CLUSTER WISE HUMAN RESOURCE MANAGEMENT USING DATA ANALYTICS

A PROJECT REPORT
Submitted By

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CUAUMCA025

In Partial Fulfilment Of The Requirements For The Degree Of
MASTER OF COMPUTER APPLICATION (MCA)

CENTRE FOR COMPUTER SCIENCE AND INFORMATION TECHNOLOGY (CCSIT)
UNIVERSITY OF CALICUT
SEPTEMBER 2022

DECLARATION

I **ARSHAQ**, hereby declare that this project work entitled "**CLUSTER WISE HUMAN RESOURCE MANAGEMENT USING DATA ANALYTICS",** is a bona fide project work done by me in partial fulfilment of the requirements for the award of degree of MASTER OF COMPUTER APPLICATION, under the guidance of **Mrs SEEMA S**, **CENTRE FOR COMPUTER SCIENCE AND INFORMATION TECHNOLOGY, UNIVERSITY OF CALICUT.**

I also declared that this report has not been submitted fully or partially for the award of any other degree/post-graduation/Diploma/Title or recognition before at any place.

Place: CU CAMPUS
Date: 20/09/2022

ARSHAQ
(CUAUMCA025)

CERTIFICATE

Certified that this is a bona fide record of the project work entitled "**CLUSTER WISE HUMAN RESOURCE MANAGEMENT USING DATA ANALYTICS**" *submitted by* **ARSHAQ (Reg No: CUAUMCA025)** *in partial fulfilment of the requirement for the award of the degree of* **MASTER OF COMPUTER APPLICATION** *from University of Calicut.*

Mrs. SEEMA S
Associate Coordinator
CCSIT, CU Campus

Place: CU CAMPUS
Date :

Certified that the candidate was examined by us in the Project Viva Voce Examination held on …..……..... and his Register Number is ……

Examiners

ACKNOWLEDGEMENT

Let me take this opportunity to thank all those who have been directly and indirectly involve in making this project a success.

First of all, I am grateful to god Almighty, for helping as to select this topic and giving me the interest to pursue this topic, without whose blessing, I could not have been able to complete this project.

I am grateful to **Mrs. Seema S** Associative coordinator of Centre for Computer Science and Information Technology, University of Calicut for providing library, internal and lab facilities and for acting as my project in-charge by providing valuable suggestions and help.

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I am extremely grateful to the officials of CCSIT University of Calicut who made all arrangements for smooth completion of the dissertation. I express my sincere thanks to family members and friends who helped in overcoming all the hurdles thus gearing strength towards the fulfilment of the task that I had overtaken.

I would also like to express my profound gratitude to all others who gave in some way of the other helped us with this project till end.

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ABSTRACT

Currently there is little to no proper management or record keeping of residence residing in a community. Mostly data is shattered across human knowledge or at most cases in some forms or ledger kept by residence association or some other society groups where houses are listed based on house name or internal route. The aim of the project is to digitalize the people's data and make use of data analytics to help and improve the minority community to excel and rise in all ways possible.

The project terms all such social groups, whether it be Residence Associations, Society Groups etc into one single word called "Cluster", and thus aims to provide technical and analytical data and resource spreading suggestions based on that data to the authoritative personnel of the cluster in order to aid and lend a helping hand to the ones in need within the cluster.

Thus implementing a stronger bond within the community backed by digital technology and providing assistance and guidance to the ones in need by connecting them to the one that can provide the same within the cluster.

INTRODUCTION

Any collective of humans, whether it be a small registered society or just a group of residence, they have been classified in this project as a “Cluster”. The objective of the project is to provide a different perspective of seeing the collective and provide a mean to tap-in to totally under utilized potential resources that lies dormant or never seen the use for it among the people.

Any data in the hands of a good analyst becomes some kind of information, what this project aims to do is to become that analyst for the people. It helps to avoid the complexities of reaching the provided information for some people while it opens a new world of information and resources for the other.

Workplace knowledge is an invisible lifeline in any organisation or a job. It's the familiarity, experiences, techniques, awareness, and ability to problem solve that all effective employees possesses or learns to do with experience. This is the same case for any person who has pursued the paths even to an educational sector that very little to no one has travelled before. This project enables a mean to share that knowledge to the ones in need directly with human-human contact.

It has been prepared in the form a web application portal where users within the system can login to the system and make use of it’s resources. The web portal uses basic web technologies like HTML5, CSS3 and JavaScript with Bootstrap framework for layout designing. It utilizes php for backend using a light weight php framework called CodeIgniter4.

SYSTEM STUDY

PURPOSE

The objective of this web app is to develop a system that effectively manages and keeps record of all the data related to the individuals residing in the community this gets implemented on. It keep tracks of their educational qualifications, employment status, fields they have knowledge on and can assist, member details of all registered homes, and many more data points to collectively organize and make use of these data to assist the ones in need among the same community. Thus opening a new doorway to the ones in need of help to get the assistance they require that could have been impossible to or incredibly expensive to attain from another source.

SCOPE

“It was really hard to get a mentor for anything that actually had walked through the path I was planning to go for my career”, this is the words we can usually hear from most students on their transitional states from their schooling to professional courses area. The scope for this project comes from facing the same difficulties myself. Educational system in India, specially in our state is designed in such a way that almost all who took science subjects for their Higher Secondary Education either goes to Engineering or to Medical Streams alone. They are not much aware about other possibilities or jobs that they could apply to.

There are also a lot of students out there who couldn’t get the required motivation or guidance from a person on a field or job they actually wanted to get or has taken as their ambition. There are other sectors of students in community where they actually doesn’t have the means, financially or technically to attain any guidance whatsoever while there might be people living literally 4 or 5 homes close to them whom if had known could have helped them or guided them for free. The main aim of this project is to bring the ones in need and ones who can provide under one system. To close that gap between the needy and giver. To overcome the limitations and problems moreover to build a new system which almost to an extend doesn’t exist in the current society.

EXISTING SYSTEM

Let's take an instance of a normal not so poor child going through their educational transition time. The only choices of guidance they can get is paid ones. Paid with quire huge sums of money. Whether it's provided by a guidance centre or an institution they chose for their entrance coaching, that is all a student has easy access to. It has also become incredibly difficult to attain useful information from online mediums since its now being flooded with totally unauthentic sources of information. There are government backed career guidance and other centre's like CIGI whom are used by very few people and can only provide assistance sessions than continuous mentoring.

How about the case of a student who has no financial means to obtain this? They literally goes unattended not knowing other possibilities that exist for them. There is no system in exitance in a society to assist anyone in need in such a way. Here comes the need for the proposed system.

PROPOSED SYSTEM

The problems faced in a community that could be solved by finding and connecting them to the willing peoples who can help within the same community or residential area can all now be solved with the help of the new system. This is just one of the thing this system could bring to a community.

There obviously will be at least a government employee, a police officer, a doctor, a medical staff or nurse, an advocate, a person working in aviation sector, a plumber, an electrician, a builder, a dairy farmer, people of all sorts if we take a normal residence association in Kerala. Almost entirety of their potential that could have brought up and utilized for their community is being wasted just due to lack of awareness of their willingness to help or often their exitance at all since most people lives a 9 – 5 job cycle life.

A person in need of a legal advice often goes to lawyers somewhere far liable to a huge payment when he could have got it just closer to his home. A person in need of a home repair or a plumber or electrician hires people from some other places while he could have used his neighbour faster and probably financially cheaper for the same works giving side income and additional care to work benefiting both parties. A person in need of a dairy product like milk who usually resorts to packed food now could attain it fresh from someone in his own community, thus getting fresh and nutritional product than ones filled with preservatives and other addendums.

Now let's assume there is a person or some group willing to help the poor or aid and provide food items or free work, it has become increasingly difficult to find the actual people in need, people who genuinely deserve an aid in a society. While a lot of ones who could have been benefitted with such a donation goes unnoticed about their situation.

The proposed system aims to collect data sets about individual houses in a selected small residential area in a society. It collects people's name, financial state, educational qualification, job they do and everything that they are willing to share and help, categorize them to analyze how could they help, are they ones needing help or can give and connect them with each other. A system that could improve the overall throughput of individual success on a broader scale, improve the overall functioning of a society and collectively contribute to a better community as a whole by making minute contributions that often goes unnoticed.

It is designed in such a way that it's accessible to a wide range of people on a wide range of internet enabled devices. It basically acts as a website and all that's required to run the same is a web browser. Thus, device compatibility issues and other technical requirements are reduced to a bare minimum to appeal to wide range of audience. It's also designed with future enhancements and upgrades in mind and thus follows a modular structure to the overall build and I strongly believe the proposed system will overcome a great set of limitations the existing methodologies currently faces.

SYSTEM ANALYSIS

PRELIMINARY INVESTIGATION

The main aim of preliminary analysis is to identify the problem. First, need for the new or enhanced system is established. Only after the recognition of need, for the processed system done then further analysis is possible.

Once the initial investigation is done and the need for new or improved system is established, all possible alternate solutions are chalked out. All new system are then weighed and the best alternative of all those is selected as the solution system, which is termed as the "proposed system". The proposed system is then evaluated of its feasibility.

Feasibility for a system means whether it is practical and beneficial to build that system. The system has been designed in such a way that it can be modified with very little effort when such a need arises in the future. The preliminary investigation has concluded that the proposed system works effectively and efficiently.

FEASIBILITY STUDY

A feasibility study is a high-level capsule version of the entire System analysis and Design Process. The study begins by classifying the problem definition. Feasibility is to determine if it's worth doing. Once an acceptance problem definition has been generated, the analyst develops a logical model of the system. A search for alternatives is analyzed carefully. There are 3 parts in feasibility study.

❖ OPERATIONAL FEASIBILITY

Operational feasibility is the measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirements analysis phase of system development.

The operational feasibility assessment focuses on the degree to which the proposed development projects fits in with the existing business environment and objectives with regard to development schedule, delivery date, corporate culture and existing business processes. To ensure success, desired operational outcomes must be imparted during design and development. These include such design-dependent parameters as reliability, maintainability, supportability, usability, producibility, disposability, sustainability, affordability and others. These parameters are required to be considered at the early stages of design if desired operational behaviours are to be realised.

A system design and development requires appropriate and timely application of engineering and management efforts to meet the previously mentioned parameters. A system may serve its intended purpose most effectively when its technical and operating characteristics are engineered into the design. Therefore, operational feasibility is a critical aspect of systems engineering that needs to be an integral part of the early design phases.

❖ TECHNICAL FEASIBILITY

This involves questions such as whether the technology needed for the system exists, how difficult it will be to build, and whether the firm has enough experience using that technology. The assessment is based on outline design of system requirements in terms of input, processes, output, fields, programs and procedures. This can be qualified in terms of volume of data, trends, frequency of updating in order to give an introduction to the technical system.

The technical feasibility assessment is focused on gaining an understanding of the present technical resources of the organization and their applicability to the expected needs of the proposed system. It is an evaluation of the hardware and software and how it meets the need of the proposed system.

The application is in fact designed to work on any kind of devices or mobile platforms that can access internet and has html5 support. It does not require high level hardware specifications either as all tasks that requires computation, if any, are done at the server side of this program. This is technically feasible.

❖ ECONOMICAL FEASIBILITY

The purpose of the economic feasibility assessment is to determine the positive economic benefits to the organization that the proposed system will provide. It includes quantification and identification of all the benefits expected. This assessment typically involves a cost/benefits analysis.

Establishing the cost-effectiveness of the proposed system i.e. if the benefits do not outweigh the costs then it is not worth going ahead. In the fast paced world today where everything is digitalized and is getting online and smarter, where “time” has become the ultimate price, this project in the current scenario make it economically feasible.

SYSTEM SPECIFICATION

HARDWARE REQUIREMENTS

It is recommended that for optimal performance, the following minimum hardware is installed on the server on which the portal is hosted, as the client only needs to access the server via web using any browser that supports html5 and associated latest web technologies, it's specifications are not mentioned.

CPU Hardware	:	Processor Intel core i3 9th gen (or above) / AMD ryzen 3000 series
Preferred Architecture	:	64bits.
RAM size	:	8 GB.
Memory capacity	:	400 GB.
Other peripheral devices	:	Keyboard Mouse Monitor

SOFTWARE REQUIREMENTS

For the proposed system to work properly, it is necessary that following software are installed and running on the respective server and client side.

Operating system	:	Windows 8 or Windows 10.
Active Internet connection		
Database	:	MySQL.
Coding language	:	HTML5, CSS, JS, PHP.

CLIENT SIDE

A modern web browser for the client side.

SYSTEM DESIGN

The detailed design of the system selected in the study phase is accomplished in the design phase and the user-oriented performance specification is covered into a technical design specification. The principle activities performed by the design phase are general system design, input design and the design of the database.

In simple terms, System Design is the process of designing the architecture, components, and interfaces for a system so that it meets the end-user requirements. All these decisions are required to be taken carefully keeping in mind Scalability, Reliability, Availability, and Maintainability.

Reliability in System Design

A system is Reliable when it can meet the end-user requirement. When you are designing a system you should have planned to implement a set of features and services in your system. If your system can serve all those features without wearing out then your System can be considered to be Reliable.

A Fault Tolerant system can be one that can continue to be functioning reliably even in the presence of faults. Faults are the errors that arise in a particular component of the system. An occurrence of fault doesn't guarantee Failure of the System.

Failure is the state when the system is not able to perform as expected. It is no longer able to provide certain services to the end-users.

Availability in System Design

Availability is a characteristic of a System which aims to ensure an agreed level of Operational Performance, also known as uptime. It is essential for a system to ensure high availability in order to serve the user's requests.

Scalability in System Design

Scalability refers to the ability of the System to cope up with the increasing load. There are various factors that describe the Load on the System:

- Number of requests coming to your system for getting processed per day
- Number of Database calls made from your system
- Amount of Cache Hit or Miss requests to your system
- Users currently active on your system

MODULES

There are 5 primary modules in this system, who has defined job roles and possible interactions with the system as mentioned below. The SITE ADMIN is the person who acts the role of DBA, the modules and action are as follows :

- SITE ADMIN

  - Database Administrator
  - Maintenance of Website
  - Approving a Cluster
  - Handling Service Requests
  - View Service requests made by Cluster Admin
  - Communicating and resolving the issue..

- CLUSTER ADMIN

  - Registration and login to portal
  - Creating/Editing Cluster
  - Adding cluster operational members
  - Assigning job roles/designations to members
  - Sending notifications
  - Chat to Counsellors & Fact Finders
  - Raise Service Request to Site Admin

- FACT FINDER

  - Registration and login
  - Profile Updation
  - Create/Edit Houses
  - Add/Edit Member data of houses
  - Assess and assign financial state of houses
  - Chat to Counsellors, Fact Finders, Cluster Admin

- COUNSELLOR

  - Registration and login
  - Profile Updation
  - Act as a mentor by providing educational/job oriented guidance.
  - Helping the cluster members / fact finders connecting them to help as how it's required.
  - Chat to Counsellors and Fact Finders.

- MEMBERS

  - Registration and login
  - Chat to Counsellors
  - Profile Updation

INPUT DESIGN

Input design is the process of converting the user-oriented input data is to make the automation is easy and free from errors. The design of handling input specifies how data are accepted for computer processing. Input design is art of overall system design that needs careful attention and if includes specifying the means by which actions are taken. A system user interacting through a work station must be able to tell the system whether to accept input produce a report or end processing.

The collection of input data is considered to be the most expensive part of the system design. Since the inputs have to be planned in such a manner so as to get the relevant information extreme care is taken to obtain the information if the data going into the system is incorrect then the processing and outputs will magnify these errors. Input design is a part of overall system design, which requires careful attention.

The major objective of the input design is to make the data entry easier, logical and error free. With this objective the screen for the system is developed. The input design requirement such user friendliness, consistent format and interactive dialogue boxes for giving the development of the project. The data entry operator needs to know the space allocated for each field, the field sequence, which must match with source document and the format in which the data is entered.

OUTPUT DESIGN

The design of output is the most important task of any system. During output design, developers identify the type of outputs needed, and consider the necessary output controls and prototype report layouts.

Objectives of Output Design

The objectives of input design are

- To develop output design that serves the intended purpose and eliminates the production of unwanted output.
- To develop the output design that meets the end users requirements.
- To deliver the appropriate quantity of output.
- To form the output in appropriate format and direct it to the right person.
- To make the output available on time for making good decisions.

DATA FLOW DIAGRAM

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modelling its process aspects. A DFD is often used as a preliminary step to create an overview of the system without going into great detail, which can later be elaborated. DFD's can also be used for the visualization of data processing (structured design).

A DFD shows what kind of information will be input to and output from the system, how the data will advance through the system, and where the data will be stored. It does not show information about process timing or whether processes will operate in sequence or in parallel, unlike a traditional structured flowchart which focuses on control flow, or a UML activity workflow diagram, which presents both control and data flows as a unified model.

DIAGRAM NOTATIONS:

The two main types of notation used for data flow diagrams are Yourdon-Coad and Gane-Sarson, both named after their creators, all experts who helped develop DFD methodology: Ed Yourdon, Peter Coad, Chris Gane and Trish Sarson. There are some differences in style between the notation types. For example, Yourdon and Coad notation uses circles to represent processes, whereas Gane and Sarson notation use rectangles with rounded corners. Another variation is the symbol used for data stores—Yourdon and Coad uses parallel lines while Gane and Sarson notation uses an open-ended rectangle. Because DFD symbols vary, it's important to be consistent with whatever notation you choose in order to avoid confusion.

All data flow diagrams include four main elements: entity, process, data store and data flow.

- EXTERNAL ENTITY

  Also known as actors, sources or sinks, and terminators, external entities produce and consume data that flows between the entity and the system being diagrammed. These data flows are the inputs and outputs of the DFD. Since they are external to the system being analyzed, these entities are typically placed at the boundaries of the diagram. They can represent another system or indicate a subsystem.

- PROCESS

  An activity that changes or transforms data flows. Since they transform incoming data to outgoing data, all processes must have inputs and outputs on a DFD. This

symbol is given a simple name based on its function, such as “Ship Order,” rather than being labeled “process” on a diagram.

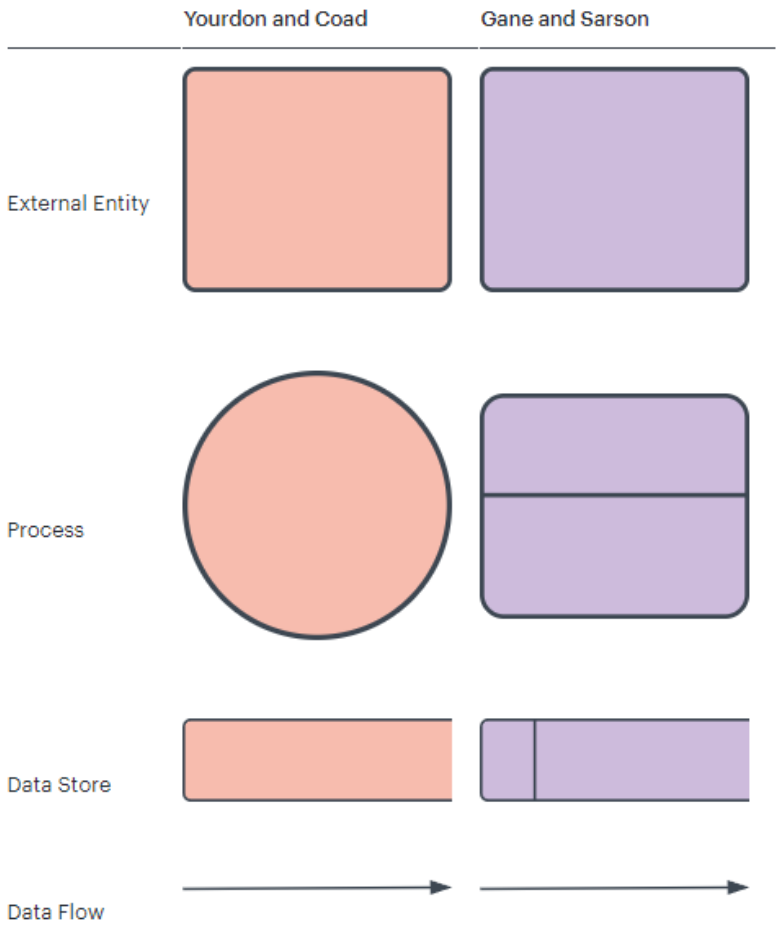
In Gane-Sarson notation, a rectangular box is used and may be labeled with a reference number, location of where in the system the process occurs and a short title that describes its function. Processes are typically oriented from top to bottom and left to right on a data flow diagram.

- DATA STORE

A data store does not generate any operations but simply holds data for later access. Data stores could consist of files held long term or a batch of documents stored briefly while they wait to be processed. Input flows to a data store include information or operations that change the stored data. Output flows would be data retrieved from the store.

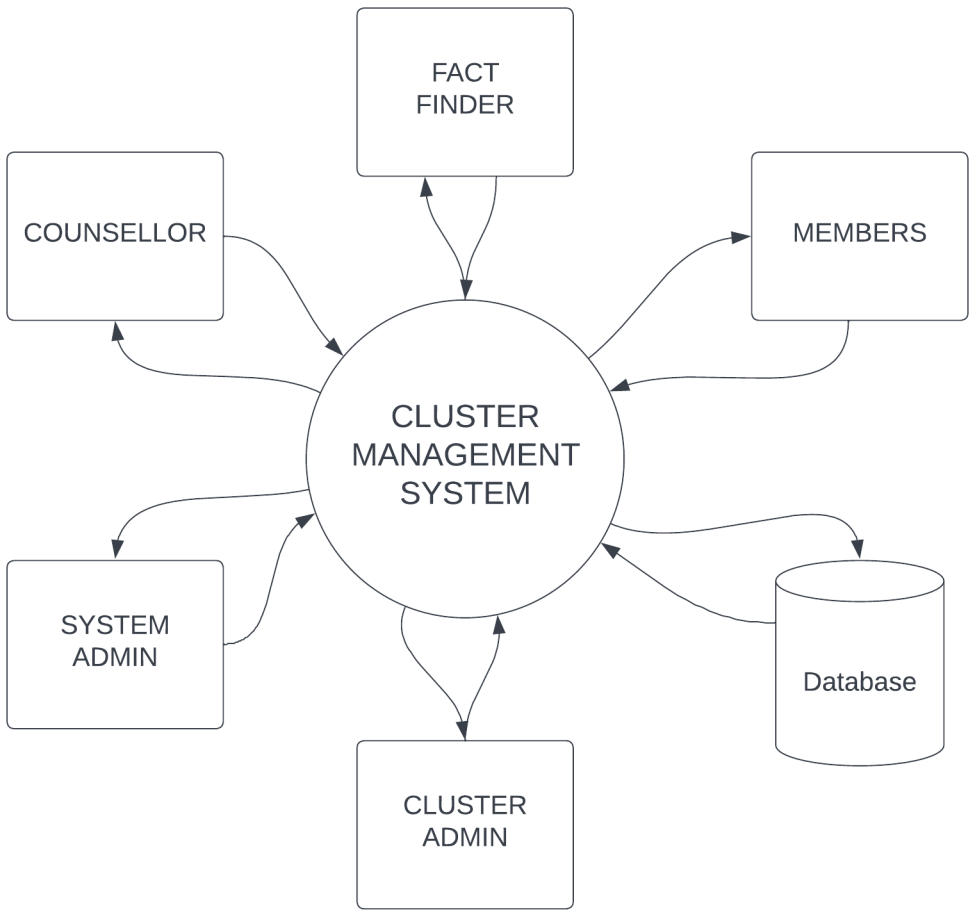
- DATA FLOW

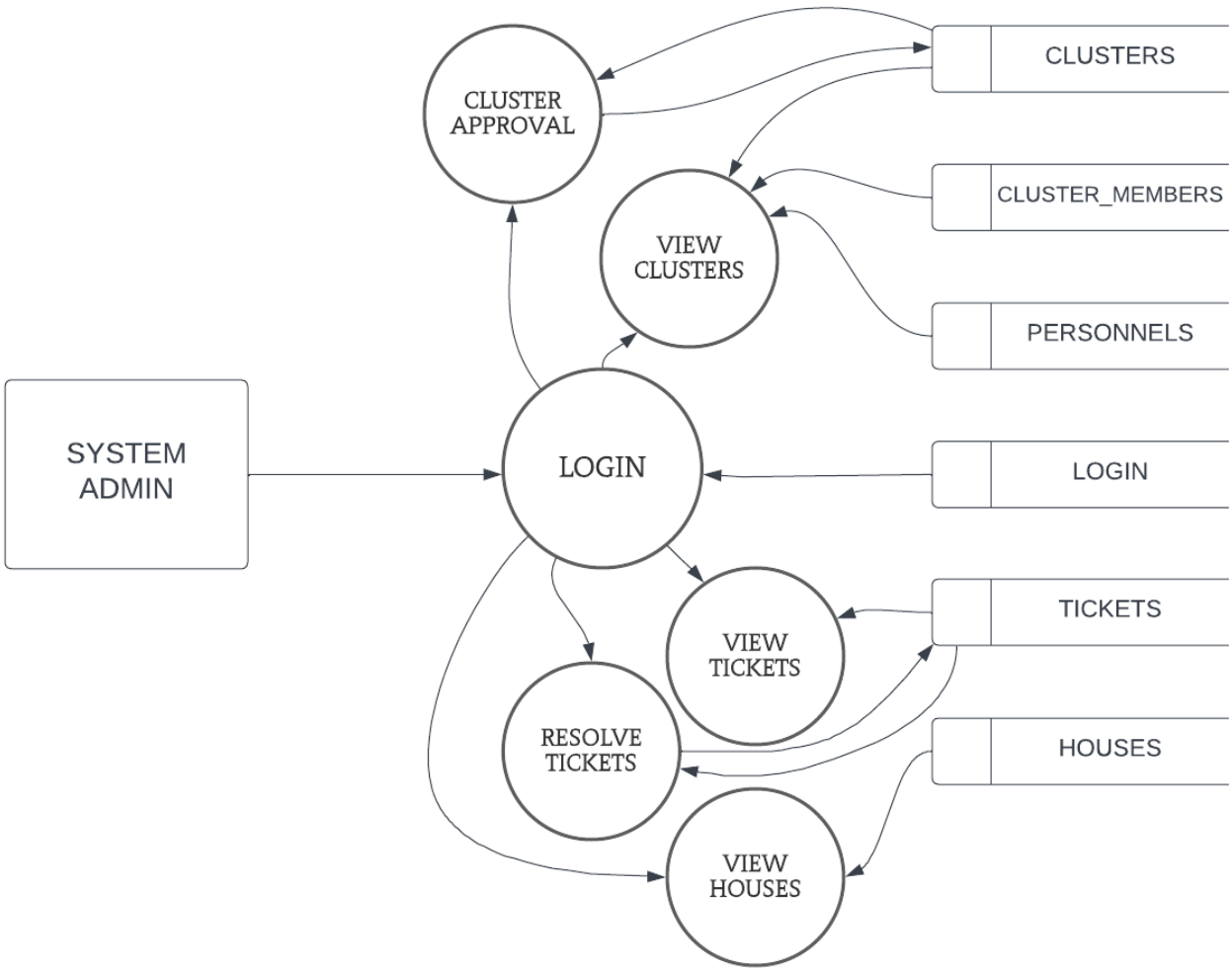
Movement of data between external entities, processes and data stores is represented with an arrow symbol, which indicates the direction of flow. This data could be electronic, written or verbal. Input and output data flows are labelled based on the type of data or its associated process or data store, and this name is written alongside the arrow.



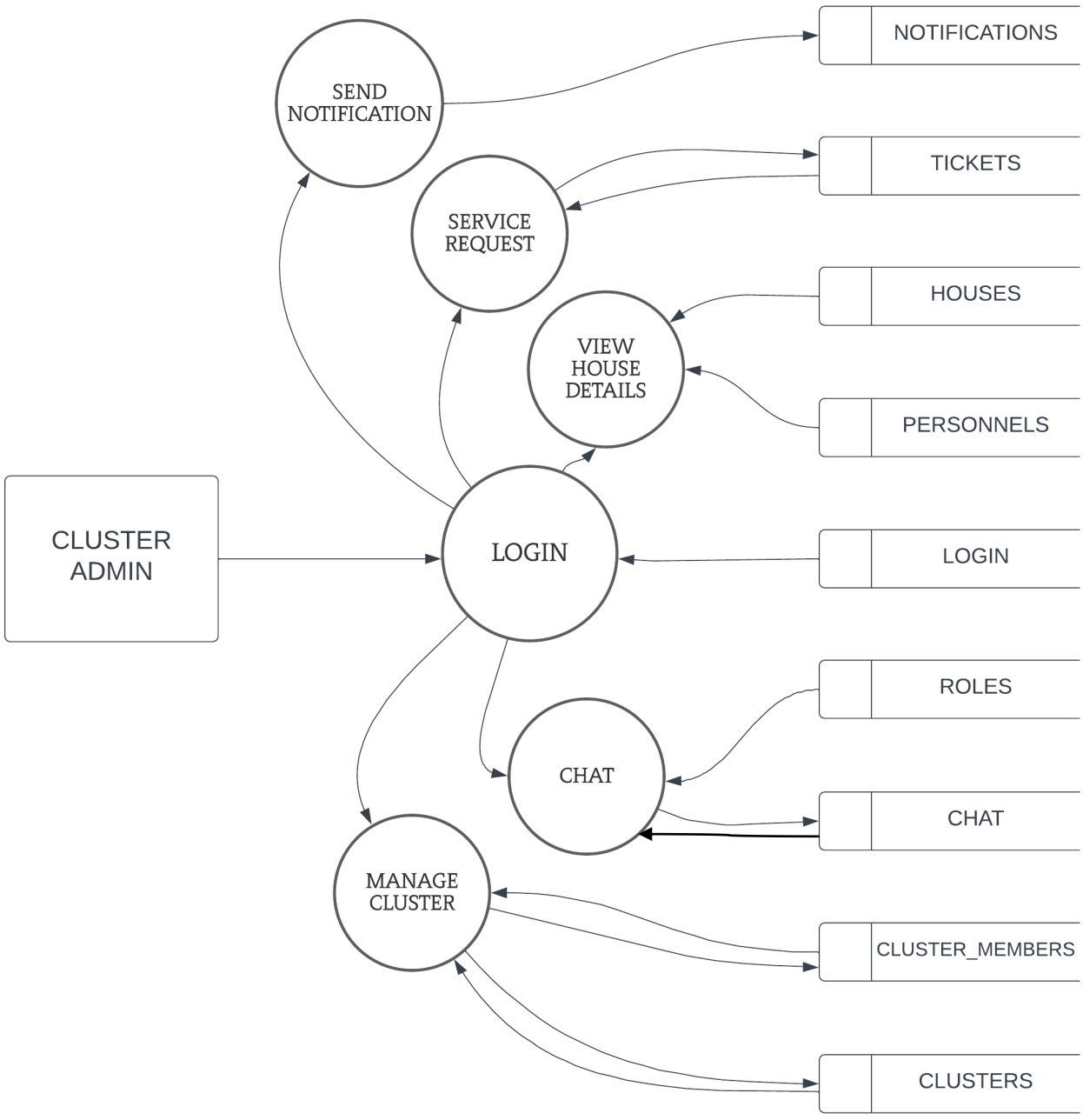
DFD
(DATA FLOW DIAGRAM)

LEVEL – 0

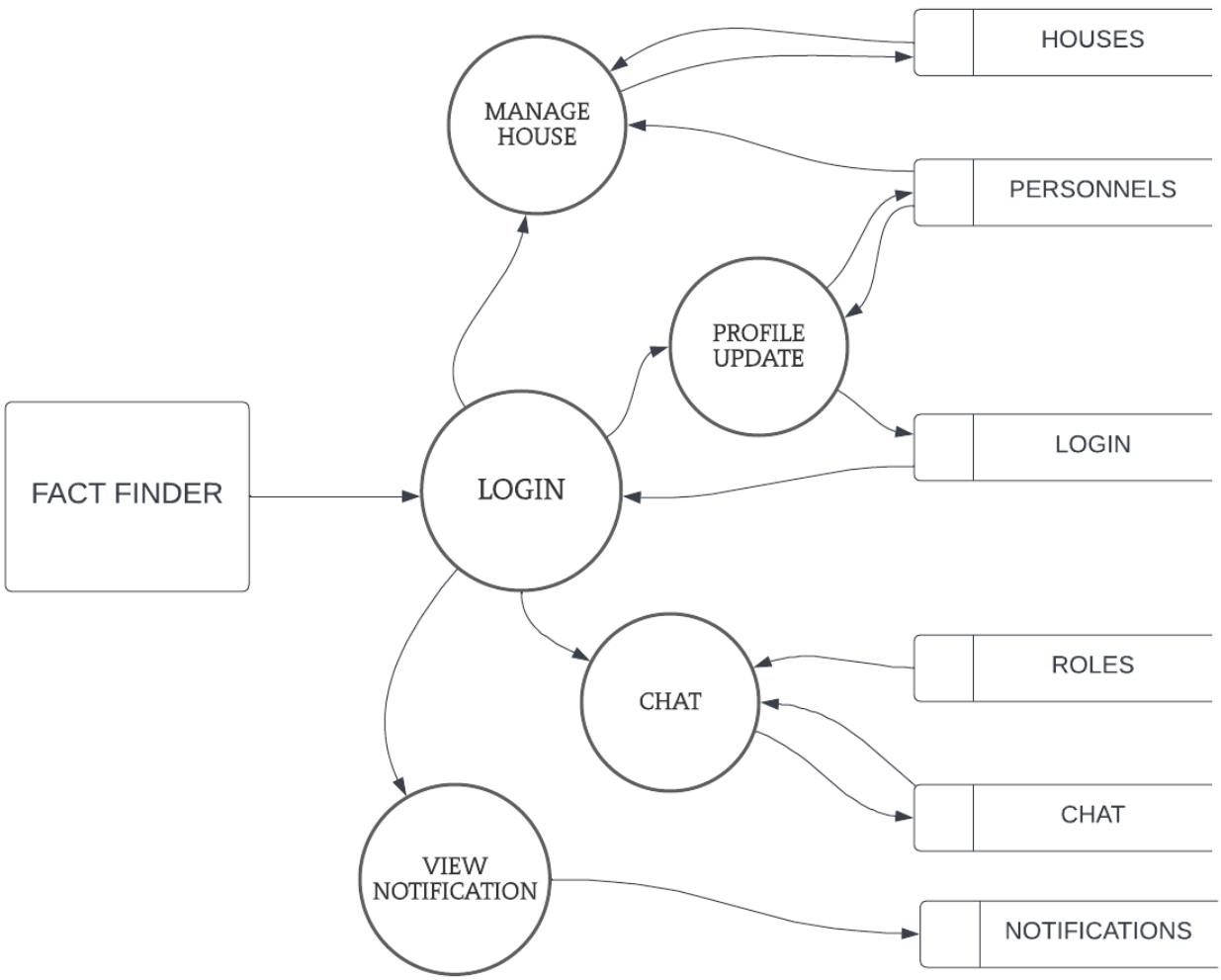

FACT
FINDER
COUNSELLOR
MEMBERS
CLUSTER
MANAGEMENT
SYSTEM
SYSTEM
ADMIN
Database
CLUSTER
ADMIN


CLUSTER APPROVAL
CLUSTERS
CLUSTER_MEMBERS
VIEW CLUSTERS
PERSONNELS
SYSTEM ADMIN
LOGIN
LOGIN
TICKETS
VIEW TICKETS
RESOLVE TICKETS
HOUSES
VIEW HOUSES

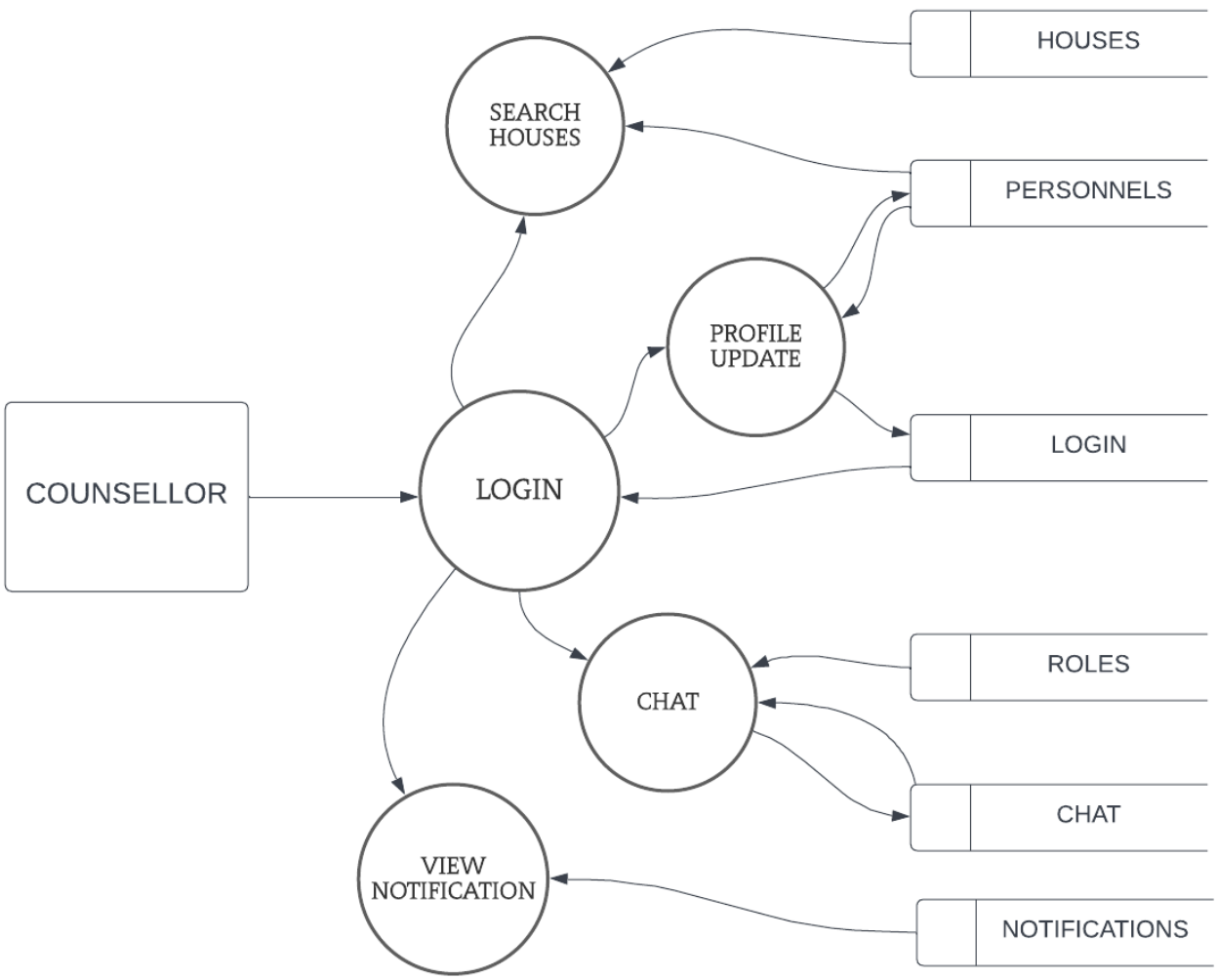
LEVEL – 1


NOTIFICATIONS
SEND NOTIFICATION
TICKETS
SERVICE REQUEST
HOUSES
VIEW HOUSE DETAILS
PERSONNELS
CLUSTER ADMIN
LOGIN
LOGIN
ROLES
CHAT
CHAT
MANAGE CLUSTER
CLUSTER_MEMBERS
CLUSTERS

LEVEL – 1


HOUSES
MANAGE HOUSE
PERSONNELS
PROFILE UPDATE
FACT FINDER
LOGIN
LOGIN
ROLES
CHAT
CHAT
VIEW NOTIFICATION
NOTIFICATIONS

LEVEL – 1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SEARCH HOUSES
PERSONNELS
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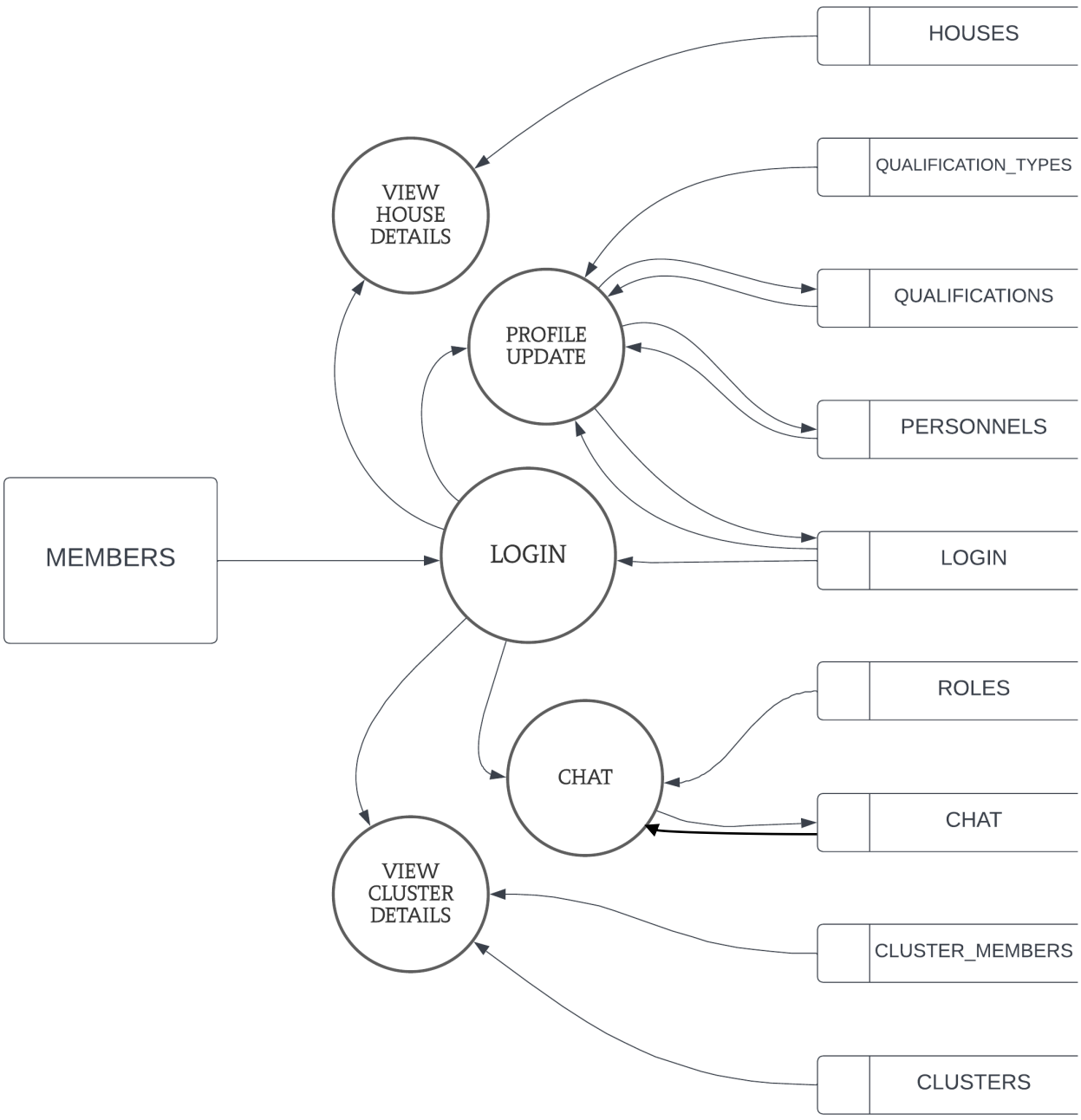
COUNSELLOR
LOGIN
LOGIN
ROLES
CHAT
CHAT
VIEW NOTIFICATION
NOTIFICATIONS

LEVEL – 1


HOUSES
QUALIFICATION_TYPES
QUALIFICATIONS
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LOGIN
ROLES
CHAT
CLUSTER_MEMBERS
CLUSTERS
VIEW HOUSE DETAILS
PROFILE UPDATE
LOGIN
CHAT
VIEW CLUSTER DETAILS
MEMBERS

DATABASE DESIGN
AND
TABLE STRUCTURES

DATABASE DESIGN

Database design is one of the most important parts of the system design phase. In a database environment, common data are available and are used by several users. Instead of each program managing its own data, authorized users share data across the application with the database software managing the data as an entity. The primary objective of database design is fast response time to enquiries, more information at low cost, control of redundancy, clarity and ease of use, date and program independence, accuracy and integrity of thesystem, fast recovery and availability of powerful end-user languages

In simple terms, it can be generally defined as a collection of tasks or processes that enhance the designing, development, implementation, and maintenance of enterprise data management system. Designing a proper database reduces the maintenance cost thereby improving data consistency and the cost-effective measures are greatly influenced in terms of disk storage space. Therefore, there has to be a brilliant concept of designing a database. The designer should follow the constraints and decide how the elements correlate and what kind of data must be stored.

Primary Objective to have a good Database Design is to :

- Control redundancy.
- Ease of use.
- Data independence.
- Accuracy and integrity.
- Recovery from failures.
- Security and privacy.
- Performance.

NORMALIZATION

Normalization is the process of organizing the data in the database. It is used to minimize the redundancy from a relation or set of relations. It is also used to eliminate undesirable characteristics like Insertion, Update, and Deletion Anomalies. Normalization divides the larger table into smaller and links them using relationships. The normal form is used to reduce redundancy from the database table

Types of Normal Forms Applied for the project

- First Normal Form [1NF]
- Second Normal Form [2NF]
- Third Normal Form [3NF]

First Normal Form (1NF)

- A relation will be 1NF if it contains an atomic value
- It states that an attribute of a table cannot hold multiple values. It must hold only single-valued attribute.
- First normal form disallows the multi-valued attribute, composite attribute, and their combinations.

Second Normal Form (2NF)

- In the 2NF, relational must be in 1NF.
- In the second normal form, all non-key attributes are fully functional dependent on the primary key

Third Normal Form (3NF)

- A relation will be in 3NF if it is in 2NF and not contain any transitive partial dependency.
- 3NF is used to reduce the data duplication. It is also used to achieve the data integrity.
- If there is no transitive dependency for non-prime attributes, then the relation must be in third normal form.

A relation is in third normal form if it holds atleast one of the following conditions for every non-trivial function dependency $X \rightarrow Y$.

- X is a super key.
- Y is a prime attribute, i.e., each element of Y is part of some candidate key.

TABLE STRUCTURES

LOGIN

Field	Type	Comment
id	int(11) NOT NULL	
email	varchar(100) NULL	
password_hash	varchar(255) NULL	
type	varchar(5) NULL	
created_at	datetime NULL	
updated_at	datetime NULL	

CLUSTERS

Field	Type	Comment
id	int(11) NOT NULL	
name	varchar(100) NULL	
state	varchar(20) NULL	
district	varchar(20) NULL	
address	varchar(100) NULL	
pincode	varchar(6) NULL	
contact	varchar(14) NULL	
email	varchar(50) NULL	
BodyMembersCount	int(11) NULL	
created_at	datetime NULL	
updated_at	datetime NULL	

CLUSTER_MEMBERS

Field	Type	Comment
id	int(11) NOT NULL	
clusterID	int(11) NULL	
PersonnelID	int(11) NULL	
designation	varchar(50) NULL	
created_at	datetime NULL	
updated_at	datetime NULL	

PERSONNELS

	Field	Type	Comment
	id	int(11) NOT NULL	
	name	varchar(50) NULL	
	gender	varchar(50) NULL	
	dob	date NULL	
	email	varchar(50) NULL	
	contact	varchar(14) NULL	
	workStatus	varchar(10) NULL	
	houseid	int(11) NULL	
	clusterID	int(11) NULL	
	created_at	datetime NULL	
	updated_at	datetime NULL	

QUALIFICATION

	Field	Type	Comment
	id	int(11) NOT NULL	
	pid	int(11) NULL	
	type	int(11) NULL	
	title	varchar(100) NULL	
	organization	varchar(100) NULL	
	created_at	datetime NULL	
	updated_at	datetime NULL	

QUALIFICATION_TYPES

	Field	Type	Comment
	id	int(11) NOT NULL	
	Qname	varchar(100) NULL	
	created_at	datetime NULL	
	updated_at	datetime NULL	

CHAT

	Field	Type	Comment
	messageID	int(11) NOT NULL	
	from	int(11) NULL	
	to	int(11) NULL	
	time	timestamp NOT NULL	
	message	varchar(500) NULL	

HOUSES

	Field	Type	Comment
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	clusterid	int(11) NULL	
	housename	varchar(15) NULL	
	address	varchar(100) NULL	
	pincode	varchar(6) NULL	
	financialState	varchar(20) NULL	
	ownerid	int(11) NULL	
	created_at	datetime NULL	
	updated_at	datetime NULL	

ROLES

	Field	Type	Comment
	id	int(11) NOT NULL	
	pid	int(11) NULL	
	role	varchar(20) NULL	

ROLES

	Field	Type	Comment
	id	int(11) NOT NULL	
	title	varchar(255) NULL	
	msg	text NULL	
	email	varchar(50) NULL	
	status	enum('open','closed','resolved') NULL	
	created_at	datetime NULL	
	updated_at	datetime NULL	

CODING

This is the actual writing of the program. A small project might be written by a single developer, while a large project might be broken up and worked by several teams. Use an Access Control or Source Code Management application in this phase. These systems help developers track changes to the code. They also help ensure compatibility between different team projects and to make sure target goals are being met.

The coding process includes many other tasks. Many developers need to brush up on skills or work as a team. Finding and fixing errors and glitches is critical. Tasks often hold up the development process, such as waiting for test results or compiling code so an application can run.

LANGUAGES USED

PHP

PHP (Hypertext Pre-processor) is a scripting language originated in 1995 by a software development contractor named Rasmus Lerdorf. It has developed as one of the best larger scripting languages around the globe. PHP is a server-side scripting language that was introduced for developing dynamic web applications. PHP code is embedded into HTML source file with PHP tags and interpreted by web server. Its syntax is a mixture of C, Java and Perl languages. PHP become very famous among developers because of its easy connectivity to MySQL databases that leads to creating dynamic web sites.

PHP can be used from command line interface or in standalone graphical applications. It can be deployed on any server and any operating system easily. Figure shows the syntax of PHP code in an HTML file. PHP starting and ending tags makes it available anywhere in the page to use it as scripting language.

JavaScript

JavaScript (often shortened to JS) is a lightweight, interpreted, object oriented language with first-class functions, and is best known as the scripting language for Web pages, but it's used in many non-browser environments as well. It is a prototype-based, multi-paradigm scripting language that is dynamic, and supports object-oriented, imperative, and functional programming styles. JavaScript runs on the client side of the web, which can be used to design / program how the web pages behave on the occurrence of an event. JavaScript is an easy to learn and also powerful scripting language, widely used for controlling web page behaviour.

HTML5 & CSS3

HTML5 is a markup language used for structuring and presenting content on the World Wide Web. It is the fifth and final[3] major HTML version that is a World Wide Web Consortium (W3C) recommendation. The current specification is known as the HTML Living Standard. It is maintained by the Web Hypertext Application Technology Working Group (WHATWG), a consortium of the major browser vendors (Apple, Google, Mozilla, and Microsoft).

CSS(Cascading Style Sheet) is a style sheet language use for styling HTML elements on a web page. It defines the presentation of HTML elements, how they appear on web page, including designs, layout, fonts and tailor pages on different environment. Figure explains the syntax of CSS file with the properties of HTML tags

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Bootstrap

Bootstrap is a free and open source front end development framework for the creation of websites and web apps. The Bootstrap framework is built on HTML, CSS and JavaScript(JS) to facilitate the development of responsive, mobile first sites and apps. Responsive design makes it possible for a web page or app to detect the visitor’s screen size and orientation and automatically adapt the display accordingly; the mobile first approach assumes that smartphones, tablets and task-specific mobile apps are employees primary tools for getting work done and addresses the requirements of these technologies in design.

MySQL

MYSQL is a relational database management system based on SQL (structured query language). The application is used for a wide range of purposes, including data warehousing, e-commerce, and logging applications. The most common use for MySQL however, is for the purpose of a web database. It can be used to store anything from a single record of

information to an entire inventory of available products for an online store. In association with a scripting language such as PHP or Perl(both offered on our hosting accounts) it is possible to create websites which will interact in real time with a MySQL database to rapidly display categorized and searchable information to a website user.

CodeIgniter4

CodeIgniter is an Application Development Framework - a toolkit - for people who build web sites using PHP. Its goal is to enable you to develop projects much faster than you could if you were writing code from scratch, by providing a rich set of libraries for commonly needed tasks, as well as a simple interface and logical structure to access these libraries. CodeIgniter lets you creatively focus on your project by minimizing the amount of code needed for a given task.

Where possible, CodeIgniter has been kept as flexible as possible, allowing you to work in the way you want, not being forced into working any certain way. The framework can have core parts easily extended or completely replaced to make the system work the way you need it to. In short, CodeIgniter is the malleable framework that tries to provide the tools you need while staying out of the way.

TESTING

In general, testing is finding out how well software or a product works. Testing is a set of activity that can be planned and conducted systematically. Testing begins at the module level and work towards the integration of entire computers based system. Nothing is complete without testing, as it is vital success of the system. Software testing is a process of executing a program or application with the intent of finding the software bugs. Testing is for evaluating a system or its components to find whether it satisfies the specified requirements or not. Testing cannot show the absence of defects, it can also be stated as the process of validating and verifying that a software program or software or product.

TESTING OBJECTIVES

There are several rules that can serve as testing objectives, they are

- Testing is a process of executing a program with the intent of finding an error.
- A good test case is one that has high probability of finding an undiscovered error.
- A successful test is one that uncovers an undiscovered error.

If testing is conducted successfully according to the objectives as stated above, it would uncover errors in the software. Also testing demonstrates that software functions appear to the working according to the specification, that performance requirements appear to have been met. There are three ways to test a program:

- For correctness.
- For implementation efficiency.
- For computational complexity.

Tests for correctness are supposed to verify that a program does exactly what it was designed to do. This is much more difficult than it may at first appear, especially for large programs. Test for implementation efficiency attempt to find ways to make a correct program faster or use less storage. It is code refining process, which re-examines the implementation phase of algorithm development. Test for computational complexity amount to an experimental analysis of the complexity of an algorithm or an experimental comparison of two or more algorithms, which solve the same problem.

For this project, I have completed the following tests excluding Acceptance Testing

UNIT TESTING

Unit testing is the testing of an individual unit or group of related units. It falls under the class of white box testing.

It is often done by the programmer to test that the unit has implemented is producing expected output against given input. In this the smallest testable parts of an application, called units, are individually and independently scrutinized for proper operation. Unit testing can be done manually but is often automated. In our system, unit testing has been successfully handled.

INTEGRATION TESTING

Integration testing (sometimes called integration and testing, abbreviated as I&T) is the phase in software testing in which individual software modules are combined and tested as a input modules that have been unit tested, groups them in larger aggregates, applies tests defined in an integrated test plan to those aggregates, and delivers as its output the integrated system ready for system testing.

SYSTEM TESTING

System testing of software or hardware is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements. System testing falls within the scope of black-box testing, and as such, should require no knowledge of the inner design of the code or logic. As a rule, system testing takes, as its input, all of the "integrated" software components that have passed integration testing and also the software system itself integrated with any applicable hardware system. The purpose of integration testing is to detect (called assemblages) or between any of the assemblages and the hardware. Software testing is more limited type of testing; it seeks to detect defects both within the "inter-assemblages" and also within the system as whole.

ACCEPTANCE TESTING

In engineering and its various sub disciplines, acceptance testing is a test conducted to determine if the requirements of a specification or contract are met. It may involve chemical tests, physical test, or performance tests. In systems engineering it may involve black-box testing performed on a system (for example: a piece of software, lots of manufactured mechanical parts, or batches of chemical products) prior to its delivery. In software testing the ISTQB defines acceptance as: formal testing with respect to user needs, requirements, and business processes conducted to determine whether a system satisfies the acceptance criteria and to enable the user, customers or other authorized entity to determine whether or not to accept the system. Acceptance testing is also known as user acceptance testing(UAT), end user testing and operational acceptance testing (OAT) or field (acceptance) testing.

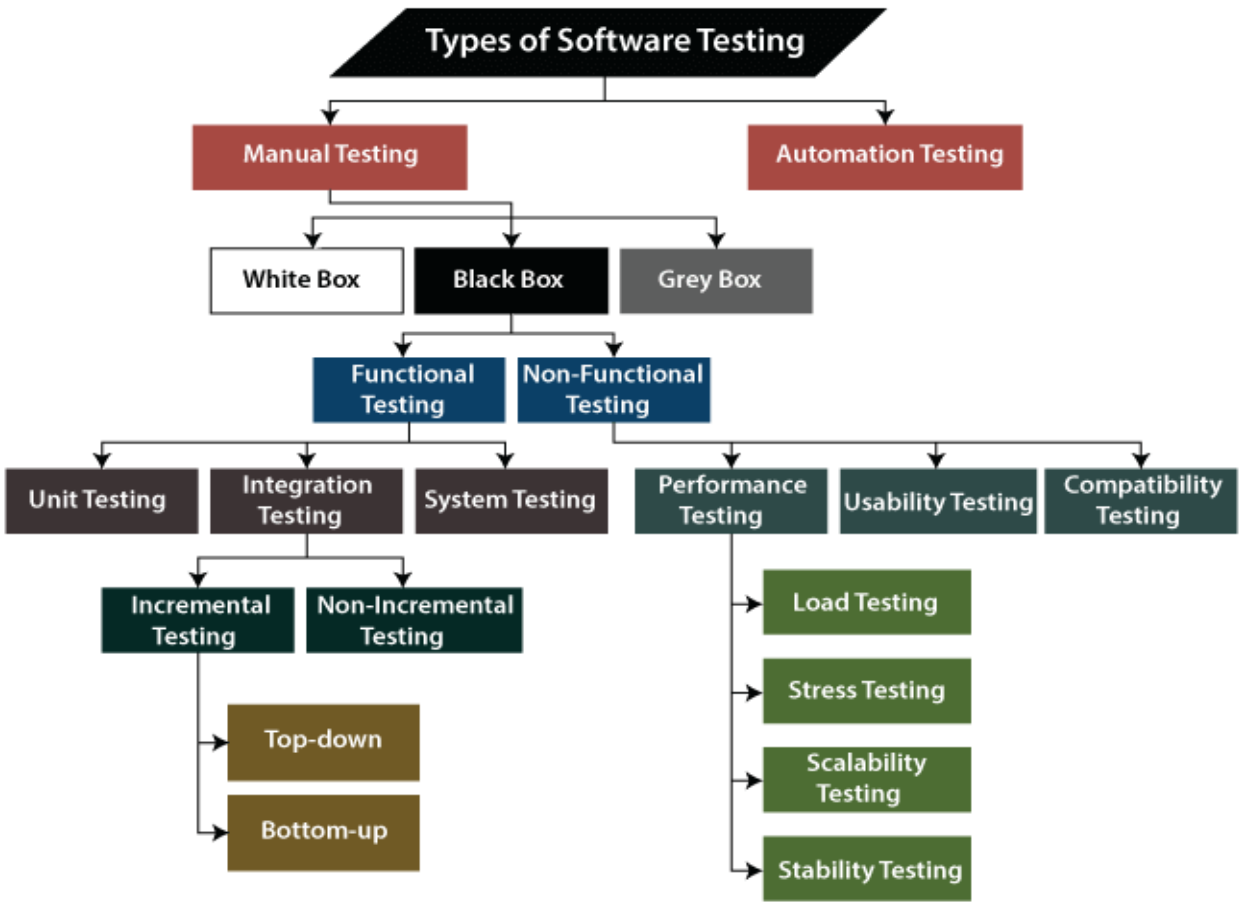
A smoke test may be used as an acceptance test prior to introducing a build of software to the main testing process

VALIDATION TESTING

In this, all the code modules were tested individually one after the other. The following were tested in all the modules 1. Loop Testing 2. Boundary Value Analysis 3. Equivalence Partitioning Testing In our case all the modules were combined and given the test data. The combined module works successfully without any side effect on other programs. Everything was found fine working.

OUTPUT TESTING

Output testing popularly known as Black Box testing. This is the final step of testing. Black Box testing is a software testing techniques in which functionality of the software under test is tested without looking at the internal code structure, implementation details and knowledge of internal paths of the software, it just focuses on inputs and output of the software system without bothering about internal knowledge of the software program.



IMPLEMENTATION

The implementation phase is less creative. It is primarily concerned with user training, site preparation, and file conversion. It also tests the user acceptance. After the completion of project it is aim to implement or install the system in the company. Prior to the implementation site preparation are made which includes the assurance of hardware and software that have already met. After the system is implemented then checks for the readiness and accuracy of the system to access, update and retrieve data from new files.

Once the program become available, test data are read into computer and processed against the files provided for testing. If successful, the programs are then run with 'live data'. Thus the data's that the company want to keep in the new system are entered, processed and verified the output. Otherwise, a diagnostic procedure is used to locate and corrects errors in the program. Major activities in implementation are:

User Training:

While computer programs are being developed and tested, the analyst will starts familiarizing users with procedures to be used in the new system. The data entry operators must be trained to enter data from the source documents and to correct errors.

Implementation Procedure:

Implementation procedure is the last phase regarding any system development, before any system is implemented various tests are performed the system is reviewed thoroughly. The changeover selected is used to change the existing system to the new proposed system. In this phase, the system enters the operation and maintenance stage.

Operation Documentation:

This system is developed in such a way that the existing system facilities are not enough for implement the developed system. The implementation phase is less creative. It is primarily concerned with user training, site preparation and file conversion. It also tests the user acceptance. After the completion of project it is aim to implement or install the system in the company. Prior to the implementation site preparation are made which includes the assurance of hardware and software that have already met

CONCLUSION

This project is only a humble venture to satisfy the idea and demonstrate a possibility to manage a cluster and bring out something productive within the community with little to no infrastructural requirements work. Several user friendly coding have also adopted. At the end it is concluded that I have made effort on following points…

- A description of background and context of the project and its relation to work already done in the area.
- Made statement of the aims and objectives of the project.
- The description of the purpose, scope and applicability.
- We define the project on which we are working in project.
- We describe the requirement specifications of the system and actions that can be done on these things.
- We designed user interface and security issues related to system.
- Finally the system is implemented and tested according to the test cases.

DEPLOYMENT AND MAINTENANCE

When the system meets all the requirements and completed the test phases, it goes to approval and is ready to “go live”. Then the system is ready to deploy it to production environment. There is no need to install any software on end-users machines – all software is installed on the server.

A process of modifying a software system or component after delivery to correct faults, to improve performance is known as software maintenance. A common perception of maintenance is that it merely involves fixing defects. However, one study indicated that the majority, over 80%, of the maintenance effort is used for non-corrective actions.

Software maintenance is a very broad activity that includes error correction, enhancements of capabilities, deletion of obsolete capabilities, and optimization. Because change is inevitable, mechanisms must be developed for evaluation, controlling and making modifications. So, any work done to change the software after it is in operation is considered to be maintenance work. The purpose is to preserve the value of software over the time.

It is also possible that despite completing multiple testing on alpha and beta side, when deployed, there will still be errors and bugs that might have slipped testing phases. Any personal with intermediate knowledge on workings of relational databases can handle the project for deployment and maintenance work relatively easily.

SCOPE FOR FUTURE DEVELOPMENT

It can be summarizing that the future scope of the project circles around maintaining information regarding:

- We can add advance analytics tools for management system including more facilities.
- We can host the platform on online servers to make it accessible worldwide on a global scale.
- Integrate multiple load balancers to distribute the loads of the system.
- Create the master and slave database structure to reduce the overload of the database queries.
- Implementing the backup mechanism for taking backup on codebase and database on regular basis on different servers.
- Change the flow of the portal and queries to make it more dynamic and customizable.

The above mentioned points are the enhancements which can be done to increase applicability and usage of the project. Also it can be seen that now a days the players are versatile, i.e. so there is a scope for introducing a newer method to maintain the cluster management system.

BIBLIOGRAPHY

WEBSITES

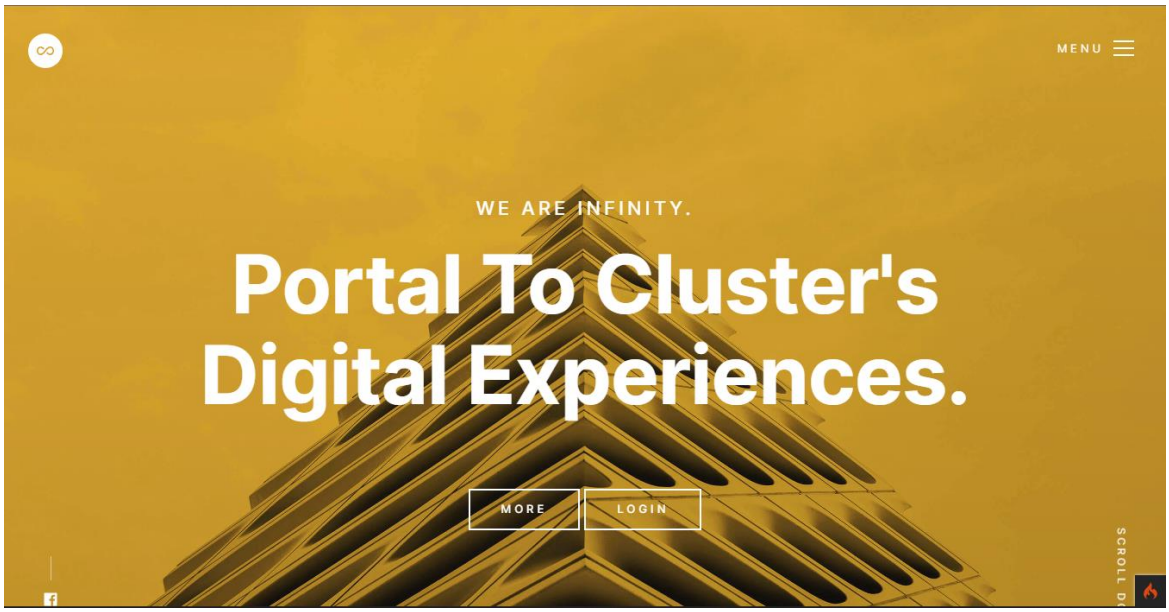
- https://www.javatpoint.com/
- https://www.tutorialspoint.com/
- https://www.geeksforgeeks.org/
- https://codeigniter.com/user_guide/index.html
- https://stackoverflow.com/

BOOKS

- Pro CodeIgniter : Alex Manfield - Year: 2021
  Language : English
  Pages : 469
  ISBN : B09LDH3CJ3

SCREEN SHOTS
DESKTOP AND MOBILE

LANDING PAGE



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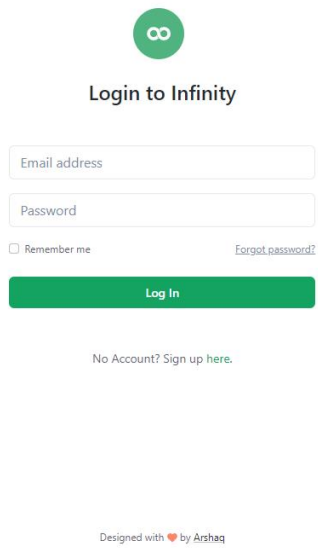

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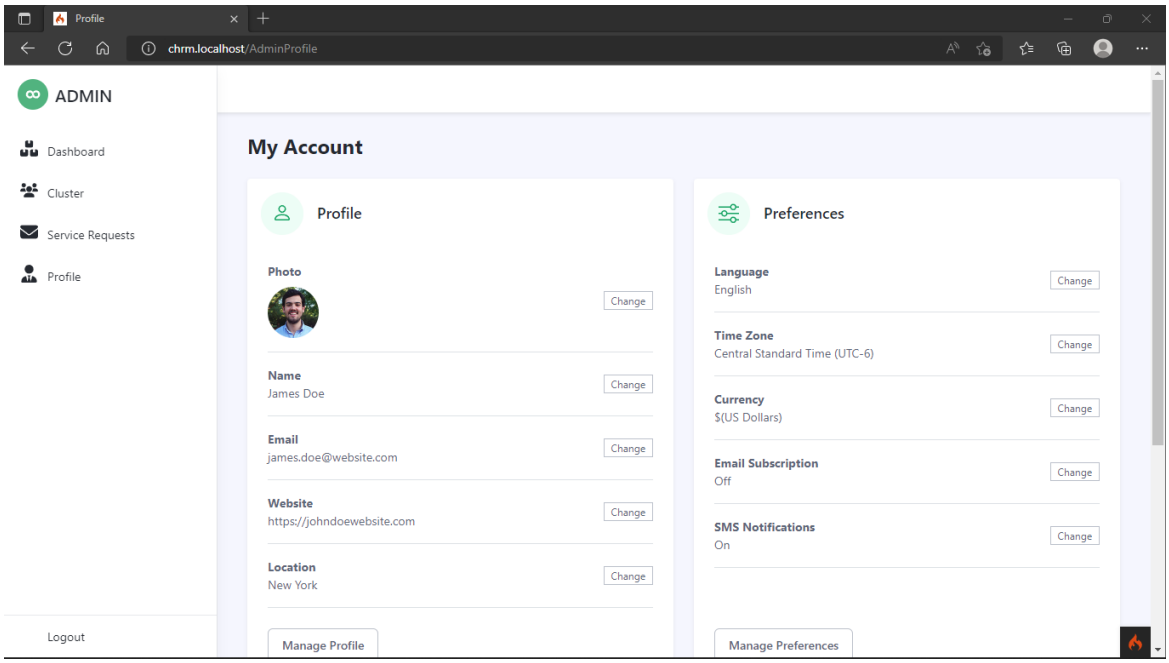

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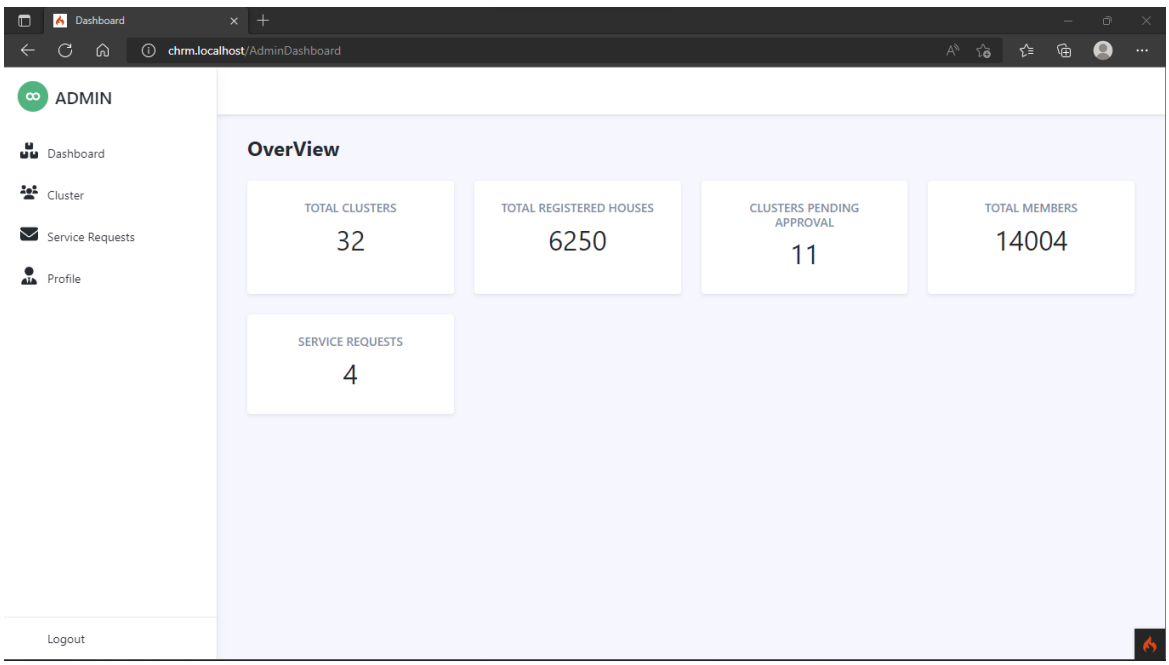

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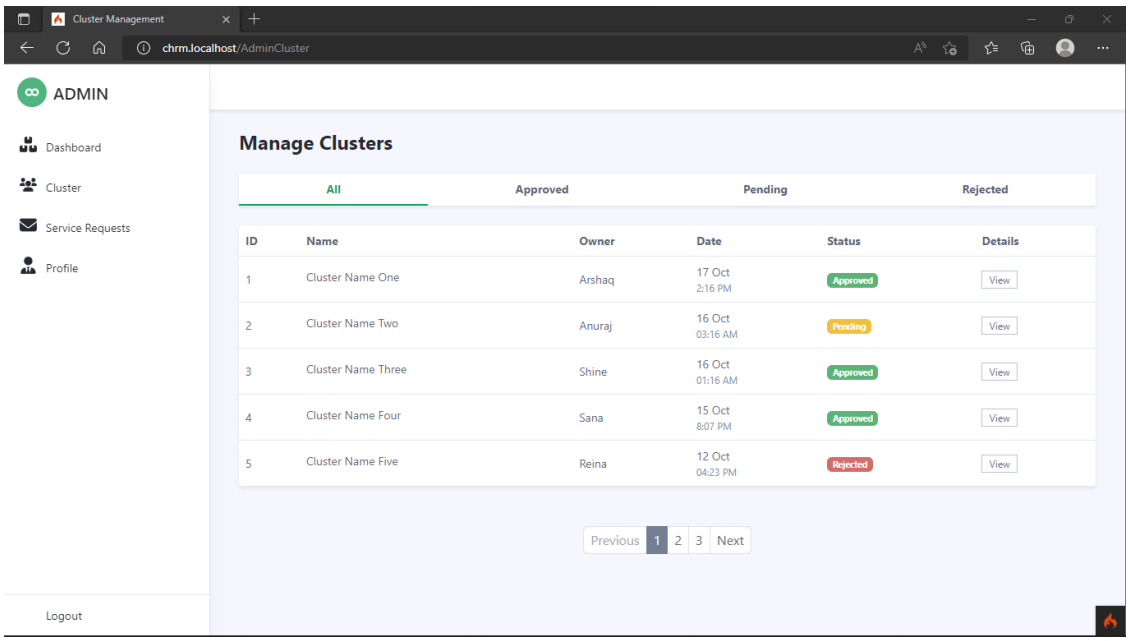

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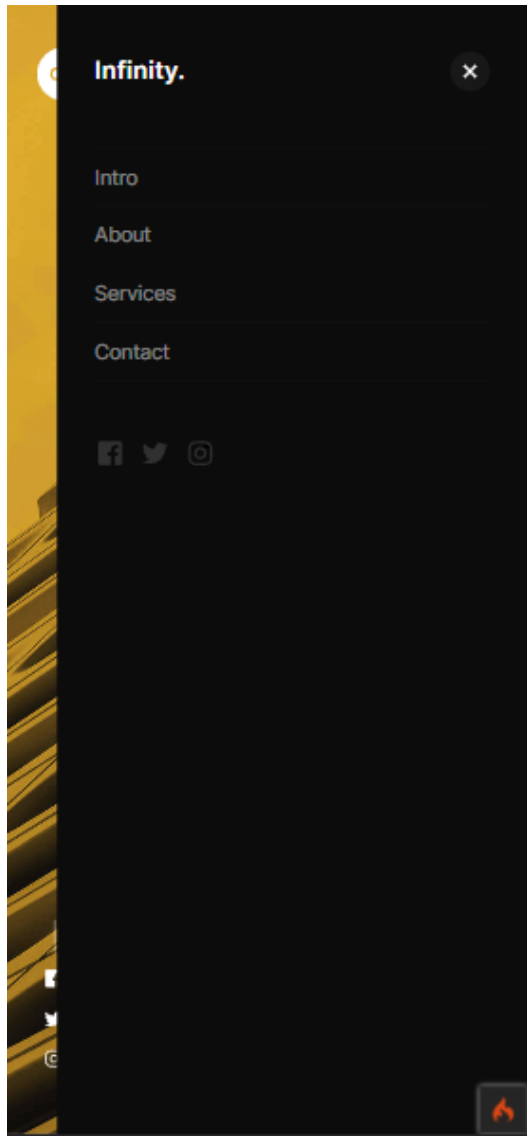

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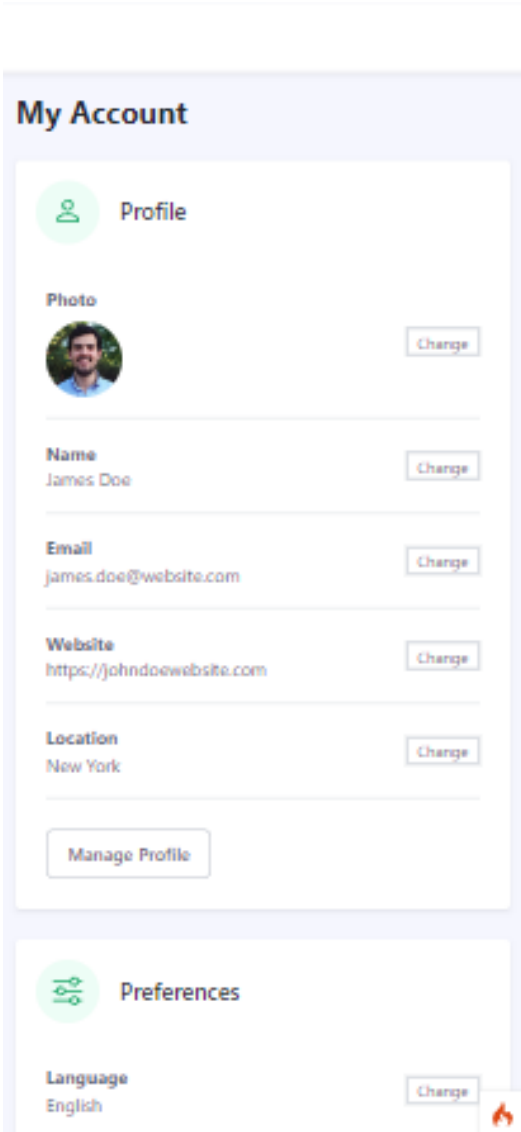

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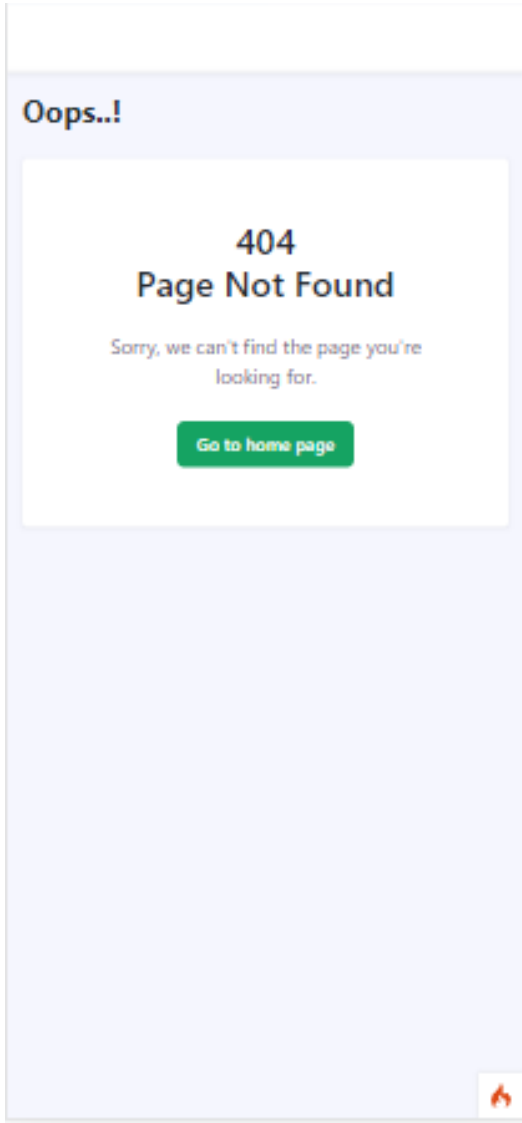

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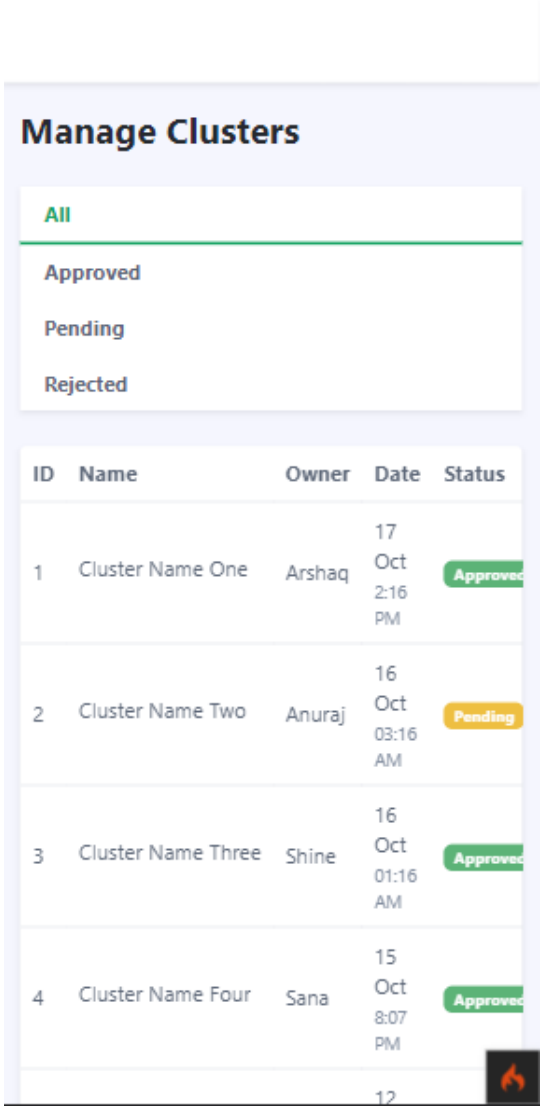
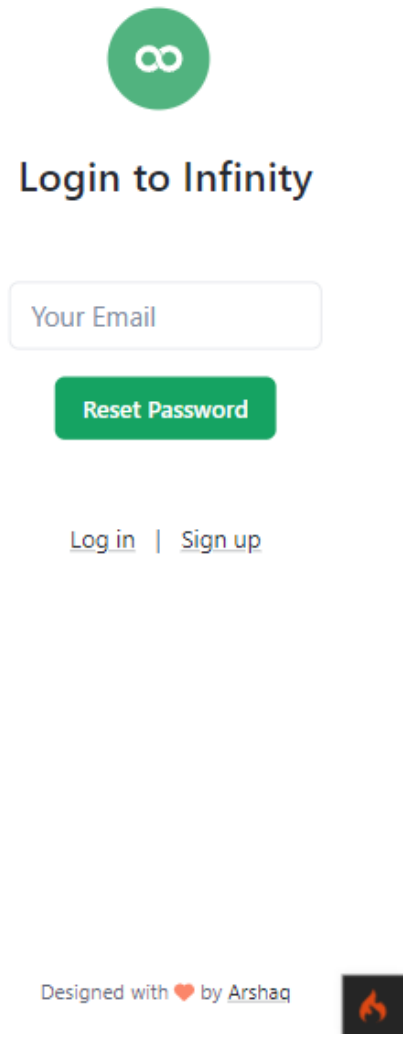


MANAGE CLUSTERS



RESET PASSWORD