



# HUMAN RESOURCE AND PAYROLL MANAGEMENT SYSTEM

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## **PROBLEM STATEMENT**

The HUMAN RESOURCE MANAGEMENT SYSTEM is basically concerned with managing the Administrator of the HUMAN RESOURCE Department in a company. A Human Resource Management System, refers to the systems and processes at the intersection between human resource management and information technology. It merges HRM as a discipline and in particular its basic HR activities and processes with the information technology field, whereas the programming of data processing systems evolved into standardised routines and packages of enterprise resource planning software. The main objective of this system is to reduce the effort of the Administrator to keep the daily events such as logins, authentications, salaries, appraisals, trainings, departments, etc. This system deals with the process of identifying the employees, keeping track of training programs and calculating their effective payable hours or days, etc. This system should maintain the records of each and every employee and their time spent in the company, which can be used for performance appraisal. Based on that transfer, removal, promotion can be done.

We are Designing a Human Resource Management for the Employee management. The **Employee** will have a **role** to perform and will have a unique role id, title and their specific description. For **users** to login in the system they will need a few **permissions** which will authenticate the user to access certain files. For the specific permissions, the user should have unique data such as id, title etc. for the permission. After authentication, users can access many datasets and can modify and manage the data. The data such as **Salary** information of the employee, data regarding the **training** of the employees, data of the several **departments** of the company, **appraisal** data of the employee. All the datasets will have their unique attributes such as unique id and several descriptions. The users can add, edit, save, update, list and delete the datas from the particular domain according to the access they have been granted based on the permission id they put while logging into the system.

# OBJECT MODELLING

Class Diagram describes the structure of a Human Resource Management System classes, their attributes, operations (or methods), and the relationships among objects. The main classes of the Human Resource Management System are Employee, Training, Appraisals, Departments, Salary, Salary Slip.

## **1. Identifying Classes**

The first step in creating an object model is to identify the relevant object classes from the application domain. Objects will include physical entities such as name of owners, name of customers, payment options, payment schedules, concepts, etc.

- **Employee Class** : Manage all the operations of Employee
- **Trainings Class** : Manage all the operations of Trainings
- **Appraisals Class** : Manage all the operations of Appraisals
- **Departments Class** : Manage all the operations of Departments
- **Salary Class** : Manage all the operations of Salary
- **Salary Slip Class** : Manage all the operations of Salary Slip

## **2. Identifying Attributes**

Attributes are properties of individual objects, such as name, email id etc. Attributes should not be objects or a relationship between objects. Derived attributes should be omitted and link attributes should be identified as well.

- **Employee Attributes** : employee\_id, employee\_name, employee\_mobile, employee\_email, employee\_username, employee\_password, employee\_address
- **Trainings Attributes** : training\_id, training\_employee\_id, training\_registration, training\_name, training\_type, training\_year, training\_description
- **Appraisals Attributes** : apprasail\_id, apprasail\_employee\_id, apprasail\_name, apprasail\_type, apprasail\_description
- **Departments Attributes** : department\_id, department\_name, department\_place, department\_type, department\_description
- **Salary Attributes** : salary\_id, salary\_employee\_id, salary\_amount, salary\_total, salary\_type, salary\_description
- **Salary Slip Attributes** : salary\_slip\_id, salary\_slip\_employee\_id, salary\_slip\_name, salary\_slip\_date, salary\_slip\_number, salary\_slip\_type, salary\_slip\_description

## **3. Identifying Operations**

- **Employee Methods** : addEmployee(), editEmployee(), deleteEmployee(), updateEmployee(), saveEmployee(), searchEmployee()

- Trainings Methods** : addTrainings(), editTrainings(), deleteTrainings(), updateTrainings(), saveTrainings(), searchTrainings()
- Appraisals Methods** : addAppraisals(), editAppraisals(), deleteAppraisals(), updateAppraisals(), saveAppraisals(), searchAppraisals()
- Departments Methods** : addDepartments(), editDepartments(), deleteDepartments(), updateDepartments(), saveDepartments(), searchDepartments()
- Salary Methods** : addSalary(), editSalary(), deleteSalary(), updateSalary(), saveSalary(), searchSalary()
- Salary Slip Methods** : addSalary Slip(), editSalary Slip(), deleteSalary Slip(), updateSalary Slip(), saveSalary Slip(), searchSalary Slip()

## 4. Identifying Generalisation and Aggregation

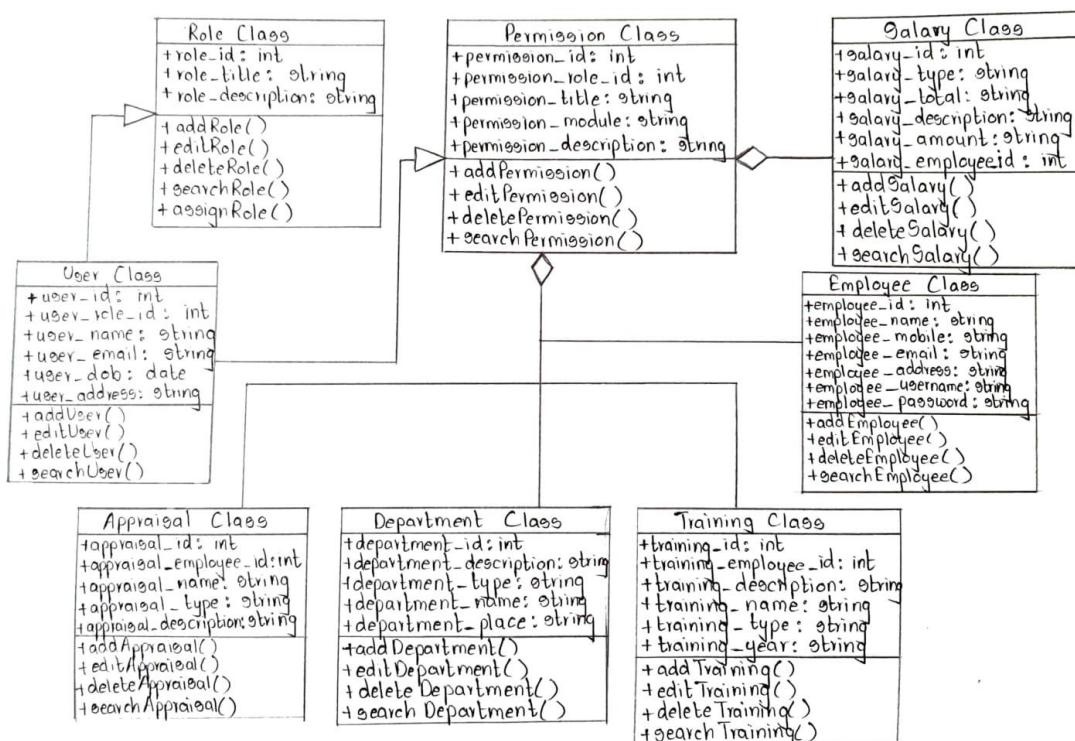
### Generalisation:

The User Class is a Sub Class and Has been inherited from 2 Super Classes, Role Class and Permission Class. These classes deal with the type of user to the system and accordingly work to grant access to different modules of the system.

### Aggregation:

Employee, Training, Department, Salary all have a part-of relationship with the Permission Class. Thus they have an aggregation to Permission Class.

## 5. CLASS DIAGRAM



# **DYNAMIC MODELLING**

The Dynamic Model describes those aspects of a system concerned with time and the sequencing of operations - events that mark changes, sequences of events, and the organising of events and states. The Dynamic Model does not consider what the operations do, what they operate on, nor how they are implemented.

In Human Resource Management, there are many events and transitions taking place from state to state. Such as User login to authentication and from managing of employees to managing the department many things have been discussed below with the help of appropriate Scenario, Event trace diagram and State-transition diagram.

## **1. Design scenario (list sequence of events)**

The steps of the scenario will be as follow:

**Step 1:** User will go to **login page**

**Step 2:** The login data will be **verified**

**Step 3:** If data is successfully verified user will **login successfully**

**Step 4:** If the verification fails the user will have to **reset the password** by answering questions and an email will be sent to the user to reset the password.  
(User will login again with new password)

**Step 5:** According to the login information system will **authenticate the user** and will allow the appropriate access

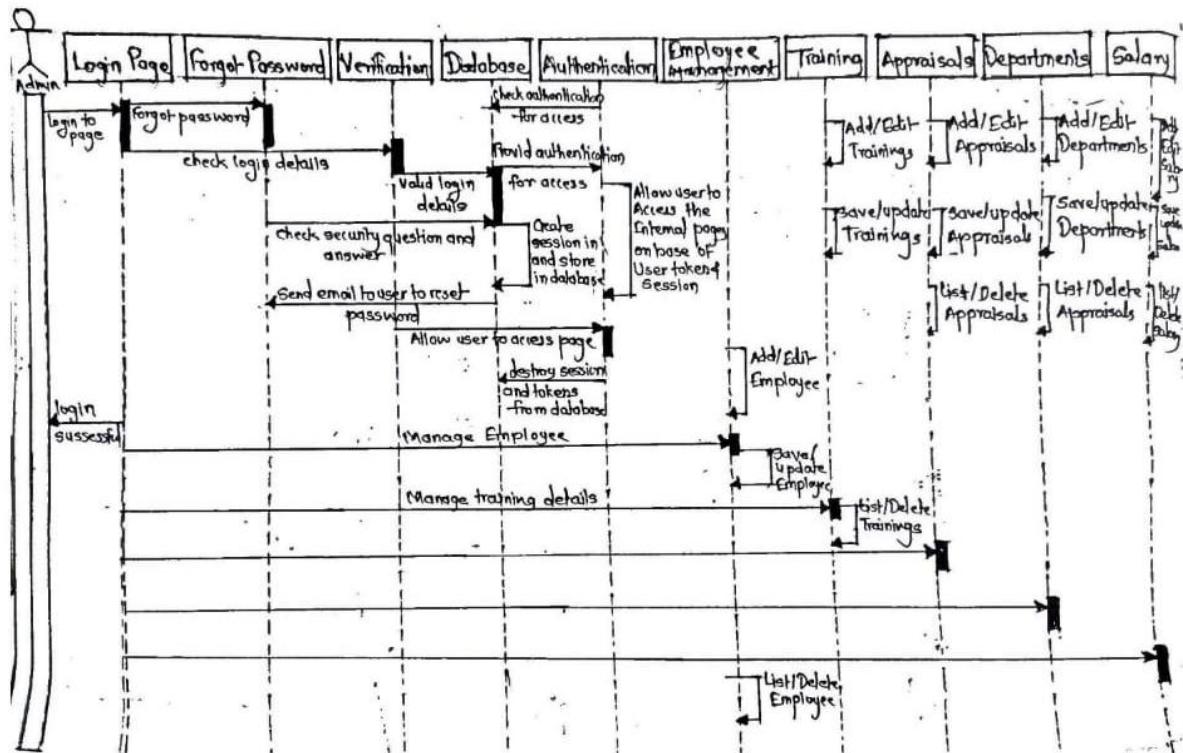
**Step 6:** User can do following activities after authentication:

- a. User can **manage the Employee data** (if any changes in employee data)
- b. User can **manage the training programs** (when new employee joins the company)
- c. User can **manage the Appraisal data** (When new appraisals are approved)
- d. User can **manage the Salary data** (When new salaries has to be calculated and distributed)
- e. User can **manage the Department data** (If there are any changes in the departments)

## **2. EVENT TRACE DIAGRAM**

Event Trace Diagrams, sometimes called sequence diagrams, event scenarios, and timing diagrams, allow the tracing of actions in a scenario or critical sequence of events. The Event Trace Diagram can be used by itself or in conjunction with a State Chart to describe dynamic behaviour of processes.

Following is the Event trace diagram for **Human Resource Management System**



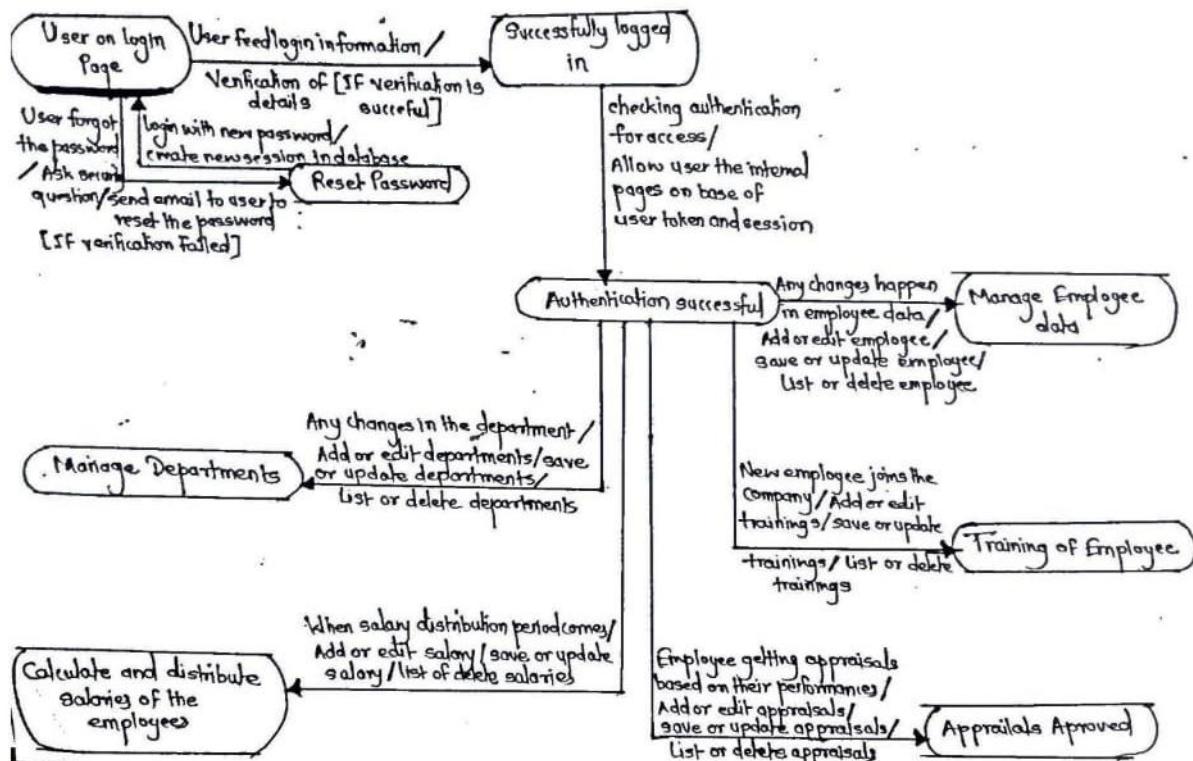
### 3. Identifying Events and States

Following are the Events, States and Actions in the State-transition diagram:

Sr. no.	States	Event	Actions
1.	User on the Login Page	User starts the system and wish to access it	User will go to system login page
2.	User successfully Logged in	User feed the login information	Verification of the details
3.	Reset Password	User forgot the password and Verification failed	Ask security question and send email to the user to reset the password
4.	Authentication	Checking authentication for the	Allow user the internal

	Successful	access and authentication information is correct	pages based on user token and sessions
5.	Manage Employee data	When any changes in the Employee data happen	Add, edit, save, update, list, delete new employee data
6.	Training of Employee	New employee joins the company	Add, edit, save, update, list, delete new training data
7.	Calculate and distribute Salary	When the salary distribution has to be done	Add, edit, save, update, list, delete new salary information
8.	Manage Departments	Any changes in the department data	Add, edit, save, update, list, delete new department data

#### 4. STATE DIAGRAM



# FUNCTIONAL MODELLING

## **1. Identifying Processes**

This diagram shows that the human resources system consists of two actors: human resources manager and employees. Each actor requests login action to enter the system and does their tasks. Processes are login, Manage Employees, Manage salaries, Manage roles, View salary, Change password, Confirm attendance/leave, Manage roles, Edit profile etc.

## **2. Identifying Database**

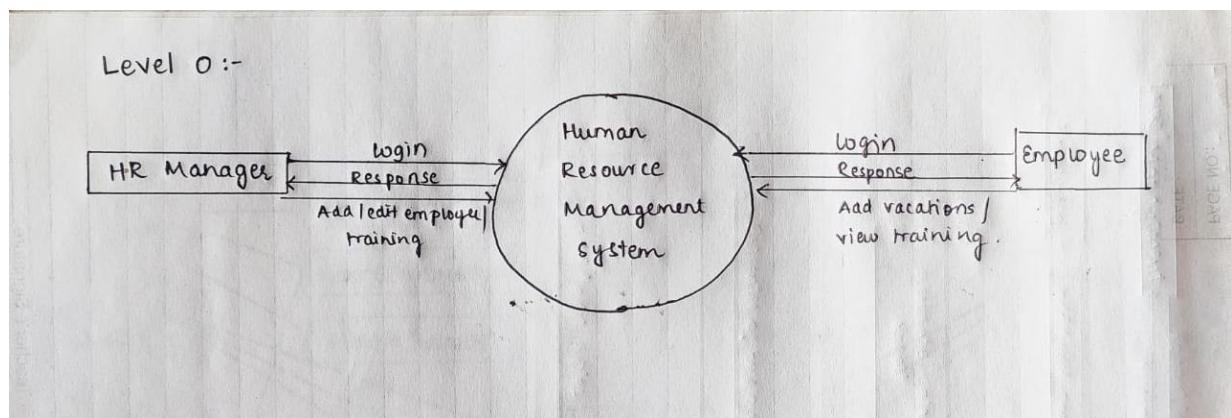
Databases required are Admin, Employee, Salary, Attendance, Roles.

## **3. Identify Constraints**

- Employees can only view salaries and can't make changes in the database named salary.
- The process to manage salaries will retrieve data from the database Attendance.

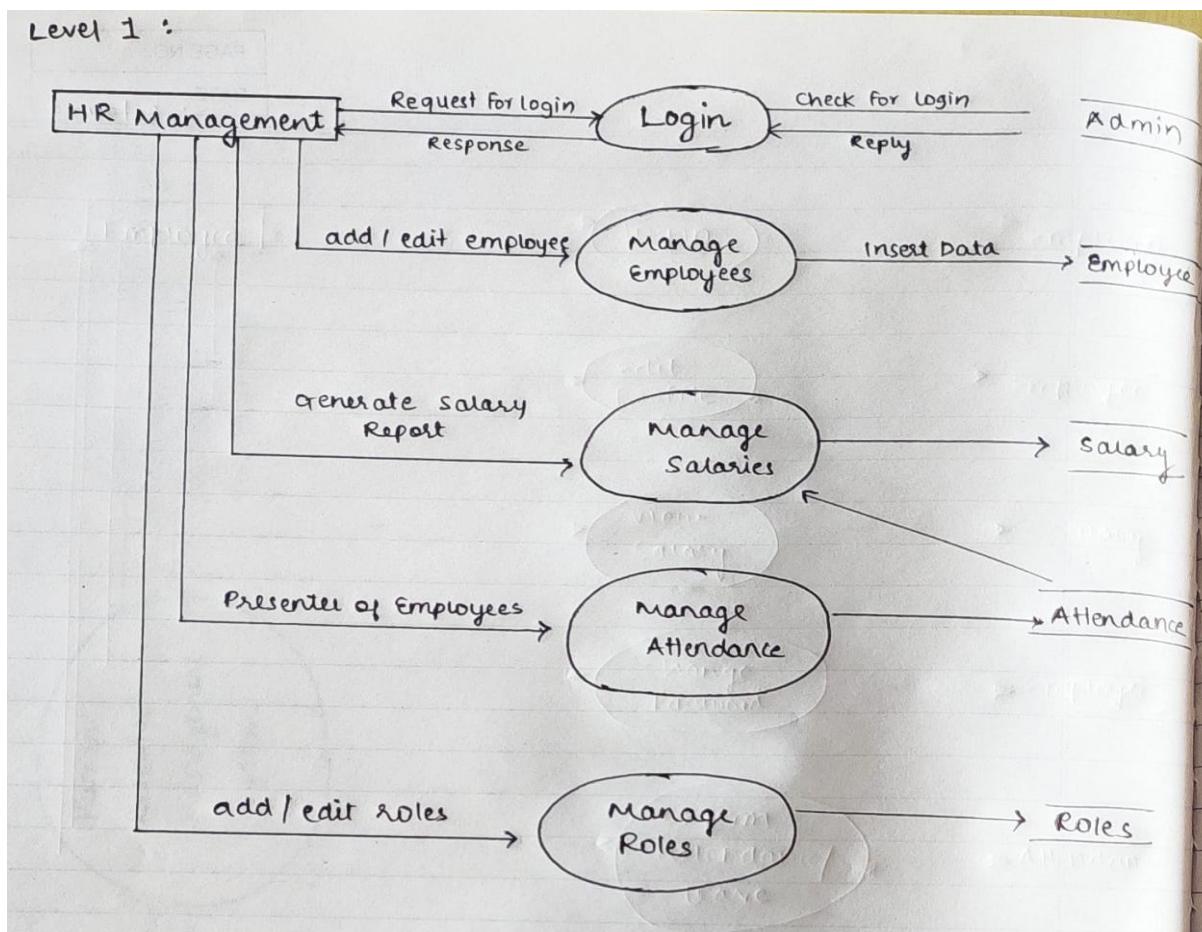
## **4. DATA FLOW DIAGRAM**

**Level 0 DFD:-**



### Level 1 DFD :-

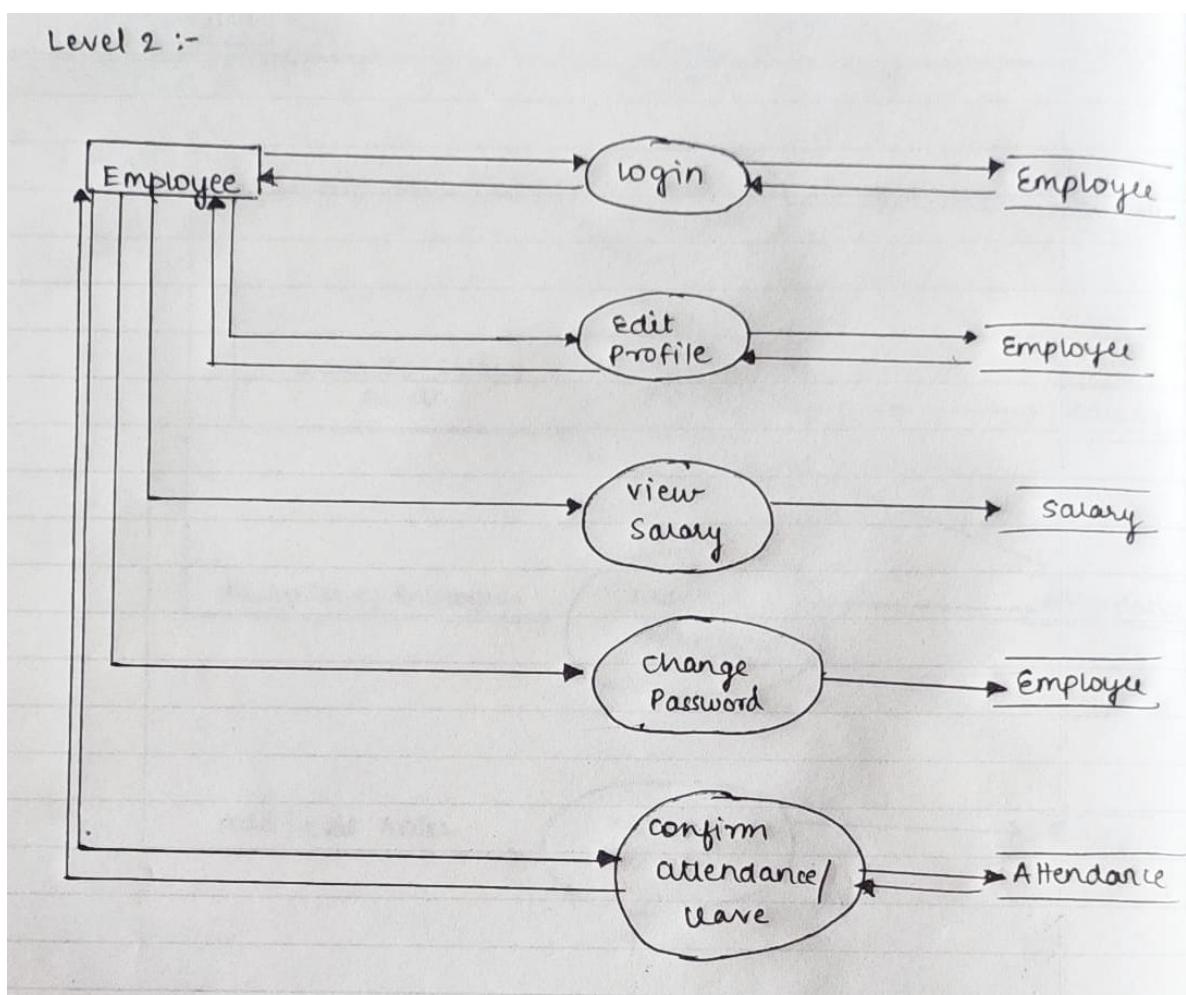
First level DFD (1st Level) of human resource management system shows how the system is divided into subsystems (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the human resource management system as a whole. It also identifies internal data stores of human resource rules, attendance, training, vacation, salary that must be present in order for the human resource system to do its job, and shows the flow of data between the various parts of salary, attendance, HR rule, training, and vacation of the system. DFD level 1 provides a more detailed breakout of pieces of the 1st level DFD.



## Level 2 DFD :-

DFD level 2 then goes one step deeper into parts of level 1 of human resource. It may require more functionalities of human resources to reach the necessary level of detail about the human resource functioning. Main functionalities of second level DFD (2nd level DFD):

- 1) Employee logs in to the system and manages some of the functionalities of the human resource management system
- 2) Employee can edit, change passwords and view his/her profile.
- 3) Employee can view all details of salary, attendance and vacation
- 4) Employees can also add and confirm vacation.
- 5) Employees can add attendance/leave data and confirm it.



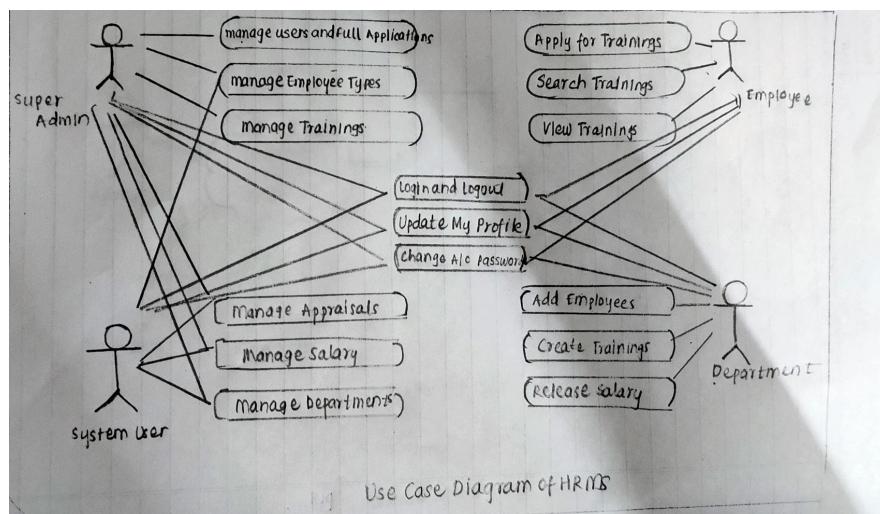
# OTHER UML DIAGRAMS

## 1. Use case diagram

This Use Case Diagram is a graphic depiction of the interactions among the elements of the Human Resource Management System. It represents the methodology used in system analysis to identify, clarify, and organise system requirements of Human Resource Management System. The main actors of Human Resource Management System in this Use Case Diagram are: Super Admin, System User, Employee, Department, who perform the different type of use cases such as Manage Employee, Manage Trainings, Manage Appraisals, Manage Employee Types, Manage Departments, Manage Salary, Manage Users and Full Human Resource Management System Operations. Major elements of the UML use case diagram of Human Resource Management System are shown on the picture below.

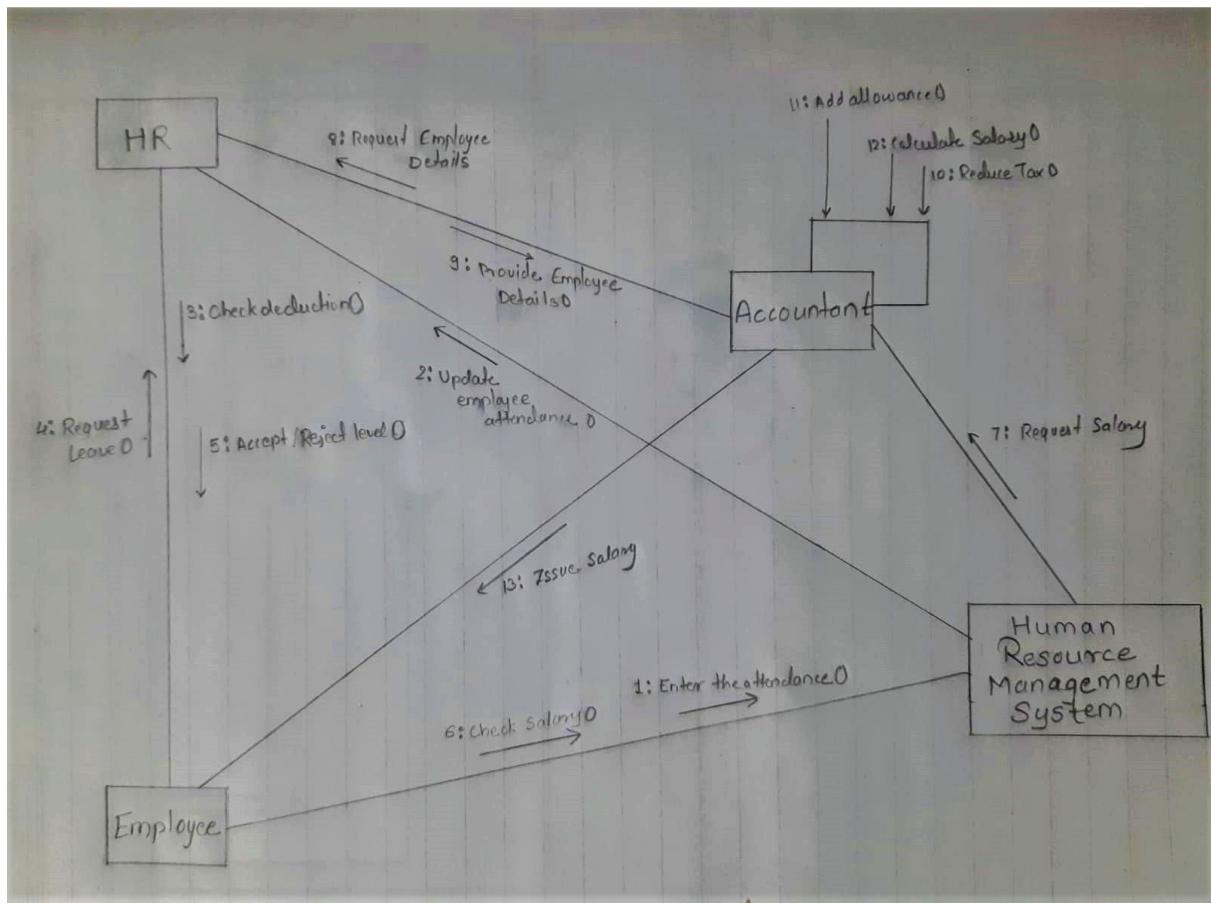
The relationships between and among the actors and the use cases of Human Resource Management System:

- **Super Admin Entity** : Use cases of Super Admin are Manage Employee, Manage Trainings, Manage Appraisals, Manage Employee Types, Manage Departments, Manage Salary, Manage Users and Full Human Resource Management System Operations
- **System User Entity** : Use cases of System User are Manage Employee, Manage Trainings, Manage Appraisals, Manage Employee Types, Manage Departments, Manage Salary
- **Employee Entity** : Use cases of Employee are View Trainings, Apply for Trainings, Search Trainings
- **Department Entity** : Use cases of Department are Create Trainings, Add Employees, Release Salary



## **2. Collaboration diagram**

UML Collaboration Diagram depicts the interactions between objects or parts in terms of sequenced messages and describes both the static structure and dynamic behaviour of a system.



## **3. Component diagram**

This is a Component diagram of Human Resource Management System which shows components, provided and required interfaces, ports, and relationships between the Employee Types, Salary, Departments, Employee and Trainings. This type of diagram is used in Component-Based Development (CBD) to describe systems with Service-Oriented Architecture (SOA). Human Resource Management System UML component diagram, describes the organisation and wiring of the physical components in a system. Components of UML.

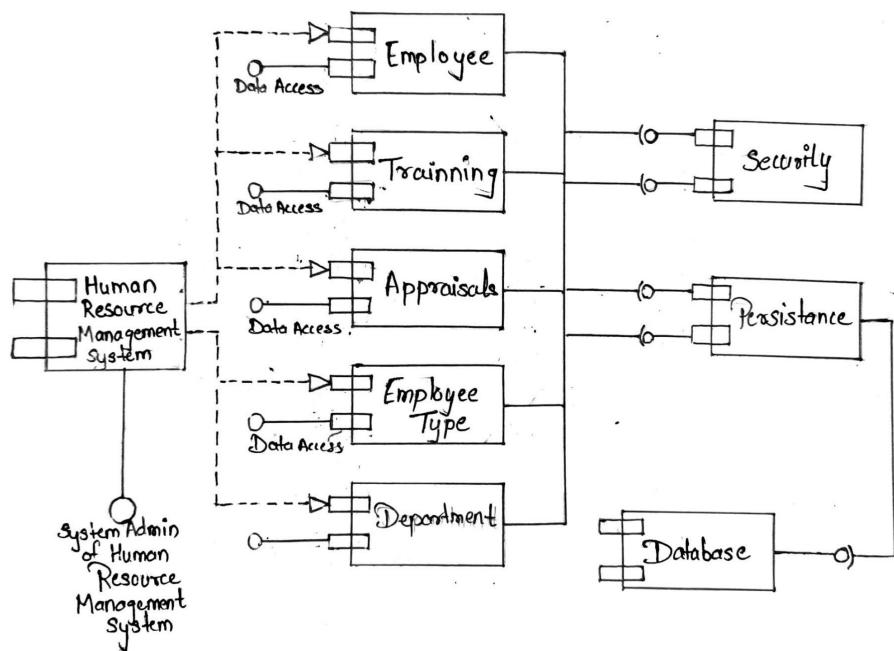
### **Component Diagram of Human Resource Management System:**

- Employee Types Component
- Salary Component

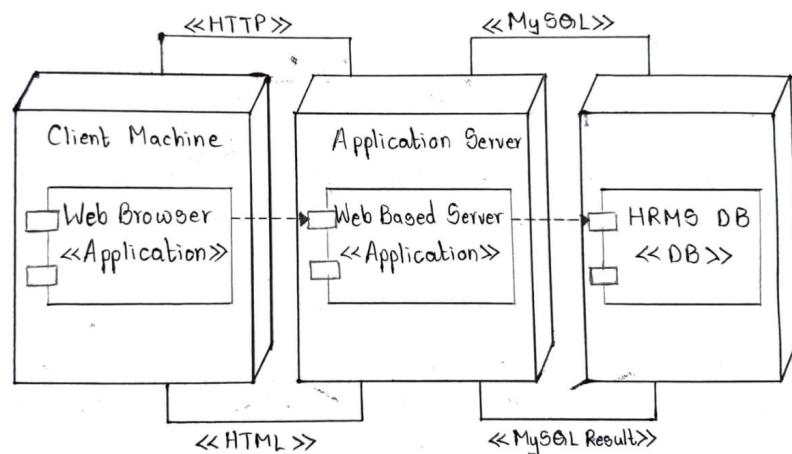
- Departments Component
- Trainings Component

### Features of Human Resource Management System Component Diagram:

- Show the models of the components of the Human Resource Management System.
- Model the database schema of Human Resource Management System.
- Model the executables of an application of Human Resource Management System.
- Model the system's source code of Human Resource Management System.



### 4. Deployment diagram



# SYSTEM DESIGN

## **Overview :**

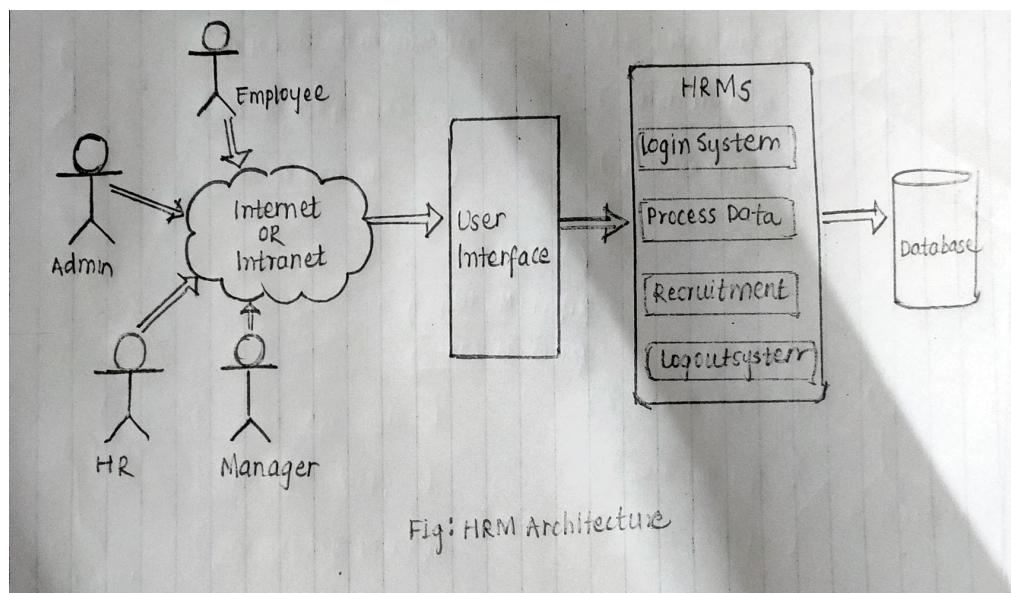
Refers to the systems development life cycle a set of processes or stages and all stages of the

system where a number of steps and the main stage falls below are all the steps and methodologies :

- Plan
- Analysis
- Design
- Implementation

## **HRMS architecture:**

HRMS which is an online intranet system will be used by four types of employees. These types who have different roles can be stated as; admin, manager, hr, employee. Every user enters the main authentication page and after that, the system will grant them authorization. After being authorised according to their permissions (role type) users will basically query and edit the database via HRMS.



As shown in figure, HRMS architecture where HRMS implements some major functions in order to accomplish required tasks. These functions constitute a basis for the whole system.

## **IMPLEMENTATION/ PSEUDO CODE/ALGORITHM**

Implementation is the stage in the paper where the theoretical design is turned into a working system. The implementation phase constructs, installs and operates the HRMS system. The most crucial stage in achieving a successful system is that it will work efficiently and effectively.

The actual Implementation and ALgorithm of the system will be as follows:

1. Start
2. LOGIN to HRMS
3. Enter LOGIN DETAILS
4. If LOGIN DETAILS are correct  
    Print VERIFICATION SUCCESSFUL!
5. Else if LOGIN DETAILS are not correct  
    Print VERIFICATION UNSUCCESSFUL!  
    do FORGOT PASSWORD  
        Send email to the user and RESET PASSWORD  
    do Step 3 again with NEW PASSWORD
6. Check LOGIN DETAILS
7. Grant authentication to ACCESS certain file based on TOKENS of LOGIN DETAILS
8. If ACCESS==GRANTED  
    Manage EMPLOYEE data  
        do ADD data  
        EDIT data  
        SAVE data  
        UPDATE data  
        LIST data  
        DELETE data  
    Manage SALARY data  
        do ADD data  
        EDIT data

SAVE data  
UPDATE data  
LIST data  
DELETE data

Manage TRAINING data  
do ADD data  
EDIT data  
SAVE data  
UPDATE data  
LIST data  
DELETE data

Manage DEPARTMENT data  
do ADD data  
EDIT data  
SAVE data  
UPDATE data  
LIST data  
DELETE data

Manage APPRAISAL data  
do ADD data  
EDIT data  
SAVE data  
UPDATE data  
LIST data  
DELETE data

9. LOGOUT of the HRMS
10. End

**CONCLUSION :** Hence we have studied and implemented human resource and payroll management system.