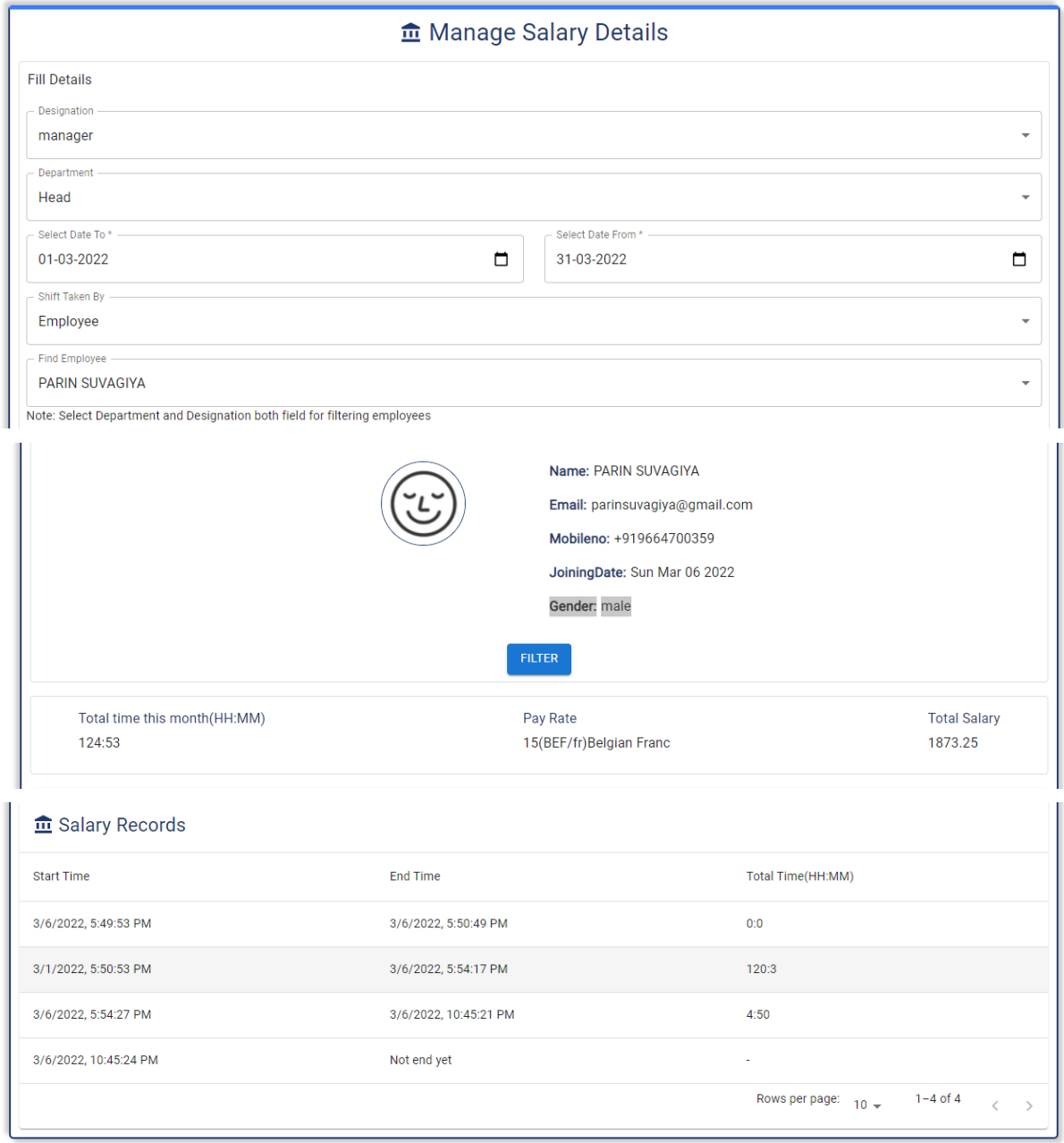
3.5.18 Manage attendance

Manage attendance and view old records and view employees list who started shift



3.5.19 Manage leaves

Manage employees leave and view their records

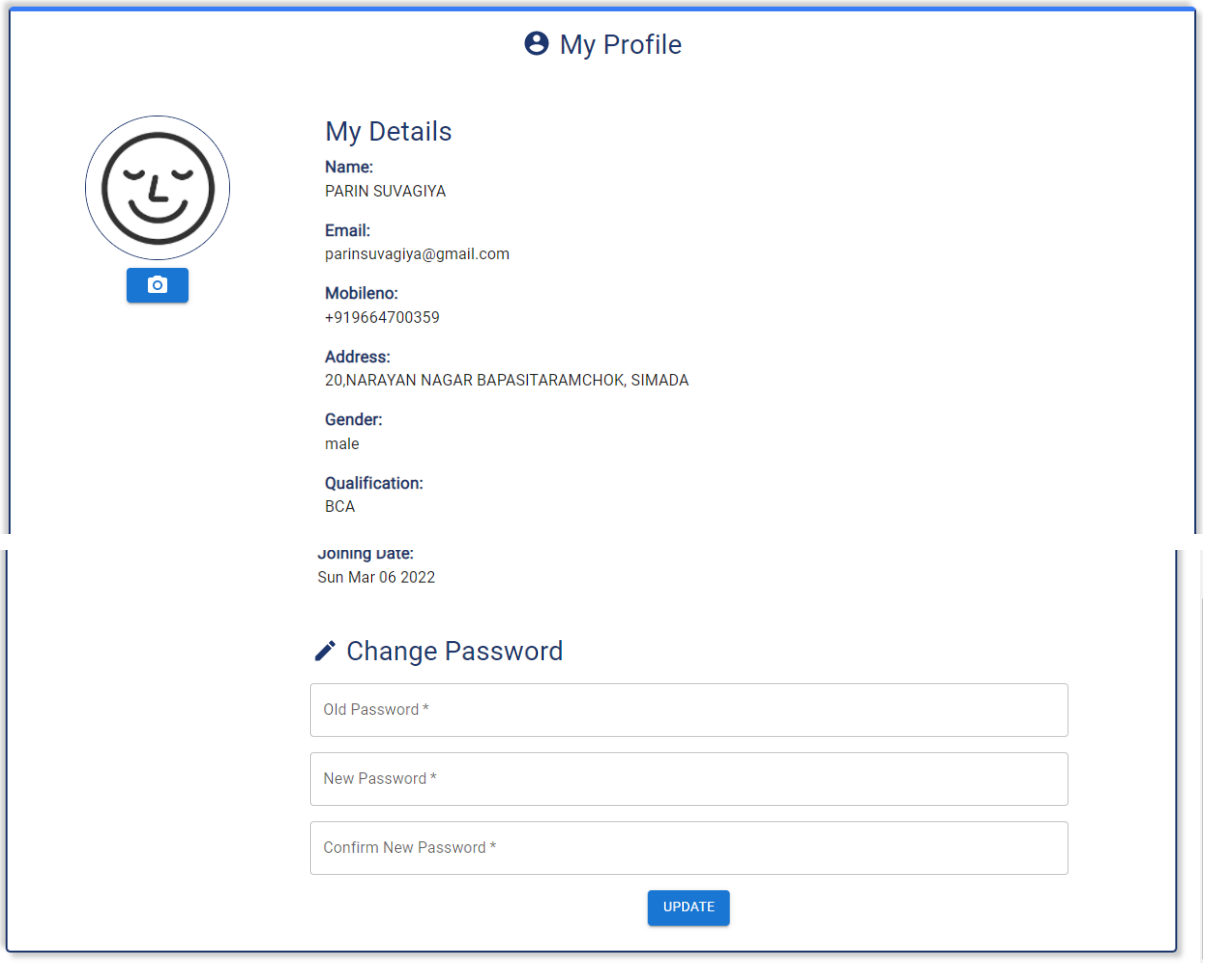


3.5.20 Manage salary

Cout salary between two dates

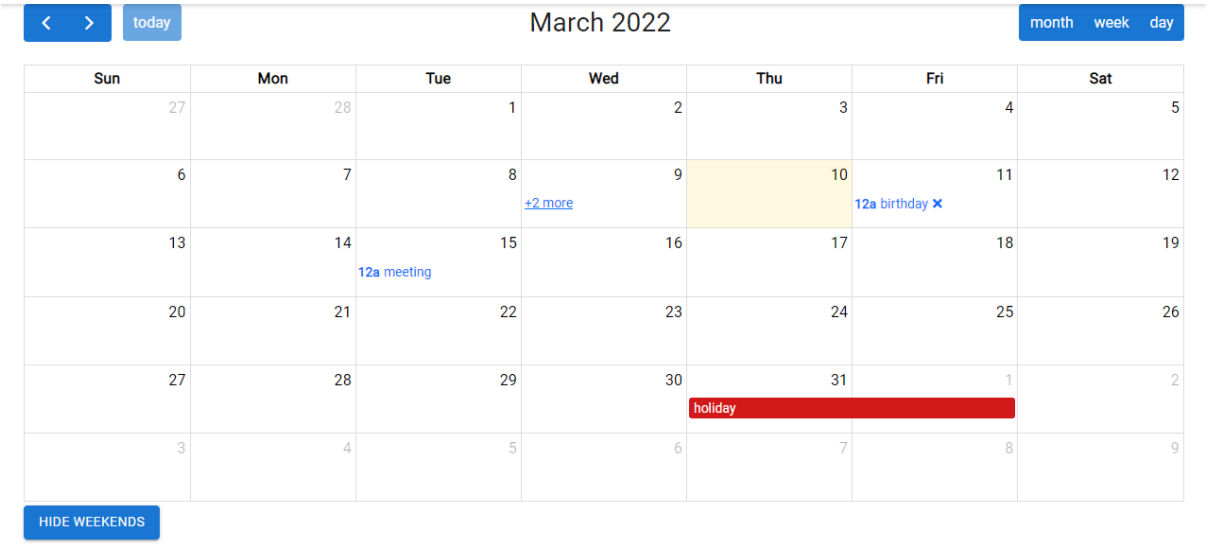
3.5.21 Employee view company profile

View company profile



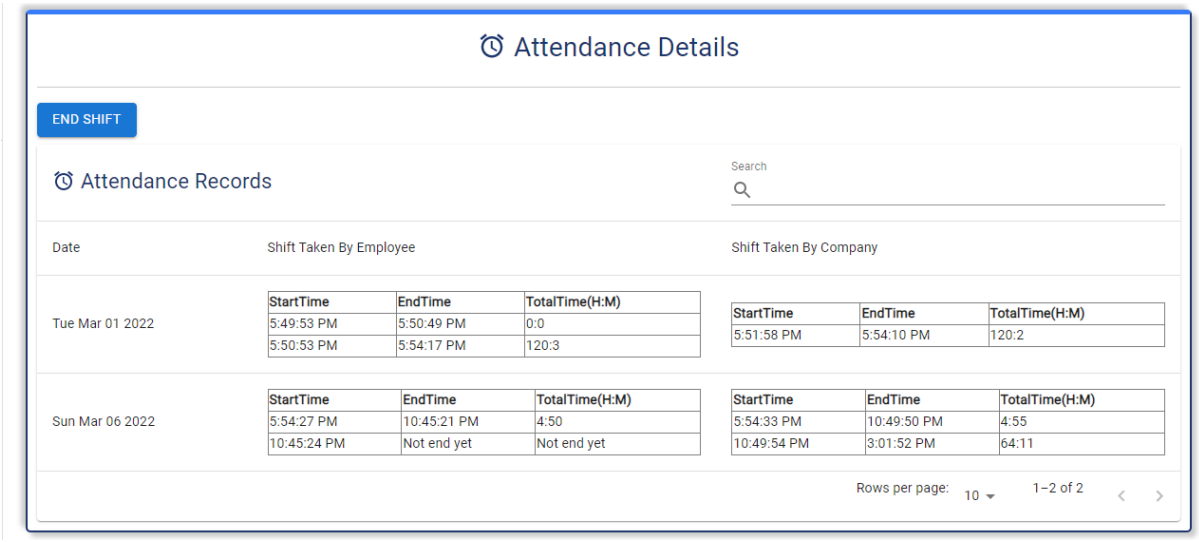
3.5.22 Employee views my profile

View my profile and edit password



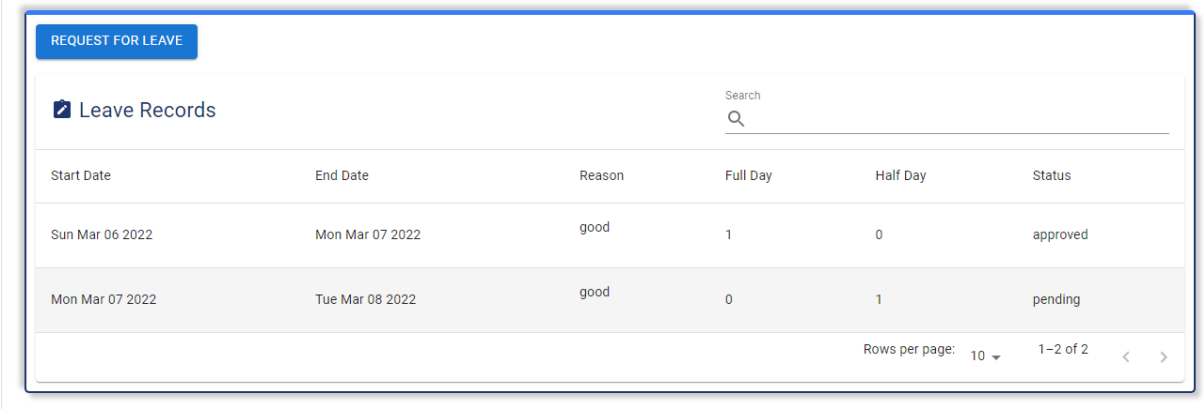
3.5.23 employee Scheduler

View events and add personal and public events

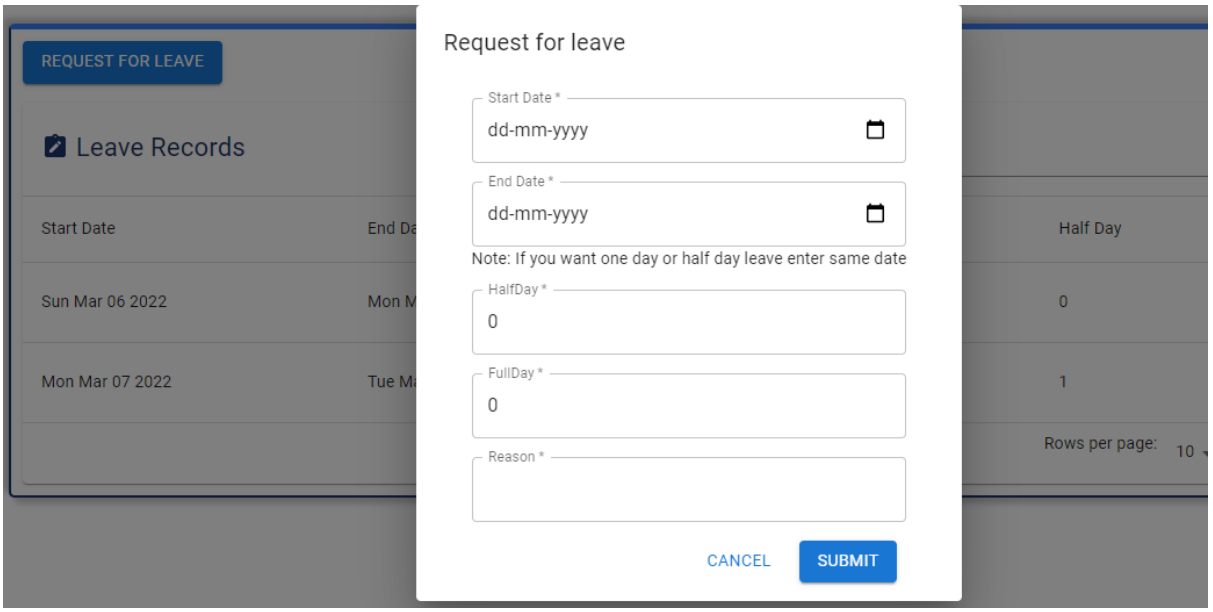


3.5.24 Attendance

Track working hours

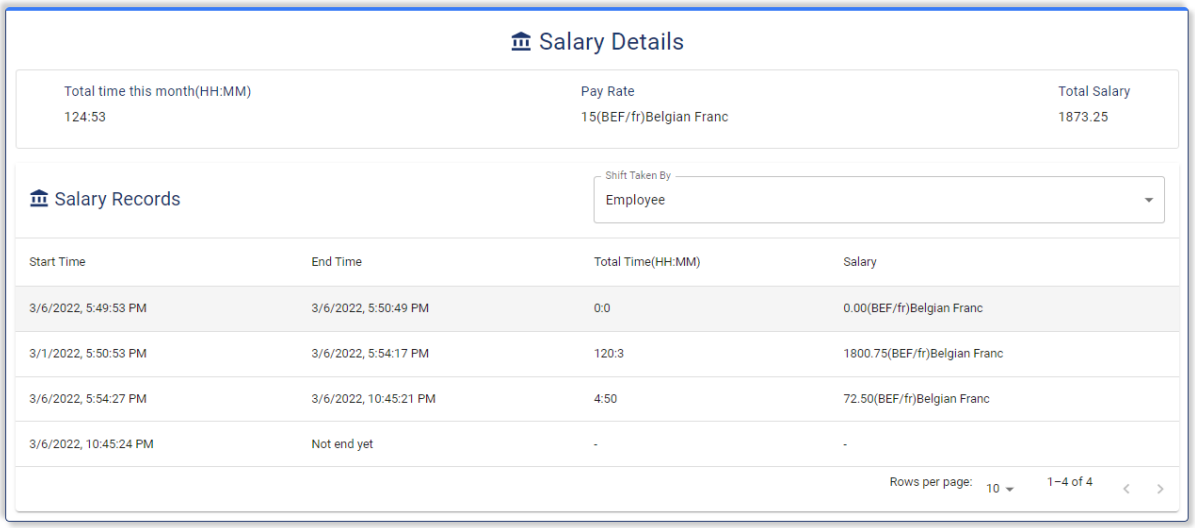


3.5.25 leave history



3.5.26 send leave request

Request for leave and view old records



3.5.27 Salary

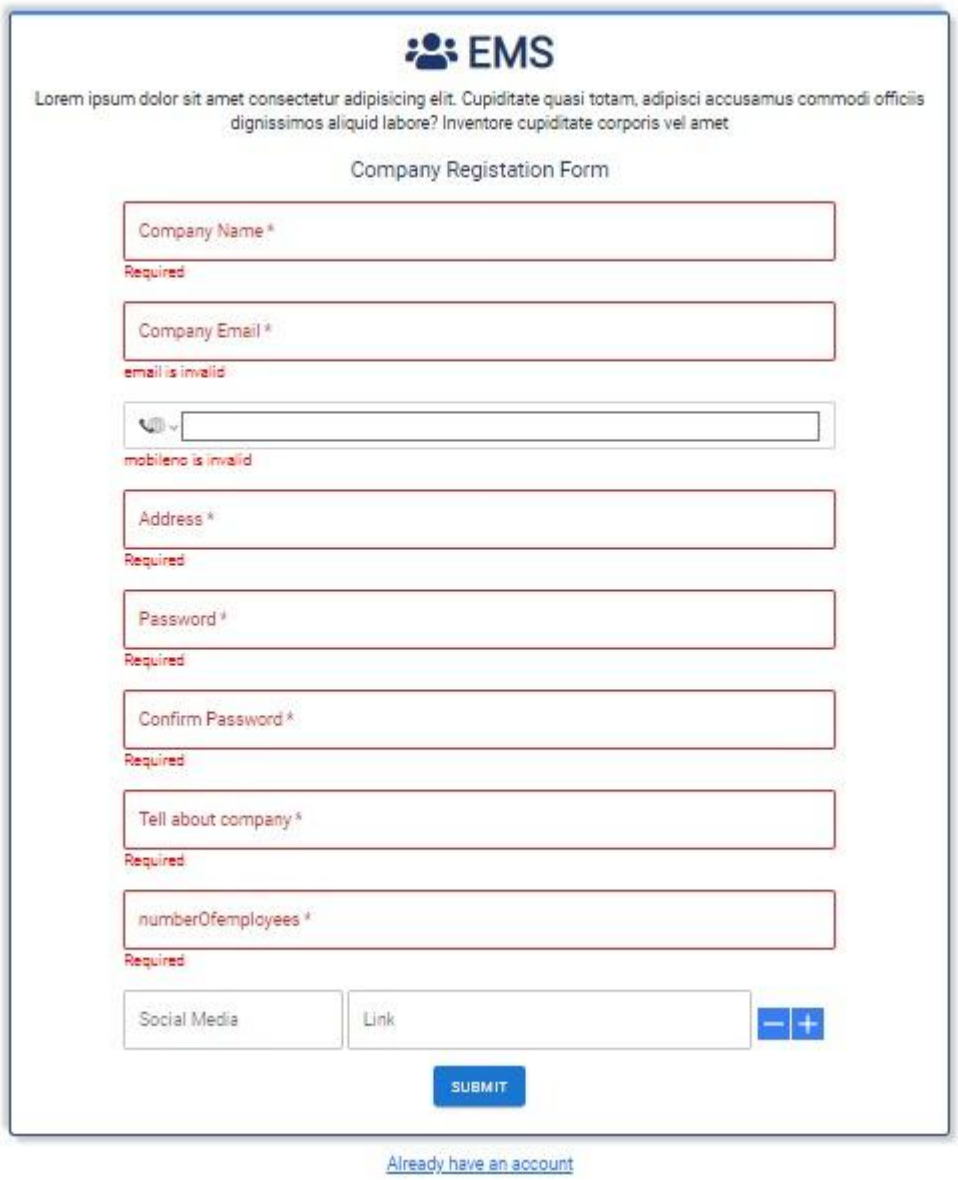
View salary details daily basis

4. Testing

4.1 Unit testing

Test case for company registration

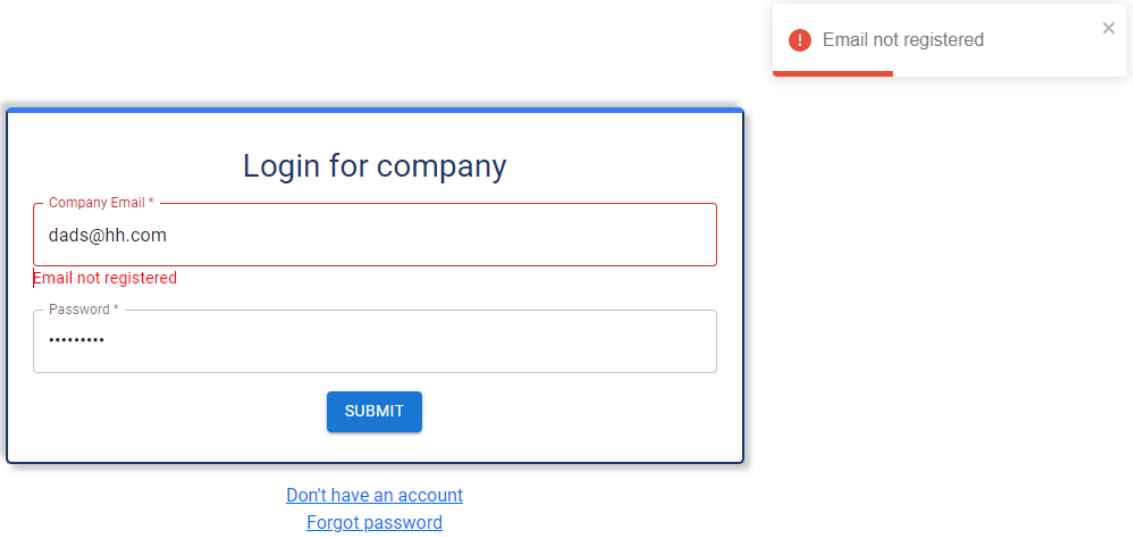
Test id	Test field	Stop execute	Executed result	Actual result
1	Company name	Required	minimum 5 character required	Expected
2	Email	Valid email	email is invalid	Expected
3	Mobile no	Required	mobile no is invalid	Expected
4	Address	Required	Required, minimum 30 character	Expected
5	password	Required	minimum 8 character required	Expected
6	Confirm password	Required	Does not match with password	Expected
7	About the company	Required	minimum 50 character required	Expected
8	Number of employees	Not less than 1	must have valid digits	Expected
9	Social media link	Empty	No error	Expected



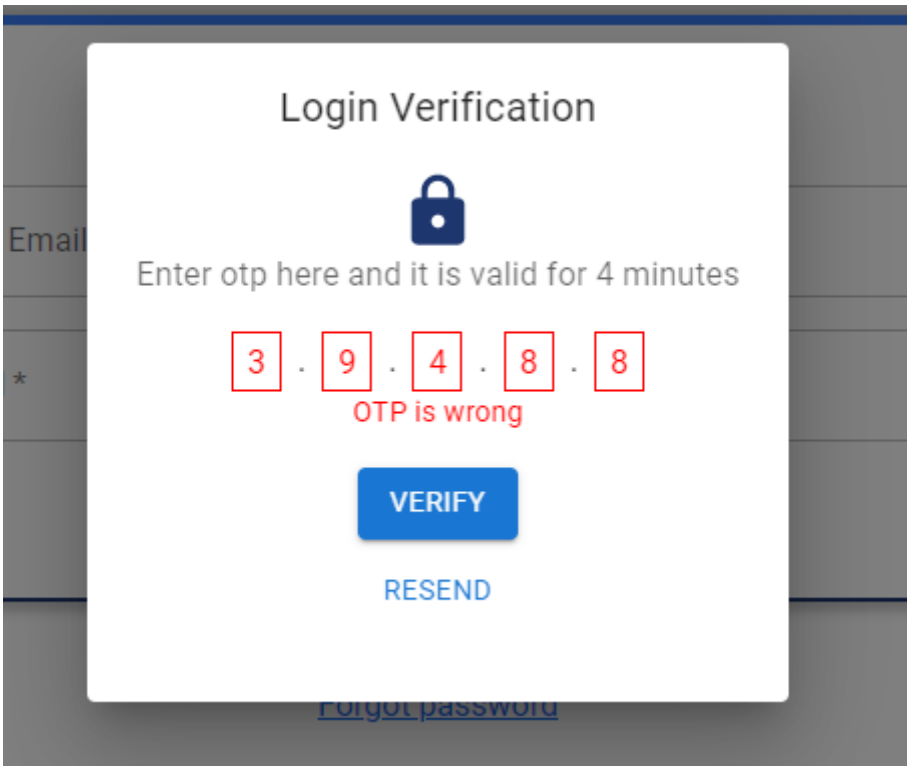
4.1.1 company registration error view

Test case for the company and employee login

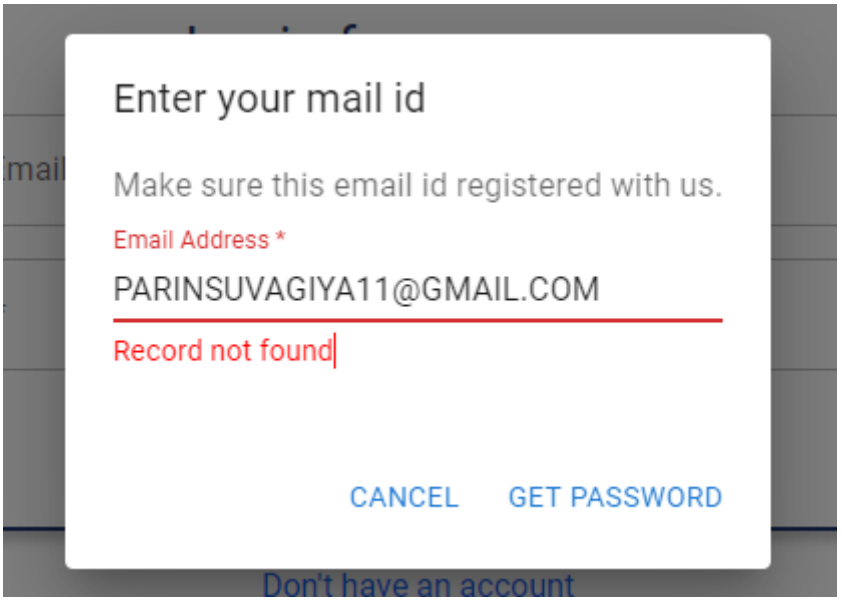
Test id	Test field	Stop execute	Executed result	Actual result
1	Email	Valid email	email is invalid, Email not registered	Expected
2	Password	Required	minimum 8 character	Expected



4.1.2 company login error view



4.1.3 OTP error view



4.1.4 forgot password error view

Test case for add employee

Test id	Test field	Stop execute	Executed result	Actual result
1	Name	Required	minimum 5 characters required	Expected
2	Mobile no	Required	mobile no is invalid	Expected
3	Email	Required	email is invalid	Expected
4	Address	Required	Required	Expected
5	Gender	Required	Required	Expected
6	Designation	Required	Required	Expected
4	departments	Required	Required	Expected
8	Manager	Required	Required	Expected
9	Workexp			Expected
10	Company where worked			Expected
11	Education details	Required	Required	Expected
12	Salary	Required	Required	Expected
13	Remark			Expected
14	About employees			Expected
15	Joining date	Required	Required	Expected

Test case for designation

Test id	Test field	Stop execute	Executed result	Actual result
1	Designation name	Required	Required	Expected
2	Description	Required	Required	Expected

Test case for the department

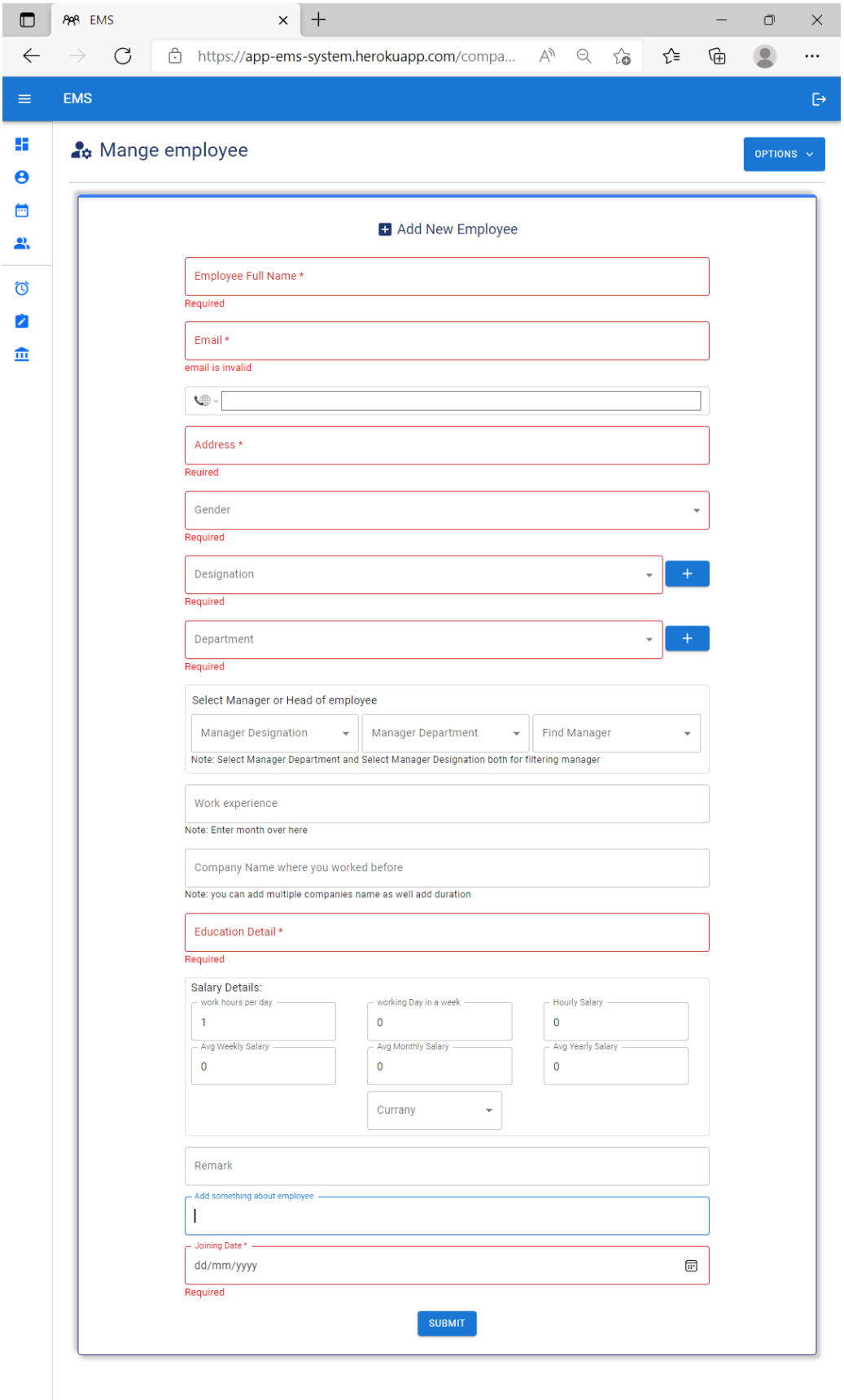
Test id	Test field	Stop execute	Executed result	Actual result
1	Department name	Required	Required	Expected
2	Description	Required	Required	Expected

Test case for events

Test id	Test field	Stop execute	Executed result	Actual result
1	**Tital**	**Required**	Required	Expected
2	**Strat date**	**Required**	Required	Expected
3	**End date**	**Required**	Required	Expected
4	**All day**			Expected
5	**Category**	**Required**	Required	Expected
6	**Type**	**Required**	Required	Expected
7	**Link**			

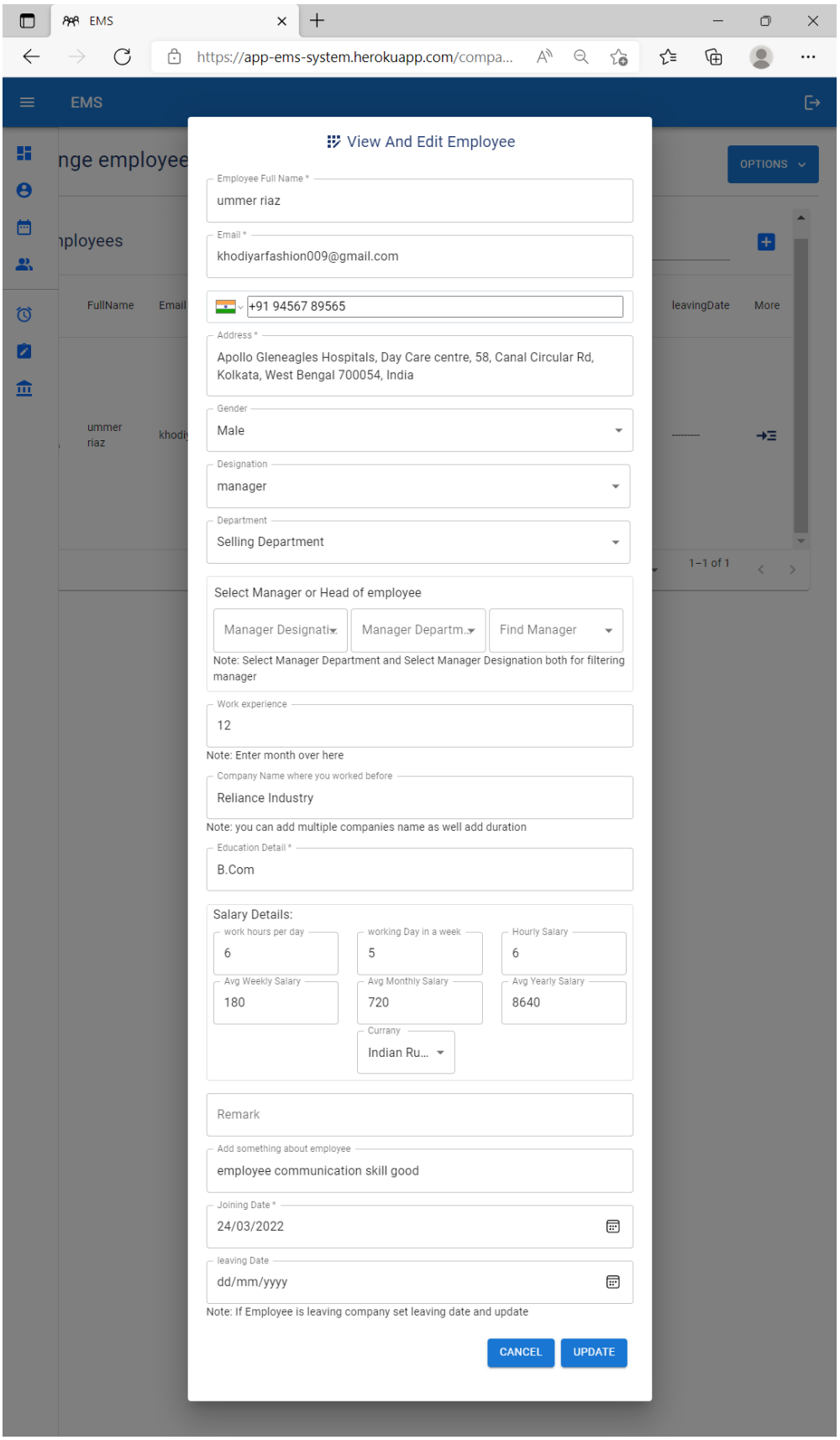
We have performed other test cases and found expected results.

Add employees



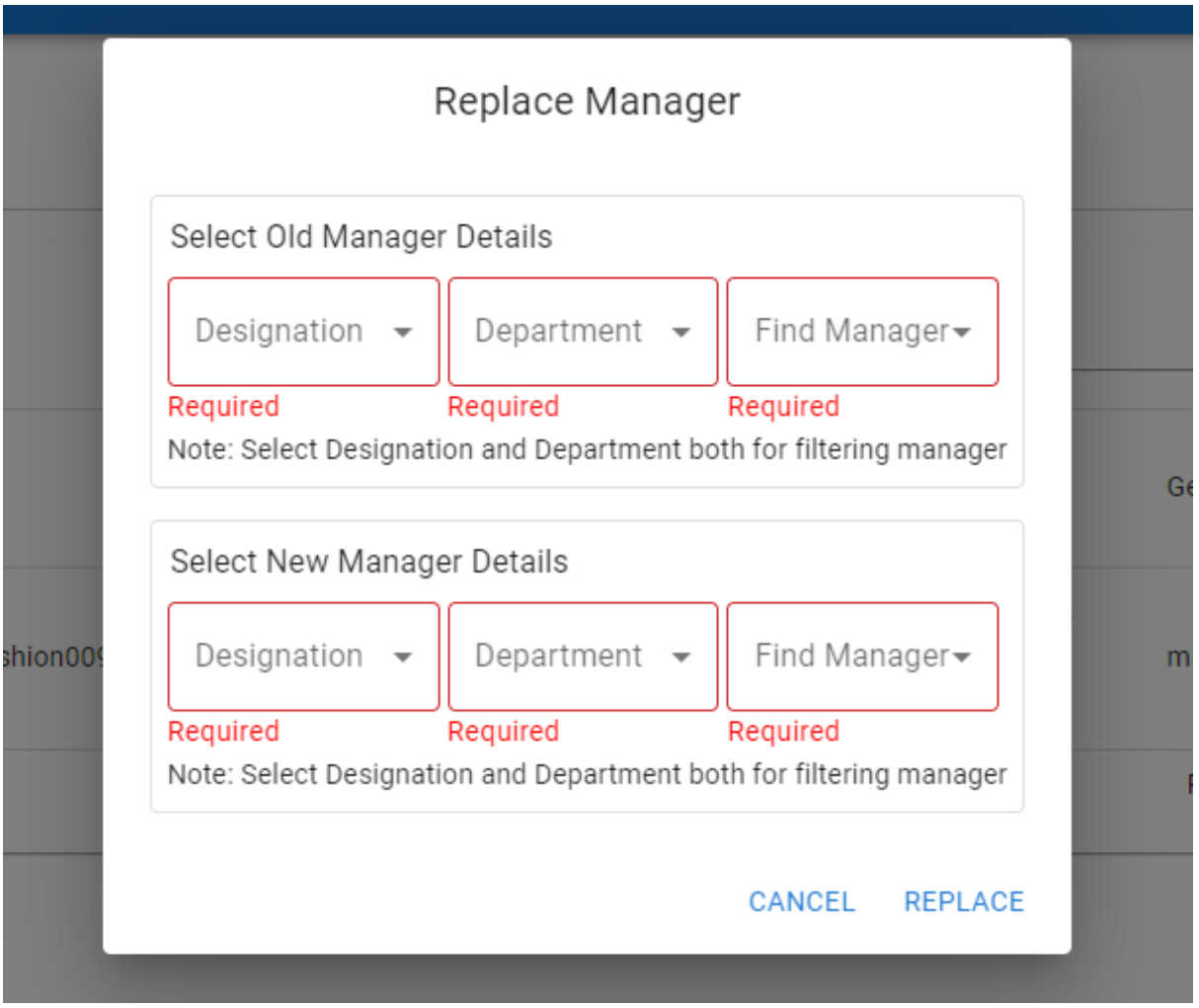
4.1.5 Add employee error view

Edit employees



4.1.6 update employee view

Replace Manager



4.1.7 replace manager error view

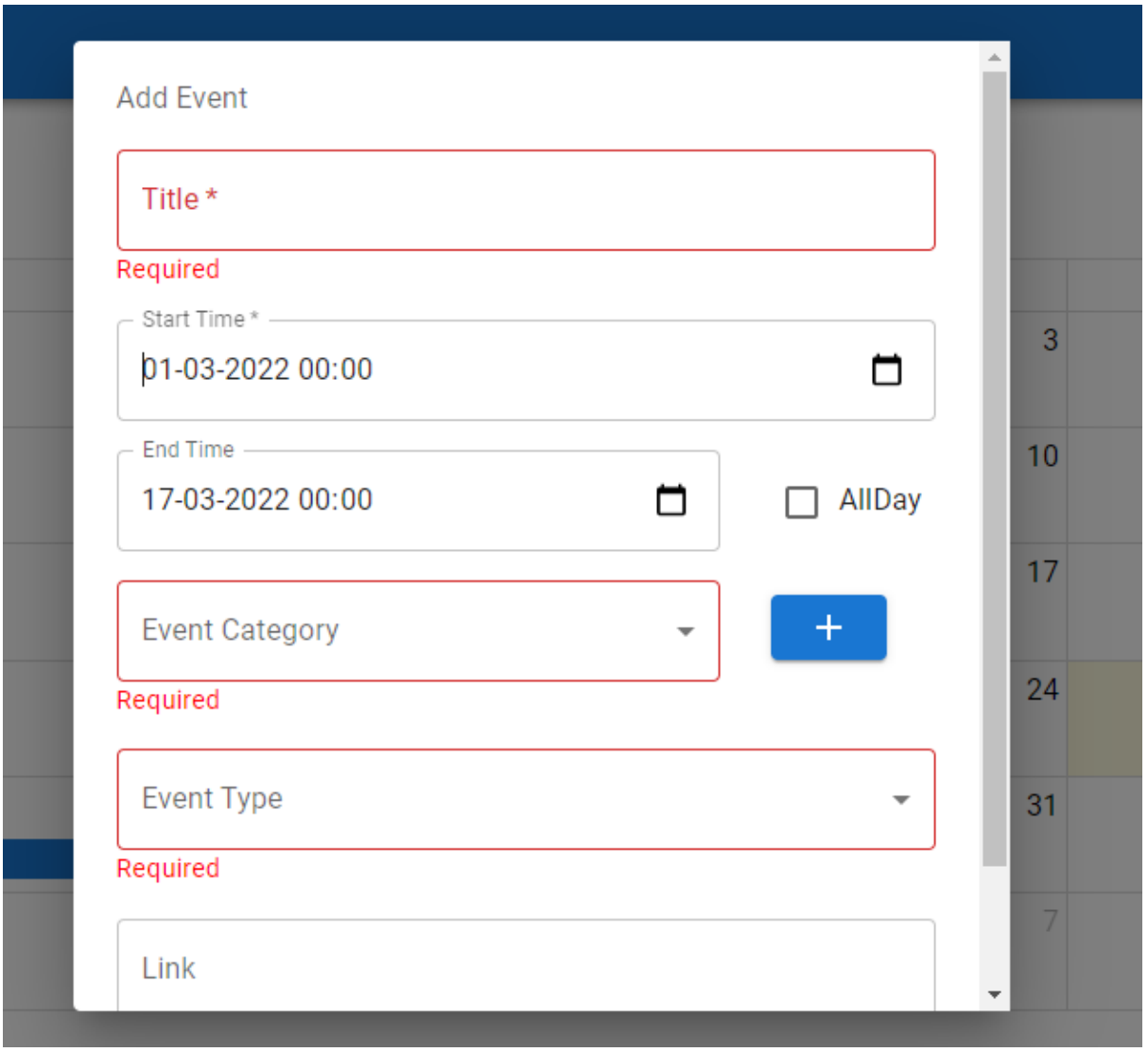
Departments

4.1.8 add department error view

Designation

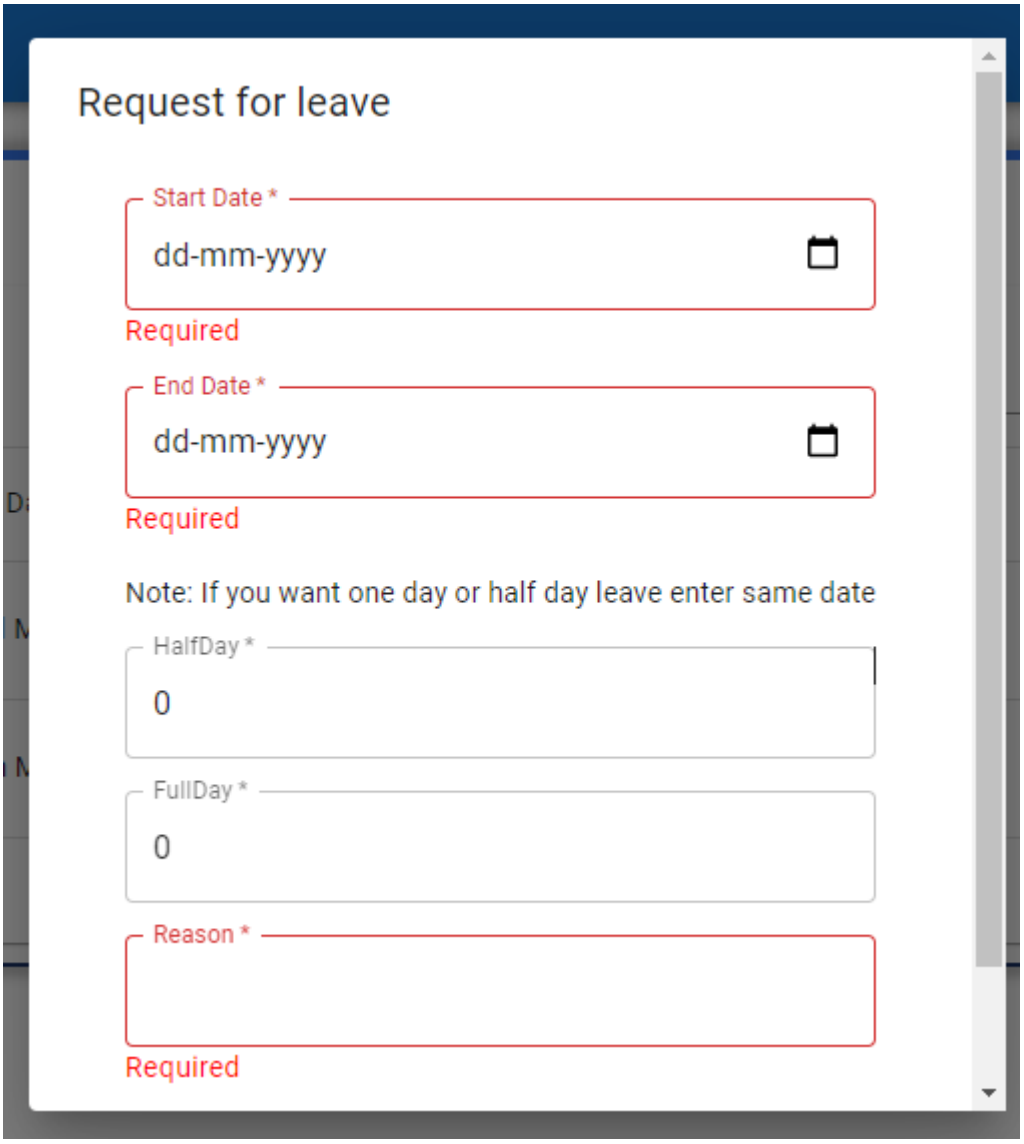
4.1.9 add designation error view

Event



4.1.10 add event error view

Request for leave



4.1.11 leave request error view

Shift Manager, Salary counter, leave manager all modules are working as we expected.

4.2 Navigation Testing

- All navigation links are redirecting users to the perfect page and protected routes are not allowing an unauthorized user to view the page.

4.3 Functional Testing

- Company login & registration are working fine with validation and authentication
- Employee login working fine
- Manage employees working fine
- Department manager working as we expected
- Designation manager working as we expected
- Shift manager is working fine
- Salary manager is working fine
- Event module is also working fine
- Leave manager is working file
- Automatic mail sending functionality is working

4.4 Environment Testing

Firefox browser, Internet Explorer and chrome consider testing for environment operability of software.

Web server	–	created using nodejs
Database	–	MongoDB
OS	–	Windows
Browser	–	Firefox/Internet Explorer/Chrome

Postman is used for API environment testing

5. Conclusion

The purpose of this website is to provide functionality for managing employees. EMS is a web application where multiple companies can create their account and get access to a lot of functionality for managing employees. EMS has API which separates the frontend and backend and also helps to integrate with other websites. EMS provides functionalities like scheduling important meetings, and events and managing employees' leave, salary, attendance, and working hours with effective sorting and filtering techniques. This system provides a portal for employees to interact with the company and track their daily data like attendance, leave, salary, and working hours. EMS frontend is built using Reactjs, which is a javascript library. EMS Backend provides an Application programming interface (API) that is built using Nodejs, Expressjs, and MongoDB. When user requests for EMS frontend will load on the web browser window and API will provide data on user needs.

6. Bibliography

Websites

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https://nodejs.org/en/docs/

https://mongoosejs.com/docs/api.html

https://mui.com/

https://getbootstrap.com/docs/5.0/getting-started/introduction/