

**PROJECT REPORT**  
**ON**  
**Design and Implementation for**  
**Management of Outsourced Manpower**

**Submitted for partial fulfillment of the requirements for the 4<sup>th</sup> semester of**  
**Master of Computer Application (MCA)**

**Submitted to**  
**DEPARTMENT OF COMPUTER APPLICATION,**  
**ASSAM ENGINEERING COLLEGE**



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## **ABSTRACT**

This formal report provides an in-depth analysis of a web application designed to address the challenges and limitations associated with managing employees and projects in a state level organization. The report presents a comprehensive overview of the proposed software product, highlighting its features, functionalities, and potential benefits for the organization. “Design and Implementation for Management of Outsourced Manpower” application aims to replace the existing system, which relies on physical files and manual processes, with a digital solution that streamlines operations and improves overall efficiency. It offers team leaders, also known as Head of Division a platform for managing employees and projects, facilitating tasks such as assigning employees to projects, progress tracking, and report generation.

The findings and recommendations presented in this report provide valuable insights for decision-makers and stakeholders involved in the evaluation and adoption of the software product. By embracing this digital solution, the organization can optimize productivity, enhance communication and collaboration, and achieve better project outcomes.

## **CERTIFICATE**

This is to certify that the project entitled "**Design and Implementation for Management of Outsourced Manpower**" submitted by **Amlan Jyoti Saikia**, bearing university Roll No.- **210620043003** for the degree of **Master of Computer Application (MCA)** under **Assam Science and Technology University (ASTU)** is accepted by the Department of Computer Application, **Assam Engineering College, Guwahati.**

I wish him success in all future endeavors.

Date:

**Dr. Subhrajyoti Bordoloi**

Time:

Professor & Head of the Department  
Department of Computer Application  
Assam Engineering College, Guwahati.

## **CERTIFICATE**

This is to certify that **Amlan Jyoti Saikia** of MCA 4th Semester, Department of Computer Application, Assam Engineering College, bearing university Roll No. **210620043003** has completed the project entitled "**Design and Implementation for Management of Outsourced Manpower**", submitted in partial fulfillment for the degree for Master of Computer Application (MCA).

Date:

**External Examiner**

Time:

## **CERTIFICATE**

This is to certify that **Amlan Jyoti Saikia** of MCA 4th Semester, Department of Computer Application, **Assam Engineering College**, bearing university Roll No. **210620043003** has completed the project entitled "**Design and Implementation for Management of Outsourced Manpower**", submitted in partial fulfillment for the degree for Master of Computer Application (MCA).

This project was carried out under my guidance. During the period of his association with me, I found his performance to be good. I wish him good luck and success in life.

Date:

**Dr. Bornali Gogoi**

Time:

Associate Professor,

Department of Computer Application,

Assam Engineering College, Guwahati.

## **ACKNOWLEDGEMENT**

I would like to express our profound gratitude to **Dr. Subhrajyoti Bordoloi, Head of the Department of Computer Application Department, Assam Engineering College**, for his valuable support in the completion of this project.

I would like to express our special thanks to my external guide **Mrs. Hiranmayee Gowami, Senior Director (IT), National Informatics Centre, Assam State Centre** for her time and efforts provided throughout this period. Her advice and suggestions were beneficial during the project's development. In this aspect, I am eternally grateful to her.

And lastly, I would like to extend my gratitude towards my Internal Guide **Dr. Bornali Gogoi, Associate Professor, Department of Computer Application, Assam Engineering College** for her valuable advice in documenting the progress throughout the development process.

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## **CHAPTER 1: INTRODUCTION**

### **1.1 INTRODUCTION TO THE ORGANIZATION**

National Informatics Centre (NIC) under the Ministry of Electronics and Information Technology (MeitY) is the technology partner of the Government of India. NIC was established in the year 1976 with the objective to provide technology-driven solutions to Central and State Governments.

National Informatics Centre (NIC) provides nationwide ICT infrastructure to support e-Governance services and various initiatives of Digital India. NIC has been associated with the design and development of software for improving the delivery of services undertaken by government departments at the State and District level.

The Assam State Centre of NIC works hand in hand with the Assam State Government in the areas of information and communication technology to achieve the common dream of a Digital Assam. The State Centre collaborates with the State Government in formulating ICT strategies for an efficient, effective and robust e-Governance eco-system framework for the State.

### **1.2 INTRODUCTION TO THE PROJECT**

The “Management of Outsourced Manpower” application is a powerful tool designed to streamline and optimize the management of contractual employees, enabling the National Informatics Centre, Guwahati to effectively handle projects and ensure smooth management of the contractual workforce. It offers a platform that brings together all the essential features required for efficient management, tracking, and communication with outsourced manpower.

### **1.3 OBJECTIVES**

The **National Informatics Centre, Assam State Centre, Guwahati** has multiple working divisions, Each division has a Head of Division, who is responsible for managing a number of contractual employees registered under their division. The project aims to provide a tool that minimises effort and streamlines the management process.

The primary aims and objectives of the project are –

- Allow Division heads to efficiently manage and organize their team members and their contracts within the application.
- Provide a platform for HODs to view and update employee profiles, including skills, and roles.
- Provide tools that enable HODs to initiate projects and assign employees to those projects within the application.

- Enable HODs to generate reports and view analytics on project status and resource allocation.
- Allow an Admin entity to create master entries, register and handle login credentials for Divisions under NIC.
- Provide secure authentication and access control mechanisms to restrict data access based on user roles and permissions.

#### **1.4 EXISTING SYSTEM**

The existing system for managing employees and projects in an IT firm involves the use of physical file copies. This traditional approach typically relies on manual processes and paper documentation, which can be time-consuming, inefficient, and prone to errors. Updating employee or project data in such a system is a burden. Physical files are susceptible to loss, damage, or unauthorized access. Maintaining data security and privacy becomes a challenge, as physical files can be easily misplaced or accessed by individuals without proper authorization. Generating reports and analyzing data from physical files can be a tedious and time-consuming process. Gathering information from different sources, compiling data, and generating meaningful insights often require significant effort and resources.

#### **1.5 PROPOSED SYSTEM**

Considering the limitations and inefficiencies of the existing system, an application designed specifically for team leaders or in this case Heads of Divisions to manage employees and projects can greatly enhance productivity, collaboration, and data management within the organization. By implementing the proposed system, the organization can eliminate the limitations of the existing physical file system. It offers streamlined employee and project management, advanced reporting and analytics, and improved data security. Ultimately, the proposed system aims to optimize productivity, efficiency, and decision-making within the organization.

## **CHAPTER 2: FEASIBILITY STUDY**

### **2.1 INTRODUCTION**

Feasibility is an important phase in the software development process as it enables the developers to have an assessment of the product being developed. In this study, three aspects related to the development of a software platform for “Management of Outsourced Manpower” have been evaluated.

### **2.2 ECONOMIC FEASIBILITY**

Development of a software platform for “Management of Outsourced Manpower” is highly economically feasible. The only thing required is making an environment for the development with effective supervision. In doing so, maximum usability of the corresponding resources can be attained. The hardware infrastructure required is already available within the organization. There is no need to spend additional funds for the development of the system. All the tools and technology stacks used for development are free and open source. Therefore, the system is economically feasible.

### **2.3 TECHNICAL FEASIBILITY**

Technical feasibility refers to the assessment of whether a proposed system can be implemented using the available technology and resources. The required expertise and resources for software development, including programming languages, frameworks, and tools, are readily available. Also, the firm's existing infrastructure and hardware resources can support hosting and running the application. Additional hardware requirements can be assessed and acquired if necessary.

### **2.4 OPERATIONAL FEASIBILITY**

Operational feasibility refers to the assessment of whether a proposed system can be effectively implemented and operated within an organization's existing processes, procedures, and resources. Considering factors like the willingness of team leaders and employees to adopt and use the application, analyzing existing processes and workflows related to employee and project management the proposed system can be effectively implemented and operated within the organization. It helps identify potential challenges and develop strategies to overcome them, ensuring a successful and sustainable system deployment.

### **2.5 STUDY CONCLUSION**

Based on the above studies, it can be concluded that the platform for “Management of Outsourced Manpower” is feasible in all aspects. The study supports the recommendation to proceed with the development and implementation of the software product.

## CHAPTER 3: SYSTEM DESIGN

System design is the process of defining the architecture, interfaces, and data for a system that satisfies specific requirements. System design requires a systematic approach to building and engineering systems. A good system design requires you to think about everything in an infrastructure, from the hardware and software, all the way down to the data and how it's stored.

### 3.1 UML USE CASE DIAGRAM

In the case of this system, There are two primary actors ADMIN and HOD. Additionally, the application follows microservices architecture where the backend functionalities are divided into multiple services. These services are **Auth Service**, **Admin Service**, and **HOD Service**. These services are independent of each other but communicate with each other via API calls.

#### Level 1 use case diagram-

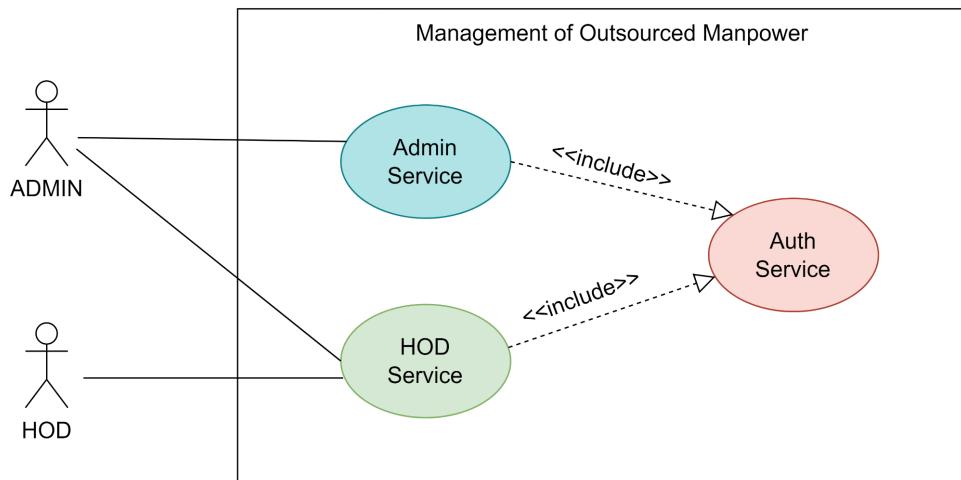


Figure - Level 1 Use case diagram for Management of outsourced Manpower

**Level 2 use case diagram for Auth Service-**

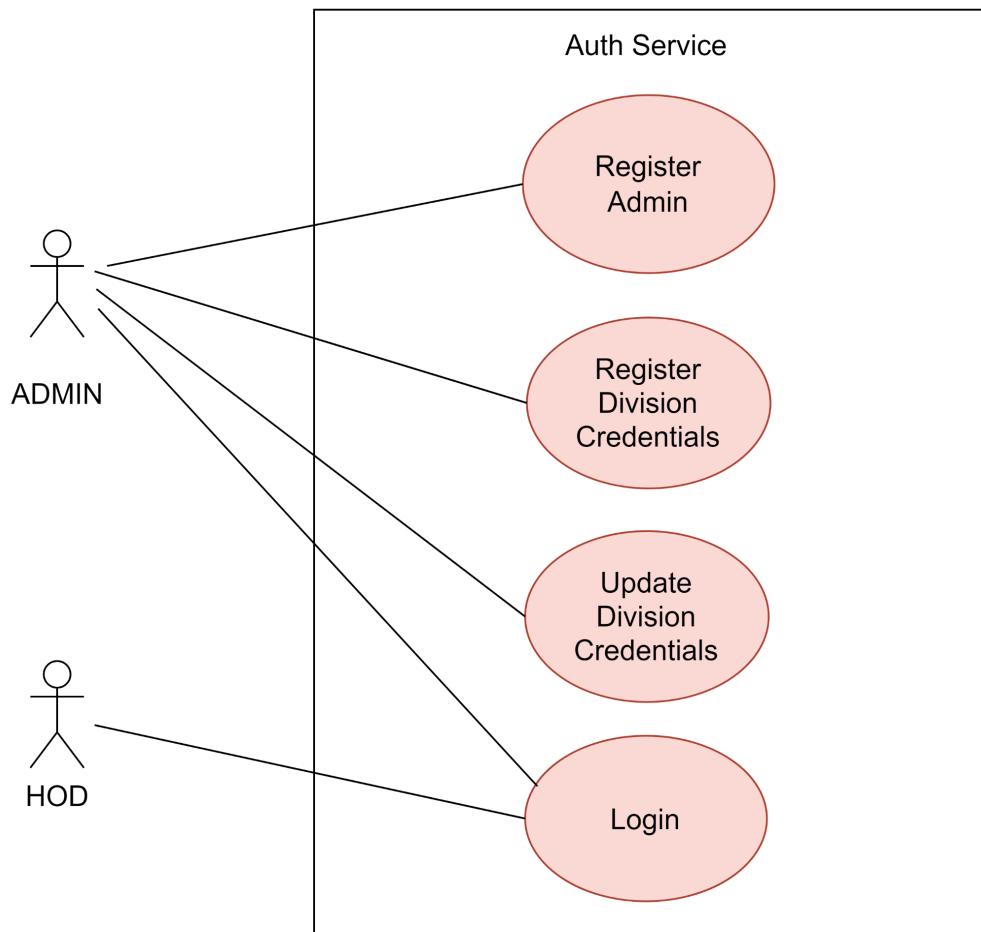


Figure - Use case diagram for Auth Service

**Level 2 use case diagram for Admin Service-**

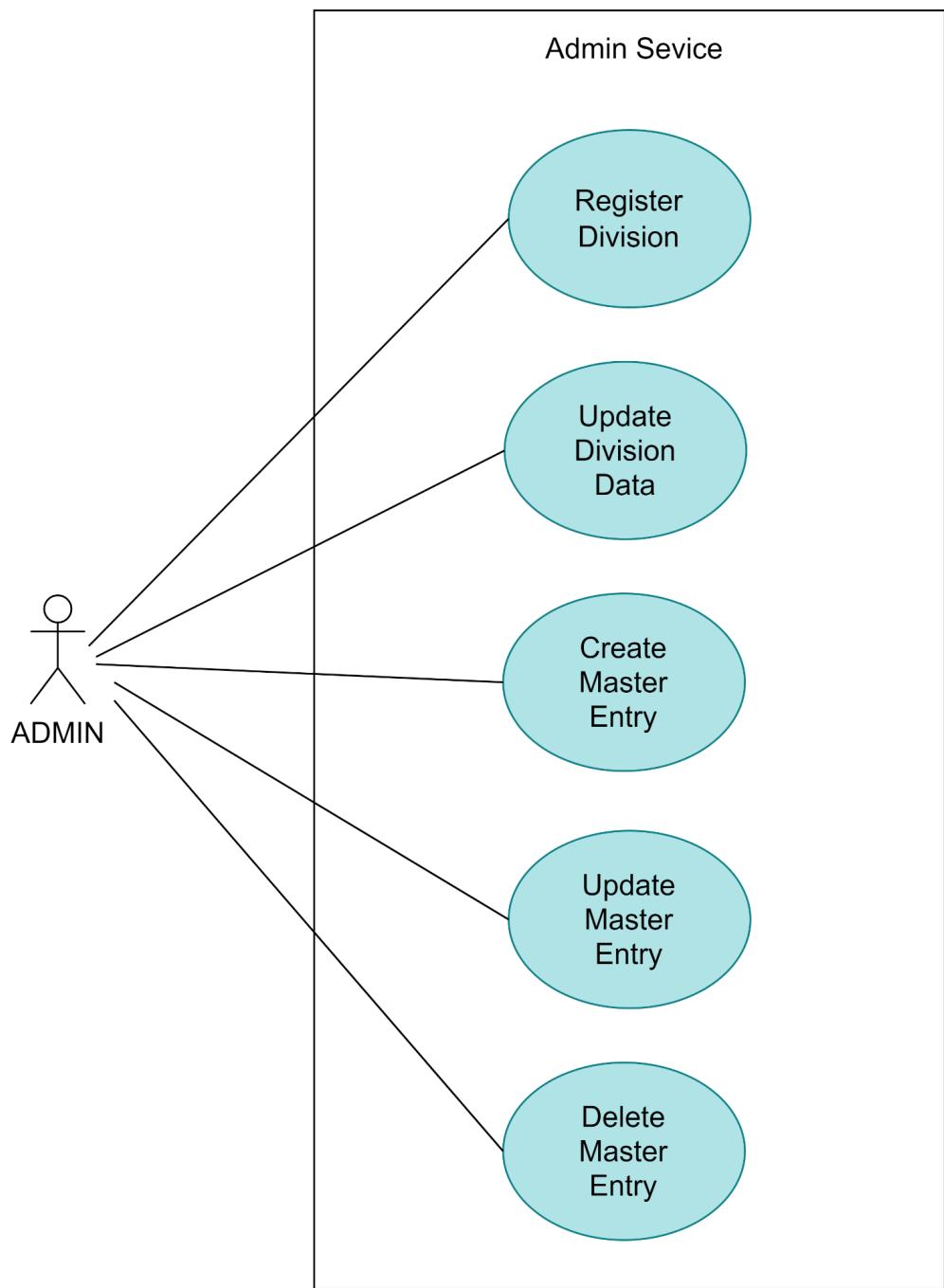


Figure - Use case diagram for Admin Service

## Level 2 use case diagram for HOD Service-

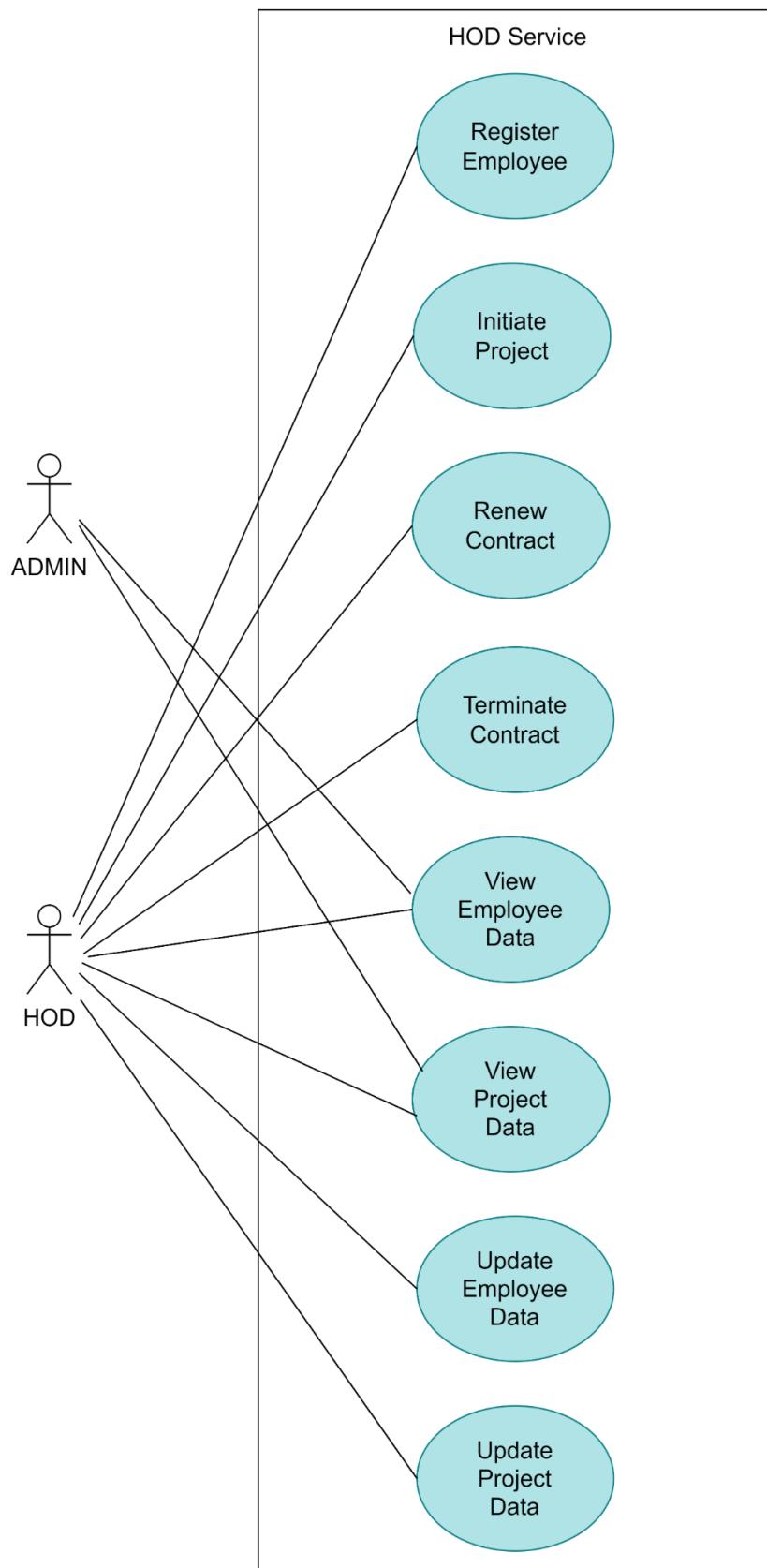


Figure - Use case diagram for HOD service

### 3.2 DATA FLOW DIAGRAM

Data flow diagrams are used to graphically represent the flow of data in a business information system. DFD describes the processes that are involved in a system to transfer data from the input to the file storage and report generation. It also gives insight into the inputs and outputs of each entity and the process itself.

#### **Context diagram-**

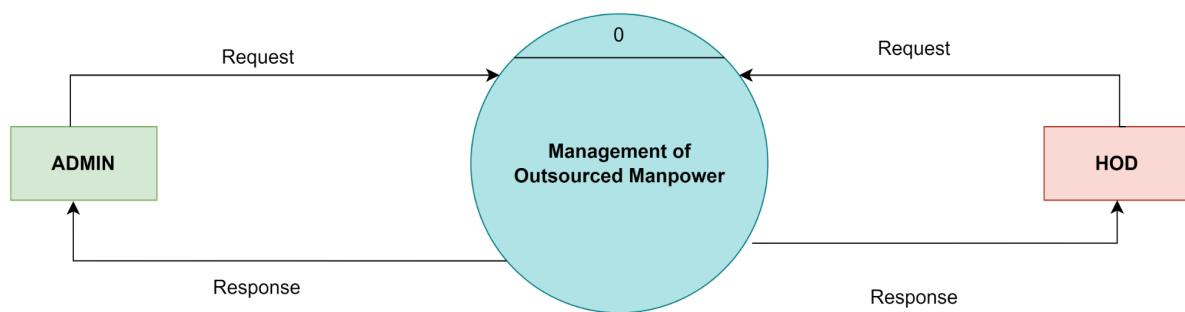


Figure - Context Diagram or 0 Level DFD for “Management of Outsourced Manpower”

## Level 1 DFD for Admin-

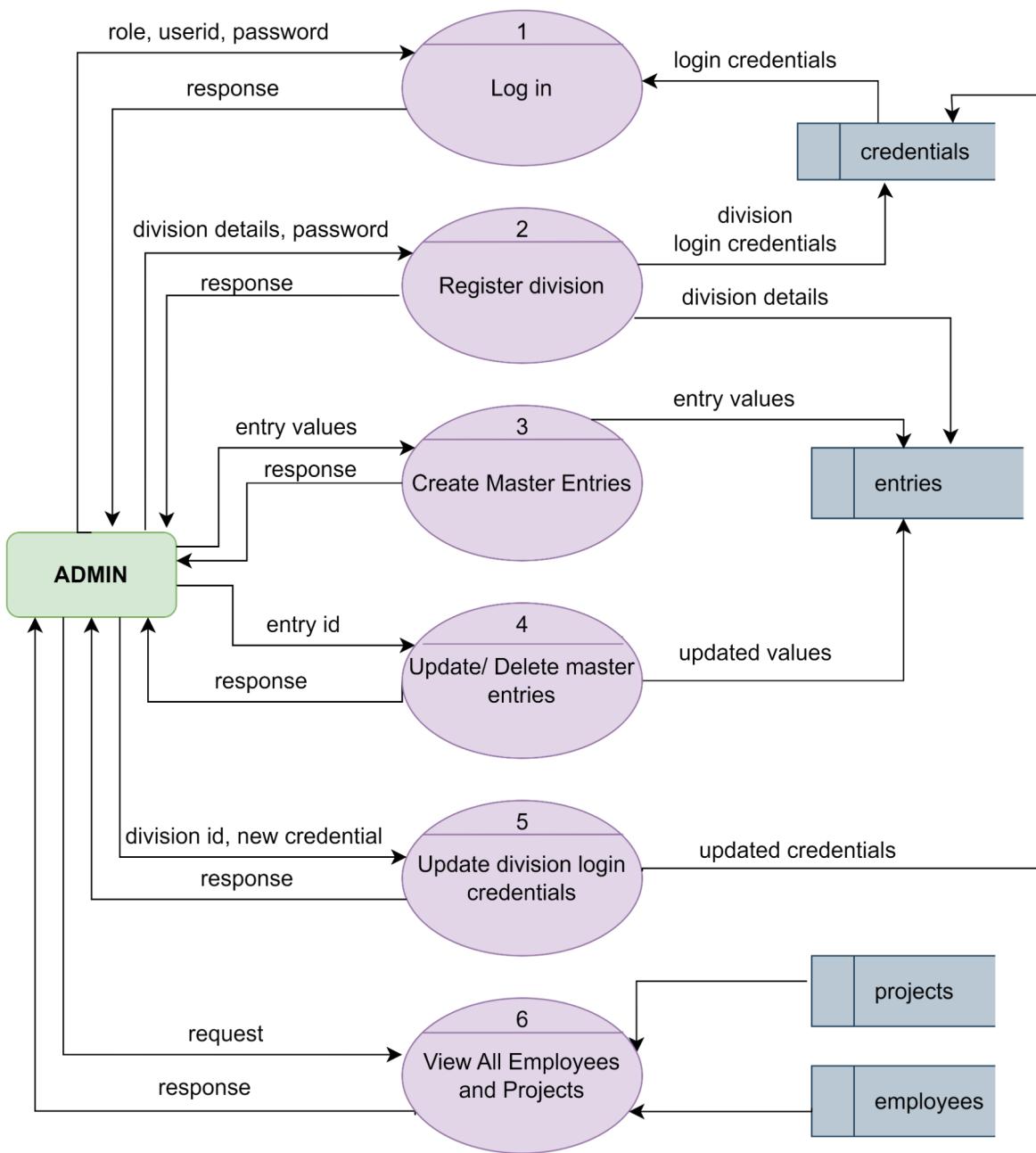


Figure - Level 1 DFD for ADMIN

## Level 1 DFD for HOD

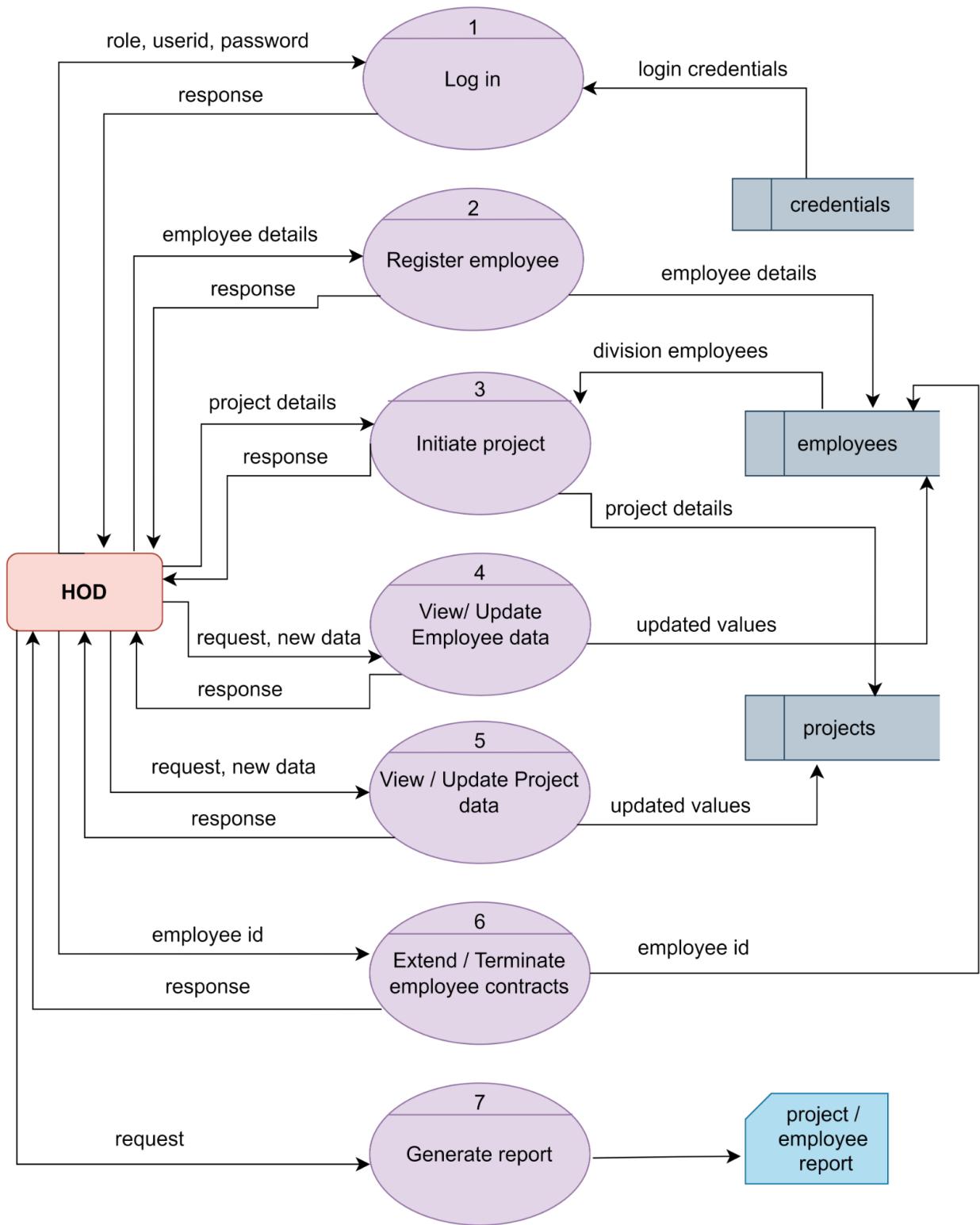


Figure - Level 1 DFD for HOD

## Level 2 DFD for process 3 (initiate project)-

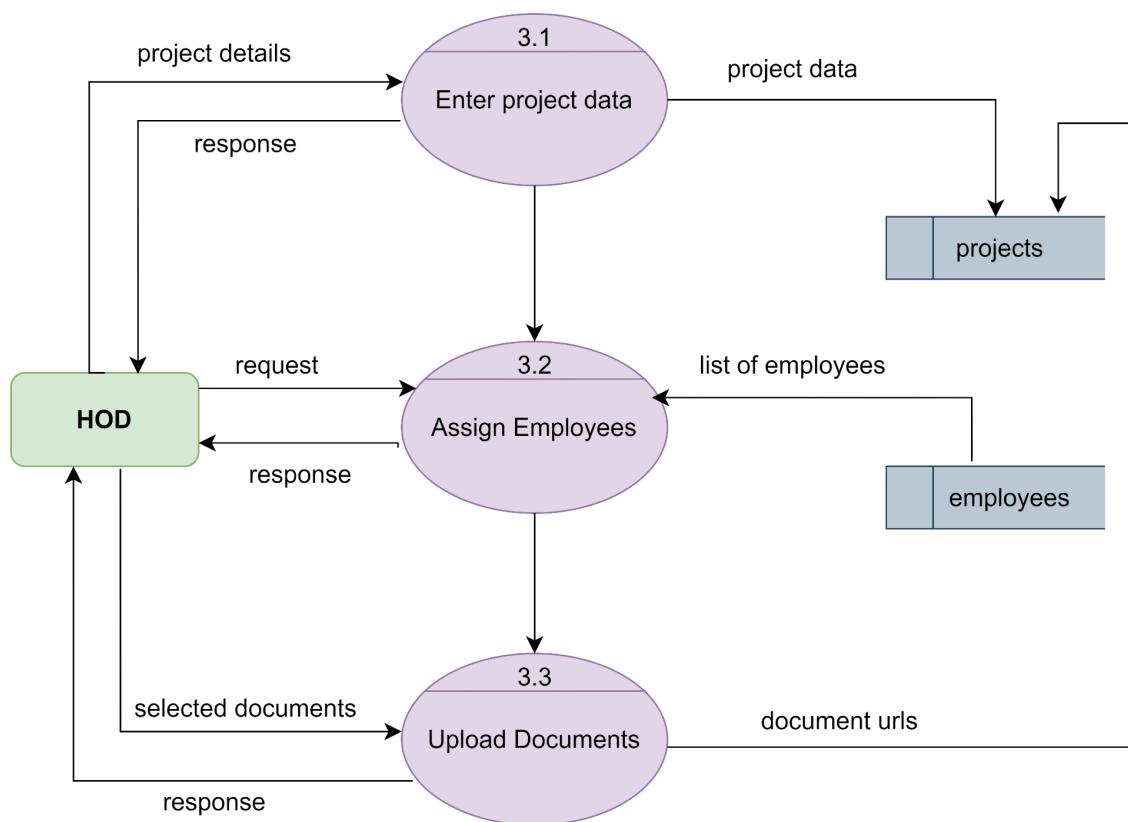


Figure - Level 2 DFD for Initiate Project process

### 3.3 ENTITY RELATIONSHIP DIAGRAM

In MongoDB, which is a NoSQL database, the concept of an Entity-Relationship (ER) diagram, as traditionally used in relational databases, does not directly apply. However, relationships between collections in MongoDB can still be displayed using a schema visualization.

ER diagram represents the logical relationships between the entities (databases and collections) and does not represent the actual document structure within MongoDB.

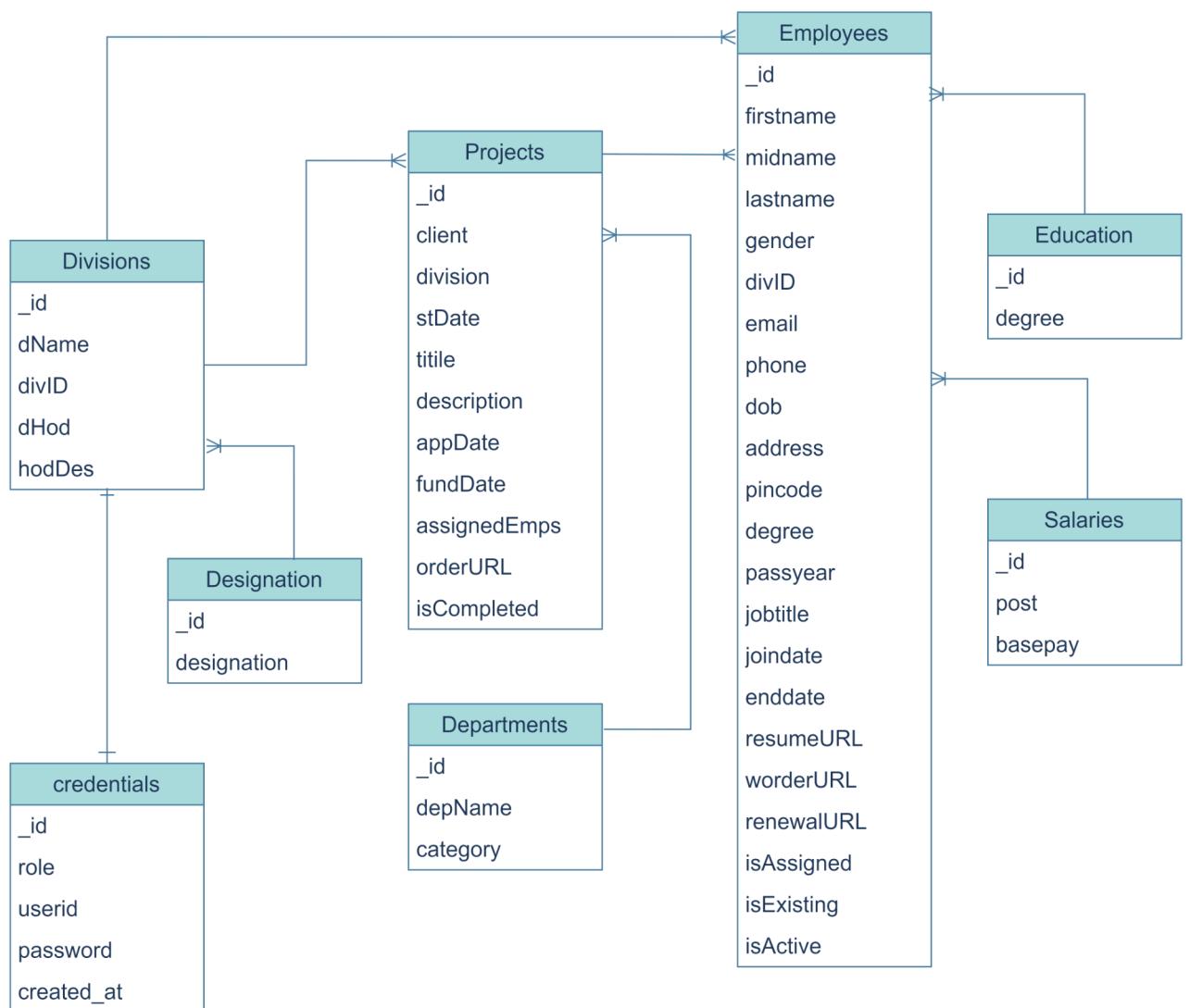


Figure - Entity Relationship Diagram for “Management of Outsourced Manpower”

### 3.4 DATA DICTIONARY

A data dictionary contains metadata that is data about the database. The data dictionary is very important as it contains information such as what is in the database, who is allowed to access it, where is the database physically stored, etc.

<b>Serial No.</b>	<b>Field Name</b>	<b>Data Type</b>	<b>Description</b>
1	role	String	Role of the user. Can be either “admin” or “hod”
2	userid	String	Unique userID for each user
3	password	String	A hashed value of the password used for logging in
4	created_at	Date Object	Date object to log the creation of credentials
5	depName	String	Master entry for Name of departments of the government of Assam
6	category	String	Master entry for category of the government department
7	designation	String	Master entry for designation of the HODs.
8	dName	String	Name of the Division inside the organization
9	hodDes	String	Designation of selected HOD
10	dHod	String	Name of the Head of Division
11	degree	String	Master entry for highest education of employee
12	post	String	Job title master entry for employees
13	basePay	Integer	Master entry for monthly salary of employees
14	firstname	String	First name of the employee to be registered
15	midname	String	Middle name of the employee to be registered

<b>Serial No.</b>	<b>Field Name</b>	<b>Data Type</b>	<b>Description</b>
16	lastname	String	Last name of the employee to be registered
17	gender	String	Gender of the registered employee
18	divID	String	Unique ID of the division, the employee is registered under
19	email	String	email ID of the employee to be registered
20	phone	Double	Phone number of the employee to be registered
21	dob	Date Object	Date of birth of the employee to be registered
22	address	String	Permanent address of the employee to be registered
23	pincode	Integer	Pincode of the permanent address
24	degree	String	Highest education of the employee to be registered
25	passyear	Integer	The year of graduation of the employee to be registered
26	jobtitle	String	The job title of the employee
27	joindate	Date Object	The starting joining date of the employee
28	enddate	String	The end date of the contract offered to the employee
29	resumeURL	String	The URL to the resume of the employee
30	workOrderURL	String	The URL to the work order document issued for the employee
31	renewalURL	String	The URL to the renewal document issued for the employee
32	isAssigned	Boolean	Boolean value to check if the employee is assigned to any project.
33	isExisting	Boolean	Boolean value indicating if the employee is new or existing

<b>Serial No.</b>	<b>Field Name</b>	<b>Data Type</b>	<b>Description</b>
34	isActive	Boolean	Boolean value to check if the employee is still working at the organization.
35	client	String	Name of the government department that is the client of initiated project
36	division	String	The division undertaking the project
37	stDate	Date	Starting date of the project
38	title	String	Title of the project being taken
39	description	String	Detailed explanation of what the project is about.
40	appDate	Date Object	Project approval date
41	fundDate	Date Object	The date on which the funding of the project is allocated
42	assignedEmps	Array	An array consisting of _id references to the employees assigned to the project
43	orderURL	String	URL to the official project order document issued by the government
44	isCompleted	Boolean	Boolean value to check if the project is ongoing or finished

## CHAPTER 4: HARDWARE AND SOFTWARE

### 4.1 HARDWARE REQUIREMENTS

The online website requires minimal hardware requirements. The following configuration is required for a PC to use the web app without any performance issues:

**Processor:** Quad-core or better CPU by AMD or Intel

**RAM:** 2 GB RAM or more

**Storage:** 256 GB or higher

**Other:** An active internet connection

### 4.2 SOFTWARE REQUIREMENTS

This section lists the requirements that are needed to run the system efficiently. The operating system needed for the system to run effectively and the interface to run the application are as follows:

**Operating System:** Windows 8 or newer, Linux all major distributions, macOS Sierra or newer

**Web Browser:** All modern browsers such as Edge, Firefox, Chrome, Safari, etc.

### 4.3 TOOLS AND TECHNOLOGIES

The integrated development environment to develop the application, and the third-party tool used for editing purposes are as follows:

### TOOLS & SERVICES USED

- Visual Studio Code
- Google Chrome developer tools
- MongoDB Community Server
- MongoDB Compass
- Git Version control
- Postman
- Github

## **TECHNOLOGY STACK**

### **Front-End -**

- **React JS**
  - HTML5
  - CSS3
  - ChakraUI framework

### **Back-End -**

- **Node JS**
  - Express Framework
- **MongoDB**
  - Mongoose Library
- Jsonwebtoken

### **NPM Packages -**

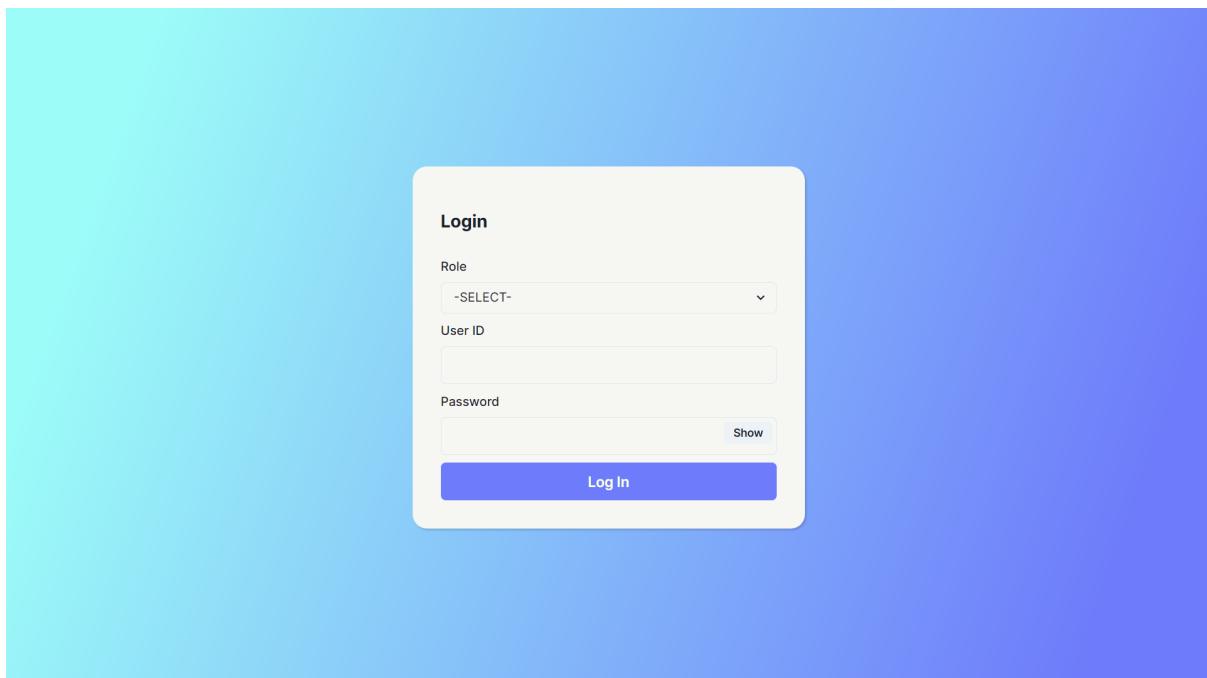
- Axios
- Formik
- Yup
- jsPDF
- ReCharts
- Toastify
- Bcrypt
- JSONwebtoken
- Nodemon

## CHAPTER 5: USER INTERFACE DESIGN

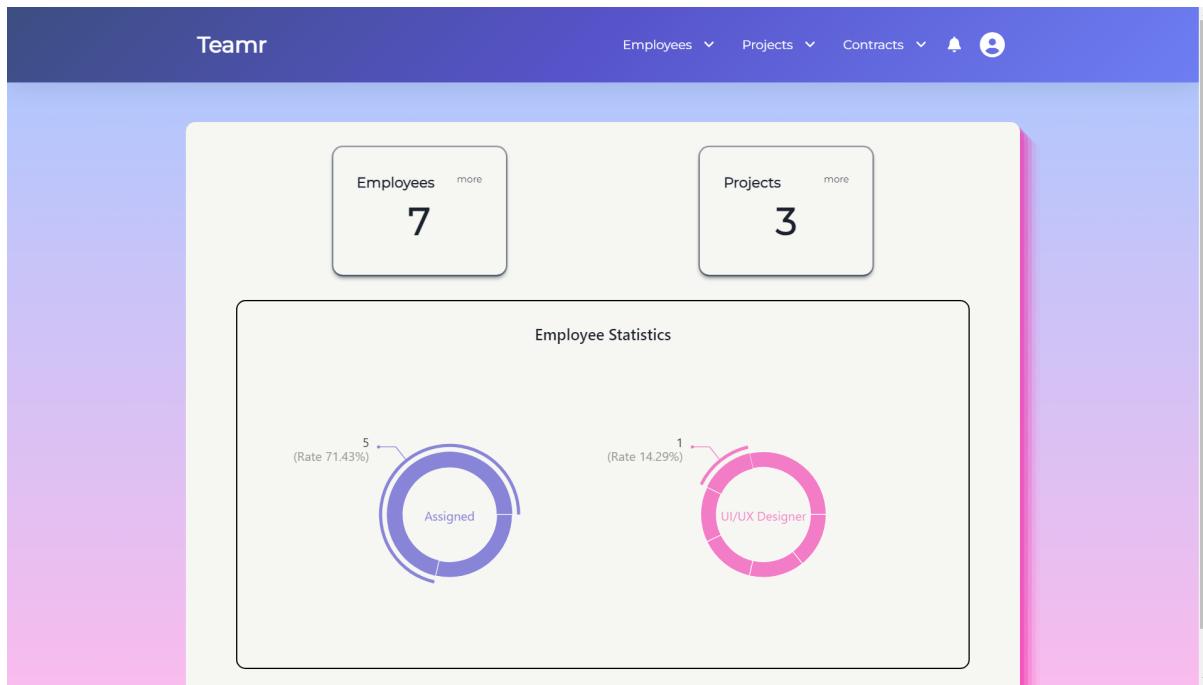
The User Interface is the view of the website from the user or client's end. It is how the user is able to interact with the different elements and features of the website. This section describes the different interfaces of the website, including all the different pages. It contains a descriptive screenshot of each interface.

### 5.1 SYSTEM SNAPSHOTS

Login page -



## HOD Dashboard -



## Three-step employee registration page -

The registration page has a header 'Enter employee Information' and a progress bar with three steps: 1. Personal Info (current), 2. Contract Info, and 3. Documentation. The 'Personal Info' step contains fields for First Name, Middle Name, Last Name, Email (with placeholder 'eg- john@mail.com'), Phone number (+91 0), Date of Birth (dd-mm-yyyy), Highest Education (dropdown menu '-select-'), Year of Passout (text input '0'), Current Address (text input 'ABC Road, Delhi'), and PIN (text input '0'). Navigation buttons 'PREV' and 'NEXT' are at the bottom right.

### Three-step project initiation page -

The screenshot shows a web-based application interface for project initiation. At the top, there is a dark blue header bar with the word "Teamr" on the left and navigation links for "Employees", "Projects", and "Contracts" on the right, along with a notification bell icon and a user profile icon.

The main content area has a light blue background and features a rounded rectangular form titled "Enter Project Information". The form is divided into three horizontal tabs at the top: "1. Project Info" (which is currently active and highlighted in dark blue), "2. Assign People", and "3. Documentation".

The "Project Info" tab contains several input fields:

- "Client Department": A dropdown menu with the placeholder "-Select-".
- "Project Division": A dropdown menu with the placeholder "-Select-".
- "Starting Date": A date input field with a placeholder "dd-mm-yyyy" and a calendar icon.
- "Project Title": A text input field with the placeholder "Full Name of the project".
- "Description": A text input field with the placeholder "Enter detailed description of the project".
- "Approval date": A date input field with a placeholder "dd-mm-yyyy" and a calendar icon.
- "Fund Receive date": A date input field with a placeholder "dd-mm-yyyy" and a calendar icon.

At the bottom right of the form, there are two buttons: "PREV" and "NEXT".

### All division employees page -

The screenshot shows a web-based application interface for managing employees. The top navigation bar is identical to the one in the previous screenshot, featuring "Teamr" and links for "Employees", "Projects", and "Contracts".

The main content area displays a table titled "All Employees of the Division".

At the top of the table, there are filtering and search options:

- A "sort by" dropdown menu set to "Name".
- A "Search by employee name" input field.
- A "Search" button.
- A "Print" button.

The table itself has a light purple header row with columns labeled "SL. NO", "FULL NAME", "JOB TITLE", and "STATUS". Below the header, there are six data rows, each representing an employee:

SL. NO	FULL NAME	JOB TITLE	STATUS
1	John Smith	Software Engineer	Assigned
2	Jane Doe	UI/UX Designer	Unassigned
3	Bob Johnson	Software Engineer	Assigned
4	Sara Lee	Quality Assurance Engineer	Assigned
5	Mike Brown	Database Administrator	Unassigned
6	Karen Davis	Technical Writer	Assigned

## Individual employee profile page -

The screenshot shows the Teamr platform's employee profile page. At the top, there is a navigation bar with links for Employees, Projects, Contracts, a notification bell, and a user profile icon. The main content area features a large purple header section with a placeholder profile picture and the name "Amlan Jyoti Saikia" followed by the title "Software Engineer". Below this, there are two main sections: "Personal Information" and "Educational Information", each with edit buttons.

Personal Information		
First Name Amlan	Middle Name Jyoti	Last Name Saikia
e-mail Address abc@gmail.com	Phone Number 7002592269	Date of Birth 2023-07-05
Gender Male		

Educational Information	
Highest Education Master of Computer Application	Year of Passout 2023

## Individual project details page -

The screenshot shows the Teamr platform's project details page for the project "Management of remote workforce". The top navigation bar is identical to the employee profile page. The main content area includes a project summary with the title, client information, and a detailed description. Below this, there are two main sections: "Project Information" and "Assigned Workforce", each with edit buttons.

Project Information		
Project Title Management of remote workforce	Client Department Directorate of Accounts & Treasuries	
Starting Date 03-02-2023	Approval Date 05-02-2023	Fund Receive Date 07-02-2023

Assigned Workforce
Employees
1. Jenna Woods
2. Rajeev Khanna
3. Pranay Sharma

## Employee contract management page -

The screenshot shows a dark-themed web application interface. At the top, there's a navigation bar with 'Teamr' on the left and 'Employees', 'Projects', 'Contracts', a notification icon, and a user profile icon on the right. Below the navigation, there's a search bar with placeholder text 'Search' and a 'Sort by' dropdown set to 'Name'. A modal window is open in the center, prompting for 'Full Name' (filled with 'John Smith'), 'Job Title' (set to '-SELECT-'), 'From' (date field), 'Till' (date field), and 'Work Order' (file upload field). A 'SUBMIT' button is at the bottom of the modal. In the background, a list of employees is visible with columns for 'SL. NO.', 'FULL NAME', 'POSITION', 'EXPIRY DATE', and 'Actions' (Renew or Terminate buttons).

## ADMIN Dashboard -

The screenshot shows a teal-themed dashboard. On the left, a sidebar titled 'Teamr' contains links for 'Dashboard', 'Master Entries', 'Projects', 'Employees', and 'Security', along with a 'Log Out' button. The main area is titled 'Analytics' and displays three summary cards: 'Active Employees' (24), 'Total Divisions' (9), and 'Ongoing Projects' (15). Below the cards is a section titled 'Employee Statistics' featuring two donut charts. The first chart, labeled 'Assigned', shows 20 employees (83.33%). The second chart, labeled 'UI/UX Designer', shows 5 employees (Rate 29.41%).

## Master Entries Page -

The screenshot shows the 'Master Entries' page. On the left, a sidebar titled 'Teamr' contains links: Dashboard, Master Entries (which is selected and highlighted in blue), Projects, Employees, and Security. At the bottom of the sidebar is a 'Log Out' button. The main content area is titled 'Master Entries' and contains a 'Create or Update' section. This section features five rounded rectangular buttons with icons and text: 'Division >' (orange), 'Education >' (light blue), 'Designation >' (light purple), 'Salary >' (yellow-green), and 'Departments >' (pink).

## Division management page -

The screenshot shows the 'Divisions' management page. The left sidebar is identical to the one in the previous screenshot. The main content area is titled 'Divisions' and includes a 'Create New Division' button in the top right corner. Below it is a table with four columns: DIVISION NAME, HEAD OF DIVISION, HOD DESIGNATION, and OPERATIONS. The table contains two rows of data:

DIVISION NAME	HEAD OF DIVISION	HOD DESIGNATION	OPERATIONS
Division 1	A Saikia	Scientist B	<button>Edit</button> <button>Delete</button>
Division 2	M. Deka	Scientist F	<button>Edit</button> <button>Delete</button>

## New division registration page -

Teamr

Dashboard

Master Entries

Projects

Employees

Security

Log Out

### Divisions

Create New Division

Division Name

Name of HOD

Division ID

HoD Designation

-SELECT-

Division Password

Confirm Password

Show Show

Create

OPERATIONS

Edit Delete

Edit Delete

## Division credential management page -

Teamr

Dashboard

Master Entries

Projects

Employees

Security

Log Out

### Security

View or change credentials

Division 1

User ID

NICDIV1

Change Password

Division 2

User ID

NICDIV2

Change Password

## **CHAPTER 6: SYSTEM TESTING**

System testing process aims to ensure the reliability, functionality, and security of the system.

### **6.1 UNIT TESTING**

For the backend components developed with Node JS using Express JS framework, unit tests were performed to simulate server-side functionalities such as API endpoints, data validation, authentication mechanisms, and database interactions. By mocking dependencies and simulating various scenarios, unit tests verify that the backend components work as expected.

Frontend unit tests focus on testing individual React components, including their rendering, state management, user interactions, and data handling. By simulating user actions and asserting expected outcomes, unit tests validate the behavior of the frontend components.

### **6.2 INTEGRATION TESTING**

Integration testing is a crucial phase in our system as the system follows a microservices architecture. Tests were performed using Postman and Jest to cover scenarios involving API calls, database interactions, and error handling among three separate backend services. These tests validate the communication and interoperability between the backend components.

Front end integration tests ensure the seamless integration of frontend components with the backend and external services.

### **6.3 USER ACCEPTANCE TESTING**

By conducting User Acceptance Testing, we aim to ensure that our developed product is thoroughly tested from the end user's perspective. This process helps us validate that the system meets user requirements, refine its usability, and enhance user satisfaction. After conducting this test, it was found that the application met the expectations of all the end users including the HODs and ADMIN.

## CHAPTER 7: FUTURE SCOPE OF THE PROJECT

The future scope of a project refers to the potential opportunities, enhancements, and possibilities for further development and expansion beyond the current project's objectives and deliverables. It involves identifying areas where the project can grow, evolve, and adapt to meet changing needs, technological advancements, and emerging trends in the industry.

The future scope of “**Management of Outsourced Manpower**” application for managing employees and projects in an organization holds significant potential for further development and expansion. Here are some potential future enhancements and opportunities for the project:

- **Advanced Analytics and Insights:** The application can be further enhanced by incorporating advanced analytics capabilities. By leveraging data gathered from employee performance, project progress, and other relevant metrics.
- **Resource Management and Optimization:** Future iterations of the application can include advanced resource management capabilities. This may involve features such as resource allocation, skills mapping, workload balancing, and capacity planning, helping team leaders optimize resource utilization and improve project outcomes.
- **Integration with Collaboration Tools:** Integration with popular collaboration tools such as project management software, team communication platforms, and document sharing services can enhance the application's capabilities. This integration allows for seamless information exchange, improved collaboration, and streamlined workflows across different systems.
- **Enhanced UI/UX:** Enhancing the user interface and improving user experience by adding more user interactive features.

## **CHAPTER 8: CONCLUSION**

In conclusion, developing an application for managing employees and projects in a software development firm offers numerous benefits and opportunities for improvement. By replacing the existing physical file system with a digital solution, the organization can streamline operations, enhance collaboration, and improve overall efficiency.

This project has provided me with the opportunity to learn and implement web development as well as the various stages of software engineering that take place in developing a real-world application. From identifying the requirements and problems to solving them, implementation, and testing, it has been a valuable learning experience that will most definitely be useful in our careers in the future.

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