An Online Center Management System for Vocational Training Centre (VTC)

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DECLARATION

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ABSTRACT

Vocational Training Centre is a semi-government technical training institute that comes directly under the Ministry of Youth affairs. It consists of five main departments providing various training programs from certificate to diploma level. The institution provides training for more than 500 students per year.

The current Center Management System. That is handling all staff and student related functionalities from recruitment to retirement and enrolment to exams is done through a paper based manual system. A legacy system developed in C language is used to manage employee attendance and leave. Careful observation proved that the manual system is not productive due to reasons such as overhead in cross checking information, producing management reports, maintenance of records and etc.

The scope of this project is to provide a web based Center Management System that can automate employee details (personal, educational, professional, etc.) management, the management of employee attendance, leave management, produce information for salary processing and employee training and appraisal and all processers through student enrolling to exams.

The system analysis and design followed a fully Object Oriented Development Approach along with some Agile/Extreme Programming best practices. The Implementation architecture falls into the popular three layered architecture. It adheres to Factory Pattern identified in the Design stage as the core of its implementation. Currently, the system is at the design/development iterations.

This system has been developed in Microsoft® Windows environment using Apache, PHP and MySQL three open source technologies that are often combined to develop web applications.

ACKNOWLEDGEMENT

First and foremost I owe my deep admiration to the Director and all the academic staff of University of Colombo School of Computing, for facilitating me to follow the BIT program, which greatly covers the present day Information Technology. I also thank them for their follow-up giving all the resources of latest technology in the field.

I wish to express my sincere appreciation and deeper thanks to my project supervisor Mr Ashoka Bandula, without whom this project would simply have never been completed successfully. His expertise on Internet Application Development, Systems and Network Administration and shortly the entire Information Technology industry made the whole task possible without that much of difficulty.

I also offer my gratefulness to the authors of the main and web reference materials which I have referred throughout and all the individuals who answered my questions that were put on the on-line forums and orally. Finally I am grateful to Microsoft Corporation for Windows® for their very user friendly Operating System, and the online documentation of Apache, MySQL and PHP the Open Source giants.

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LIST OF ACRONYMS

AM – Agile Modeling

CGI – Common Gateway Interface

ER – Entity Relationship

FAQ – Frequently Asked Questions

GB – Giga Byte

GHz – Giga Hertz

GUI – Graphical User Interface

HTML – Hyper Text Markup Language

HTTP – Hyper Text Transfer Protocol0

ICT – Information and Communication Technology

IDE – Integrated Development Environment

IEEE – Institute of Electronic and Electrical Engineering

IT – Information Technology

JBGE – Just Barely Good Enough

Kbps – Kilo bits per second

LAMP – Linux, Apache, MySQL, PHP

MVC – Model View Controller

OOSAD – Object Oriented System Analysis and Design

PDA – Personal Digital Assistant

PHP – PHP Hypertext Preprocessor

RAM – Random Access Memory

SOAP – Simple Object Access Protocol

TDD – Test Driven Design

UI – User Interface

URL – Uniform Resource Locator

WAMP – Windows, Apache, MySQL, PHP

WAN – Wide Area Network

WAP – Wireless Application Protocol

WML – Wireless Markup Language

WWW – World Wide Web

XML – Extensible Markup Language

XP – e Xtreme Programming

CHAPTER 01 - INTRODUCTION

Chapter 1- Introduction section gives a brief explanation about the client, the existing manual system, the motivating factor for the project, problem domain and the need of the project, objective of the project and the users who are going to make use of this system and some brief explanation and listing of the hardware and software to use.

A Brief about the Report

This documentation is designed to provide brief explanation about the analysis, design, implementation, and testing process of Center Management System for Vocational Training Centre (VTC). The main objective of the project is to help the client solve Human Resource Management and Student related issues related to the manual file based operations. Through this computerization, the client's needs will be fulfilled. This project enables HR division employees and other staff to handle their daily HR and Student related operations efficiently and effectively. This report depicts the above mentioned functions regarding the system.

1.1 The Client

This project involves the subject area of web based Center Management System for Vocational Training Centre (VTC). Vocational Training Centre (VTC) was established by the parliament under Vocational Training Authority of Sri Lanka Act No.12 0f 1995.The Institute functions under the purview of the Ministry of Youth Affairs & Skills Development. A major objective of VTC is to provide progressive upward movement to students in the Technical & Vocational Education based on their aptitudes and ability to acquire higher education. It consists of five main departments providing various training programs from certificate to diploma level. The institution provides training for more than 500 students per year **[1].**

1.2 Existing Manual System

Presently employees in HR division find it very difficult to maintain up-to-date staff information. With the growth, the institute was in a critical position in handling the day to day activities. Because of the increasing complexity of the business their manual way of handling HR activities using MS Excel and CR book records was not adequate. Also staff does not have a communication medium to check their HR and Student related activates such as Daily attendance, Leave details, students details and updates whenever it is required. The only available way is to communicate via MS Outlook through emails with HR division and Student Services Unit. This email communication has generated many problems like secure data transfer unavailability of history details and delay in communication.

1.3 Problem Domain and Need

There are several problem identified in the present manual system followed in VTC HR and Student Services division such as,

- Unavailability of data when necessary- E.g.: When staff need their leave details it is not possible to get it within one or two hours. Employee need to send a leave detail request mail to HR division and wait until their respond.
- Difficulties in generating reports on managements request - E.g.: When a manager request an attendance summary report for a particular period then, HR staff need to go through manual MS Excel sheets and prepare.
- Duplicates in data and reports.
- HR division is unable to meet management and staff request within given time line.
- Problem in keeping track of history information.
- No proper dataflow- E.g.: If employee needs to request for training there is no proper automated business flow.
- Lack of security to maintain employee personal details.
- Redundant and duplicates in recruitment procedure.

The major need for the development of this web based system is to remove the communication gap and delay between the HR staff and other staff who are located in

different geographical location and provide up to date information whenever needed and reduce paper based work presently followed by HR team. To manage employees effectively, it is essential to automate the management of human resources information. This will also motivate HR division staff.

1.4 Objective of the Project

Objective is to provide Employees and Managers with a Self Service solution for common HR activities and automate the workflow of Center Management System. The major goal is to develop an efficient web based application that replaces and improve the work of the current Center Management staffs' ad hoc methods that are currently followed and increase the effectiveness of Center Management System. Scope of the project is to develop a web based Center Management System with following modules and functionalities,

- Develop Employee Login, Selection and Recruitment, Employee Data Management, Training and development, Attendance and Leave and Performance management modules.
- Employee login provides Login facility to the system, for various user groups with security privileges.
- Recruitment module is to handle end to end operation of selection and Recruitment.
- Attendance and leave module is to allow employees to view and request employees attendance, leave info with the superior approval.
- Training module is to list down employees local and foreign training details.
- Data management module is to maintain employees Personal details, Job Description and performance details.
- Attendance module is to provide, Authorize leave or shift covering, Training covering or exchange.
- Help module is to provide useful links for documentation, forms for approvals and user manuals.
- Reports function in each module will generate daily/weekly/monthly reports and graph on request.
- Auto mails, Auto alerts and reminders facilities are also included.

1.5 Motivation

Vocational Training Centre (VTC) wants to automate its HR operations. There are plenty of commercial HR software packages available. However these HR software packages do not fully fit the client requirement, also those software are not flexible for customize configuration. Due to these reasons, the client is not satisfied with these packages, also those packagers are very expensive too. Only few organizations have the capacity to afford such packages. This was the thought that made the clients to investigate further and to identify that it would be better to build small customizable, cost effective Center Management web applications for the use of VTC which will cater lot of HR related operations in the company.

The motivation for doing this project was primarily an interest in undertaking a challenging project in an interesting area. The opportunity to learn about a new area of human resource management which not covered in lectures was appealing and put into practice some of the technique such as programming, software engineering and project management taught throughout the course. Also to replace fully automated web system for manual file based ad hoc system presently practiced by client.

1.6 Hardware/Software/User requirements

Hardware requirements:

Server – Dedicated Server Pentium Xeon 3.2 GHz

8 GB RAM

500 GB SCSI on RAID 5

Backup

Ethernet Connection 100 Base T

Client – 1 GHz with 512 MB RAM, 20 GB Hard disk

Software requirements

- **Operating System:**

  Server - Microsoft Server 2008

  Client – Not dependent

- **Languages:**
  PHP on Apache Server.

- **Database:**
  MySQL.

User requirements

- **HR Admin:** Administrator is higher level user with the higher level privileges. Hence responsible to create user, maintaining all master file information, taking back up of the database, Taking back up of the system and has access to carry out all the tasks, which carried out by other casual users of the system.
- **Manager:** Manager is the second level privileged user, responsible for Approval of subordinates request and ability to generate reports from web application.
- **Employee:** Lowest level user with limited privileges such as view attendance, leave and send request for approvals such as training, attendance and leave.

1.7 Structure of the Dissertation

This dissertation divides into main six chapters and five appendices based on the readers‟ expectation and system techniques. Main six chapters are Introduction, Analysis, Design, Implementation, Evaluation and Conclusion.

Chapter 2 is Analysis which includes details about Description of client's current system, Outline of existing HR related solutions in industry, Requirements gathered from client and Relevant diagrams for the object oriented methodology.

Chapter 3 Design of solution illustrates Alternate solution evaluation, selected solution description/justification, User interface design on developed HR web based system. Designing consist of UML diagrams, Class Diagrams, sequence diagram and other required diagrams for system development.

Chapters 4 describe Implementation, which identifies Implementation environment (hardware/software), Code and module structure description, Acknowledgement of any

reused existing code. This includes Major code and module structures, Software development tools Hardware used and installation.

Chapters 5 describe Evaluation, Test plan and results and User evaluation. Further this chapter includes a discussion about Test plan and test data used to validate and verify.

Chapters 6 contain Conclusion, Critical assessment of project and Future work. This is end of the dissertation. This describes the lesson learned during the project, improvement done on the system and future improvement which can be done to system.

CHAPTER 02 - ANALYSIS

Analysis chapter will provide detail knowledge to the reader in order to understand the rest of the document. By providing a brief overview of current situation of the client, the type of system needed and what are the concerned areas and technologies used.

2.1 Current System and the Process

Presently all the Center operations are handled and maintained manually. MS Excel is used for data management, calculation purpose and MS Outlook is used for email communication among staff. Based on the activities presently practiced, HR functions could be categorized into,

- Recruitment and Selection
- Employee personal data management
- Attendance and Leave
- Training and Development
- Employee Performance Management

Figure 2.1 shows the use case diagram of the current manual system

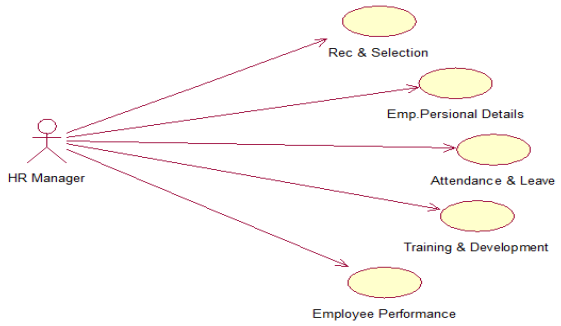


Figure 2.1:Use Case Diagram for Manual system

In Recruitment and selection, if a team needs a new employee or new vacancy arises due to business expansion then relevant team leader will fill a form (Recruitment request form) and send it to HR. Then HR will analyze and send it for the approval of higher management and CEO. Then based on approval, job bidding or job posting will be followed. Then CV will be collected, short listed, Interview will be conducted and evaluated. After successful completion of the entire recruitment process, appointment

letter will be given and relevant personal documents will be collected. Figure 2.2 shows the use case diagram of the recruitment and selection of manual system.

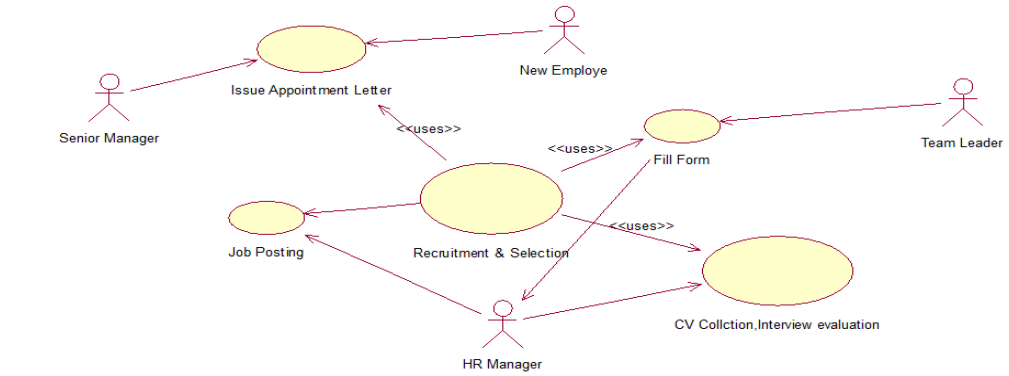


Figure 2.2:Use case Diagram for Recruitment and Selection

Employee personal data management is to maintain collected personal documents from employees in manual files for HR related purpose such as Salary, Insurance, Medical claim and performance evaluation. Figure 2.3 shows the use case diagram of the personal data management of the manual system.

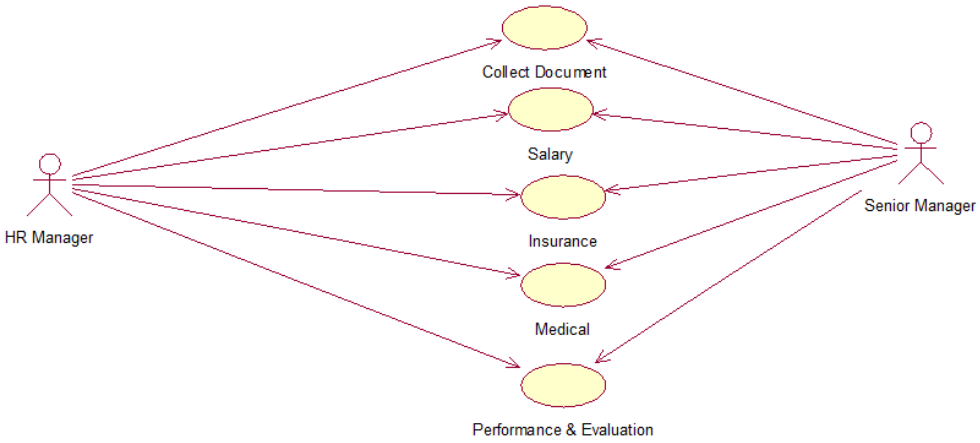


Figure 2.3:Use case Diagram for Employee Personal data Management

Presently Employees Attendance details are manually entered into MS Excel sheets and maintained. For Leaves employees need to send a leave request letter to HR approval and then it also will be maintained in MS Excel sheets. Figure 2.4 shows the use case diagram of the employee's attendance of the manual system.

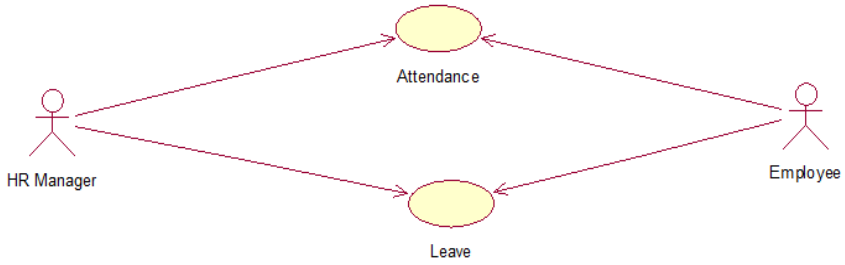


Figure 2.4:Use case Diagram for Employees Attendance

Training is given to an employee by filling TRF (Local/Foreign). TRF will be sent for request approval to HR, once it is approved, Training will be provided based on HR annual Training schedule. All these Training request forms, Feedback forms are presently maintained in manual files and MS Excel sheets. Figure 2.5 shows the use case diagram of the training module of the manual system.

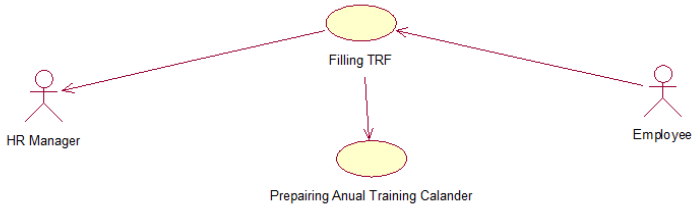


Figure 2.5:Use case Diagram for Training

For Performance evaluation employee has to fill Performance evaluation form and face to face evaluations will be conducted and corrective action such as promotion, salary increment and Training will be carried out. Figure 2.6 shows the use case diagram of the performance evaluation of the manual system.

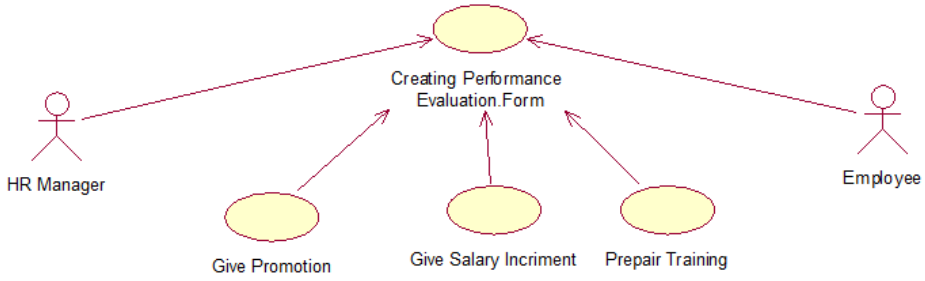


Figure 2.6:Use case Diagram for Employees Performance Evaluation

Also entire computers are connected via secure LAN and WAN networks for data transfer. But VTC does not make any use of these networking resources other than Internet/email communication.

2.2 Existing Similar Systems

Human Resource Management Systems (HRMS) also known as Human Resource Information System (HRIS) provides a single, accurate view of all human resource activities including recruiting, performance management, training and development and also compensation. HRMS reduces the workload of the HR department as well as increasing the efficiency of the department by standardizing human resource processes. HR department plays an important role in the smooth running of the company by tracking and analyzing the time keeping and work patterns of the workforce. There are wide ranges of applications available to help human resource department in their tasks, making possible the automation of certain tasks and helping in the organization many other tasks.

Oracle's PeopleSoft Enterprise Human Resources delivers comprehensive HR capabilities, from workforce management to compensation and talent management. Oracle PeopleSoft has been divided into six units such as Global Core HCM, Workforce Management, Workforce Service Delivery, Integrated Talent Management and HR Analytics. Each of these six units provide certain benefits such as Benefits Administration, Payroll Interface, Payroll Interface for ADP Connection, Payroll for North America, Pension Administration, Global Payroll, Human Resources, Stock Administration, Absence Management, Time and Labor, Workforce Scheduling, Directory Interface, eBenefits, ePay, eProfile, eProfile Manager Desktop, Fusion Middleware, HelpDesk for Human Resources, HRMS Portal Pack , Workforce Communications, Integrated Talent Management, Candidate Gateway , eCompensation, eCompensation Manager Desktop, eDevelopment, ePerformance, Incentive Compensation, Learning Management, Services Procurement, Talent Acquisition Manager, Tutor, User Productivity Kit (UPK) and Oracle Human Resources Analytics. Since this is a web based HRMS it will Manage HR globally on a single system of record **[2].**

The interface of the Oracle HCM Streamlining the Approvals Process with the Mass Approvals Page is depicted by Figure 2.7 below.

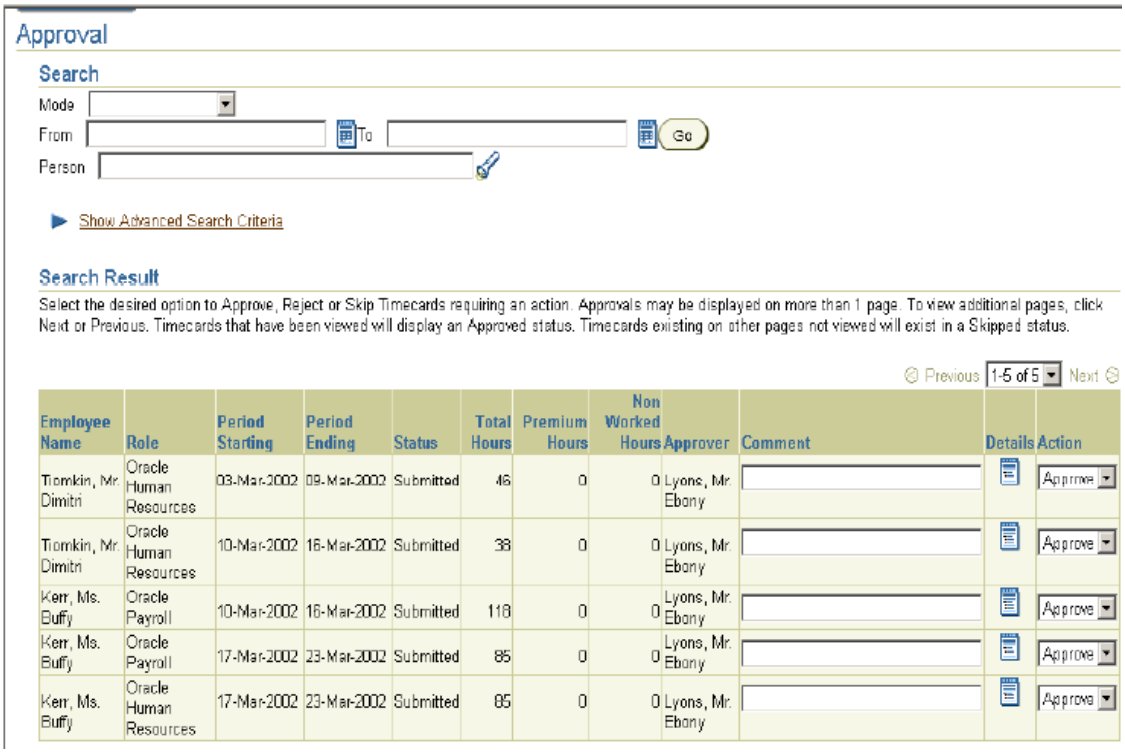


Figure 2.7: Oracle HCM Approvals Process with the Mass Approvals Page

Microsoft human resource management software solutions can help to fulfill the potential needs and increase the loyalty of workforce while minimizing the cost and complexity of administrating salaries, benefits, recruiting, and performance management. The Microsoft Dynamics suite of products, built on familiar and widely used Microsoft technologies, offers several solutions for human resource management. MS software for HRM comes in four types such as Microsoft Dynamics AX solutions for HRM, Microsoft Dynamics GP for HRM, ERP software Microsoft Dynamics NAV for human resources and Microsoft Small Business Financials. This is a windows standalone application and is designed to be more user friendlier and allows users to use the system without any user training. This provides Core human resource management administrative functionality, Payroll information, Historical data storage, Registration of benefits, Management of loans, Reports for follow-up, periodic reporting and decision support for management functionalities **[3].**

The Microsoft Human Resource Management Employee Info Screen depicted by Figure 2.8 below.

Figure 2.8 : Microsoft Human Resource Management Employee Info Screen

SAP ERP Human Capital Management (SAP ERP HCM) is a comprehensive, integrated human resources management solution that delivers unmatched global capability. SAP ERP HCM gives organizations in all industries worldwide the tools needed to manage their most important asset: people. The solution equips executives, human resources (HR) professionals, and line managers to hire the best talent, as well as train and cultivate the skills of their workforce. SAP HCM also provides same HR functionalities provided by Oracle and MS **[4].**

The SAP HCM Development Plan Screen depicted by Figure 2.9 below.

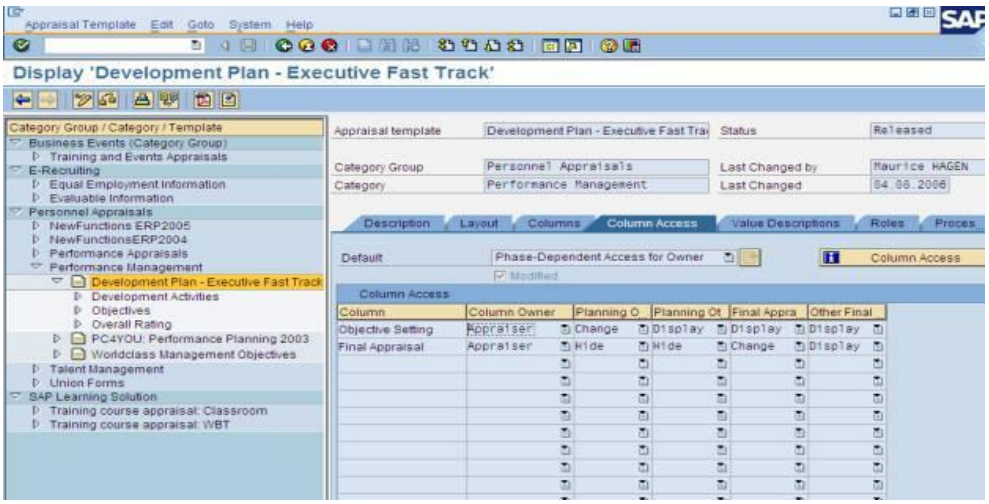


Figure 2.9: SAP HCM Development plan screen

Orange HRM offers a flexible and easy to use web based solution for small and medium sized companies free of charge. By providing modules for personnel information management, employee self-service, leave, time & attendance, benefits and recruitment, companies are able to manage the crucial organization asset – people. The combination of these modules into one application assures the perfect platform for re-engineering and aligning HR processes along with the organizational goals. OrangeHRM modules are Admin Module, Personal Information Module, Employee Self Service, Report Module, Leave Module, Time and Attendance Module, Benefit Module and Recruitment Module **[5].**

The OrangeHRM Company Info Screen depicted by Figure 2.10 below.

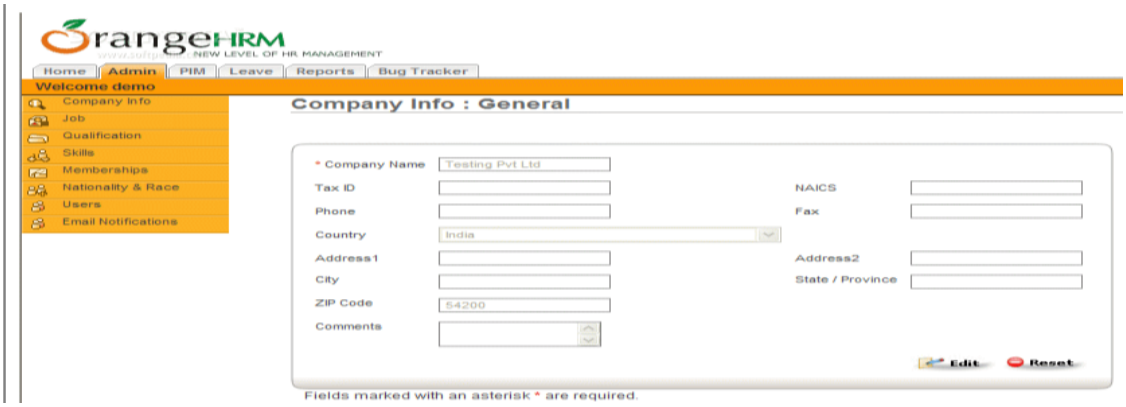


Figure 2.10: OrangeHRM Company Info Screen

2.3 The Proposed System

The proposed system is to replace all current manual activities with a computer system pertaining to the HR process of Recruitment and Selection, Employee personal data management, Attendance and Leave, Training and Development and Employee Performance management. Proposed system addresses the weaknesses of the manual system and tries to correct them. The system will also improve the efficiency and effectiveness of existing processes presently followed.

To document on what exactly the system would provide, a thorough analysis of the manual system is required. The exact functionality of the system is identified after the requirements analysis process. Additionally the system is to provide better security by implementing its security policies. The system would also help the management for decision making by providing information through various management reports and also, the system will be developed in such a way that scalability and maintainability would not be a problem. I.e. existing code should have to be changed in order to provide additional functionality. Hence, the system is to be developed in such a manner that it would provide support for plugging-ins business logic and user interface components to provide the required additional functionality a web based environment provide a good support for this extendibility.

2.4 Development Areas

2.4.1 Processes

This provides an overview of common system development process models, used to guide the analysis, design, development and maintenance of information systems. There are many different methods and techniques used to direct the life cycle of a software development project and most real-world models are customized adaptations of the generic models.

VTACMS system is in a medium complexity. The requirements are fairly stable, because it deals with straight forward business processes. The reason for this can be seen as the difficulty of documenting business processes as software engineers are unfamiliar with. It is also unfair to expect business executives and staff to be familiar with computer terminology. Hence, an iterative and incremental approach is to be followed during the implementation of the project. The rational unified process (RUP)

is an efficient methodology that provides this. Each phase is to contain one or more iterations, each iteration going through the complete System Development Life Cycle.

2.4.2 Development Methodologies

Selection of an appropriate design methodology is essential to the overall success of the system. Waterfall model, Iterative model, Spiral model and Evolutionary model are some of the major development methodologies that are available. Out of these VTACMS is developed on Iterative model.

In practice, development environment errors are introduced in almost every phase of the life cycle. These defects are usually detected much later in the life cycle. Once a defect is detected the developer needs to go back to the phase where the error got introduced and redo some of the work done during this phase and subsequent phases. Iterative waterfall model incorporates this. Because of this Iterative model has been selected as the development methodology.

There are two types of software development concepts available, which are Object Oriented and Function Oriented. VTACMS is developed on OO concepts because OO has some major advantages such as Simplicity, Modularity, Modifiability, Re-usability and Extensibility. Selected programming language of PHP also use OO concept for development.

Bottom-up approach is used for software development designing. Using the Bottom-up approach, large systems can be divided into sub-systems. This allows the software development team to get a clear idea of a system. Bottom up approach consists of Solid Business Logic, hence zero redundancy. Good Unit test case can be written to validate changes and the developer has the option to use unit testing tools to test the Logic and Easy to manage changes and modification.

Database designing is done using Relational database design. Relational model can provide more power, greater flexibility, better performance and even higher data integrity than traditional models, particularly for databases that benefit from inheritance, creative data mining, flexible class interactions or workflow constraints.

2.4.3 System Architecture

System architecture is the conceptual design that defines the structure or behavior of a system. VTACMS System Architecture divides the system into three layers such as Presentation layer where user will be, Network layer where LAN/WAN resides and

Database and Application layer with Database server, Print Server, Email server and Application server. The system diagram below Figure 2.11 depicts the idea.

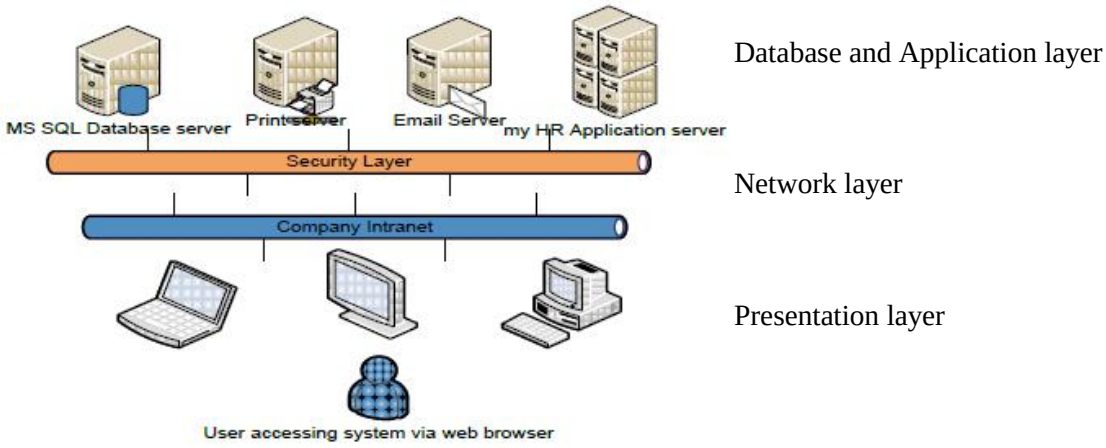


Figure 2.11: System Architecture

Advantages of three-tier architecture:

- It is easier to modify or replace any tier without affecting the other tiers.
- Separating the application and database functionality means better load balancing.
- Adequate security policies can be enforced within the server tiers without hindering the clients.

The 3 Tire System Architecture Figure 2.12 shown below.

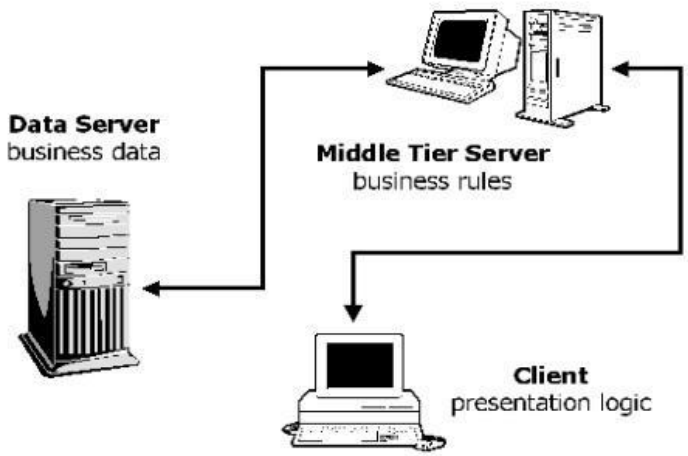


Figure 2.12 : 3 Tire System Architecture

2.4.4 User Interface and Design Patterns concerned

All the User Interface (UI) are designed in Adobe Dreamweaver CS5.There are two types of interfaces,

- Command line interface
- Graphical User Interface (GUI).

GUI has become quite popular due to the following advantages.

- They are relatively easy to use and Interactive.
- The user has multiple screens for system interaction. GUI contains windows, icons, menus, graphics or images.

2.5 Domain Knowledge

Domain knowledge is very important to build a system. Because to build a commercial system to automate it functionality, one has to have knowledge about the basic business transaction carried out by that business, functionalities, interrogators and the sequences of it. In software organization there may be business analyst who does the job exploring these areas and it is said that unlike other projects like civil engineering, Electronic engineering. The software engineering projects are most of the time one off project. Knowledge gained on a project would not be applicable as it is on another software engineering project and even on a two same type of models the problem domain may defer. Because of the above mentioned facts analysis have to do a proper analysis to have better knowledge about the system going to build. Then able to gather data about the system and do a good design.

2.6 Gathering Requirements

Three types of fact finding technique used to collect and know the exact business process and the requirement of VTC.

- Interviews: Interview fact finding carried out by meeting and interview required staff member who directly involved in the particular business process and having clear in and out knowledge about the system flow.

- Questionnaires: This involve serious set of questions which given to staff to fill and get a knowledge about the existing system and the system, client expect from the developer. These Questionnaires contain questions about both existing system and future modification on system.

- Observation: This done by visiting to client place regularly and observe how their interacting with the other systems, what is the business process etc.

- Record inspections or reviews: Analysis of documents and reports, collecting and inspecting client presently using forms, Applications, Excel equations and calculation used during the Record inspections or reviews Fact Finding Techniques

2.6.1 Functional Requirements

- System Home page
    - System home page display only User Login form and help option.
    - System identifies correct user group type and direct to appropriate pages with given user privileges.
- User Login
    - System has three user login categories such as HR Admin, Manager and Employee.
    - All employees of the VTC have a user login.
    - Login user name will be same as employee email user name.
    - Default password will be NIC No and employee able to change their password whenever their need.
    - If „Incorrect User name or Password‟ message appears, than user need contact HR Admin to reset password.
    - There is an accurate validate for user name and password.
    - Successful user login will show welcome message and direct to employee home page based on their user category.
- Employee home page
    - View the entire menu which employee accessible for the category, other menu options should be disabled or not view.

    - Employee Home page display VTC notice board, summary of employee attendance and leave details, Training details, Meetings and other related quick info details in a summary.
- Recruitment menu
    - This menu provide the option to publish vacancy details for internal staff, allow staff to upload CV with limited size capacity in a doc/pdf format, Evaluate CV, schedule interview with selected candidate, View candidate marks and finally after finalization send appointment details to candidate.
- Employee data management menu
    - This for maintain all employee personal information which collected from employee.
    - Allow employee to edit their personal information by getting approval from relevant authorizer.
- Attendance and Leave menu
    - Allow HR Admin define leave rule.
    - Allow employees to view Attendance and leave details, Request for leave, Select a leave covering person and leave alerts.
    - Allow Managers can approve subordinates leave.
- Training menu
    - HR Admin publishes Training details.
    - Employee to request training.
    - Manager to approve training, view employee feedback and comments.
- Performance Management menu
    - HR Admin will define performance objectives.
    - Manager should be able to evaluate subordinate performance.
    - Allow staff comment or give feedback on evaluation.
    - Allow HR admin to follow corrective action.

2.6.2 Non Functional Requirements

- Performance

  Since this is a web based system performance plays a major role. System should load with minimal time to web browser and have very low response time for user request, Reports generation need to take very less time.

In order to achieve above performance requirement system has used certain techniques such as avoid unnecessary images, used compressed jpeg image formats. Performance time is calculated by how long system takes to generate a form with simple set of text box and buttons for best time, how long it takes to load a form with complex Grid view and other crystal report viewer for best solution.

- Maintainability

  Facility to modify and update system if there is a new requirement or new type of issue identified or future enhancement. Suppose if there is a new programmer he should be able to understand system structure and technique used.

  To satisfy this task for each and every module and function included a detail comments on API as well as backend database. Also has developed a details user and system documentation with appropriate screenshots.

- Inter-operability

  This web site is capable of running any type of web browser on any type of operating system on client machine.

- Reliability

  Employees HR detail are very important and it able to maintain for years and years even after employee leave the organization. Also all the updates and calculation should be accurate and it should make the users of the system to rely on.

  System has separate back up storage to make sure the reliable, also MySQL server has developed in a way to perform commit, rollback, save-point and concurrency control.

- Portability

  Web based system run on server and it can be access from any source using correct user name and password.

- Constraints

  There are several constrains such as programming language, Database, Server and system environment constraints. Since VTC using windows 2008 server therefore free to use any Microsoft products. But the interface designing color should be in VTC Blue color.

2.7 Modeling the Gathered Requirements

Modeling the requirement that has been gathered through various techniques is the task that has been carried here. These sets of models would then be refined iteratively, updating code to reflect the changes.

2.8 Success Factors for Project

- Maintain proper communication with client and understand what client exact requirement.
- Achieve the client requirement within given time frame.
- Implement an error free real-time system with good performance, user-friendly, security and scalability within the given time period.

CHAPTER 03- DESIGN

Design focuses on laying out a method of solution for what have been analyzed in the analysis phase. The solution would lay out a structure as to “how” the intended requirements can be satisfied.

3.1 Alternate Solutions Evaluation

After successful completion of Feasibility study, Requirement Analysis and designing task will continue, and then need to find a solution to perform coding, Testing and Implementation tasks.

Before start coding need to decide whether to build windows based standalone application or web based application using client server architecture. Since this a Center Management System and all employees of the company need access to the system. Based on the feasibility study done web based application using client server architecture is selected because,

- High Availability - If all employees need access to the system there should be a high availability, web based system provide high availability then windows application.
- Easy to maintain - During the software development life cycle maintain is the task which takes more time, in client server architecture maintains is very easy because configurations and implementations need to be done only in the server, not to do each and every client computer.
- Low cost - In client server only server need to be a high powerful computer, due to this it can be implemented with low cost.
- Portability - Web based system are very easy to access from anywhere via network.
- Centralization - access, resources, and data security are controlled through the server.
- Scalability - any element can be upgraded when needed.
- Flexibility - new technology can be easily integrated into the system.
- Interoperability - all components (clients, network, and servers) work together.

Once the Architecture is selected then need to select the programming language, IDE and database to be used to develop the system. Since this is one year project with limited time constrain it is need to think about the language which developer familiar and which support for Rapid development technology with client satisfaction. Based on the detail analysis done is selected PHP as web technology with and My SQL selected as backend database.

3.2 Selected Solution Description and Justification

The system architecture for the proposed system is based on the popular 3-Tier Architecture used in most web based systems. The User Interface Layer is used to provide the end user a platform independent interface to work with the system. It basically consists of the web browser and a firewall/proxy for enhanced security.

The business Layer is where the entire business logic is defined and implemented. System processes are done in this layer. User requests are captured and handled in a way that the requests are sent to the database server (sometimes via Web Services when different databases are used) and queried for the desired output. PHP Hypertext Preprocessor is used to manipulate this layer. This layer consists of a web/application server.

The backend or the Data Layer stores, administrates and manages the data used in the entire system. Query requests from the business layer are processed here. The popular MySQL® database management system is used here. Following diagram helps identify the idea of the architecture of this system.

3.3 Use case Diagram

The Use case diagram is used to identify the primary elements and processes that form the system. The primary elements are termed as "actors" and the processes are called "use cases". The Use case diagram shows which actors interact with each use case. A use case diagram captures the functional aspects of a system. More specifically, it captures the business processes carried out in the system. Also Use case diagrams define the requirements of the system being modeled and hence are used to write test scripts for the modeled system**[6].**

3.3.1 Use case notations

- **Actors**: An actor shown below in Figure 3.1, any entity (or an entity) that performs certain roles in a given system. An actor in a use case diagram interacts with a use case. E.g. : HR Admin, Manager and Employee

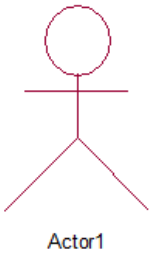


Figure 3.1: Actor

- **Use Case:** A use case shown below in Figure 3.2, in a use case diagram is a visual representation of distinct business functionality in a system. A use case is shown as an ellipse in a use case diagram. E.g.: Create Login, Request Employee, View attendance etc...

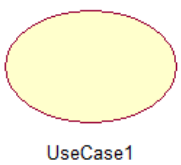


Figure 3.2: Use case

3.3.2 Higher/Top level Use case Diagram (Role based)

VTACMS system users are categorized into three main roles such as HR Admin, Manager and Employee. HR Admin is the user with highest privilege also it consist privileges of other two users. In Manager and Employee users, Employee the very low level user with limited system access privileges.

There are six main modules such as Login, Data Management, Recruitment, Attendance, Training and Performance Management. Each Module has it unique functionalities for different level of users. Also arrange in a proper sequence of data flow. Each module will be discussed detail in following sub chapters.

The Use case diagram by Figure 3.3 below depicted the idea.

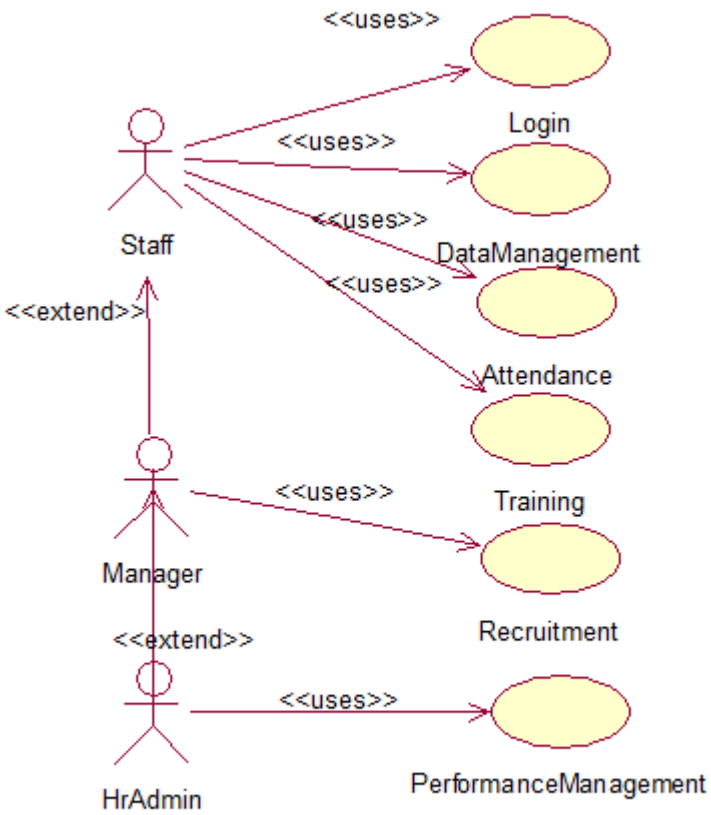


Figure 3.3: Use case Role Based

3.3.3 Use case Diagram – Login Module

Login module is the gateway to the system. For each and every employee a user login will be created by HR Admin with different user groups. Once User Login is created employee can access to the system with user name and password. Then system will maintain a history of user login for security purpose. After successful login to the system, system allows user to changed password, reset password and changed privileges. The Use case diagram for Login Module is shown in Figure 3.4 below.

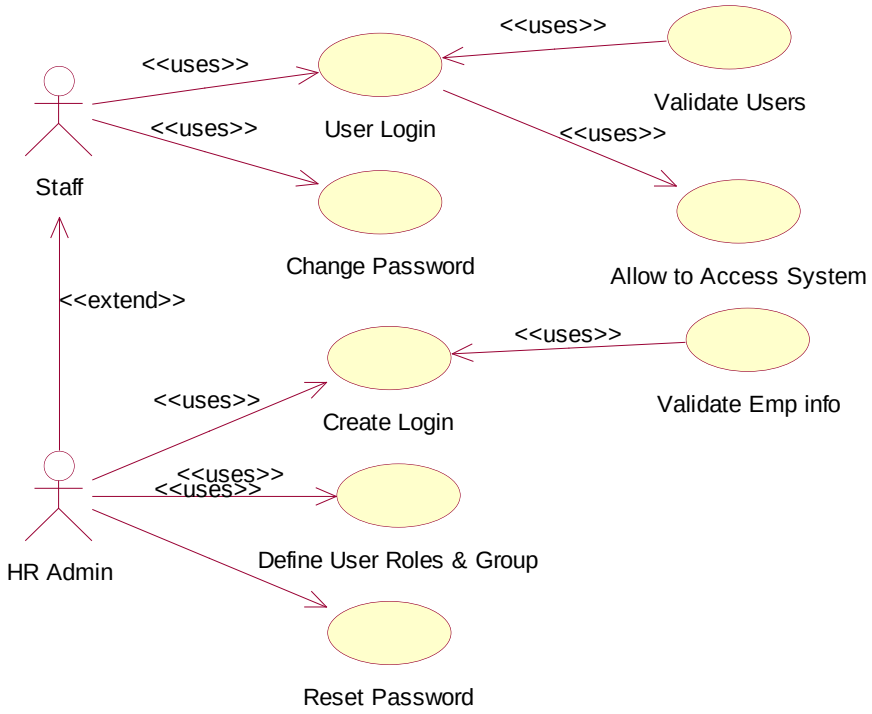


Figure 3.4: Use case Login Module

3.3.4 Use case Diagram – Recruitment Module

Recruitment module contains all the process from new employee request to employee confirmation. New employee request will be sent by divisional head to his superior once superior approves it goes HR after HR approvals based on the company need vacancy will be Bided or posted on intranet.

Then HR will collect CV and perform Interview and evaluation. Once recruit success in evaluation based on VC approval and Appointment Letter will be given and relevant personal documents will be collected. The Use case diagram for Recruitment Module is shown in Figure 3.5 below.

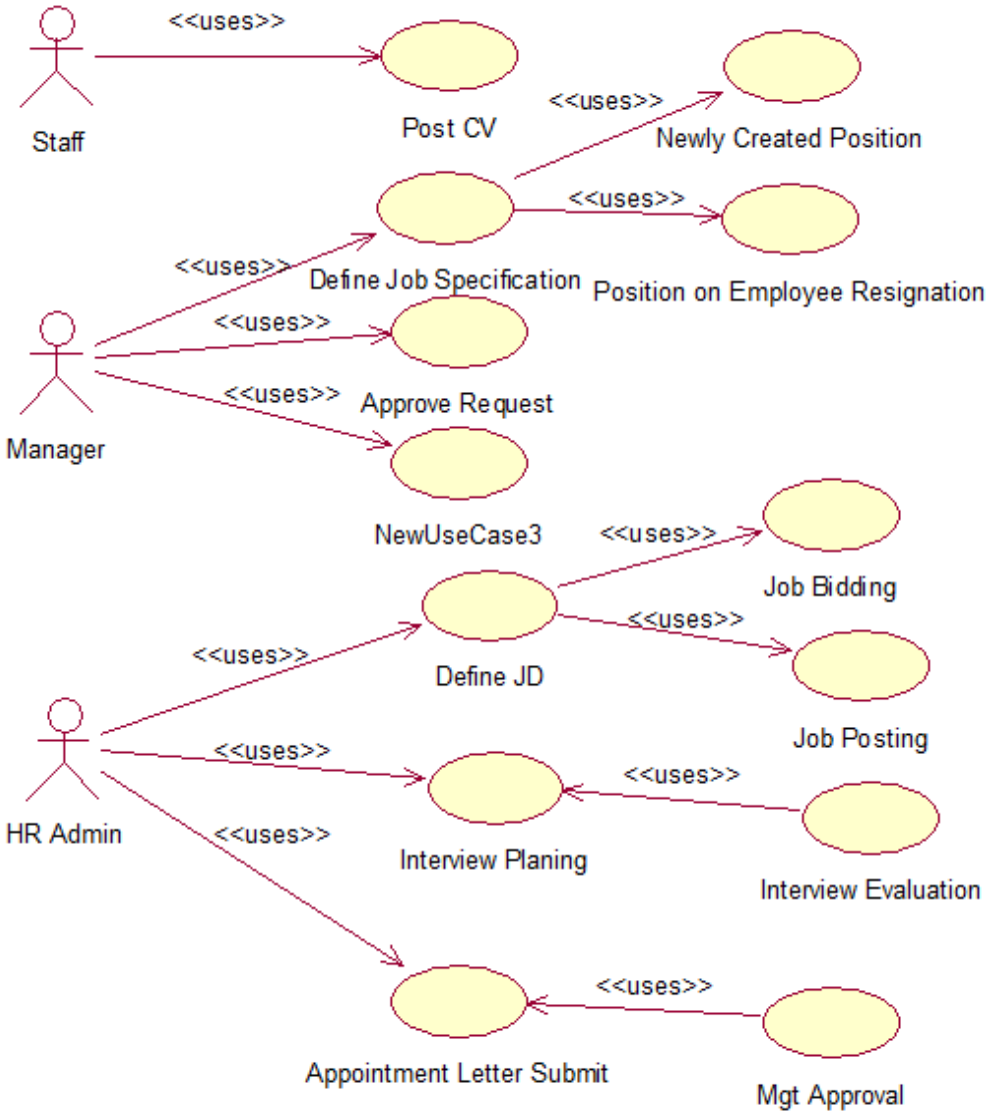


Figure 3.5: Use case Recruitment Module

3.3.5 Use case Diagram – Data Management Module

Data Management Module will collect all employee personal details and maintain. Also this module has the functionalities of report generation based on Management

requirement. The Use case diagram for Data Management Module is shown in Figure 3.6 below.

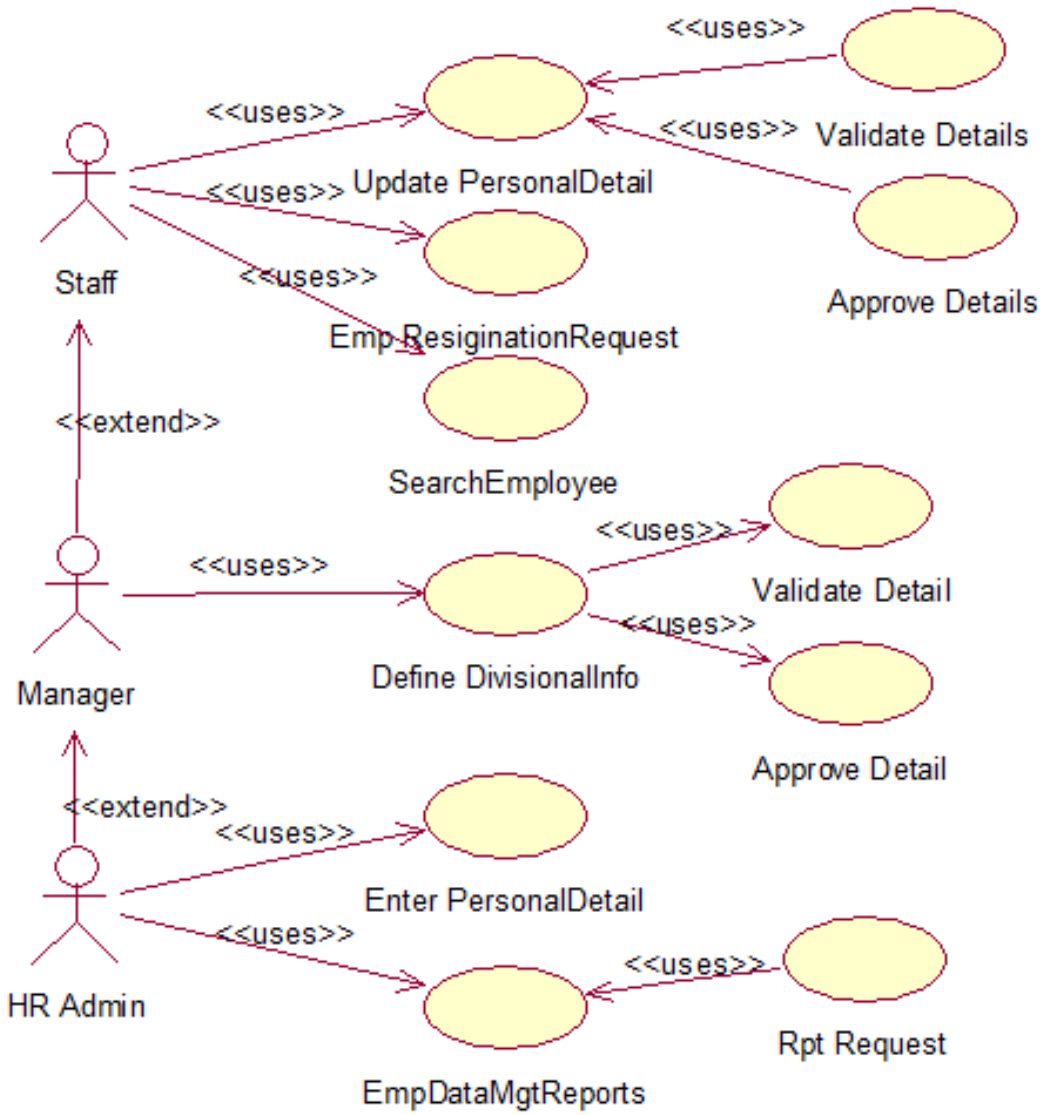


Figure 3.6: Use case Data Management Module

3.3.6 Use case Diagram – Attendance and Leave Module

Attendance and Leave module is to maintain all employees daily attendance info and leave their have taken during the particular period. The Use case diagram for Attendance Module is shown in Figure 3.7 below.

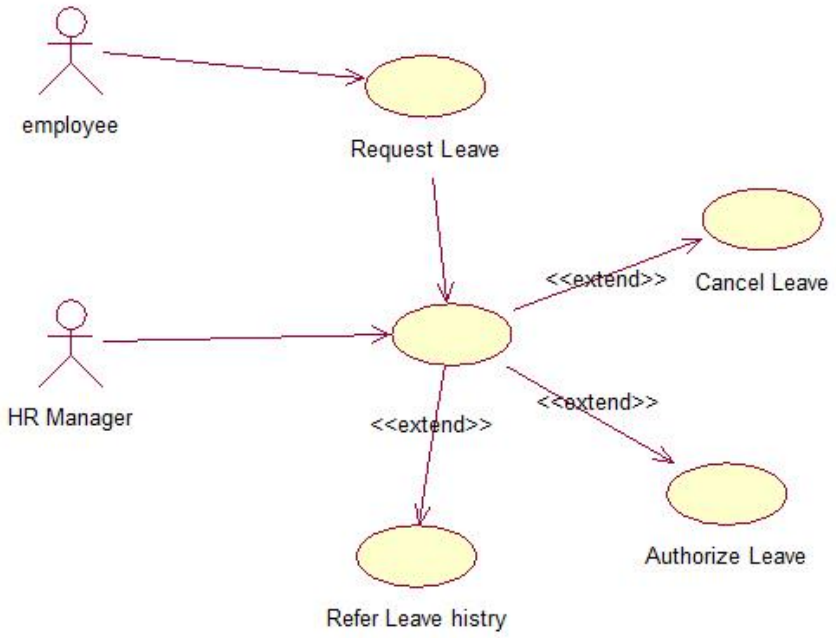


Figure 3.7: Use case Attendance Module

3.3.7 Use case Diagram – Training Module

Training module consist all Local and Foreign training request, feedback and budget information. The Use case Training Module is shown in Figure 3.8 below.

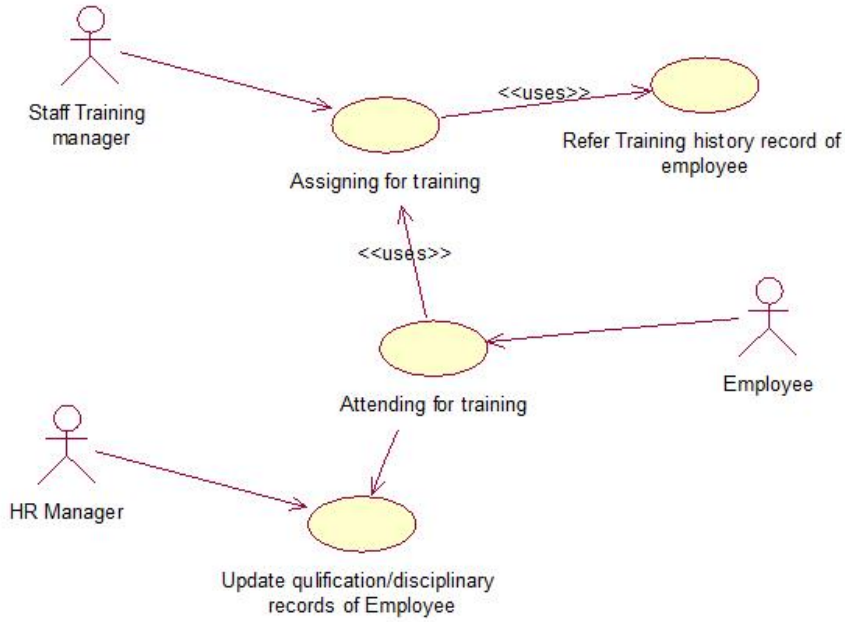


Figure 3.8: Use case Training Module

3.3.8 Use case Diagram – Performance Management Module

Performance is the final module, it get the output from other modules such as Attendance, Leave, Training and Evaluation and calculate employee performance based on that it perform corrective actions. The Use case diagram for Performance Module is shown in Figure 3.9 below.

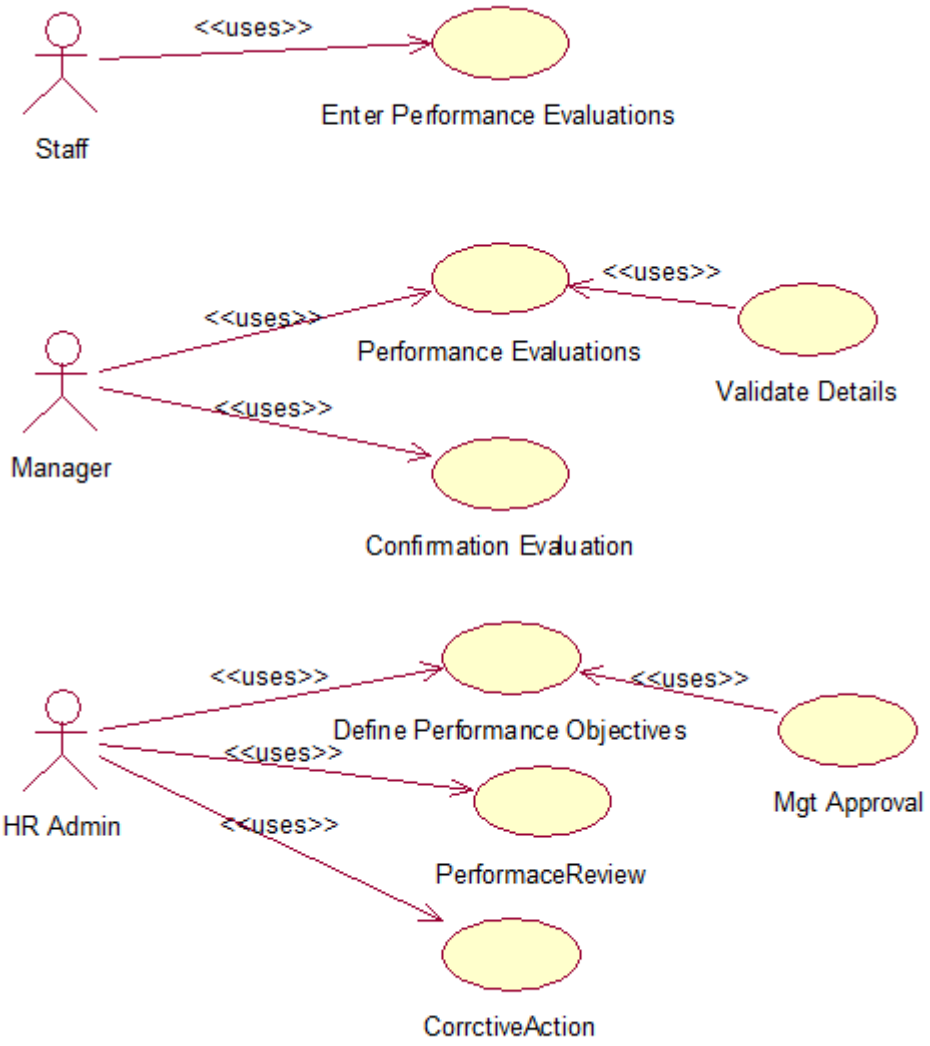


Figure 3.9: Use case Performance Management Module

3.3.9 Use case Description

Following Table 3.1 shows Use case description.

Activity	**Description of VTACMS system**
Pre condition	Able to access system online, users is an employee of the company and have valid user name and password.
Main flow	The use case begins once HR Admin creates a login for user. Then user will login to the system using his user name and password via Login form. System will do required validation once it got success system will direct employees to home page else it pop-up error message. After successful login user allow to changing his password and system will maintain a login history. If the user in Manager or HR Admin group then user can access recruitment module where user can request for new recruitment and interview and approval appointment operation can be performed. In data management module employees allows updating their personal information. For Manager or HR Admin categories users allows generating custom reports. From Attendance employee allows to view their attendance info which updated by HR Admin. Leave and Training modules is to request, approve and view employee details. Performance module is to evaluate employee performance and perform corrective actions.
Sub flow	Validate – will do validation for user login, Employee Attendance, leave, Training and Performance evaluation Approval – is get approval from relevant management level employee in order continuing.
Alternative flow	Without following a proper sequence employees can get approvals when higher level management approves.
Post condition	All relevant data are updated and save on database for future process.

Table 3. 1: Use case Description

3.4 Sequence Diagram

A Sequence diagram, Figure 3.13 depicts the sequence of actions that occur in a system. The invocation of methods in each object and the order in which the invocation occurs is captured in a Sequence diagram. A sequence diagram is made up of objects and messages.

- **Object** (Refer Figure 3.10)**:** The primary element involved in a sequence diagram. Object is an instance of a class. An object is represented by a named rectangle. The name to the left of the ":" is the object name and to its right is the class name.
- **Message** (Refer Figure 3.12)**:** The interaction between different objects in a sequence diagram is represented as messages. A message is denoted by a directed arrow. Depending on the type of message, the notation differs.
- **Lifelines** (Refer Figure 3.11)**:** When drawing a sequence diagram, lifeline notation elements are placed across the top of the diagram.

Lifelines represent either roles or object instances that participate in the sequence being modeled**[7**].

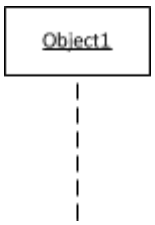


Figure 3.10: Object

Figure 3.12 : Message

Figure 3.11: Lifelines

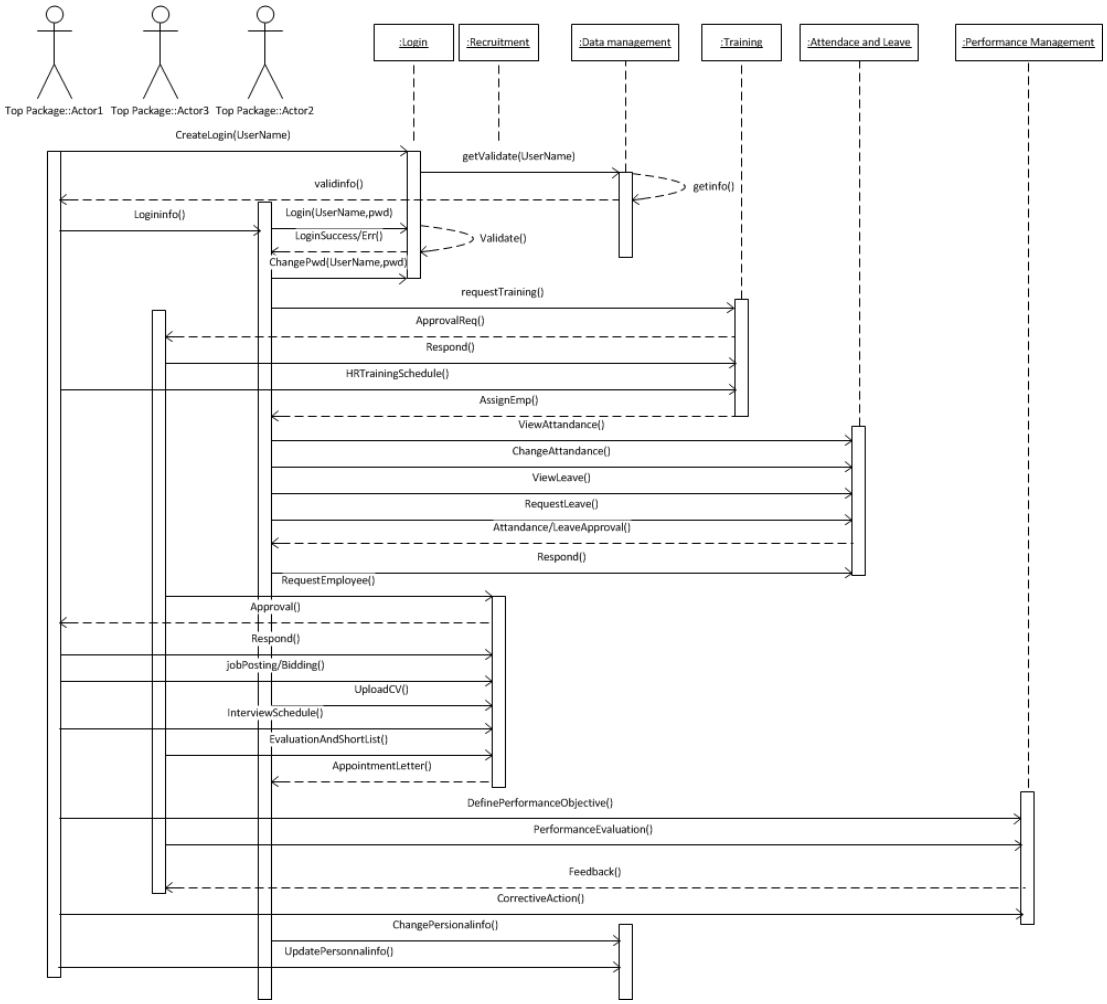


Figure 3.13: Sequence Diagram

3.5 Class Diagram

Class diagrams are the mainstay of object-oriented analysis and design. Class diagrams show the classes of the system, their interrelationships (including inheritance, aggregation, and association), and the operations and attributes of the classes. Class diagrams are used for a wide variety of purposes, including both conceptual/domain modeling and detailed design modeling. The Class Diagram is shown in Figure 3.18 below.

- **Class**(Refer Figure 3.14) An object is any person, place, thing, concept, event, screen, or report applicable to system. Objects both do have attributes and methods. A class is a representation of an object. E.g.: User, Company, Division.

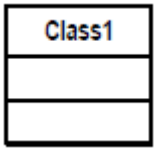


Figure 3.14: Class

Associations: Objects are often associated with, or related to, other objects. When one model associations in UML class diagrams**[8].**

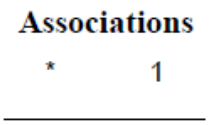


Figure 3.16 Association

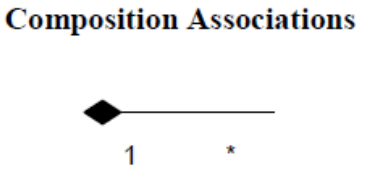


Figure 3.17 Composite Association

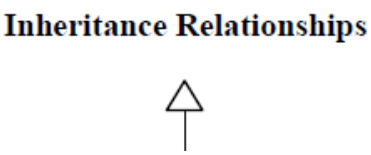


Figure 3.15 Inheritance Relationship

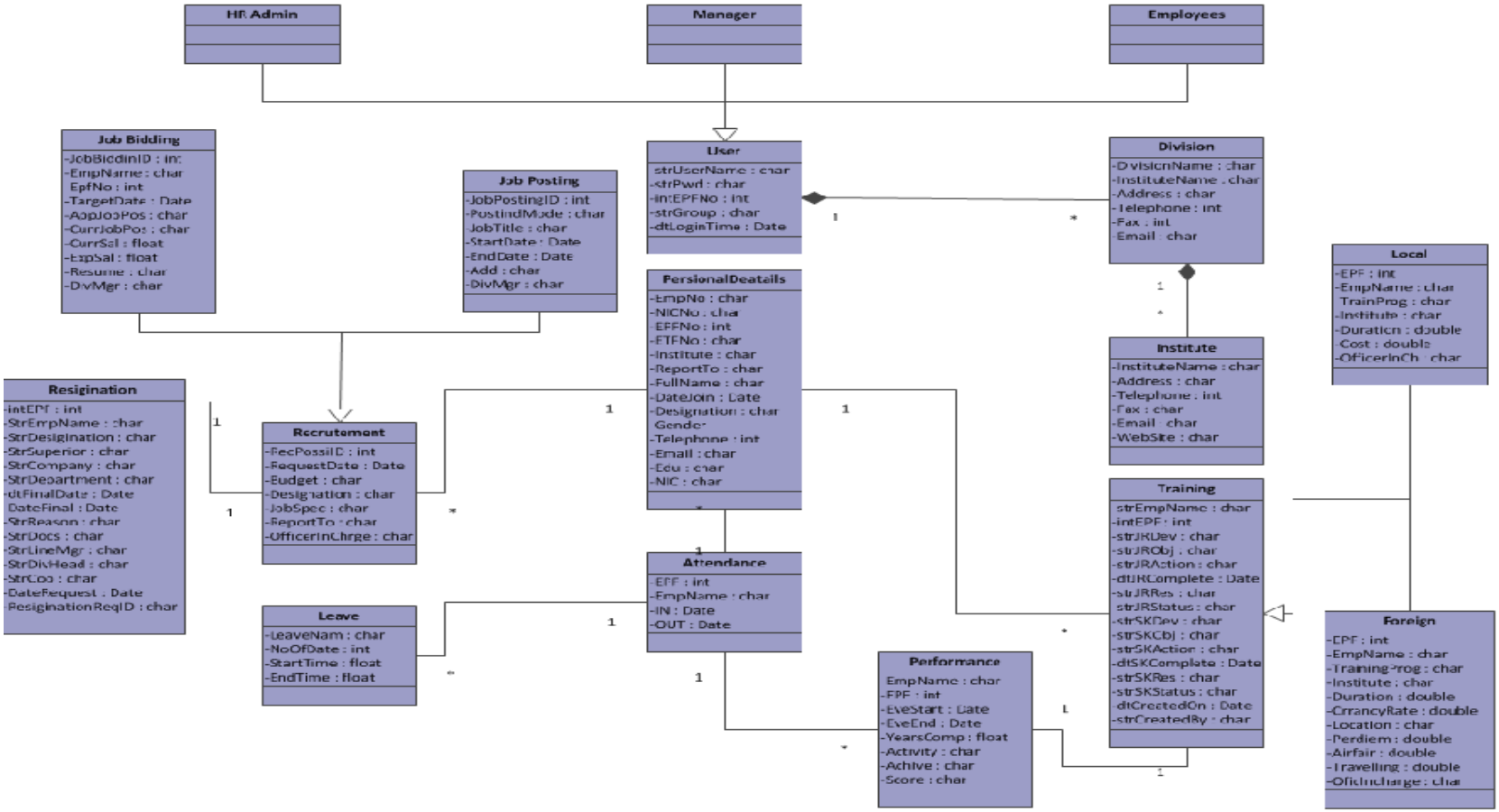


Figure 3.18: Class Diagram

3.6 Database Design

A business is highly depends on data. Selection of appropriate database design on correct database is very important. When selecting a database design points to be consider,

- Data storage needs having been met.
- Data is readily available to the end-user.
- Data being protected through database security.
- Data being accurate and easy to manage.
- Overall database performance being acceptable.
- Having a minimized amount of redundant data stored.

  The Database Design is shown in Figure 3.19 below.

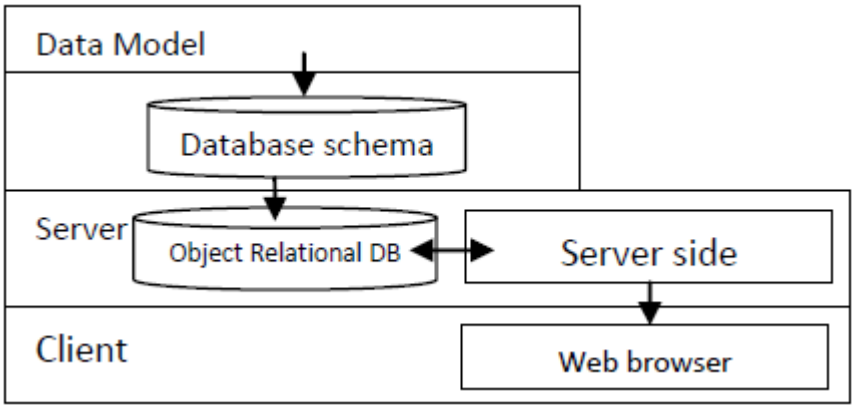


Figure 3.19: Database Design

Database Layers can be divide into,

- Presentation Layer
- Presentation logic layer
- Application logic layer
- Data manipulation layer
- Data layer

3.6.1 Designing the Business Solutions Database

Designing databases could be seen as two processes:

- Logical design
- Physical design

Logical Design

Logical modeling deals with gathering business requirements and converting those requirements into a model. The logical model revolves around the needs of the business, not the database, although the needs of the business are used to establish the needs of the database.

Physical Modeling

Physical modeling involves the actual design of a database according to the requirements that were established during logical modeling. Physical modeling deals with the conversion of the logical or business model, into a relational database model**[9].**

3.6.2 Relational Database Design

A relational database is a database that organizes its data into collections of Tables, Rows, Attributes, and Domains. Predicate logic is used to both describe the information contained in the database and to query information from it.

3.6.4 The Entity Relationship(ER) Model

Entity-Relationship (ER) diagrams, ER Mapping are used to illustrate the design of database. Figure 3.20 shows the ER Diagram of the Job Posting & Leave Management

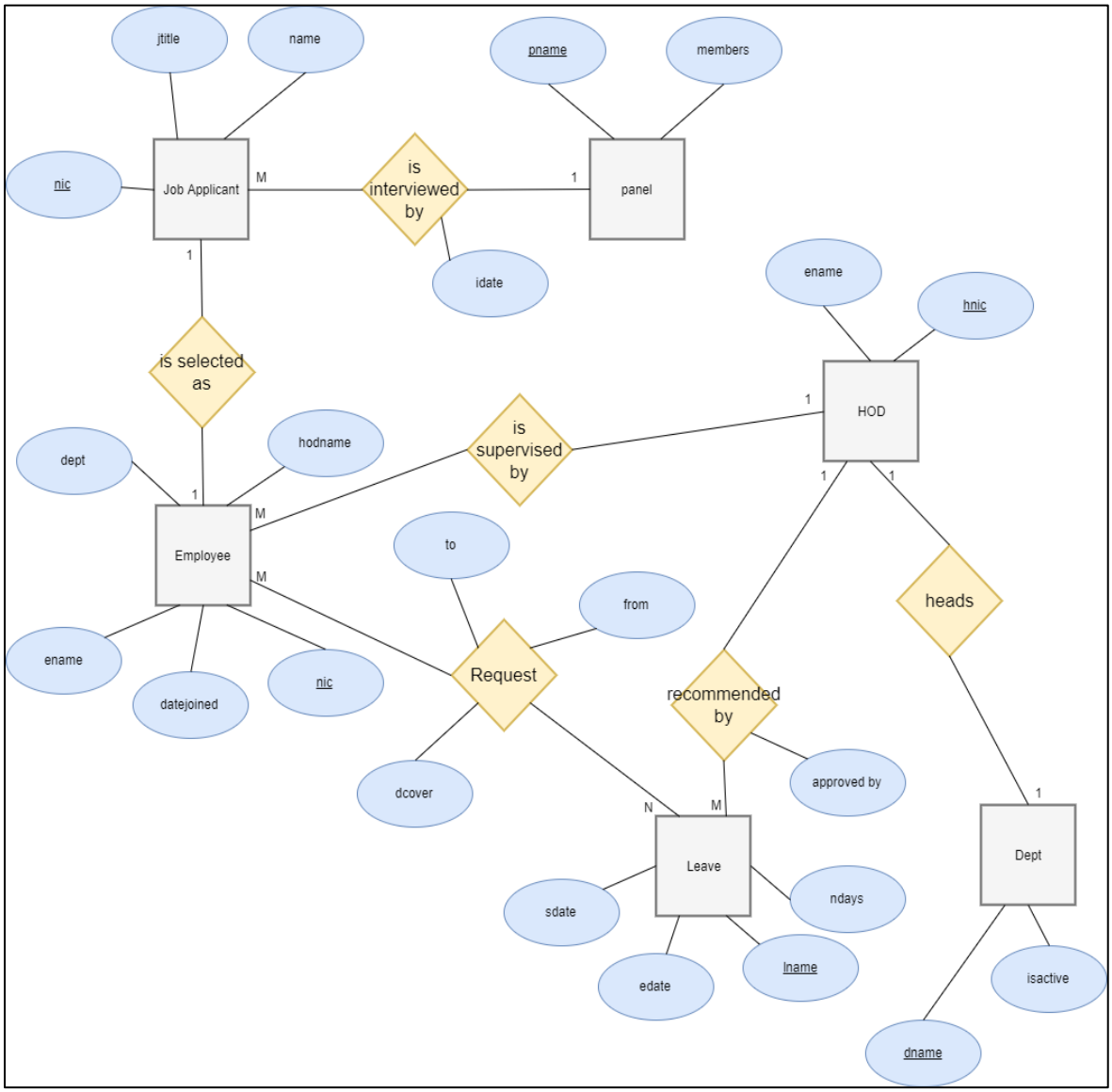


Figure 3.20:ER Diagram for Job Posting & Leave Management

Figure 3.21 Shows the ER Diagram of the Training Management Module

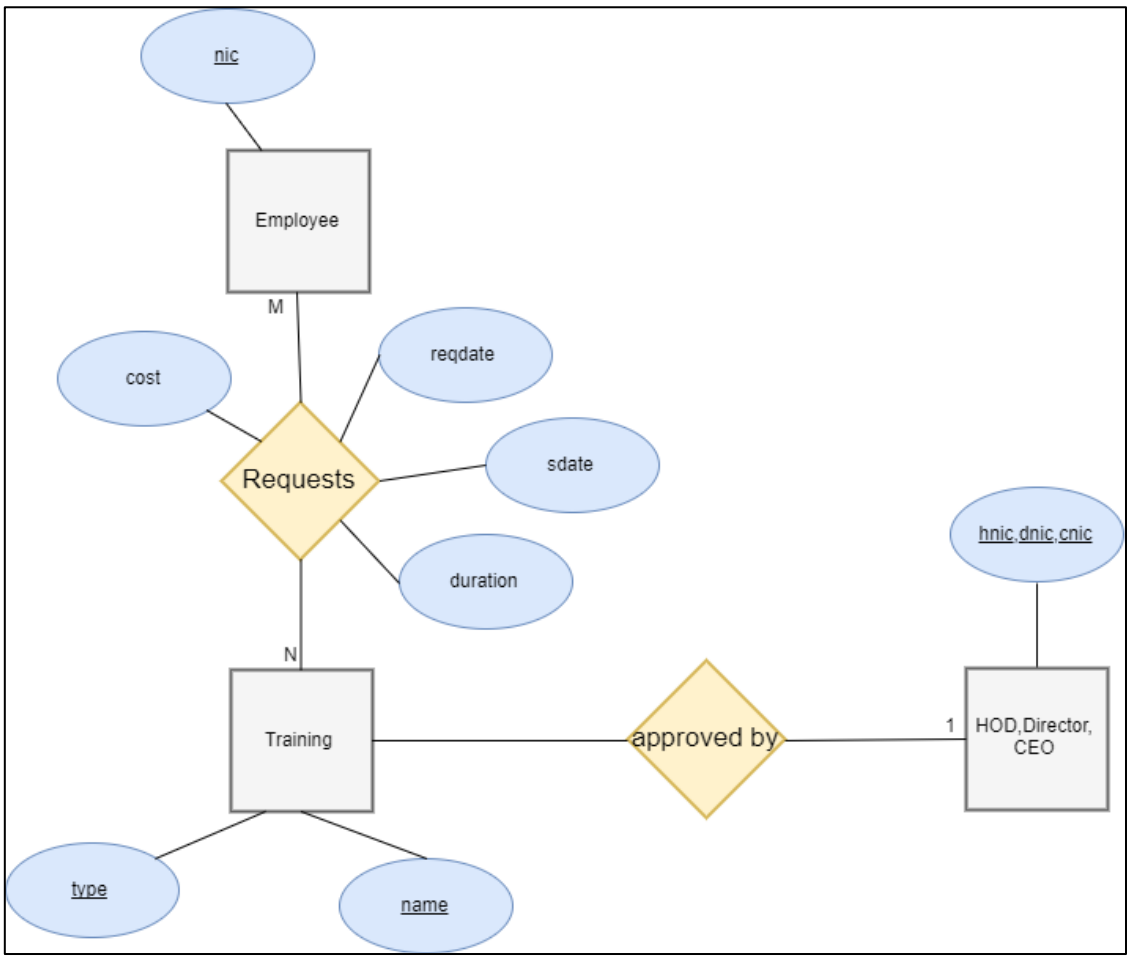


Figure 3.21:ER Diagram for Training Management Module

Figure 3.22 Shows the ER Diagram of the Performance Reviews

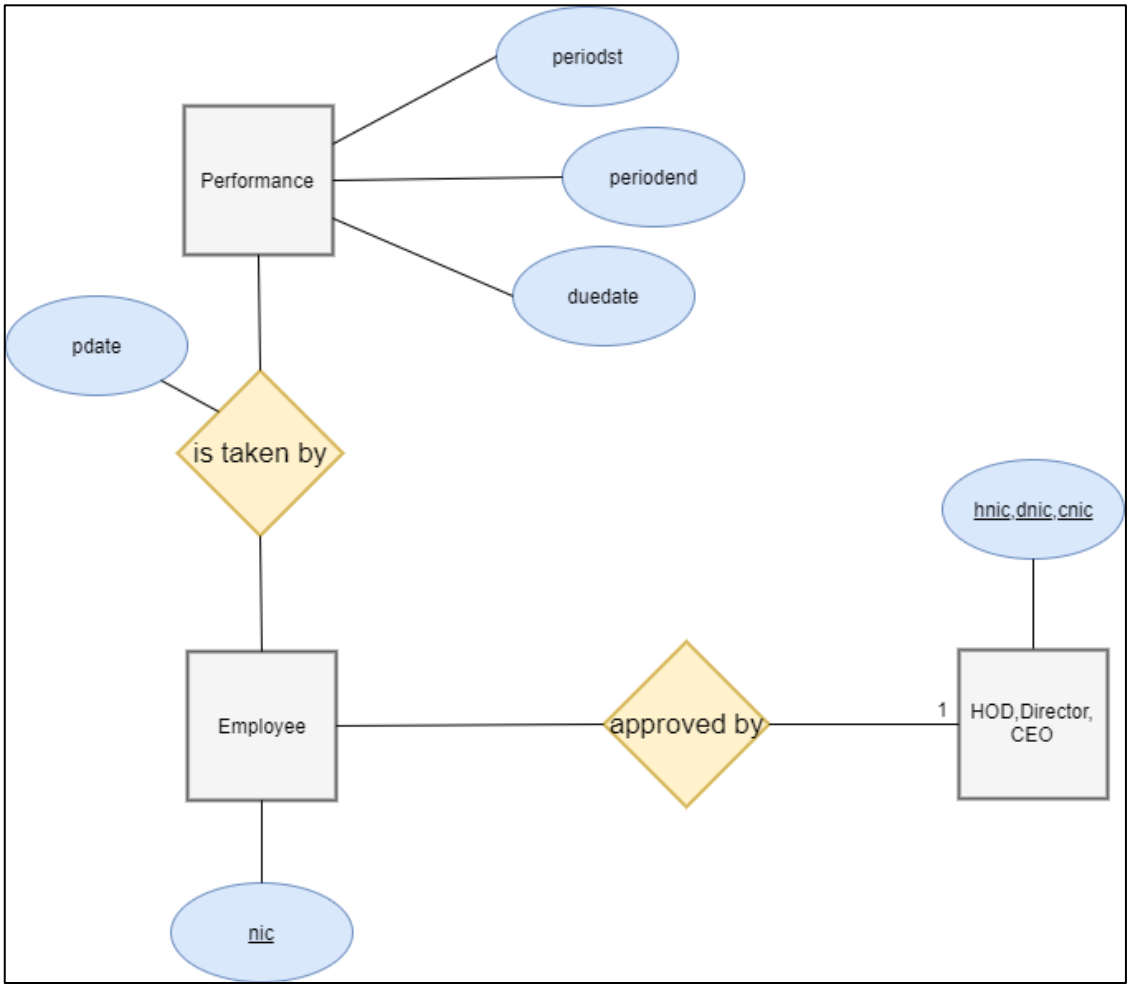


Figure 3.22:ER Diagram for Performance Reviews

3.7 Graphical User Interface – GUI

- User Login form below (Figure 3.23) is the startup window once user tries to access VTACMS by typing URL on address bar.

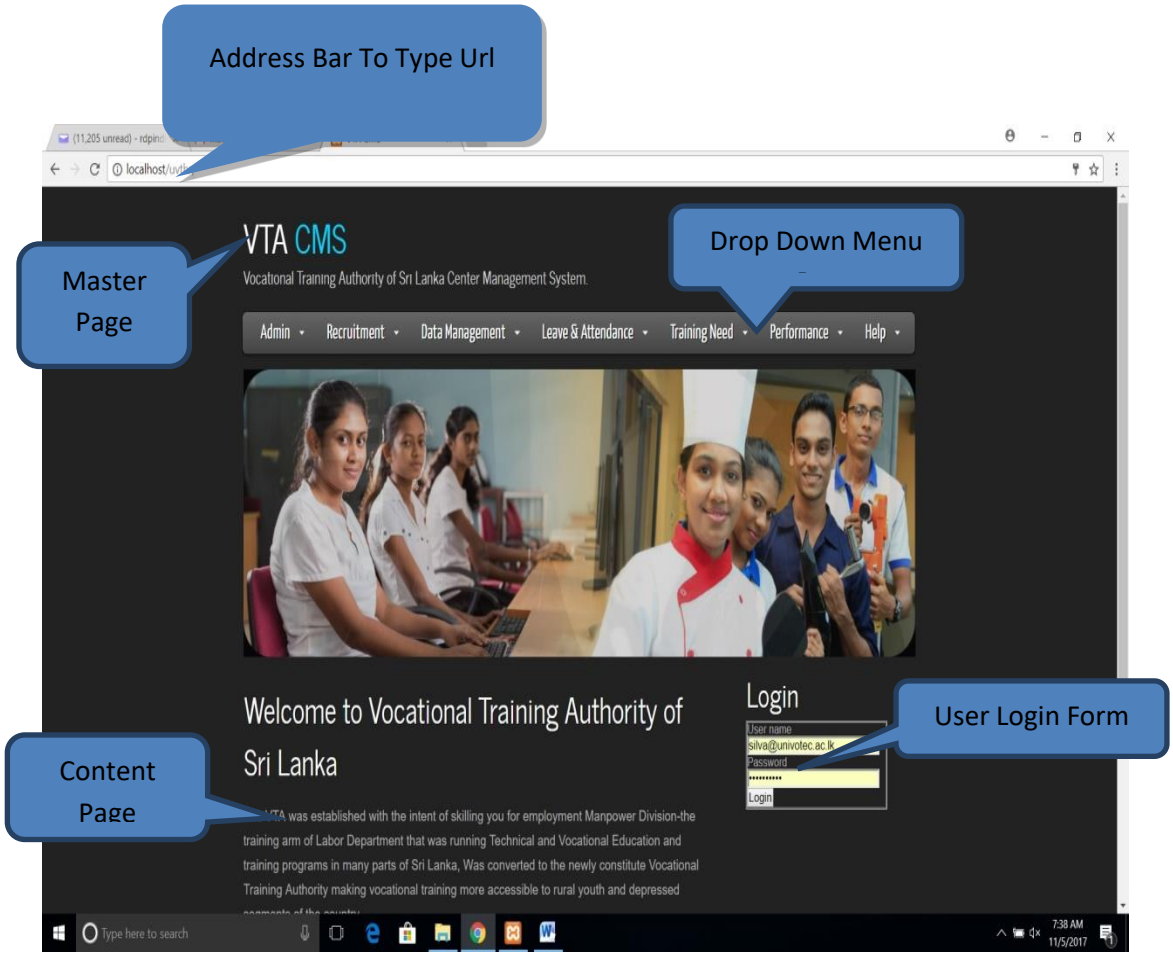


Figure 3.23: User Login form

- Some web form (Cerate/Edit/Search Company) once the user has logged in shown in Figure 3.24.

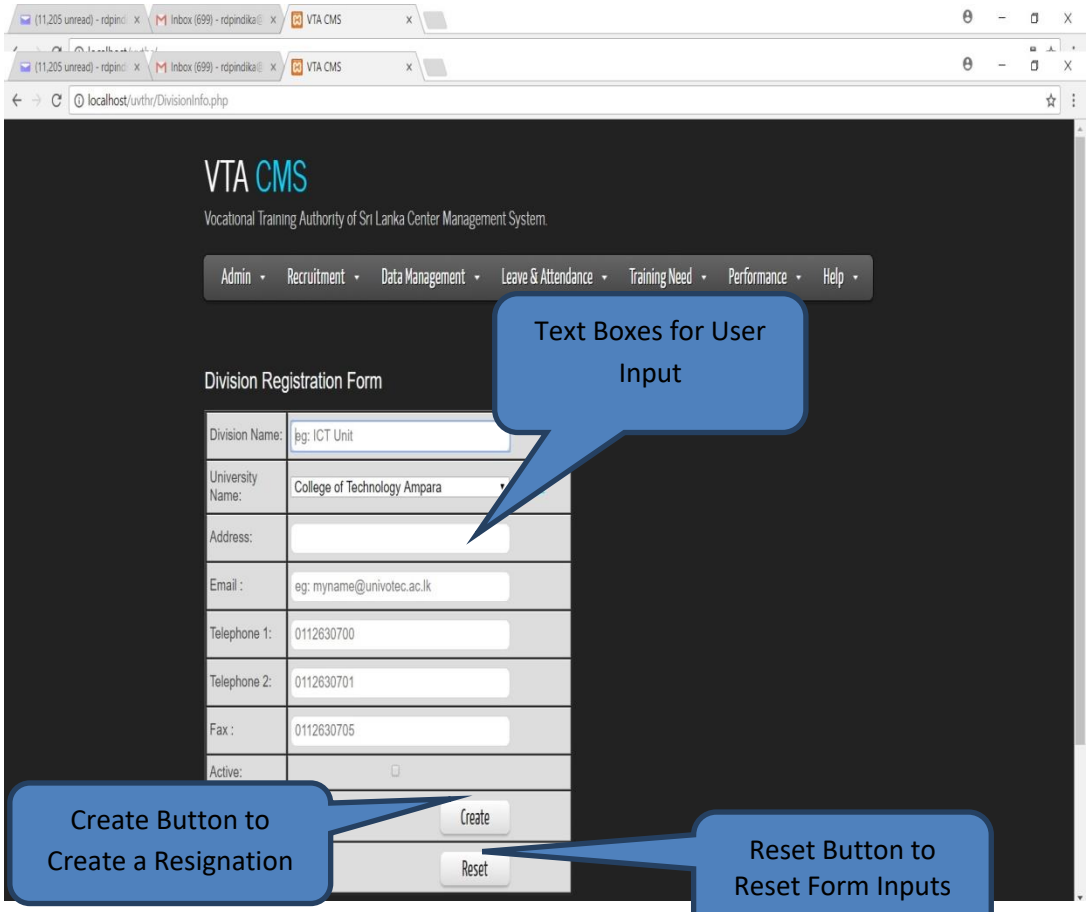


Figure 3.24: Resignation Request form

- Drop Down menu for easy form access is shown in Figure 3.25.

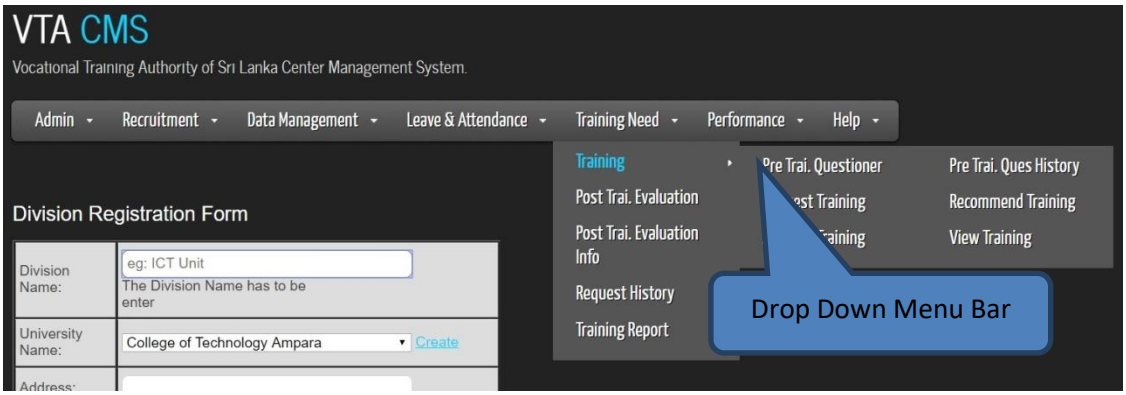


Figure 3.25: Drop Down menu

- System messages shown in Figure 3.26.

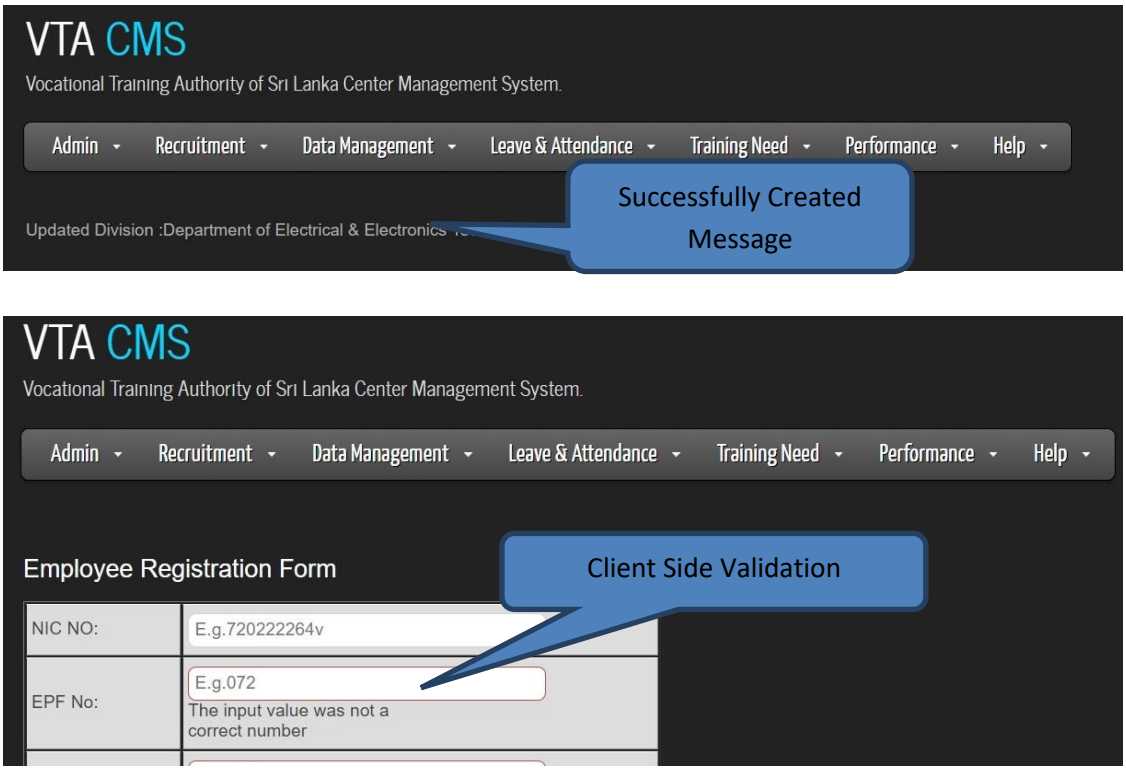


Figure 3.26: Error Messages are showed in red color

- Management Graphs and Reports is shown in Figure 3.27 and Figure 3.28.

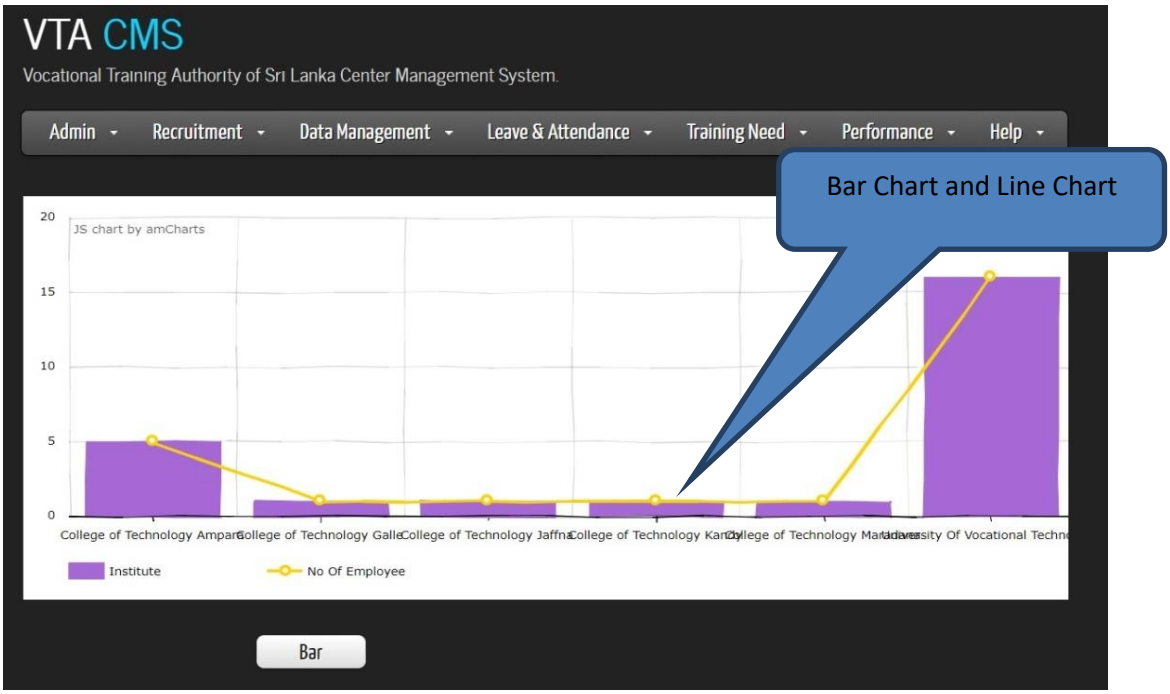


Figure 3.27: Bar chart

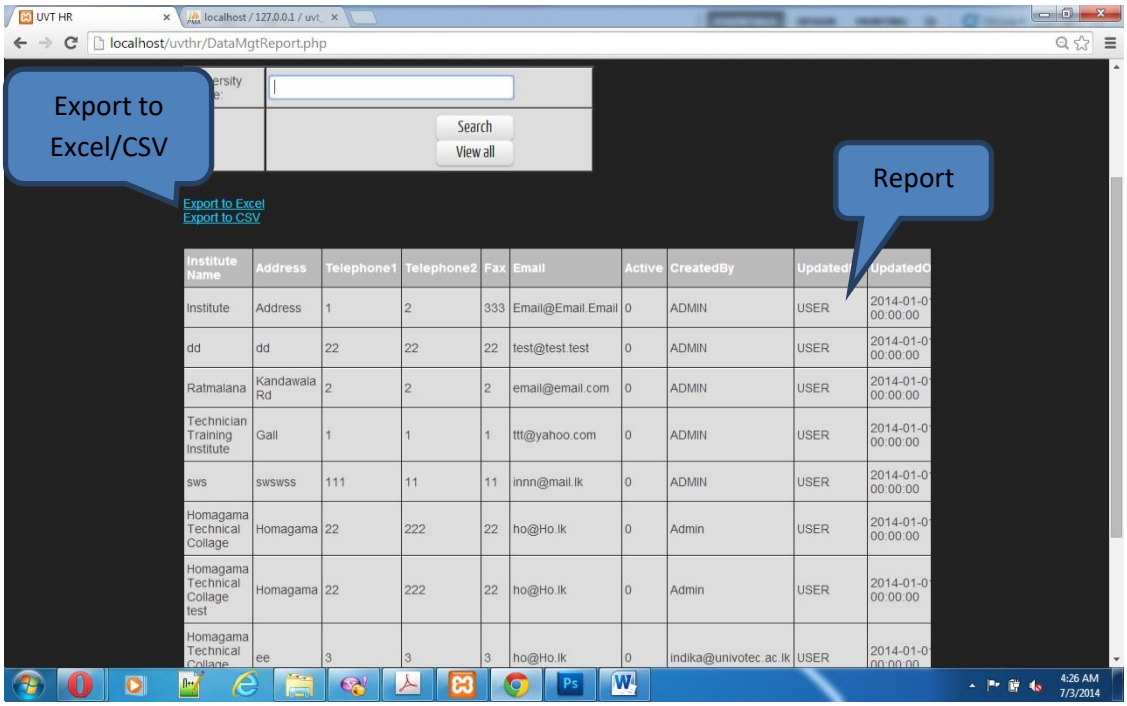


Figure 3.2 8: Management Report

CHAPTER 4 - IMPLEMENTATION

The system was implemented upon Three Tier Architecture as stated in the Design phase. One of the big advantages of the layered architecture is the use of business logic as the middle layer. Business components that are self-contained exhibit strong cohesion and loose coupling. Moreover those components, once created and handled in the middle layer, can be converted into any architecture or platform (Personal Digital Assistant, etc.) and become more portable. In addition, this greatly improves the ability to change any layer without affecting the functionality of the other layers.

The User Interface Layer is used to provide the end user a platform independent interface to work with the system. It basically runs on any standard web browser and a firewall/proxy that can be used for enhanced security. Macromedia DreamWeaver® was used as the Integrated Development Environment (IDE) to design user interfaces and as the main editor. PHP Hypertext Preprocessor was used to implement user inputs and business logic. Use of JavaScript® for client side user input validation and Macromedia Flash® and Adobe Photoshop® for image preparation were too used.

The business Layer is where the entire business logic is defined and implemented. Main classes identified and designed in analysis and design phases were implemented. An Object Oriented approach was too considered according to the analysis and design choices. Overall implementation was more Agile as it was found to be the most practical methodology for a considerably fast and more accurate implementation. One of the highlighted aspects of Agile Process is the Test Driven Design and Implementation (TDD). This process is more stakeholder-centric and allows for light traveling through the iterations. Moreover it needs Just Barely Good Enough (JBGE) approach for implementation.

Also, the user requests are captured and handled in this tier, so that the requests are sent to the database server and queried for the desired output. This layer consists of a web/application server that runs Apache® software.

The backend or the Data Layer stores, administrates and manages the data used in the entire system. Query requests from the business layer are processed here. The popular MySQL® database management system was used.

4.1 Implementation Environment

Implementation is based on Windows, Apache, MySQL and PHP (WAMP) environment. One major reason for the use of WAMP environment is its Open Source and free availability (except Windows).

4.1.1 Hardware and Software Requirements

The Backend (Database Server)

The database server is preferably an Intel Pentium® computer with the processor speed of 2.0 GHz (recommended), 2GB or higher RAM, 300GB or higher storage space depending on the company's data storage requirements. The backend is implemented with MySQL® 5.0 database management system.

The Application Server (Web Server)

It is observed that the performance of the web server is one of the most vital factors pertaining to the speed of the system. Therefore, an Intel Pentium® Core 2 Duo processor (3.0 Ghz), 2GB or higher RAM, 100GB or more free Hard disk capacity, and access to Information Superhighway at a rate of 512 kbps is recommended. It may run on Microsoft® Windows platform and Apache® 2.2 as the web server software. PHP Hypertext Preprocessor (PHP) 5.1 was used as the scripting language.

Client

All that is needed by the client side is a computer that can run any standard JavaScript enabled web browser (preferably Microsoft® Internet Explorer 8.0 or higher) and access to Information Superhighway at a minimum rate of 512kbps. Nevertheless, the more the performances of the computer and the network bandwidth, the faster the system processes as it would be.

4.1.2 Development Tools

PHP® Hypertext Preprocessor (PHP) Scripting Language [10].

Creating dynamic web pages was the main challenge of this project. The Common Gateway Interface (CGI) programming is not just limited to scripting languages.nearly any programming language can be used to write CGI programs including compiler languages like C. But PHP language owns much of popularity as a CGI scripting language, because it is easy to learn for CGI programming, very powerful and supported by numerous functions. It too supports fully Object Oriented characteristics. PHP has many positive characteristics that will make it one of the best programming languages for web applications. The intended system requires records based data processing. PHP contains extremely powerful records manipulation capabilities.

a) This system will make use of a database. PHP interface with external applications (e.g. Databases) very easily and provide its own file system functions
b) PHP is used in various platforms
c) PHP fully supports Object Oriented Programming
d) This system makes use of CGI scripts. Therefore PHP is a well-established and powerful language used in CGI environment.
e) PHP allows rapid development because it is interpreted.

MySQL® Database Server [11].

MySQL® database management system was used as the UVTHR's Data Base Management System (DBMS). It is powerful and open source!

Apache® 2.2 Web Server [12].

This is a public-domain Web server developed by a loosely-knit group of programmers. The first version of Apache, based on the NCSA httpd Web server, was developed in 1995. Because it was developed from existing NCSA code plus various patches, it was called a patchy server, hence the name Apache Server. As a result of its sophisticated features, excellent performance, Apache has became the world's most popular Web server.

4.2 Major Code and Module Structures

4.2.1 Algorithm Design

Following are some important algorithms that can be performs general tasks pertaining to the intended system.

1. Connecting to the server and the Database.
2. Login to the System.
3. Searching Institute information.
4. Inserting Data to the Database.
5. Update Data to the Database.
6. Delete Data in the Database

4.2.2 Module Structure

The module diagram showing the hierarchy of code modules used and the way they are incorporated with each other is depicted below in Figure 4.1 below.

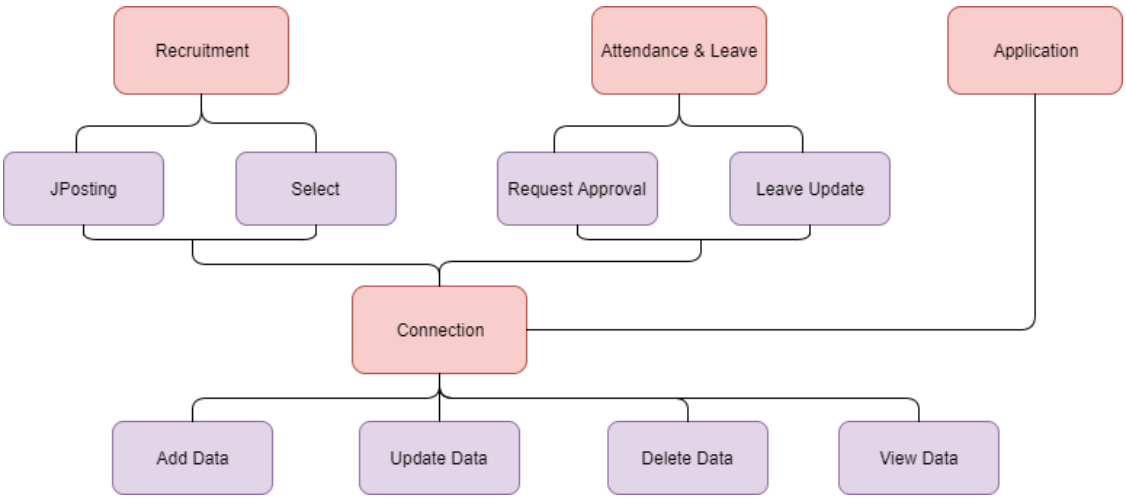


Figure 4. 1: Module Structure Diagram

4.2.3 Connecting to the server and the Database.

The following code listed in Code Listing 1 is part of the code that is written to establish a connection to the host and the database.

```
<?php
session_start();
/**
 * DATABASE CONFIGURATION
 * */
define('DB_HOST', 'localhost');
define('DB_PORT', '3306');
define('DB_NAME', 'uvt_db');
define('DB_USER', 'root');
define('DB_PASS', '');

/**
 * SITE CONFIGURATION
 * */
define('BASE_URL', 'http://localhost/uvthr');
define('LOCAL_PATH', 'D:/\xampp/\htdocs/\uvthr/\/');
define('SITE_TITLE', 'Vocational Training Centre  Human Resources
Management System.');

/**
 * SET TIMEZONE
 */
date_default_timezone_set('Asia/Colombo');
?>
```

Code Listing 1 – Connecting to the Server and the DB

4.2.4 Login to the System

Code Listing 2 shows the code used to evaluate user's login information at the login process of the system. It checks the username (first) and then the password entered with the data stored in the user table.

```
if(isset($_POST['Login']['submit']))
{
    $strUserName = $_POST['strUserName'];
    $strPwdI = $_POST['strPwd'];

    try
    {
        $conn = new PDO('mysql:host='.DB_HOST.';port='.DB_PORT.';dbname='.DB_NAME,DB_USER,DB_PASS);
        $conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);

        $sql = 'SELECT strUserName,strPwd,strGroup,intEPFNo FROM uvt_db.tbl_login where strUserName=:strUserName' ;

        $stmt = $conn->prepare($sql);
        $stmt->execute(array(':strUserName' => $strUserName));

        $result = $stmt->fetchAll();

        if ( count($result) ) {
                        $row = $result[0];
                        $dbPassword = $row['strPwd'];

                        //Verify User password with DB Password
                        if (password_verify($strPwdI, $dbPassword)) {

                                        $_SESSION['username']= $row['strUserName'];
                                        $_SESSION['strGroup']= $row['strGroup'];
                                        $_SESSION['intEPFNo']= $row['intEPFNo'];
                                        //Display success Message
                                        echo "<script>alert('Welcome to HRM !');</script>";
                                        echo "<script>document.location.href='index.php'</script>";
                        }//Display error Message
                        else
                        {
                                echo "<script>alert('Please check your password!');</script>";
                                echo "<script>document.location.href='index.php'</script>";
                        }

        } else {
            echo "<script>alert('Please check your user name and password!');</script>";
                        echo "<script>document.location.href='index.php'</script>";
        }


    }
        catch (Exception $ex)
        {

      echo "<script>alert('Login Error !');</script>";
       echo "<script>document.location.href='index.php'</script>";
```

Code Listing 2 – Login to the System

4.2.5 Searching Institute information

The Code Listing 3 shows the code that searches Institute information based on the search criteria given

```
if(isset($_POST['View']))
        {
        $sql = 'SELECT strInstituteName,strAddress,intTelephone1,intTelephone2,strFax,strEmail,bitActive,strCreatedBy,
                strUpdatedBy,dtUpdatedOn from tbl_institute WHERE strInstituteName=:strInstituteName';

        $stmt = $conn->prepare($sql);
        $stmt->execute(array(':strInstituteName'=>$strInstituteName
                                                ));

                                $_SESSION['info'][] = '<table>';
                                $_SESSION['info'][] = '<thead>';
                                $_SESSION['info'][] = '<tr>';
                                $_SESSION['info'][] = '<th>Institute Name</th>';
                                $_SESSION['info'][] = '<th>Address</th>';
                                $_SESSION['info'][] = '<th>Telephone1</th>';
                                $_SESSION['info'][] = '<th>Telephone2</th>';
                                $_SESSION['info'][] = '<th>Fax</th>';
                                $_SESSION['info'][] = '<th>Email</th>';
                                $_SESSION['info'][] = '<th>Active</th>';
                                $_SESSION['info'][] = '<th>CreatedBy</th>';
                                $_SESSION['info'][] = '<th>UpdatedBy</th>';
                                $_SESSION['info'][] = '<th>UpdatedOn</th>';
                                $_SESSION['info'][] = '</tr>';
                                $_SESSION['info'][] = '</thead>';
                                $_SESSION['info'][] = '<tbody>';

                                while ($row = $stmt->fetch(PDO::FETCH_NUM))
                                {
                                                $_SESSION['info'][] = '<tr>';
                                                $_SESSION['info'][] = '<td>'.$row[0].'</td>';
                                                $_SESSION['info'][] = '<td>'.$row[1].'</td>';
                                                $_SESSION['info'][] = '<td>'.$row[2].'</td>';
                                                $_SESSION['info'][] = '<td>'.$row[3].'</td>';
                                                $_SESSION['info'][] = '<td>'.$row[4].'</td>';
                                                $_SESSION['info'][] = '<td>'.$row[5].'</td>';
                                                $_SESSION['info'][] = '<td>'.$row[6].'</td>';
                                                $_SESSION['info'][] = '<td>'.$row[7].'</td>';
                                                $_SESSION['info'][] = '<td>'.$row[8].'</td>';
                                                $_SESSION['info'][] = '<td>'.$row[9].'</td>';
                                                $_SESSION['info'][] = '</tr>';
                                }
                                                $_SESSION['info'][] = '</tbody>';
                                                $_SESSION['info'][] = '</table>';
```

Code Listing 3 – Searching for Institute Information

4.2.6 Inserting Data to the Database

The following function (Code Listing 4) is used when inserting data to the database.

```
try
{
        $conn = new PDO('mysql:host='.DB_HOST.';port='.DB_PORT.';dbname='.DB_NAME,DB_USER,DB_PASS);
        $conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);

if (count($errors) == 0) {      // If no errors were found perform CRUD
        if(isset($_POST['Create']))
        {
        $sql = 'INSERT INTO tbl_institute(strInstituteName,strAddress,intTelephone1,intTelephone2,strFax,strEmail,
                bitActive,strCreatedBy,strUpdatedBy,dtUpdatedOn) '
                . 'VALUES(:strInstituteName,:strAddress,:intTelephone1,:intTelephone2,
                :strFax,:strEmail,:bitActive,:strCreatedBy,:strUpdatedBy,:dtUpdatedOn)';

        $stmt = $conn->prepare($sql);
        $stmt->execute(array('strInstituteName'=>$strInstituteName,
                             'strAddress'=>$strAddress,
                             'intTelephone1'=>$intTelephone1,
                             'intTelephone2'=>$intTelephone2,
                                                 'strFax'=>$strFax,
                                                 'strEmail'=>$strEmail,
                                                 'bitActive'=>$bitActive,
                                                 'strCreatedBy'=>$strCreatedBy,
                                                 'strUpdatedBy'=>$strUpdatedBy,
                                                 'dtUpdatedOn'=>$dtUpdatedOn,
                                                ));

                $_SESSION['info'][] = 'Created University Name :'.$strInstituteName;
```

Code Listing 4 – Code for Insert Data to the Database

4.2.7 Update Data to the Database

The following function (Code Listing 5) written is used when updating data to the database.

```
if(isset($_POST['Update']))
        {
        $sql = 'UPDATE tbl_institute '
                . 'SET strAddress=:strAddress, intTelephone1=:intTelephone1, intTelephone2=:intTelephone2, strFax=:strFax,
                strEmail=:strEmail, bitActive=:bitActive, strCreatedBy=:strCreatedBy,
                strUpdatedBy=:strUpdatedBy, dtUpdatedOn=:dtUpdatedOn WHERE strInstituteName=:strInstituteName';

        $stmt = $conn->prepare($sql);
        $stmt->execute(array('strInstituteName'=>$strInstituteName,
                            'strAddress'=>$strAddress,
                            'intTelephone1'=>$intTelephone1,
                            'intTelephone2'=>$intTelephone2,
                                                'strFax'=>$strFax,
                                                'strEmail'=>$strEmail,
                                                'bitActive'=>$bitActive,
                                                'strCreatedBy'=>$strCreatedBy,
                                                'strUpdatedBy'=>$strUpdatedBy,
                                                'dtUpdatedOn'=>$dtUpdatedOn,
                                                ));

                $_SESSION['info'][] = 'Updated University Name :'.$strInstituteName;

        }
```

Code Listing.5 – Function to Update Data to the Database

4.2.8 Delete Data in the Database

The following function (Code Listing 6) written is used when deleting data from the database.

```
if(isset($_POST['Delete']))
        {

        $sql = 'DELETE FROM tbl_institute '
                . 'WHERE strInstituteName=:strInstituteName';

        $stmt = $conn->prepare($sql);
        $stmt->execute(array('strInstituteName'=>$strInstituteName));

                $_SESSION['info'][] = 'Deleted University Name :'.$strInstituteName;
```

Code Listing.6 – Code to Delete Data from the Database

Please refer for more codes under Appendix F-Code Listing

4.3 Acknowledgement of any Reused Existing code

There are three third party codes and tools reused (External) in CMS development such as,

- HTML Templet download from https://html5up.net This is available free for development purpose.

- uvthr/js/ampchartsl Toolkit is an open-source project built on top of the PHP and I use it for graphical report developments.

- PdfViewer uvthr\PdfViewer.php PdfViewer It is a tool that helps to view PDF files quickly and this freely available.

CHAPTER 05 - EVALUATION

There are several types of software testing such as Black box testing, White box testing, Unit testing, Integration testing, System Testing etc. practiced in software industry in order to develop error free software. Goal of the testing, in order to check whether the system is error free and working fine not only on normal conditions even under deferent running conditions. Testing achieved by doing test plan, verifying and validating according to the set of plans. In this section discuss various testing techniques used.

5.1 Test Plan and Results

A software project test plan is a document that describes the objectives, scope, approach, and focus of a software testing effort. The process of preparing a test plan is a useful way to think through the efforts needed to validate the acceptability of a software product. The completed test plan will help users outside the test group understand the 'why' and 'how' of product validation.

Interface, unit, system, integration, security and acceptance testing were planned to be carried out at different stages and times as in Table 5.1

STAGE	START DATE	END DATE	DURATION	DATES SPENT
Unit	7/04/17	7/05/17	30 days	32 days
Sub System	10/05/17	18/05/17	08 days	08 days
Integration	20/05/17	25/05/17	05 days	05 days
Acceptance	26/05/17	05/06/17	10 days	15 days

Table 5.1 Test Plan of the System

Testing Process

Testing process of the system is shown below in Figure 5.1.

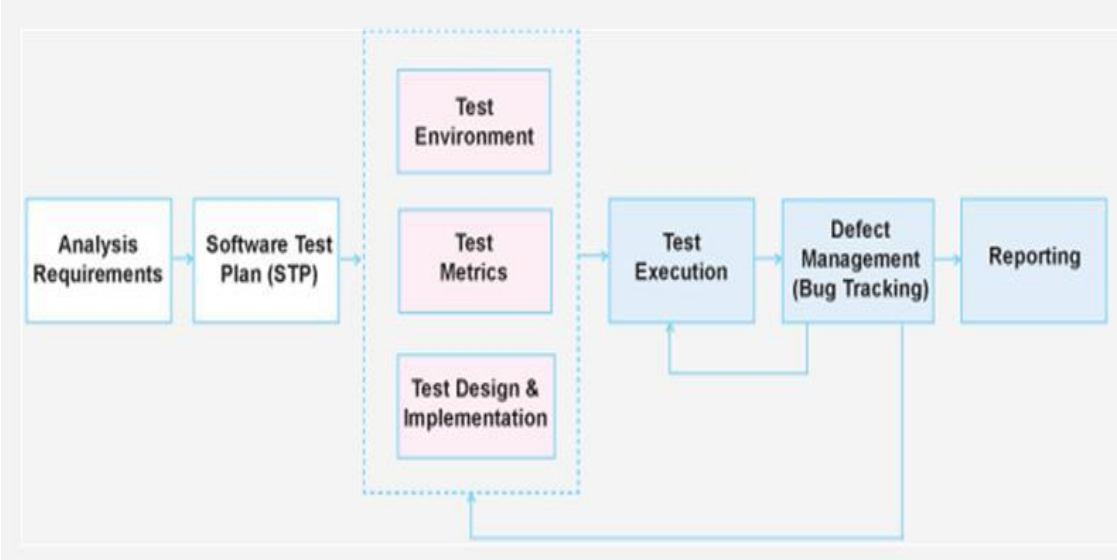


Figure 5.1: Testing Process

- Analysis Requirements: gathering and analyzing customer requirements.
- Software Test Plan: definition of scope and goals, elaboration of appropriate testing methodologies, preparation of software testing strategy, assigning roles and responsibilities, definition of resource requirements, start and completion criteria.
- Test Environment: setting up the test infrastructure, identification of testing environment and test tools, installation and configuration of the product.
- Test Metrics: description of areas to be measured, development and collection of metrics.
- Test Design and Implementation: development of test scenarios, test cases, test check-list, test procedures, test scripts; development of test applications, etc.
- Test Execution: performance of testing, both static and dynamic, which is provided for usage of manual and automatic test cases as required by STP and STS.

- Defect Management (Bug Tracking): recording testing results, defect description (Problem Reports, Change Requests); defect review and testing results analysis; errors correction; defect resolution verification.
- Reporting: status reports, weekly reports, milestone reports, closure report.

Testing Validation Vs Verification is shown below in Figure 5.2.

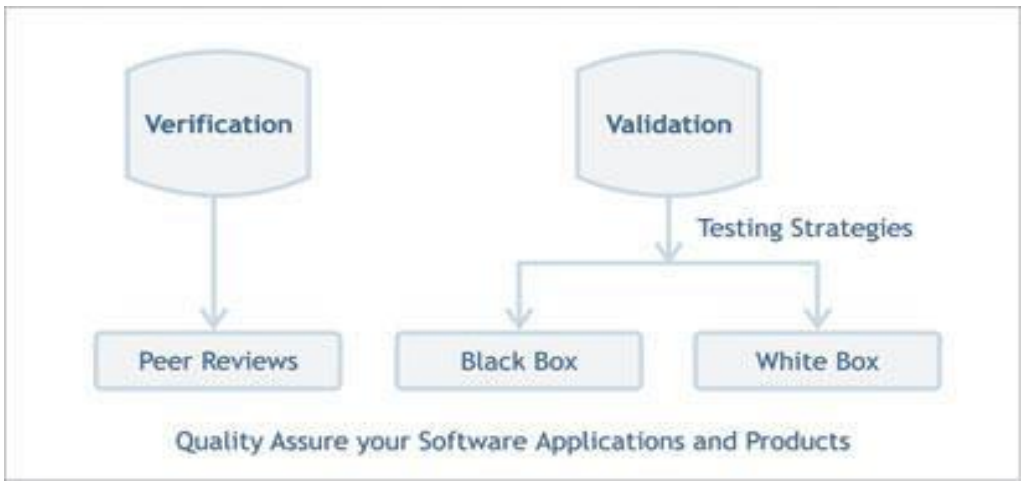


Figure 5.2: Testing Validation Vs Verification

- Black Box Test: Is a method of testing software that tests the functionality of an application as opposed to its internal structures or workings. Specific knowledge of the application code/internal structure and programming knowledge in general is not required.
- White Box Test: Is a method of testing software that tests internal structures or workings of an application as opposed to its functionality. This internal perspective of the system, as well as programming skills, are required and used to design test cases.

There are two main aspects need to focus during Testing, such Verification and Validation.

Testing Verification Process is shown below in Figure 5.3.

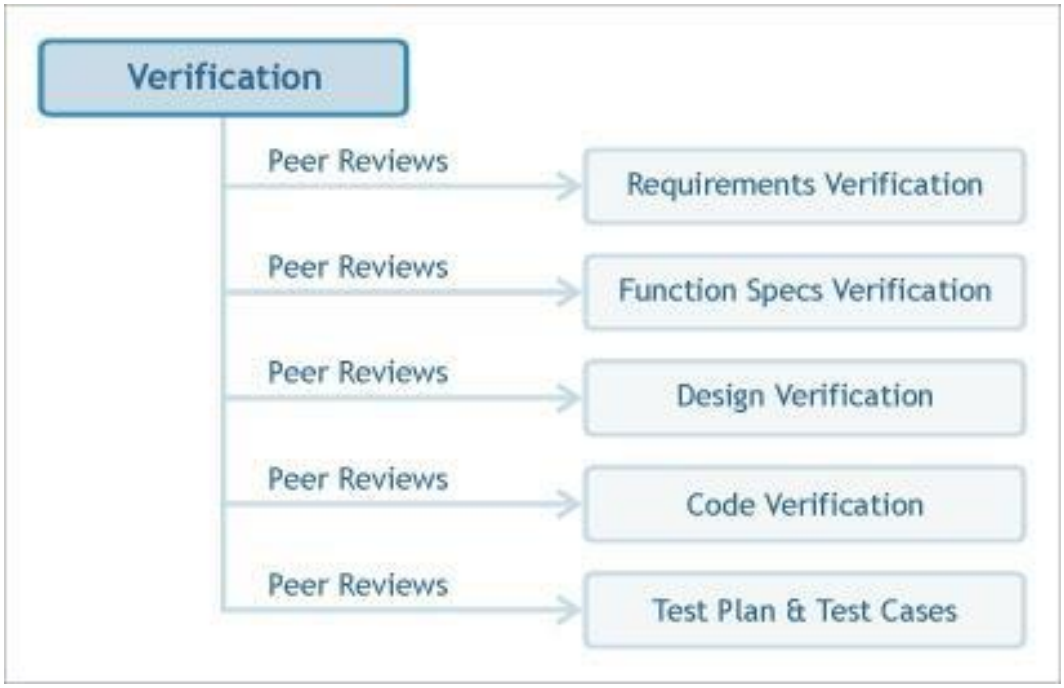


Figure 5.3: Testing Verification Process

Verification is a Preventive Measure

- Verification: Are we building the product right?
- Are Software Artifacts created right?
- What measures are being taken to prevent defects?
- The Validation service offering covers.

Testing Validation Process is shown below in Figure 5.4.

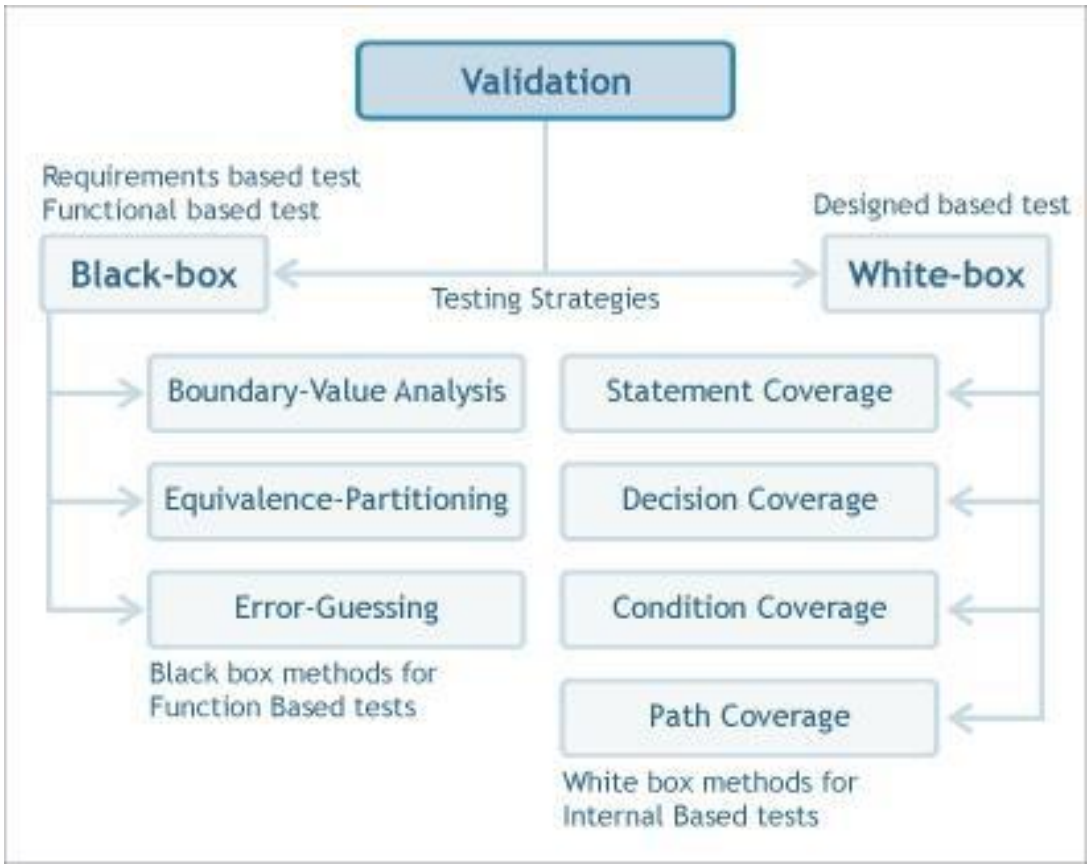


Figure 5.4: Testing Validation Process

Validation is a Detective Measure

- Validation: Are we building the right product?
- Is right software created?
- What measures are being taken to detect defects?
- Are requirements being met?

5.2 User Evaluation

VTACMS web based System was tested in the real environment using real test data. Set of employees of the VTC were selected for test the functionalities of the system. For each employee, a list of activity assigned to perform the functionalities. The test user feedback showed that the system was user friendly and can be employed in

efficient and effective manner. The feedback from user testing was mostly positive with just a few suggestions for improvements. The feedback and suggestions contributed for making several good improvements to the software was definitely a very worthwhile experience.

VTACMS system its self includes a option to send user feedback and suggestion to developer as an email, this will allow developer to identify the user needs and develop better system.

5.3 Test Cases

Test cases are a sequence of steps to test the correct behavior of a functionality/feature of an application. Test case is a document which describes Input, Action, Event and Expected Response to determine if feature of an application is working correctly or not.

Here for each module from system need look at Test case, detail Test case for each form attached in Appendices section 4.

- **Create User Test Cases**

CreateUser.php Form Controls Test

Form Path: /UVTHR/ Login/ CreateUser.php

Test Case	Summary	Steps	Expected Results
1. Load Present Employee Names to "Employee Name" at page Loading	Dropdown will load and display all the presently working employee name	Load Employee Name at page loading	1. Successful page load will Display all presently working Employees name 2. Failure Load will Display "Data Loading Failed" Error Message
2. Load "Employee EPF no, User Name" Once Employee Name selected from dropdown menu	Load "Employee EPF no, User Name" Once Employee Name selected from dropdown menu	Select Employee Name from Dropdown menu	1. Successful selection will display "Employee EPF no, User Name" on textbox 2. Failure Load will Display "Data Loading Failed" Error Message

3. Load "User Group" at page Loading	Dropdown will load and display all the active "User Group" names	Load User Group names at page load	1. Successful page load will Display all active "User Group" names 2. Failure Load will Display "Data Loading Failed" Error Message
4 Enter "Security Question, Security Answer" in textbox	Allow User to enter any type of text in any data format summary	Enter any type of text in any data format	Allow User to enter any type of text in any data format summary
5.Enter "Disable Login Date" on textbox	By clicking on Textbox it will show a dropdown calendar from that user allows to select a date	Click on textbox with blue color, select a date from drop down calendar that will appear on textbox	1. Successful selection will show the selected date on textbox 2. Failure selection will not show the date.

Table 5.2: Create User window controls

CreateUser.php Form Request Button click Test

Form Path = /UVTHR/ Login/ CreateUser.php

User = HR Admin

Current Date = Thu, 15 July 2017 00:00:00

Field Name	Input Value Test-1	Input Value Test -2	Input Value Test-3	Input Value Test-4
Employee Name	NULL	Indika Priya	Indika Priya	Indika Priya
Employee EPF no	NULL	4555	4555	4555
User	NULL	rd@mail.com	rd@mail.com	rd@mail.com

Name(Email)				
User Group	NULL	HR Admin	HR Admin	HR Admin
Security Question	NULL	School Name	School Name	School Name
Security Answer	NULL	STC	STC	STC
Login (Enable/Disable)	NULL	Yes	Yes	Yes
Disable Login Date	NULL	5/01/2017	5/01/2017	5/01/2017
Message/ Expected Results	*Select Employee Name for EPF no *Disable Login date Required *Security Question Required *Security Answer Required	For Disable Login Date, Back date not allowed	Successfully Saved	User Already Exist

Table 5.3: Create User Create button click Test

CreateUser.php Form Request Button click Database value Test

Form Path = /UVTHR/ Login / CreateUser.php

User = HR Admin

Test Case	Summary	Steps	Expected Results
1.After Create Button click Red colored error message occurs check tables for changers	If there is an error after Create button click, there should not be any changers on Database	Enter values as per *Table* 5.3 and try to generate error message, Then check table tbl_LoginCreateUser for changers	No changers on Database or tbl_LoginCreateUser table
2.Enter a already exist user details	If there is a duplicate request For same user with same EPF, then system should reject	Follow Test case 4 from table Table 5.3	sp_Save_LoginCreateUser stored procedure executed and return "User Already Exists" error message
3.After Request Button click Green colored "Successfully Saved" message Appears check tables for changers	If there is no error message and "Successfully saved" message appear then for tbl_LoginCreateUser table new records should be inserted	Enter values as per *Table 5.3* and try to generate success message, Then check table tbl_LoginCreateUser for changers	All entered values from form should be inserted to tbl_LoginCreateUser table

Table 5.4: Create User Create button click DB Test

5.4 Areas Tested

Test does not only confine to functionality. It is a much broader topic to be discussed. There are areas like.

- Database connections and communication.
- Testing User Interfaces
- Usability Testing
- Stress Testing.
- Acceptance Testing.
- Error handling.

Database connectivity

A separate database manager has been setup to facilitate the communication between the DBMS and the business layer. The database connection has been tested thoroughly, as the availability of the system is to depend almost entirely on the availability. Since a connection pool is not being maintained, and just one connection is used by the entire application, the connection needs to be tested to check if it is synchronized and no two processes access the connection at the same time.

Testing user interfaces

User interface components have to be tested to check whether these components perform how they are supposed to, and whether appear enabled for the defined user roles and have to check that whether the links are linked to destined pages or forms.

Usability testing

Usability is the most important aspect of the system. Whether the system was to be accepted or rejected would finally come down to the quality of UIs, as non-technical end users are not worried about excellent design, good coding styles, documentation, etc. All they would want is a system that caters to their need, in a user-friendly manner. End users were involved with this process and their feedback was taken as input to refine UIs. Ultimately, the UIs turned out to be quite simple and easy on the eye, but good enough to provide all required functionality. Another Important aspect of Usability is performance. It might be a state-of- the-art system, but users would reject it if it were too slow. Performance was tested in the user environment, and no serious performance issues were seen. However, the system had to be fine-tuned to improve certain performance issues.

Acceptance Testing

The client organization carried out certain hands-on sessions involving the end users of the system. The system was tested for aspects like functionality, usability, stress, etc. however, they follow the "Black-Box" approach of testing if the system performs according to expectations. They are not worried about how the system achieves these objectives internally. These are only a few of the major areas where the system has to be thoroughly tested. Failure to pass these tests would probably mean the rejection of the system.

Error handling

Error handling is one of the most important aspects of the system. All possible errors have to be anticipated and trapped by the system, and not expect the user to act rationally. The system should not crash due to any unhandled exception. This is achieved by having all user interactions within try – catch blocks, catching generic exception. Hence, any type of exception is handled.

5.5 Test Data

The test data for the system was acquired by the present manual System stored in Excel and Word formats.

5.6 User Evaluation

The user evaluation is done by using a questioneir. The questioneir compost of 10 questions to obtain user feedback.

Regarding requirement fulfillness , user friendliness, report generation , supporting to decision making functionality , authentication, interface and response time.

The responses are obtained as satisfactory levels.

The questioneir is shown bellow.

1. Requirement fulfillness of the system

1).Not at all 2).Average
3).Satisfactory 4).Good
5).Excellent

2 User friendliness of the system

1).Not at all 2).Average
3).Satisfactory 4).Good
5).Excellent

3 Helpfulness of reports for your decision making process

1).Not at all 2).Average
3).Satisfactory 4).Good
5).Excellent

4 Availability of required functionality of the system

1).Not at all 2).Average
3).Satisfactory 4).Good
5).Excellent

5 The system is authorized to do what your user level is required to do?

1).Not at all 2).Average
3).Satisfactory 4).Good
5).Excellent

6 The system is authorized to do what your user level is not required to do?

1).Not at all 2).Average
3).Satisfactory 4).Good
5).Excellent

7 Interface designing of the system

1).Not at all 2).Average
3).Satisfactory 4).Good
5).Excellent

8 Navigation process of the system

1).Not at all 2).Average
3).Satisfactory 4).Good
5).Excellent

9 The average response time for a link selection is;

a)< 1s b.) > 1s and < 3s c) > 3s and < 5s d.) > 5s

10 Overall satisfaction of the system

1).Not at all 2).Average
3).Satisfactory 4).Good
5).Excellent

A sample of 20 users selected representing different user levels (EX: CEO, DG, Director)

The system was underwent one month time period of User testing and after that feedback is obtained (Figure 5.5 summary of users feedback shown below).

Answers	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total
Not at all	0	0	0	0	0	0	0	0	0	0	0
Average	1	0	1	3	0	1	0	1	0	0	7
Satisfactory	2	1	1	3	3	3	5	4	1	0	23
Good	5	5	2	4	6	4	5	6	3	0	40
Excellent	12	14	16	10	11	12	10	9	16	20	130

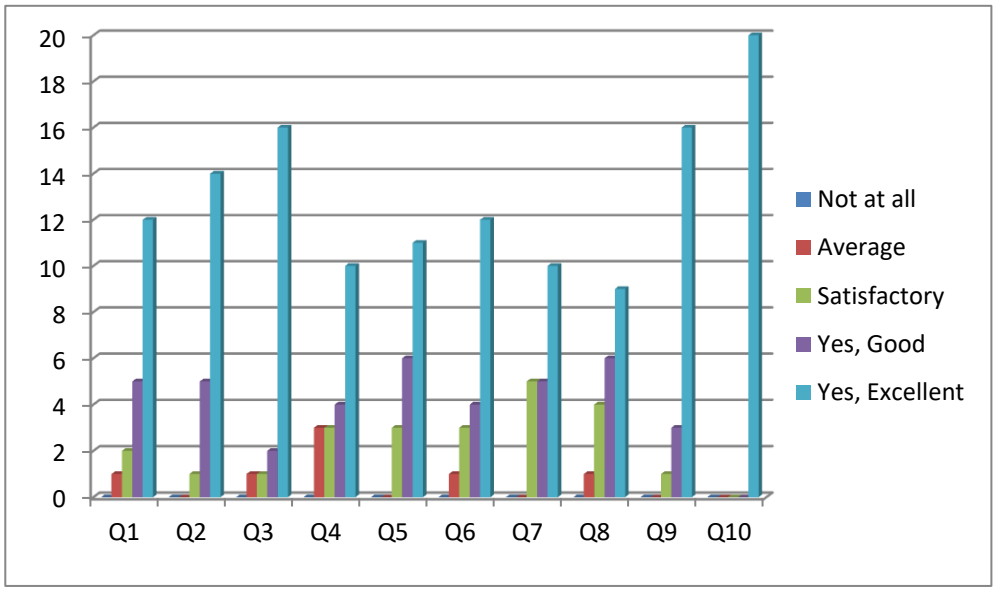


Figure 5.5: Summary of user's feedback

Assuming of feedback received from twenty users different levels for ten question are shown bellows.

Response

Not at all	0
Average	7
Satisfactory	23
Good	40
Excellent	130

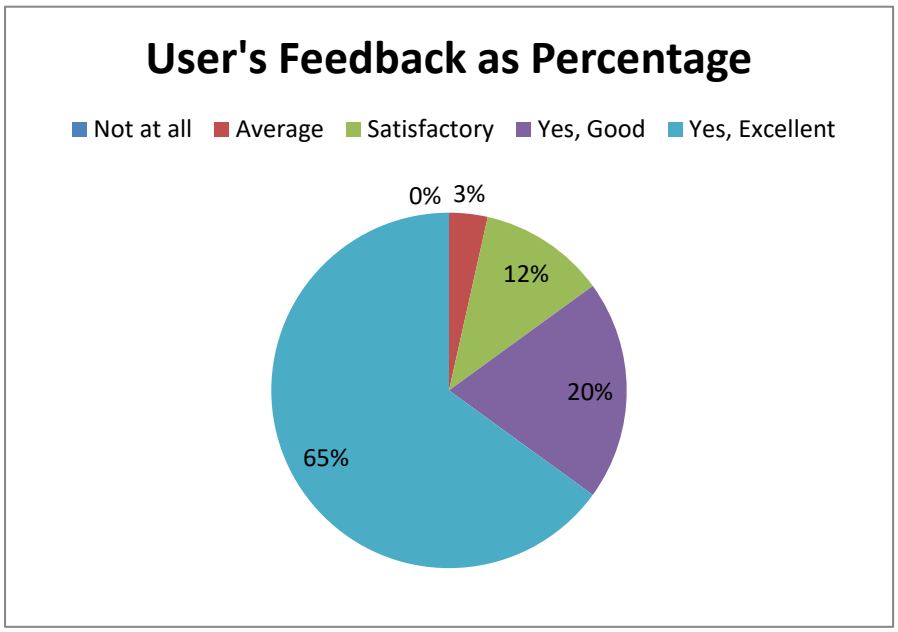


Figure 5.6:Users feedback as percentage

According to the above responses it is clear that the 193 of response out of 200 are above satisfactory level.

$$\frac{(satisfactory+good+excelent\ )}{total} = \frac{(23+40+130)}{200} *100$$

$$= 96.5$$

Since 193 out of 200 responses are above satisfactory level it can be concluded that this center management system is high user accepted and user friendly.

CHAPTER 06 - CONCLUSION

6.1 Critical Assessment of Human Resource Management System

Almost all the major objectives were considerably met at the end of the project. The main objective was to provide a web based facility for staff, dean, managers, and the HR-Admin. As it was observed in the analysis phase, the main areas included staff data management, attendance and leave management, recruitment management, resignation management, training and staff evaluation. Separate User Management module is provided for the admin apart from system backup facility. They all were proved to be at the acceptable standards during the acceptance testing.

Throughout the project life cycle, more time devoted for System analysis and Design. For system analysis, different facts gathering methods were used. They were interviewing, past reports observation and prototyping. As each requirement was found, it was recorded in the Requirements Catalogue and due care was made to maintain the catalogue correctly as it serves as the main reference for the other stages of the project. IEEE standards were used to document the requirements catalogue. Regular requirement reviews were carried out to ensure the accuracy of the requirements gathered.

In design phase, the use of OOSD with Agile/Extreme programming helped the design to be more accurate, fast, reliable, and practical. OOSD improved the module reuse and independence and the introduction of strong cohesive modules that are loosely coupled enhanced maintainability to a much greater extent. The use of case tools at all stages cannot be forgotten as they made the entire process automated and thus easier.
Implementation, the whole phase was generally based on Agile Process, which made the implementation much faster and accurate. Stakeholder participation and implementing Just Barely Good Enough (JBGE) amount of work cut off extra overhead. The use of simple, open source, yet powerful case (implementation and testing) tools for modeling, implementing and testing were outstanding. User interfaces

were proved to be friendly and easy to use and consists with a good color combination that mix together.

The system was tested using the test cases and test data developed in the design stage of the project. The test results were documented and compared with the expected results in the original test cases. All the test results were compared and verified with expected results.

Documentation, the most important artifact as far as it is concerned in general, was done in a much organized manner with the help of the sample reference material given by the Institute.

This online Center Management System is designed to manage and administer online transactions only. The usual face-to-face (f2f) business runs as it is. However, the transaction data that are generated due to f2f work could also be fed into the system to be utilized by various stakeholders for various functions.

The total project completion time was extended than projected time in the original project schedule, because of the excessive development time. Most of the concepts and technologies were new and comprehensive initial knowledge was required to develop appropriate applications. Therefore development time extended than the projected time.

6.2 Lessons Learnt

During the course of this project considerable amount of new concepts and lessons were learnt and they are listed below.

Thorough understanding of Software Engineering was obtained. It was understood that Software Engineering is all about engineering the artifact from the inception to the release and for this modeling plays an important role.

Software Project Management - all phases in a typical software project, beginning from project proposal to final system implementation were comprehensively covered.

A great opportunity was made through this project as it paved way to lot of research and background literature review. Moreover, this was an opportunity to fully practice what have been studied in theory.

An insight to proper documentation was well covered. The importance of documentation at all stages of the Software Life Cycle was clearly understood.

The application of Object Oriented concepts in analysis, design and implementation stages to create more practical, robust, maintainable and platform independent components were well appreciated.

Writing working web applications and use of PHP and MySQL.

Another main concept learnt was how to practically handle the business logic in the middle tier of the 3-tier architecture. Since this application spans over different platforms and hardware over different tiers the variations were learnt well.

6.3 Future Work

Identified some further work to be done on implemented system. Since in the development process followed incremental model for software development which allows developing system incrementally module by module.

- Integrate Finger print system

  Presently company Director looking into introducing finger print system for Employee attendance. Once it implemented which can be integrated to UVTHR. Then Employees Attendance and Leave will be automatically calculated, for special purpose attendance and leave regularization they can use VTACMS functionality.

- Improve Performance

  User has identified there is a performance issue on report generation when number of data is high. As a solution in future planning to generate reports Crystal report as HTML report.

- Knowledge sharing

  Since most of the modules are developed with the requirement gathered from selected HR employees, others do not aware the exact functionality of other system, therefore planning to do a hands-on practical session of all employees.

- Increase system security

  Security is very important area to be considered because VTA CMS includes all the employee personal details. Presently security is handles using encrypted user login from application level and different schema database login is maintained for database security.

- Add reports with more filtered options

  Presently for the reports only date range filter options is provided, but in future is planned to build with more filtering options.

- Include new modules such as Payroll, Medical claims and other claims.

  Current Implemented VTACMS system does not maintain any financial related information of employee. Once System security is further improved company likes to add employee payroll module.

REFERENCES

[1]"Welcome to the Vocational Training Authority of Sri Lanka", *Vtasl.gov.lk*, 2017. [Online]. Available: http://www.vtasl.gov.lk. [Accessed: 13- Feb- 2017].

[2]2017. [Online]. Available: https:// www.oracle.com. [Accessed: 11- Mar- 2017].

[3]"Microsoft - Official Home Page", *Microsoft.com*, 2017. [Online]. Available: https://www.microsoft.com. [Accessed: 19- Mar- 2017].

[4]"SAP Software Solutions | Business Applications and Technology", SAP, 2018. [Online]. Available: https://www.sap.com. [Accessed: 10- Feb- 2018].

[5]"HR Management System | OrangeHRM l HR Management Software", Orangehrm.com, 2017. [Online]. Available: https://www.orangehrm.com. [Accessed: 09- Mar- 2017].

[6]"Developer.com: Technical Information for Software Developers", Developer.com, 2017. [Online]. Available: https://www.developer.com. [Accessed: 11- Apr- 2017].

[7]"IBM - United Kingdom", Ibm.com, 2017. [Online]. Available: https://www.ibm.com/. [Accessed: 19- Apr- 2017].

[8]"Online Diagram Software & Visual Solution | Lucidchart", Lucidchart, 2017. [Online]. Available: https://www.lucidchart.com. [Accessed: 15- Apr- 2017].

[9]2017. [Online]. Available: https://www.agilemodeling.com. [Accessed: 12- May- 2018].

[10]2017. [Online]. Available: https://www.php.net. [Accessed: 02- May- 2017].

[11]2017. [Online]. Available: https://www.dev.mysql.com/doc/mysql/en/index.html. [Accessed: 19- May- 2017].

[12]2017. [Online]. Available: https://www.apache.grg/docs-2.1. [Accessed: 19- May- 2017].

APPENDIX A- SYSTEM DOCUMENTATION

VTACMS is a web based application developed on three-tier architecture. It has three major components such as Client, Middle-tier and Server with different hardware configuration.

Server Hardware Requirement

- Server – Dedicated Server With 3.0 GHz processor speed
- 4 GB RAM
- 80 GB SCSI on RAID 5
- Backup
- Ethernet Connection 100 Base T

Client Hardware Requirement

- Client – 1 GHz with 512 MB RAM, 20 GB Hard disk
- 15'' Monitor with 1024 x 768 screen resolution.
- Printer (Optional)

Client-Server Architecture

User can access the web application, which is installed in Application server via web browser. First web application will connect to LAN using company Intranet, and then it will connect to security layer. Security layer will perform the user validation; if the user validation is successful then the user will be allow to connecting to Application server, Email server, Printer server and MySQL database server.

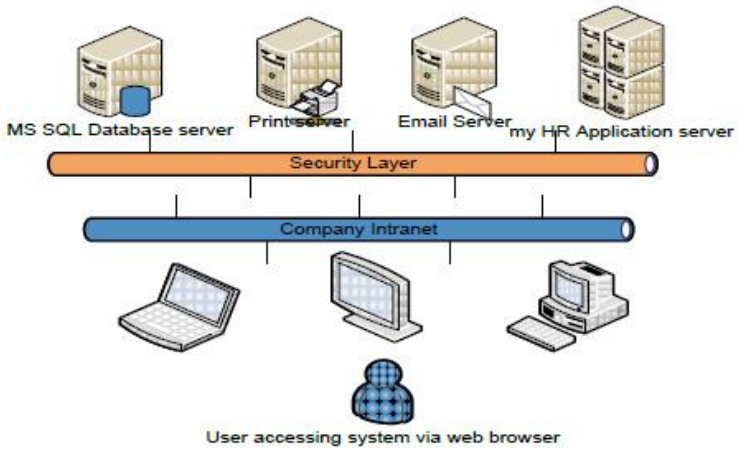


Figure A.1: System Architecture

3-Tire Architecture

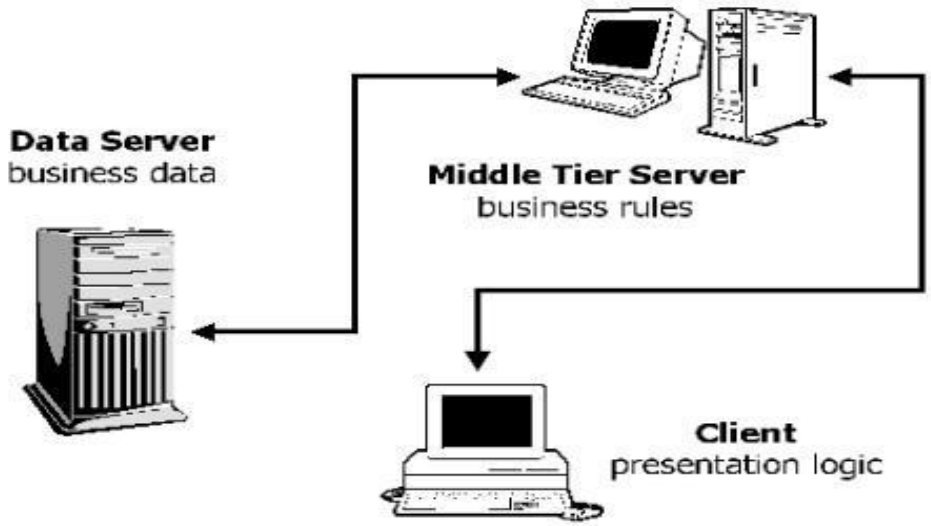


Figure A.2: 3-Tire System Architecture

3-Tier architecture generally contains UI/ Presentation Layer, Business Layer (BA)/Business Access Layer (BAL) or and Master Layer (MA)/ Data Access Layer (DAL).

Presentation Layer (UI)

Presentation layer contains pages like .aspx or windows form where data is presented to the user or input is taken from the user.

Business Layer (BS)/Business Access Layer (BAL)

BAL contains business logic, validations or calculations related with the data.

Master Layer (MA)/ Data Access Layer (DAL)

DAL contains methods that helps business layer to connect the data and perform required action, might be returning data or manipulating data (insert, update, delete etc.)

Software Requirements

Server Software Requirement

- MS Windows XP, Windows Vista or Windows 7
- Apache® 2.2 Web Server
- MySQL® Database Server

Client Software Requirement

- Web browser

XAMPP Installation (Windows 7)

1. In your web browser, go to http://www.apachefriends.org/en/xampp-windows.html for download XAMPP.
2. Once your download is complete, install the program, click on "Run"
3. Accept the default settings.
4. When your installation is complete, exit the command window by typing x on the command line.
5. Start the XAMPP Control Panel.
6. Start the Apache and MySQL components.
7. Verify the Apache install, by clicking on the Apache administrative link in the Control Panel.
8. Verify the MySQL installation, by clicking on the MySQL administrative link in the XAMPP Control Panel.

Installing Firefox or Google chrome web browsers

Download and install the latest version of Mozilla Firefox from www.mozilla.com or Google chrome from www.google.com

Database installation

- Open your web browser and type http://localhostin the URL and press Enter. If you have installed XAMPP properly, you could now see the XAMPP home page on your browser window.
- Select phpMyAdmin tool from the left side panel of the Xampp home page
- In the phpMyAdmin window click in the text field named “Create new database” and type “uvt_hr” and press „Create“ button. A new database named “uvt_hr” will be created.
- Now click on the “Import” tab from the tabs located in the top of the window and click on the “Chose file” button located next to the “Location of the text file” option in “File to import” section. It will give you a browsing window.
- Insert the “VTA CMS System” CD in to your CD-ROM. Locate and select the “uvtdb.sql” from the CD-ROM and press “Open” button.
- Press “Go” button located in the bottom right hand corner.

System installation

- Browse the VTACMSCD, Locate the folder “UVTHR” from the path: X:\VTACMSsystem\VTACMS(Note: X is your CD-ROM drive letter).
- Copy the entire folder and paste it in the following location C:\xampp\htdocs\UVTHR

Run the system

Type URL http://localhost/ uvthr/ in the URL and press enter to launch the VTA CMS system.

APPENDIX B -DESIGN DOCUMENTATION

USE CASE DIAGRAM WITH DISCRIPTION

Figure B.1 shows the high level use case diagram for the main system

Use case Diagram – Data Management Module

Data Management Module will collect all employee personal details and maintain. Also this module has the functionalities of report generation based on Management requirement.

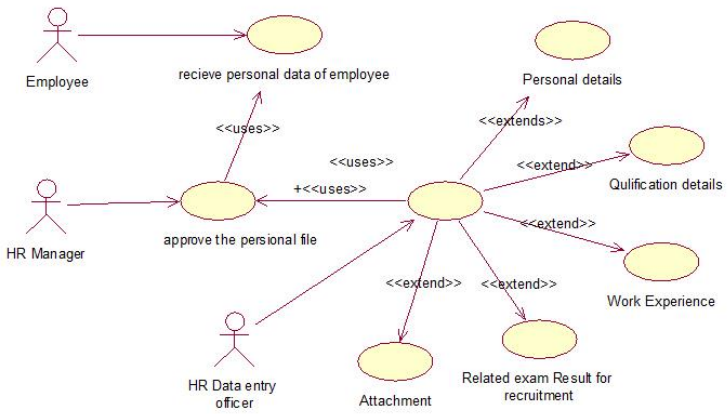


Figure B.1 : Employee Management – Personal Details

Requirement Number:	**HR/0001/01**
Category	Human Resources Management → Staff Details → Personal details
Source Document	Personal file
Source Document No	N/A
Requirement	System shall provide facility to enter to enter personal information of Staff members
Description	Application details shall consist of, • Name(First,Middle,Last) • Date of birth • Address • NIC number • Religion • Nationality • Gender • Marital status • Contact numbers • Email • Emergency information • Dependnts information Date of Employment

Related Requirement	
Main Actor	HR Data entry operatior
Supporting actors	**Staff Member,HR Manager**

Table B.1: Employee Management – Personal Details

Time and Leave Management System

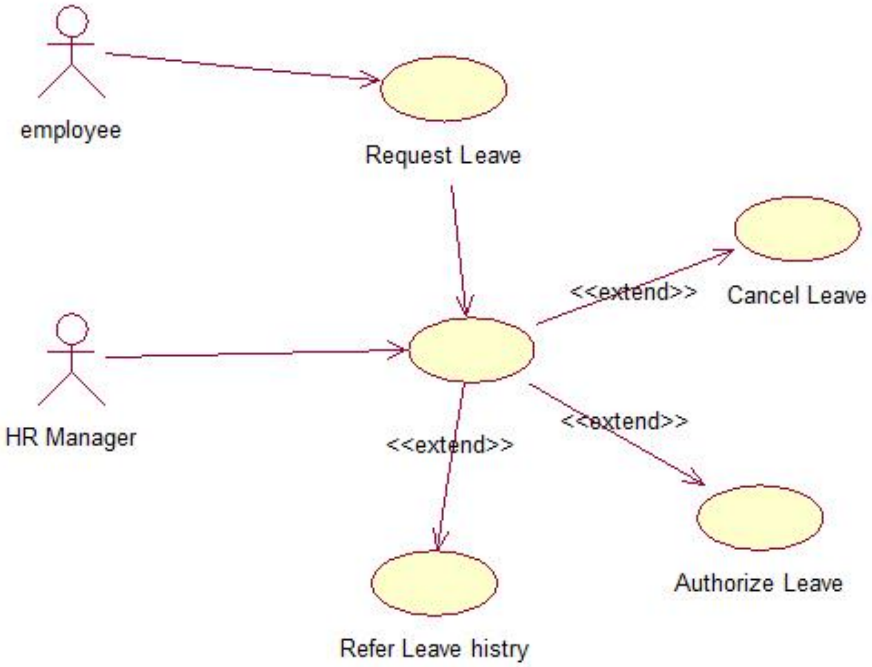


Figure B.2: Employee Management – Leave Management

Requirement Number:	**HR/0017**
Category	Human Resources Management → Leave
Source Document	Leave application
Source Document No	N/A
Requirement	System shall provide facility to manipulate leave of the staff.
Description	Leave application should consist following information. • Reason for Leave • From date • To date • Requested date • No of leaves • Actor details who will work instead

	Moreover system should provide facility to authorize leave,forprivileged persion.
Related Requirement	
Main Actor	HR Manager
Supporting actors	Staff Member
Related Institute	
Relate references	

Table B.2: Attendance Management

Flow chart – Login Module

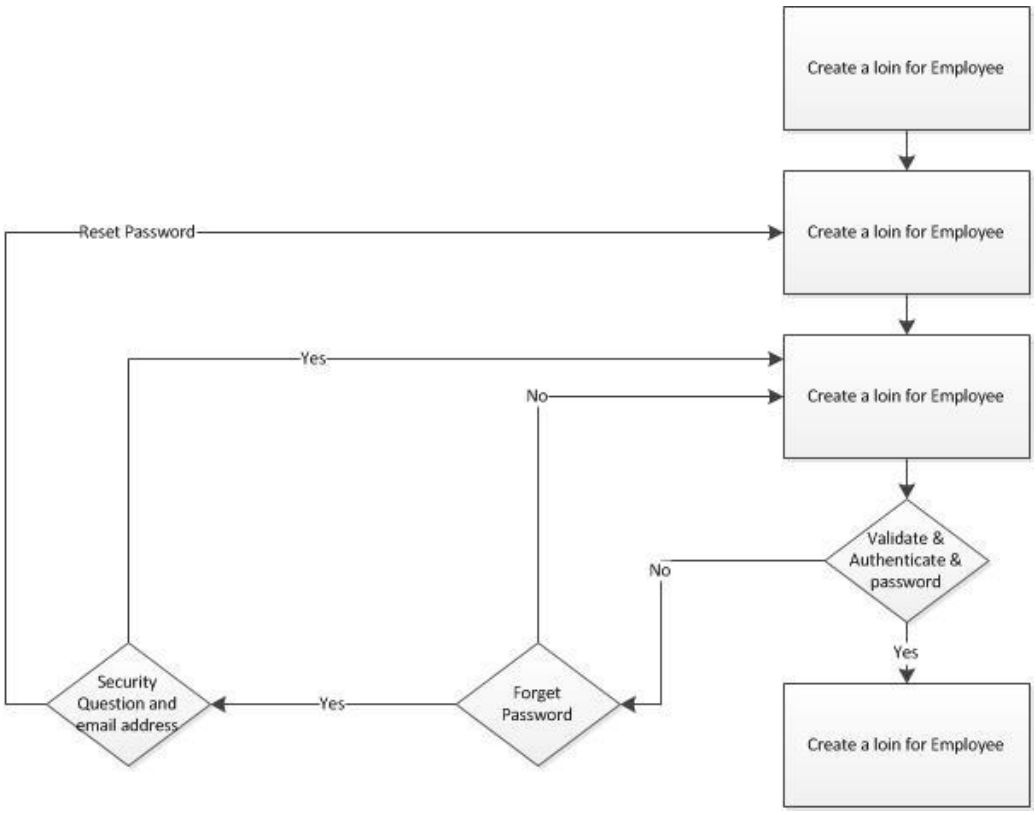


Figure B.3: Login Module

Database Schemas

Login Module

tbl_LoginCreateUser	Keys	Field	Description	Type	Size	Null	Default
	Primary	Employee EPF no	Unique key for each employee	int	8	No	
		Employee Name	Name of the Login User	varchar	50	Yes	
		User Name	User Name to Login system	varchar	50	No	
		User Group	User group which employee belongs to	varchar	50	No	Staff
		Division	Employee working Division	varchar	50	Yes	
		Created Date	Login Created Date	datetime	8	Yes	Sysdate
		Blocked User Date	Flag to define user Blocked or not	boolean	1	No	1
	Foreign	NIC	Unique for each employee	varchar	8	No	

Table B.3: Login module tbl_LoginCreateUser table schema

Recruitment Module

tbl_RecruitmentDefJobSpec	Keys	Field	Description	Type	Size	Null	Default
	Primary	Job ID	Unique key for each Applicant	int	8	No	
		Job Title	Job for vacancy	varchar	50	Yes	
		Company	Name of company	varchar	50	No	
		Division	Division which need new recruit	varchar	50	No	
		Reports To	Immediate superior Name	varchar	50	Yes	
		Reporting Relationship	Immediate superior Designation	varchar	50	Yes	
		Job Purpose	Purpose of Job	varchar	50	No	
		Job Summary	Summary of Job	varchar	50	No	
	Foreign	NIC	Uniquely identify each applicant	varchar	50	No	
		Qualifications	Applicant Education qualification	varchar	50	Yes	

		Required /Certifications	Required Certification or licenses	varchar	50	Yes	
		Experience	No of years experience	varchar	50	Yes	
		Line Manager	No of years experience	varchar	50	Yes	
		Divisional Head	Head confirmation	varchar	50	Yes	
		VC	VC confirmation	varchar	50	Yes	

Table B.4: Recruitment module tbl_RecruitmentDefJobSpec table schema

Data management Module

tbl_PersonalDetailsForm	**Keys**	**Field**	**Description**	**Type**	**Size**	**Null**	**Default**
		Employee No	Unique Number for Employee	int	8	No	
		Company	Name of the company	varchar	50	Yes	
		DOB	Employee DOB	datetime	8	No	
	Foreign	EPF No	Employee EPF no	varchar	50	No	
	Primary	NIC No	Employee NIC no	varchar	50	No	

		ETF No	Employee ETF no	varchar	50	No	
		Full Name	Full name of the employee	varchar	50	No	1
		Date joined	Employee Joined Date	datetime	8	No	Sysdate
		Designation	Employee current Designation	varchar	50	Yes	
		Gender	Male/Female	varchar	50	No	
		Contact details TP	Employee contact details	int	8	No	
		Name of the bank	Name of the bank for salary to be debit	varchar	50	No	
		Branch	Bank branch name	varchar	50	Yes	
		Account No	Bank account no	varchar	50	Yes	
		MediacalRelationship	Medical claim eligibilities	varchar	50	No	
		MediacalName	Name of the eligibilities	varchar	50	No	
		InsuranceRelationship	Employee Insurance Relationship	varchar	50	No	
		InsuranceName	Employee Insurance Name	varchar	50	No	

Table B.5: Recruitment module tbl_PersonalDetailsForm table schema

Attendance and Leave Module

tbl_ViewAttandance	Keys	Field	Description	Type	Size	Null	Default
		Employee EPF	EPF number of employee	int	8	No	
		Employee Name	Name of the Employee	varchar	50	Yes	
		Year	Current Year	Int	8	No	
		Month	Current Month	int	8	No	
		IN Time	Employee IN Time	datetime	8	Yes	Sysdate
		OUT Time	Employee OUT Time	datetime	8	Yes	Sysdate

Table B.6:Attendance and Leave module tbl_ViewAttandance table schema

tbl_ViewAttandance	Keys	Field	Description	Type	Size	Null	Default
		Employee EPF	EPF number of employee	int	8	No	
		Employee Name	Name of the Employee	varchar	50	Yes	
		Leave Type	Leave Type Applied	varchar	50	No	
		No of Days	Days on Leave	int	8	No	
		Covering Emp	Covering Employee Name	varchar	50	Yes	
		Start Date	Leave Start Date	datetime	8	No	Sysdate
		End Date	Leave End Date	datetime	8	No	

Table B.7: Attendance and Leave module tbl_ViewLeave table schema

Training and Development Module

tbl_TRFLocal	Keys	Field	Description	Type	Size	Null	Default
	Foreign	Employee EPF	EPF number of employee	int	8	No	
		Employee Name	Name of the Employee	Varchar	50	Yes	
		Date	Current Date	datetime	50	NO	Sysdate
		Training Programe	Name of Training Programe	varchar	50	NO	
		Institute/ Institute	Name of the place	varchar	50	Yes	
		Start Date	Training Start Date	datetime	50	Yes	
		Duration	Training Duration	Int	8	Yes	
		Cost	Cost of Training	float	8	Yes	
		Budgeted	Budget Allocated for Training	float	8	Yes	
		Line Manager	Line Manager Approval	varchar	50	Yes	
		Divisional Head	Divisional Head Approval	varchar	50	Yes	
		VC	VC Approval	varchar	50	Yes	

Table B.8: Training and Development module tbl_TRFLocal table schema

Performance Management

tbl_TRFLocal	Keys	Field	Description	Type	Size	Null	Default
	Foreign	Employee EPF	EPF number of employee	int	8	No	
		Employee Name	Name of the Employee	Varchar	50	Yes	
		Date	Current Date	datetime	50	NO	Sysdate
		Training Programe	Name of Training Programe	Varchar	50	NO	
		Institute/ Institute	Name of the place	Varchar	50	Yes	
		Start Date	Training Start Date	datetime	50	Yes	
		Duration	Training Duration	Int	8	Yes	
		Cost	Cost of Training	float	8	Yes	
		Budgeted	Budget Allocated for Training	float	8	Yes	
		Line Manager	Line Manager Approval	Varchar	50	Yes	
		Divisional Head	Divisional Head Approval	Varchar	50	Yes	
		VC	VC Approval	Varchar	50	Yes	

Table B.9: Performance Management tblPerformanceEvaluation table schema

APPENDIX C-USER DOCUMENTATION

After completion of successful implementation of system user can access VTACMS system via Network by typing URL on web browser.
Eg: http://localhost:8080/UVTHR/index.php

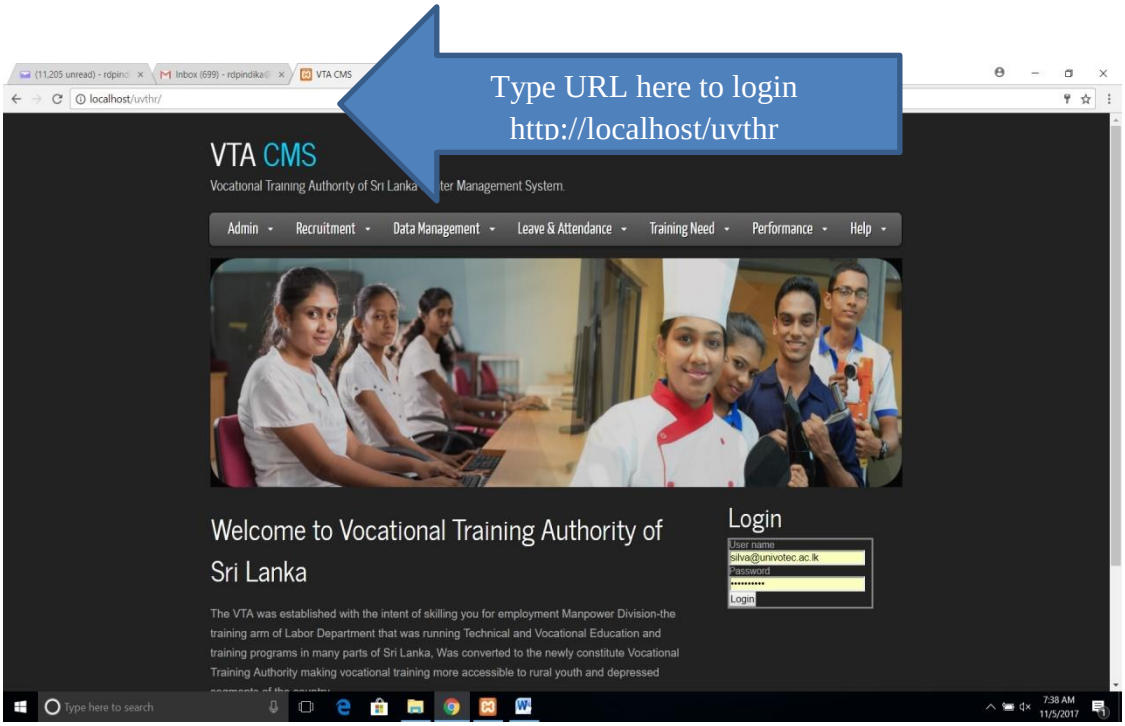


Figure C.1: Login Form Screen

Logging on

All registered employees can access to the system by using the use name and password, Successful login will direct user to system home page and Unsuccessful page will trigger "Login Failed!" error message.
If user forgot the password by clicking „Forgot your password link", he can get his/her password by email by typing correct Security Question and Answer. Or User get an approval from Manger reset password and HR-Admin can reset password for default password.

Using the Navigator / Menu

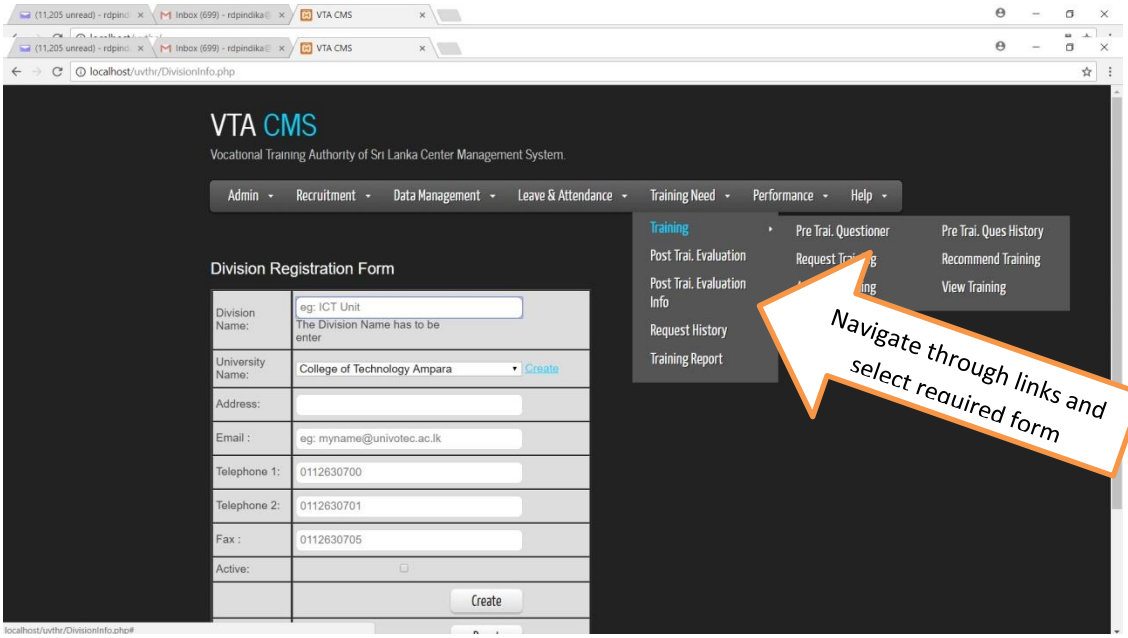


Figure C.2: Using the Navigator / Menu

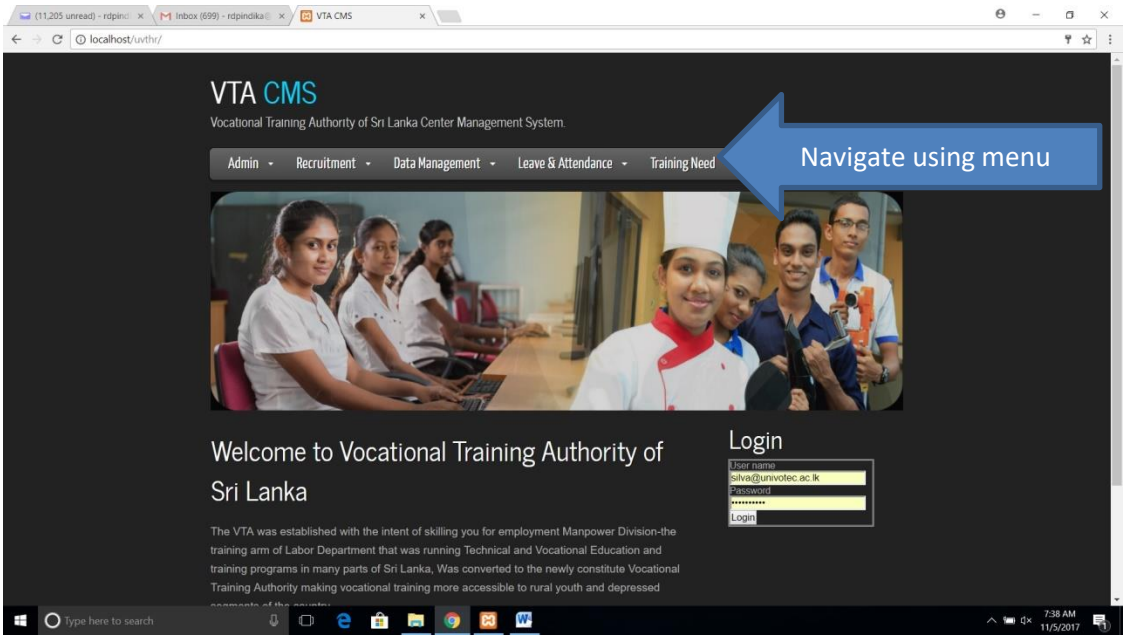


Figure C.3: Navigate using menu paths

Application Messages and tooltips

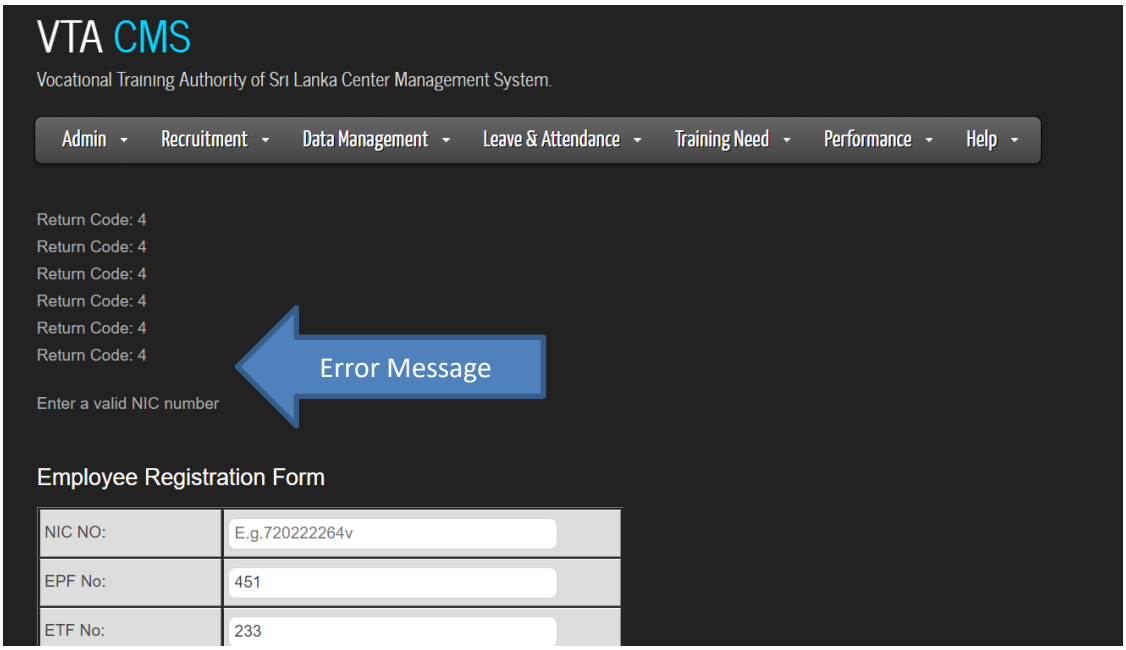


Figure C.4: Error messages are showed in white color

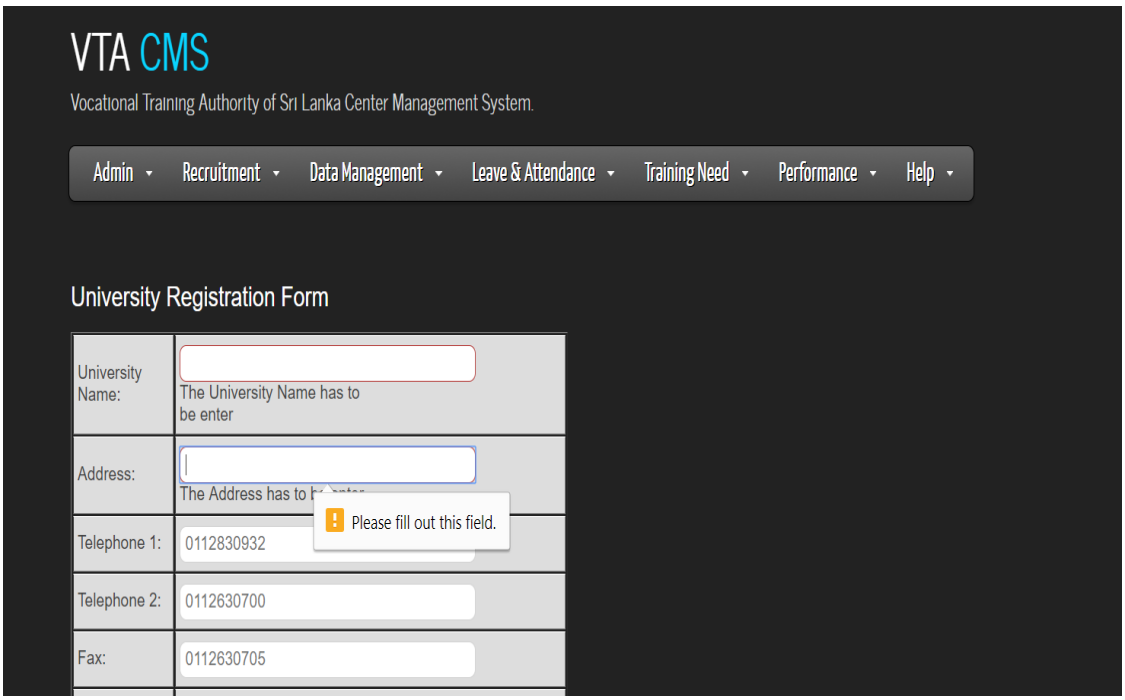


Figure C.5: User Validation are showed with explanation mark

Login Module

Login module allows the administrator to manage all access related functions of the system.

Create User

This sub module allows the admin to grant access rights to relevant users and also to create user.

Form Access

Form access form allows the admin to allocate forms to their respective modules.

User Group

Create user groups form is to create different user roles and allocate users for groups

Reset Password

Reset Password form allows HR-Admin to reset user password to his/her default password on Mangers Approval.

Recruitment Module

Recruitment module is to provide all Recruitment need of the company, from the time recruitment request received to employee get confirmed and issue Appointment Letter. Recruitment module is mainly used by HR staff. Also it can use by senior managers to Request/Approve employee for a new position.

Request Employee

Decision to commence recruitment will be made by Chairman/ VC when vacancies arise after considering the following:

a. Newly created positions (budgeted)
b. Newly created positions (non budgeted)
c. Vacancies arising due to resignations/terminations.

Position on Employee Resignation

When the management decides to accept a resignation letter, the senior manager/ line manager must decide whether the position needs to be replaced or if the work can be allocated among the other members. If the decision is to recruit, then a duly completed Recruitment Requisition forms to be filled and send request for approval.

Approve Employee Request

This form will allow managers to Approve/Reject/Hold Employee recruitment request on Employee resignation.

Request History

Display Request history of Employee recruitment request on Employee resignation.

Define JD (Job Description)

Job description form used to define Job Description for Job Title which relevant to Job specification.

Job Bidding

Job bidding form allows an employee to make a bid for a different position in the company. If the position the user desires, is not listed, the user can create the desired position by clicking the link “job specifications” which will take the user to job description page.

Job Posting

Job Posting form allows the company to make advertise for a vacant position internally or externally. If the position the company wants to advertise is not listed, the company can create the desired position by clicking the link “job specifications”, which will take the user to job description page.

Interview Planning

This sub-module allows the management to effectively evaluate & select the most suitable applicant for a particular job position. Further it allows the management to view the interview history.

Interview Evaluation

Interview evaluation form allows the management to create a new applicant form & enter their observation regarding that applicant. If the Job position is not listed the interviewer can create a new position by clicking on the link “new Job Specifications”, which will take that person to “Define job ID”. If the company is not listed the interviewer can create a new company by clicking on the link “new Company”, which will take that person to “new company” Page.

Interview History

The management can search for the interview details, categorized by Employee name, NIC or designation or by Interviewed by, interview date or expected salary.

Documents to be collect

This from provides an interface for the management to collect the relevant documents from a newly appointed employee.

Induction

The details of the induction process carried out the company are entered.

Data Management Module

Data Management module is to provide for all data management needs of the company. The employee details can be edited, an employee can apply for resignation or details of the subsidiaries of the group can be edited or new subsidiaries can be added. Also it can use by senior managers to Request/Approve an employee's updated details or his resignation request.

Personal Detail Form

An employee can edit his personal details & submit it for approval. The senior management can either approve it or reject it.

Change Details

A user can search the employees by name, NIC no or EPF No. once he has selected the details will be displayed in a table format. After clicking the "Edit" button & updating the data, the user has to option either to confirm the update or cancel it.

Request History

Shows Request History for Approvals.

Resignation Confirmation

Resignation confirmation form allows the company to take back all the official items given to an employee & to make sure that there are no overdue payments or settlements. If the employee's name is not on the confirmed list then user can click "new resignation" & place a new resignation request.

Company Info

Company info. Page allows the user to create a new subsidiary or edit an existing one.

Division Info

Divisional info. Page allows the user to create a new division under a company or edit an existing division. If the company is not available the user has the option to create a new company & then add a division.

Attendance Module

Attendance module is to provide for all attendance related needs of the company. The main function of this module is to record the attendance of the employees. It also allows the employee to request for leave. Also it can use by senior managers to Approve/ reject leave & to verify the daily attendance.

View Attendance

Request Attendance

Request attendance form allows an employee to record his working hours & place a request to approve it.

Approve Attendance
Approve attendance form allows the senior management to approve/reject an attendance request made by an employee.

Request Leave

Request leave form allows the employee to place a request for leave. The request must be placed not more than five days prior to the leave.

Training Module

Training module is to provide all training related information of the company, from the time an employee requests training up to the time an evaluation is made after the employee has attended the training.

View Training

The employees can request training& the top management can approve training request
Request Training

Employees can request for local or overseas training.

TRF Local

In this form employees can request for training within the country (local)

TRF Overseas

In this form employees can request for training overseas.

Performance Management Module

Performance management Module caters to the overall performance related activities of the company. It allows the users/company to evaluate the performance of the employees & form action plans to rectify any inefficiencies.

Performance Evaluation

Performance evaluation form is the third step in the overall performance measurement process. This page allows the user to evaluate an employee in terms of objectives achieved & technical knowledge development

Evaluation Competencies

Evaluation Competencies form allows the evaluator to evaluate an employee based on several factors such as team leadership, communication, team work, commitment, etc. the particular employee also can evaluate himself under these criteria's. The evaluation options are categorized into sub forms. Once a user has selected a rating for each option in the sub criteria the average of the ratings will be automatically calculated

Evaluation Comments

Evaluation comments page allows the evaluator to make comments.

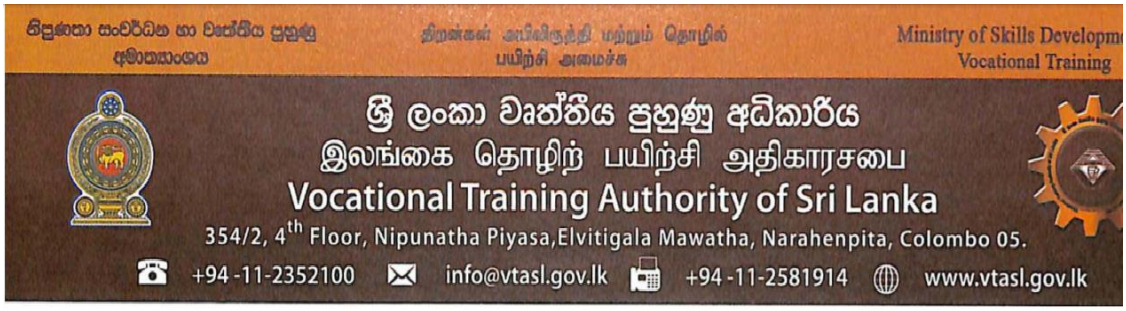
APPENDIX D-MANAGEMENT REPORTS

Introduction

As per the objectives set out at the inception phase of this system, management reports provide useful information to the management to assist in their decision making process. Some mandatory data analysis reports will be illustrated and discussed in detail in the following topics.

Employee Detail Report

The Employee Analysis report shows (Figure D.1)employee details including section they attached. It includes the relevant employee details and the divisions that he/she is attached in. These details are captured from the employee personal details activity.



Employee Personaldetails Details of Institute

No	Full Name	Division	Designation	Mobile No	Address
1	Kapila Gamini Abhayawardene Goonasekara	CEO Office	CEO	0770383752	Gannoruwa Road, Peradeniya
3	D.S Hettiarachchi	Administration Division	Director Administration	0718777775	No:623,Temple Road,Maharagama
4	Ambawalage Wickremapala Silva	Finance Office	Director Finance	0718365483	No.1239, Hokandara Road,Pannipitiya
5	Chulani Pramila	Student Services Unit	Assistant Registrar	0714447203	59A, Mapalagama Road, Wanduramba, Galle
6	Sandya Jayawardene	Skills Sector Project Division	Assistant Registrar	0718112146	Moratu Mulla,Moratuwa
7	Sampath Ranathunga	Maintanance Unit	Maintenance Officer	0773436770	No.60, Kandy Road, Miriswatta, Mudungoda
8	Buddika Prabhath	CEO Office	Office Aid	0777654367	No765,Dikwalla,Galle

Figure D.1: Employee Detail Report

List of Divisions Respect to the Institutes Report

The list of all divisions with registered Institute is shown below in Figure D.2. This allows the management to get information about their Institute and division with all relevant information.

Divisions of The Institute Report

ID	Division	Institute	Address	Telephone 01	Telephone 02	Fax	Email
1	Department of Construction Technology	Vocational Training Center Padukka	Galagedara, Padukka	112630704	112630704	0112630704	dctpk@vtasl.gov.lk
2	Department of Manufacturing Technology	National Vocational Training Institute Narahenpita	Galagedara, Padukka	112630704	112630704	0112630704	dmtpk@vtasl.gov.lk
3	Department of Electrical & Electronics Technology	Vocational Training Center Padukka	Galagedara, Padukka	112630704	112630704	0112630704	deetpk@vtasl.gov.lk
4	Student Services Unit	Vocational Training Center Padukka	Galagedara, Padukka	112630704	112630704	0112630704	ssupk@vtasl.ov.lk
5	Continuing Education Centre	Vocational Training Center Padukka	Galagedara, Padukka	112630704	112630704	0112630704	cecpk@vtasl.gov.lk
6	Skills Sector Project Division	National Vocational Training Institute Narahenpita	Galagedara, Padukka	112630704	112630704	0112630704	sspdpk@vtasl.gov.lk
7	Administration Division	Vocational Training Center Padukka	Galagedara, Padukka	112630704	112630704	0112630704	adminpk@vtasl.gov.lk
8	CEO Office	Vocational Training Center Padukka	Galagedara, Padukka	112630704	112630704	0112630704	ceopk@vtasl.gov.lk
9	Internal Audit	National Vocational Training Institute Narahenpita	Galagedara, Padukka	112630704	112630704	0112630704	iapk@vtasl.gov.lk
10	Finance Office	Vocational Training Center Padukka	Galagedara, Padukka	112630704	112630704	0112630704	financepk@vtasl.gov.lk
11	Maintanance Unit	Vocational Training Center Padukka	Galagedara, Padukka	112630704	112630704	0112630704	maintanancepk@vtasl.gov.lk

Figure D.2: List of Divisions Respect to the Institutes Report

Bar Chart for Institute Vs Employee.

The following chart show out details of employees working with respective institutes. It will give managers to quick overview of employees register under etch institutes.

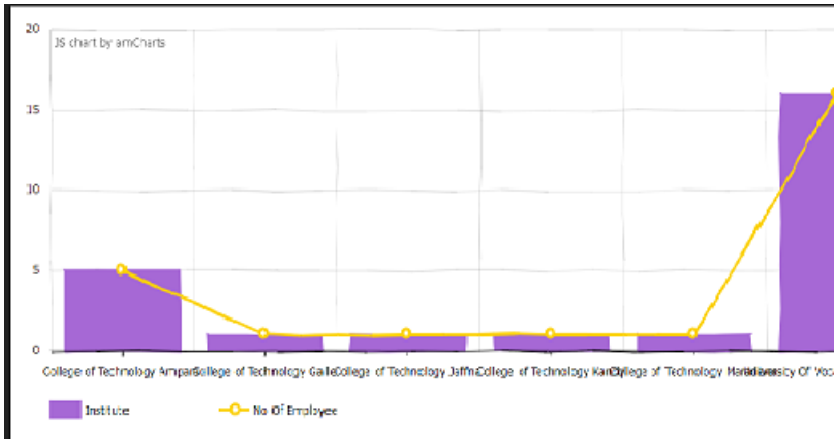


Figure D.3: Bar Chart for Institute Vs Employee

Employee Leave Detail Report

Figure D.4 shows employee leave detail report which offer to Managers. This report shows employee name, applied leave type ,number of days and duty covering employee's epf number.

Figure D.4:Leave Details Report

Approved Training Details Report

Figure D.5 shows training report based on duration of training. This report shows employee EPF number name of training program duration and cost of program.

Figure D.5:Approved Training Report

APPENDIX E- TEST RSESULT

Recruitment Module

User: HR Admin
NewlyCreatedPosition.php **Form Controls Test**
Form Path: http://localhost/uvthr/NewlyCreatedPosition.php

Test Case	Summary	Steps	Expected Results
1. Load Present Employee Names to "Reports To, Line Manager, Divisional Head, VC Drop Down menu" at page Loading	Dropdown will load and display all the presently working name	Load Employee Name at page loading	1.Successful page load will Display all presently working Employees name 2. Failure Load will Display "Data loading Failed" Error Message
2. Job Specification	Dropdown will load and display all the Job Specification Title name already defined	Select Job specification name From Drop down box	1.Successful page load will Display all the Job Specification Title name 2. Failure Load will Display "Data loading Failed" Error Message
3. Select Target Date	By Clicking on "Target Data" Text box calendar will appear from that user allowed to select a Date	By Clicking on "Target Date" Textbox calendar will appear from that user allowed to select a Date	1.Successful selection will display Date on textbox in "Day, DD MM YYYY HH:MM:SS" format (Wed, 16 June 2017 09:40:15) 2. Failure selection will raise date format error at the time of clicking Request button
4. Enter Designation	User to enter Designation	Enter Designation name on Designation Textbox	Enter Designation name on Designation Textbox
5. Enter Minimum remuneration for new applicant	User to enter Minimum remuneration for new applicant (Floating point value)	Enter Minimum remuneration as Numeric value, Non numeric value entering not allowed	Minimum eight characters allowed with decimal points. Only Numeric value allowed, Non numeric value entering not allowed

6. Enter comments	User to enter comments on Request	Enter comments on comment Textbox	Enter comments on comment Textbox

Table E.1: Request Employee New window controls

NewlyCreatedPosition.php Form Request Button click Test

Form Path: http://localhost/uvthr/NewlyCreatedPosition.php
User = HR Admin
Current Date = Thu, 08 July 00:00:00

Field Name	Input Value Test-1	Input Value Test-2	Input Value Test-3	Input Value Test-4
Newly Created Position	Budgeted	Budgeted	Budgeted	Budgeted
Target Date	Wed,28 April	NULL	Thu,08 July	Thu,08 July
Designation	Engineer	NULL	Engineer	Engineer
Job Specification	Engineer	NULL	Engineer	Engineer
Justification for recruitment	Abdul Basith	Abdul Basith	Abdul Basith	Abdul Basith
Minimum remuneration for new applicant	40000.00	NULL	40000.00	40000.00
Maximum remuneration for new applicant	50000.00	NULL	50000.00	50000.00
Comments	NA	NULL	NA	NA
Line Manager	Gihan	Gihan	Gihan	Gihan
Divisional Head	Chamil	Chamil	Chamil	Chamil
VC	Chrishan	Chrishan	Chrishan	
Message/Expected Results	For Target date, Back date not allowed	*Target Date Required *Designation Required * Min Salary Required *Max Salary Required	Successfully Saved	Attendance Request Already Exists

Table E.2: Request Employee New Request button click Test

NewlyCreatedPosition.php Form Request Button click Database value Test

Test Case	Summary	Steps	Expected Results
1.After Request Button click Red colored error message occurs check tables for changers	If there is an error after request button click, there should not be any changers on Database	Enter value as per *Table 3.2.1*and try to generate error message, Then check table tbl_RecNewPosition for changers	No changers on Database or tbl_RecNewPosition table
2. Enter a already exist Attendance request	If there is a duplicate request For same Designation, then system should reject	Follow Test case 2 from table *Table 3.2.1*	Sp_Save_RecNewPosition stored procedure executed and return "Request Already Exists" error message
3. After Request Button click "Successfully Saved" message Appears check tables for changers	If there is no error message and "Successfully saved" message appear then for tbl_RecNewPosition table new records should be inserted	Enter values as per *Table 3.2.1*and try to generate success message, Then check table tbl_RecNewPosition for changers	All entered values form should be inserted to tbl_RecNewPosition table

Table E.3: Request Employee New Request button click DB Test

Data Management Module

ResignationReq.php Form Controls Test
Form Path: http://localhost/uvthr/ResignationReq.php

Test Case	Summary	Steps	Expected Results
1. Load Present Recruit Names to "Name of Employee, Line Manager, Divisional Head, VC" at page	Dropdown will load and display all "Name of Employee, Line Manager, Divisional Head, VC" name	"Name of Employee, Line Manager, Divisional Head, VC" at page loading	1.Successful page load will Display all "Name of Employees, Line Manager, Divisional Head, VC" names 2. Failure Load will Display "Data loading Failed" Error Message

Loading			
2. Load" Employee EPF No, designation, Immediate Supervisor, Company, Department" once Employee Name selected	By clicking on drop down menu of Employee name "Employee EPT No, designation, Immediate Supervisor, Company, Department" will appear	By clicking on drop down menu of Employee name. Select Employee name	1.Successful selection will show the "Employee EPF No, Designation, Immediate Supervisor, Company, Department" on textbox 2. Failure selection will not show the date.
3. "Anticipated final date" will allow to enter dates	By Clicking on Text box it will show a dropdown calendar from that user allows to select a date	Click on Textbox with blue color, select a date from drop down calendar that will appear on textbox	1.Successful selection will show the selected date on textbox 2. Failure selection will not show the date.
4. "Final Date" will allow to enter dates	Final Date will be automatically calculate by system. This will be 90 days from current date	System Auto calculate at page load	System Auto calculate at page load
5. Save Induction	After completing of All required field allow user to Save Induction	1.Complete all required fields without any error 2. Click Save button	1.Successful Create will Save Resignation request & Display "Successfully Saved" Message 2. Failure Save will Display Message * Select Employee Name for EPF * Final Date Required * Anticipated Final Date Required * Reason Required

Table E.4: Emp Resignation Request window controls

ResignationReq.php FormRequest Button click Test

Form Path: http://localhost/uvthr/ResignationReq.php

User = HR Admin

Current Date = Thu, 13 July 00:00:00

Field Name	Input Value Test-1	Input Value Test-2	Input Value Test-3	Input Value Test-4
Name of Employee	NULL	IndikaPriya	IndikaPriya	IndikaPriya
Employee EPF No	NULL	5544	5544	5544
Designation	NULL	Support Engineer	Support Engineer	Support Engineer
Immediate Supervisor	NULL	Gihan	Gihan	Gihan
Company	NULL	JITH	JITH	JITH
Department	NULL	Clarity	Clarity	Clarity
Final Date	NULL	10/13/	10/13/	10/13/
Anticipated final date	NULL	5/14/	7/27/	7/27/
Reason	NULL	NA	NA	NA
Returned documents and goods	NULL	Yes	Yes	Yes
Line Manager	NULL	Chamil	Chamil	Chamil
Divisional Head	NULL	Crishan	Crishan	Crishan
VC	NULL	JIT	JIT	JIT
Message/Expected Results	*Select Employee Name for EPF * final Date Required *Anticipated Final Date Required * Reason Required	* for Anticipated final date, Bank date not allowed	Successfully Saved	Recodes Already Exist

Table E.5: Emp Resignation Request click Test

ResignationReq.php FormRequest Request Button click Database value Test

Form Path: http://localhost/uvthr/ResignationReq.php

User = HR Admin

Test Case	Summary	Steps	Expected Results
1.After Save Button click Red colored error message occurs check tables for changers	If there is an error after Save button click, there should not be any changers on Database	Enter value as per *Table 4.3* and try to generate error message, Then check table tbl_EmpResignationReq _Temp for changers	No changers on Database or tbl_EmpResignationReq _Temp table
2. Enter a already exist Job Bidding request	If there is a duplicate request For same Employee & same End date, then system should reject	Follow Test case 4 from table *Table4.3*	Sp_Save_EmpResignationReq stored procedure executed and return "Request Already Exists" error message
3. After Request Button click Green colored "Successfully Saved" message Appears check tables for changers	If there is no error message and "Successfully saved" message appear then for tbl_EmpResignationRecq_Temp table new records should be inserted	Enter values as per *Table 4.3*and try to generate success message, Then check table tbl_EmpresignationRecq _Temp for changers	All entered values form should be inserted to tbl_EmpResignationReq _Temp table

Table E.6: Emp Resignation Request click DB Test

Attendance Module

RequestLeave.php Form Controls Test

Form Path: http://localhost/uvthr/RequestLeave.php

Test Case	Summary	Steps	Expected Results
1. Load Present Employee Names to 'Employee Name Drop Down menu at page Loading	Dropdown will load and display all the presently working employee name	Load Employee Name at page loading	1.Successful page load will Display all presently working Employees name 2. Failure Load will Display "Data loading Failed" Error Message
2. Load Employee EPF	Employee EPF number will be loading to "Employee EPF" Textbox by selecting Appropriate Employee Name	Select Employee Name From Drop Down box	1.Successful Employee Name selection will load Employee EPF to textbox 2. Failure selection will not load the employee EPF number
3. Select Leave Applied Type	Select the Leave applied type from drop down list	Select the leave applied type from drop down list	Selected value will appear on drop down box
4. Select From Date from Calendar	Selected calendar date will appear	Select From Date from Calendar	Selected Date will appear on textbox in Day,DD YYYY format
5. Select Number Leave Days	Select Number Leave Days	From down box select number of days for leave	1.Selected Number will appear on Textbox 2. To date will be calculated and appear on TO date textbox
6. If Number of days greater than 2 then request to enter comments	If Number of days greater than 2 then request to enter comments	If Number of days greater than 2 then request to enter comments	If Number of days greater than 2 then request to enter comments

Table E.7: Request Leave window controls

RequestLeave.php Form Request Button click Test

Form Path: http://localhost/uvthr/RequestLeave.php
User = HR Admin
Current Date = Mon, 05 July
Test 8 – Assume that Employee has already taken his 7 casual lave and trying to request another 3

Field Name	Input Value Test-1	Input Value Test-2	Input Value Test-3	Input Value Test-4	Input Value Test-5	Input Value Test-6	Input Value Test-7	Input Value Test-8
Employee Name	IndikaPriya	Indika Priya	NULL	IndikaPriya	IndikaPriya	IndikaPriya	Indika Priya	Indika Priya
Employee EPF	5544	5544	NULL	5544	5544	5544	5544	5544
Leave Applied	Casual Leave	Casual Leave	NULL	Casual Leave	Casual Leave	Casual Leave	Casual Leave	Casual Leave
From	Mon,28 June	Tue,20 July	NULL	Mon,05 July	Mon,05 July	Mon,05 July	Mon,05 July	Mon,05 July
No of days	2	2	NULL	3	3	3	3	3
To	Wed,30 June	Thu,22 July	NULL	Wed,07 July	Thu,08 July	Thu,08 July	Thu,08 July	Thu,08 July
Comments	NA	NA	NA	NA	Personal	NA	NA	NA
Message/ Expected Result	Back date more than 5 not allowed	Future date more than 5 not allowed	Select Employee Name for EPF From Date Required To Date Required, Select No of days for To Date No of days greater than 2, pls comment	No of days greater than2, pls comment	Number of casual day per year exceeded	Successfully Saved	Leave Request Already Exist	Casual Request per year exceed 7

Table E.8: Request Leave Request button click Test

RequestLeave.php Form Request Button click Database value Test

Test Case	Summary	Steps	Expected Results
1.After Request Button click Red colored error message occurs check tables for changers	If there is an error after Request button click, there should not be any changers on Database	Enter value as per *Table 5.2.1*and try to generate error message, Then check table tbl_LeaveReq_Temp for changers	No changers on Database or tbl_ Leave Req_Temp table
2. Enter a already exist Leave request	If there is a duplicate request For same employee with same From & To, then system should reject	Follow Test case 7 from table *Table5.2.1*	Sp_Save_Leave stored procedure executed and return "Leave Request Already Exists" error message
3. After Request Button click Green colored "Successfully Saved" message Appears check tables for changers	If there is no error message and "Successfully saved" message appear then for tbl_LeaveReq_Temp table new records should be inserted	Enter values as per *Table 5.2.1*and try to generate success message, Then check table tbl_LeaveReq_Temp for changers	All entered values form should be inserted to tbl_LeaveReq_Temp table

Table E.9: Request Leave Request button click DB Test

Please note –Complete Test case for each form would be given in the CD

APPENDIX F-CODE LISTING

Login to the System

```
<?php
require_once 'config.php';  //Site and dbconfig

if(isset($_POST['Login']['submit'])) //check button has click
{
   $strUserName = $_POST['strUserName'];//convert the field values to variables
   $strPwdI = $_POST['strPwd'];
try  //error handling
   {        //connect to the database
      $conn = new PDO('mysql:host='.DB_HOST.';port='.DB_PORT.';dbname='.DB_NAME,DB_USER,DB_PASS);
      $conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);
                        //quarry for login table for stored credentials
      $sql = 'SELECT strUserName,strPwd,strGroup,intEPFNo FROM uvt_db.tbl_login where
strUserName=:strUserName' ;

      $stmt = $conn->prepare($sql);
      $stmt->execute(array(':strUserName' => $strUserName));

      $result = $stmt->fetchAll();

if ( count($result) ) {
                                    $row = $result[0];
                                    $dbPassword = $row['strPwd'];

                                    //Verify User password with DB Password
                                    if (password_verify($strPwdI, $dbPassword)) {

                                                                        $_SESSION['username']= $row['strUserName'];
                                                                        $_SESSION['strGroup']= $row['strGroup'];
                                                                        $_SESSION['intEPFNo']= $row['intEPFNo'];
                                                                        //Display success Message and direct to index.php
                                                                        echo "<script>alert('Welcome to HRM !');</script>";
                                                                        echo
"<script>document.location.href='index.php'</script>";
                                    }//Display error Message
                                    else
                                    {
                                                echo "<script>alert('Please check your password!');</script>";
                                                echo "<script>document.location.href='index.php'</script>";
                                    }
      } else {
echo "<script>alert('Please check your user name and password!');</script>";
                                    echo "<script>document.location.href='index.php'</script>";
      }


   }
            catch (Exception $ex)
            {
            echo "<script>alert('Login Error !');</script>";
echo "<script>document.location.href='index.php'</script>";
   }
}
```

Code Listing F.1: Login to the System

Insert Delete View Update Institute Information

```
<?php
require_once 'config.php';

   $strInstituteName = trim($_POST['strInstituteName']);  ]; //convert the field values to variables
   $strAddress = trim($_POST['strAddress']);
   $intTelephone1 = trim($_POST['intTelephone1']);
   $intTelephone2 = trim($_POST['intTelephone2']);
   $strFax = trim($_POST['strFax']);
            $strEmail = trim($_POST['strEmail']);
            $bitActive = trim($_POST['bitActive']);
            $strCreatedBy = $_SESSION['username'];
            $strUpdatedBy = $_SESSION['username'];
            $dtUpdatedOn = '-01-01';

// ----- Begin Validate the input
  $errors = array();

if (strlen($strInstituteName) == 0)
array_push($errors, "Please enter InstituteName");

if (strlen($intTelephone1) < 10)
array_push($errors, "Telephone1 should be less-than 10 characters");

if (!(strcmp($bitActive, "Active") || strcmp($bitActive, "In-Active") || strcmp($bitActive, "Other")))
array_push($errors, "Please specify your Institute status");


if (!filter_var($strEmail, FILTER_VALIDATE_EMAIL))
array_push($errors, "Please specify a valid email address");
//Prepare errors for output
  $output = '';
foreach($errors as $val) {
//$output .= "<p class='output'>$val</p>";
            $_SESSION['error'][] = $val;
  }

  // ----- End Validate the input
try
{
      $conn = new PDO('mysql:host='.DB_HOST.';port='.DB_PORT.';dbname='.DB_NAME,DB_USER,DB_PASS);
      $conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);

if (count($errors) == 0) {     // If no errors were found perform CRUD
            if(isset($_POST['Create']))
            {
      $sql = 'INSERT INTO
tbl_institute(strInstituteName,strAddress,intTelephone1,intTelephone2,strFax,strEmail,bitActive,strCreatedBy,str
UpdatedBy,dtUpdatedOn) '
            .
'VALUES(:strInstituteName,:strAddress,:intTelephone1,:intTelephone2,:strFax,:strEmail,:bitActive,:strCreatedBy,:st
rUpdatedBy,:dtUpdatedOn)';

      $stmt = $conn->prepare($sql);
      $stmt->execute(array('strInstituteName'=>$strInstituteName,
                  'strAddress'=>$strAddress,
                  'intTelephone1'=>$intTelephone1,
                  'intTelephone2'=>$intTelephone2,
                                                      'strFax'=>$strFax,
                                                      'strEmail'=>$strEmail,
                                                      'bitActive'=>$bitActive,
                                                      'strCreatedBy'=>$strCreatedBy,
```

```
                                                        'strUpdatedBy'=>$strUpdatedBy,
                                                        'dtUpdatedOn'=>$dtUpdatedOn,
                                                        ));
                        $_SESSION['info'][] = 'Created Institute Name :'.$strInstituteName;
                }
                if(isset($_POST['Update']))
                {
        $sql = 'UPDATE tbl_institute '
                        . 'SET strAddress=:strAddress, intTelephone1=:intTelephone1, intTelephone2=:intTelephone2,
strFax=:strFax, strEmail=:strEmail, bitActive=:bitActive, strCreatedBy=:strCreatedBy, strUpdatedBy=:strUpdatedBy,
dtUpdatedOn=:dtUpdatedOn WHERE strInstituteName=:strInstituteName';

        $stmt = $conn->prepare($sql);
        $stmt->execute(array('strInstituteName'=>$strInstituteName,
                        'strAddress'=>$strAddress,
                        'intTelephone1'=>$intTelephone1,
                        'intTelephone2'=>$intTelephone2,
                                                        'strFax'=>$strFax,
                                                        'strEmail'=>$strEmail,
                                                        'bitActive'=>$bitActive,
                                                        'strCreatedBy'=>$strCreatedBy,
                                                        'strUpdatedBy'=>$strUpdatedBy,
                                                        'dtUpdatedOn'=>$dtUpdatedOn,
                                                        ));
                        $_SESSION['info'][] = 'Updated Institute Name :'.$strInstituteName;
                }
                if(isset($_POST['Delete']))
                {

        $sql = 'DELETE FROM tbl_institute '
                        . 'WHERE strInstituteName=:strInstituteName';

        $stmt = $conn->prepare($sql);
        $stmt->execute(array('strInstituteName'=>$strInstituteName));

                        $_SESSION['info'][] = 'Deleted Institute Name :'.$strInstituteName;

                }

                if(isset($_POST['View']))
                {
        $sql = 'SELECT
strInstituteName,strAddress,intTelephone1,intTelephone2,strFax,strEmail,bitActive,strCreatedBy,strUpdatedBy,dt
UpdatedOn from tbl_institute WHERE strInstituteName=:strInstituteName';

        $stmt = $conn->prepare($sql);
        $stmt->execute(array(':strInstituteName'=>$strInstituteName
                                                        ));

                                        $_SESSION['info'][] = '<table>';
                                        $_SESSION['info'][] = '<thead>';
                                        $_SESSION['info'][] = '<tr>';
                                        $_SESSION['info'][] = '<th>Institute Name</th>';
                                        $_SESSION['info'][] = '<th>Address</th>';
                                        $_SESSION['info'][] = '<th>Telephone1</th>';
                                        $_SESSION['info'][] = '<th>Telephone2</th>';
                                        $_SESSION['info'][] = '<th>Fax</th>';
                                        $_SESSION['info'][] = '<th>Email</th>';
                                        $_SESSION['info'][] = '<th>Active</th>';
                                        $_SESSION['info'][] = '<th>CreatedBy</th>';
                                        $_SESSION['info'][] = '<th>UpdatedBy</th>';
                                        $_SESSION['info'][] = '<th>UpdatedOn</th>';
```

```
                                        $_SESSION['info'][] = '</tr>';
                                        $_SESSION['info'][] = '</thead>';
                                        $_SESSION['info'][] = '<tbody>';

                                        while ($row = $stmt->fetch(PDO::FETCH_NUM))
                                        {
                                                        $_SESSION['info'][] = '<tr>';
                                                        $_SESSION['info'][] = '<td>'.$row[0].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[1].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[2].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[3].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[4].'</td>';
                                                                $_SESSION['info'][] = '<td>'.$row[5].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[6].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[7].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[8].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[9].'</td>';

                                                        $_SESSION['info'][] = '</tr>';

                                        }
                                                        $_SESSION['info'][] = '</tbody>';
                                                        $_SESSION['info'][] = '</table>';

            }
            if(isset($_POST['ViewA']))
            {
        $sql = 'SELECT
strInstituteName,strAddress,intTelephone1,intTelephone2,strFax,strEmail,bitActive,strCreatedBy,strUpdatedBy,dt
UpdatedOn from tbl_institute';

        $stmt = $conn->prepare($sql);
        $stmt->execute(array());
                                        $_SESSION['info'][] = '<table>';
                                        $_SESSION['info'][] = '<thead>';
                                        $_SESSION['info'][] = '<tr>';
                                        $_SESSION['info'][] = '<th>Institute Name</th>';
                                        $_SESSION['info'][] = '<th>Address</th>';
                                        $_SESSION['info'][] = '<th>Telephone1</th>';

$_SESSION['info'][] = '<th>Telephone2</th>';
                                        $_SESSION['info'][] = '<th>Fax</th>';
                                        $_SESSION['info'][] = '<th>Email</th>';
                                        $_SESSION['info'][] = '<th>Active</th>';
                                        $_SESSION['info'][] = '<th>CreatedBy</th>';
                                        $_SESSION['info'][] = '<th>UpdatedBy</th>';

                                        $_SESSION['info'][] = '<th>UpdatedOn</th>';
                                $_SESSION['info'][] = '</tr>';
                                        $_SESSION['info'][] = '</thead>';
            $_SESSION['info'][] = '<tbody>';

                                        while ($row = $stmt->fetch(PDO::FETCH_NUM))
                                        {
                                                        $_SESSION['info'][] = '<tr>';
                                                        $_SESSION['info'][] = '<td>'.$row[0].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[1].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[2].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[3].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[4].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[5].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[6].'</td>';
                                                        $_SESSION['info'][] = '<td>'.$row[7].'</td>';
```

```
                                                    $_SESSION['info'][] = '<td>'.$row[8].'</td>';
                                                    $_SESSION['info'][] = '<td>'.$row[9].'</td>';

                                                    $_SESSION['info'][] = '</tr>';

                                            }
                                                    $_SESSION['info'][] = '</tbody>';
                                                    $_SESSION['info'][] = '</table>';
                                    }
}
}
catch (Exception $ex)
{
            $_SESSION['error'][] = $ex->getMessage();
}
header("Location: ".$_SERVER['HTTP_REFERER']);
?>
```

Code Listing F.2: Insert Delete View Update Institute Information

Password change

```
<?php
require_once 'config.php';
   $strUserName = $_POST['strUserName'];
   $strPwdI = $_POST['strPwd'];
   $strPwdN = $_POST['strPwdN'];
try
{
$conn = new PDO('mysql:host='.DB_HOST.';port='.DB_PORT.';dbname='.DB_NAME,DB_USER,DB_PASS);
$conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);

                        // Crypt password
                        $strPwdN = password_hash($strPwdN, PASSWORD_BCRYPT);
//----------
$sql = 'SELECT strUserName,strPwd,strGroup,intEPFNo FROM uvt_db.tbl_login where
strUserName=:strUserName' ;

      $stmt = $conn->prepare($sql);
      $stmt->execute(array(':strUserName' => $strUserName));
       $result = $stmt->fetchAll();



if ( count($result) ) {


                                    $row = $result[0];

                                    $dbPassword = $row['strPwd'];
                                    if (password_verify($strPwdI, $dbPassword)) {

 $sql2 = 'UPDATE tbl_login '. 'SET strPwd=:strPwdN  WHERE strUserName=:strUserName';

                        $stmt2 = $conn->prepare($sql2);
                        $stmt2->execute(array('strUserName'=>$strUserName,'strPwdN'=>$strPwdN
                                                                                    ));
                                    $_SESSION['info'][] = 'Password updated :'.$strUserName;
                                    }
                                    else
```

```
                                    {
                                    $_SESSION['error'][] = 'Old password does not match !!';
                                    }
//----------
                            }
}
catch (Exception $ex)
{
            $_SESSION['error'][] = $ex->getMessage();
}

header("Location: ".$_SERVER['HTTP_REFERER']);

?>
```

Code Listing F.3: Password change

Please note –Complete code would be given in the CD

APPENDIX G-CLIENT CERTIFICATE

නිපුණතා සංවර්ධන හා වෘත්තීය පුහුණු අමාත්‍යාංශය
திறன்கள் அபிவிருத்தி மற்றும் தொழில் பயிற்சி அமைச்சு
Ministry of Skills Development & Vocational Training

ශ්‍රී ලංකා වෘත්තීය පුහුණු අධිකාරිය
இலங்கை தொழிற் பயிற்சி அதிகாரசபை
Vocational Training Authority of Sri Lanka

354/2, 4th Floor, Nipunatha Piyasa,Elvitigala Mawatha, Narahenpita, Colombo 05.

+94 -11-2352100 info@vtasl.gov.lk +94 -11-2581914 www.vtasl.gov.lk

My No. 011/SC/2017

20.10.2017

The Director,
University of Colombo School Computing,
No 35.Reid Avenue,
Colombo 07.

Center management System For Vocational Training Authority

"Online Center Management System" project for Vocational Training Authority has been undertaken by Mr.R.D.P.Indika Priyadarshana as a fulfillment for the requirement of Bachelor of Information Technology Degree Program Offered by University Of Colombo School Of Computing. It is intended as a solution for Human Rescores & student management activities that to be carried out as main business options.

This Center management system is a very important component of a Management Information System. It was demonstrated to me and I herewith attest for its overall functionality showing promise that it can be incorporated to a prospective Management Information System (MIS) package.

This letter is issued upon bearer's request

W.A.Sunethra
Director Administration
Vocational Training Center
Galagedara - Padukka

Chairman : 2581904 | Vice Chairman : 2506915 | Director General : 2595993 | Tel : 2352100/2596516/2596517/2595992

ජීවිතයට හැකියාවක් ~ හැකියාවට රැකියාවක්

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