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System Development Project undertaken in partial fulfillment of the
requirements for the BSc Degree in Information and Communication
Technology

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Project Details		
Project Theme	Task Management System for KDU	
Start Date	13/05/2013	
Submission Date	02/01/2014	
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Abstract

General Sir John Kotelawala Defence University provides undergraduate and post graduate programs to the military officer cadets as well as to the civil students on payment basis. It has a very wide organizational hierarchy and numbers of tasks are handled by employees in this hierarchy. In present situation manual task allocation procedure is used within KDU and there are many problems that can be seen in the manual procedure such as keep tracking what task is assigned to who?, the deadliness of tasks and less means of communication regarding to tasks. This research defined the problem domain as KDU and driven with the aim of producing a computerized Task Management System which will provide benefits over the extant procedure.

For this research a mix of qualitative and quantitative methodologies were used. As data gathering techniques questionnaires, interviews, observations and document reviews were used and they reflected the mixed methodological nature of the research. After gathering the necessary data, gathered data were analyzed thoroughly quantitatively and qualitative to attain the system requirement specification for the software solution.

After producing the proper requirement specification, software was coded successfully using a mix of languages and frameworks. Then the working prototype it was tested to detect errors and bugs. Several testing strategies were used in this process. When the testing phase completed, the system was implemented in the real environment using the parallel changeover strategy. Later an evaluation phase was carried out to get the feedback from the users about the successfulness of the product outcome.

This research was carried out in different phases mentioned in the above and a successful working software solution was produced as the outcome of this research project.

Plagiarism Declaration

We confirm that the enclosed written work, entitled "*Task Management System for KDU*" is entirely our ideas except where explicitly stated otherwise. We declare that wherever we used copying, paraphrasing, summarizations or other appropriate mechanism related to the use of another author's work, it has been properly acknowledged in accordance with normal scholarly conventions. We understand that wherever 6 or more consecutive words are extracted from a source they must be acknowledged and 10 consecutive words that are unacknowledged will be regarded as of plagiarism.

Signed: WMIL Wasalage
(Project Leader)

Dated: 2014-01-02

Acknowledgement

We would like to express our deepest appreciation to all those who provided us the possibility to complete this project successfully.

We would like to express gratitude towards all officers, staff members of KDU without whose valuable input this would have been possible. We thank them heartily for their valuable time squandered for our benefit.

In addition, a special thanks goes to Head of Department Lt. Col SPP Pakshaweera and all the staff members of IT & Mathematics who provided their valuable advises during the project.

We would also like to thank our families and colleagues, who provided unwavering support through the entire project.

Furthermore, a special gratitude we give to, Mr.Roshan Senevirathna, who helped us to coordinate our project through technical obstacles especially in software development phase.

Finally and most importantly, a very big “thank you” is due to our project supervisor Mr.Nandana Pathirage for his continues support and inspiring guidance throughout the research project.

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Abbreviations

CO- Commanding Officer

DR- Deputy Registrar

DVC (A) - Deputy Vice Chancellor (Academic)

DVC (D) - Deputy Vice Chancellor (Defence)

HOD- Head of Department

KDU- Kotelawala Defence University

OCLS- Officer Commanding in Logistic Services

SQ Diagrams- Sequence Diagrams

TMS- Task Management System

UML- Unified Modeling Language

VC- Vice Chancellor

1.0 Introduction and Problem Outline

This chapter is dedicated to present an introduction to the research and an outline of the problem which would function as the foundation of the entire project. Furthermore in this chapter it is identified the correct problem domain and the core of the problem to steer this research project in the right direction.

1.1 Situation Overview

General Sir John Kotelawala Defence University provides undergraduate and post graduate programs to the military officer cadets as well as to the civil students on payment basis. In the current system there are 8 faculties in the fields namely Defense & Strategic Studies, Engineering, Medicine, Law, Graduate Studies, Research & Development, Allied Health Science and Management, Social Sciences & Humanities. There are several departments working under these faculties. There are military personals and civil staff working in the administrations process and as well qualified lecturers.

Following figure shows the administrative hierarchy of the Kotelawala Defence University.

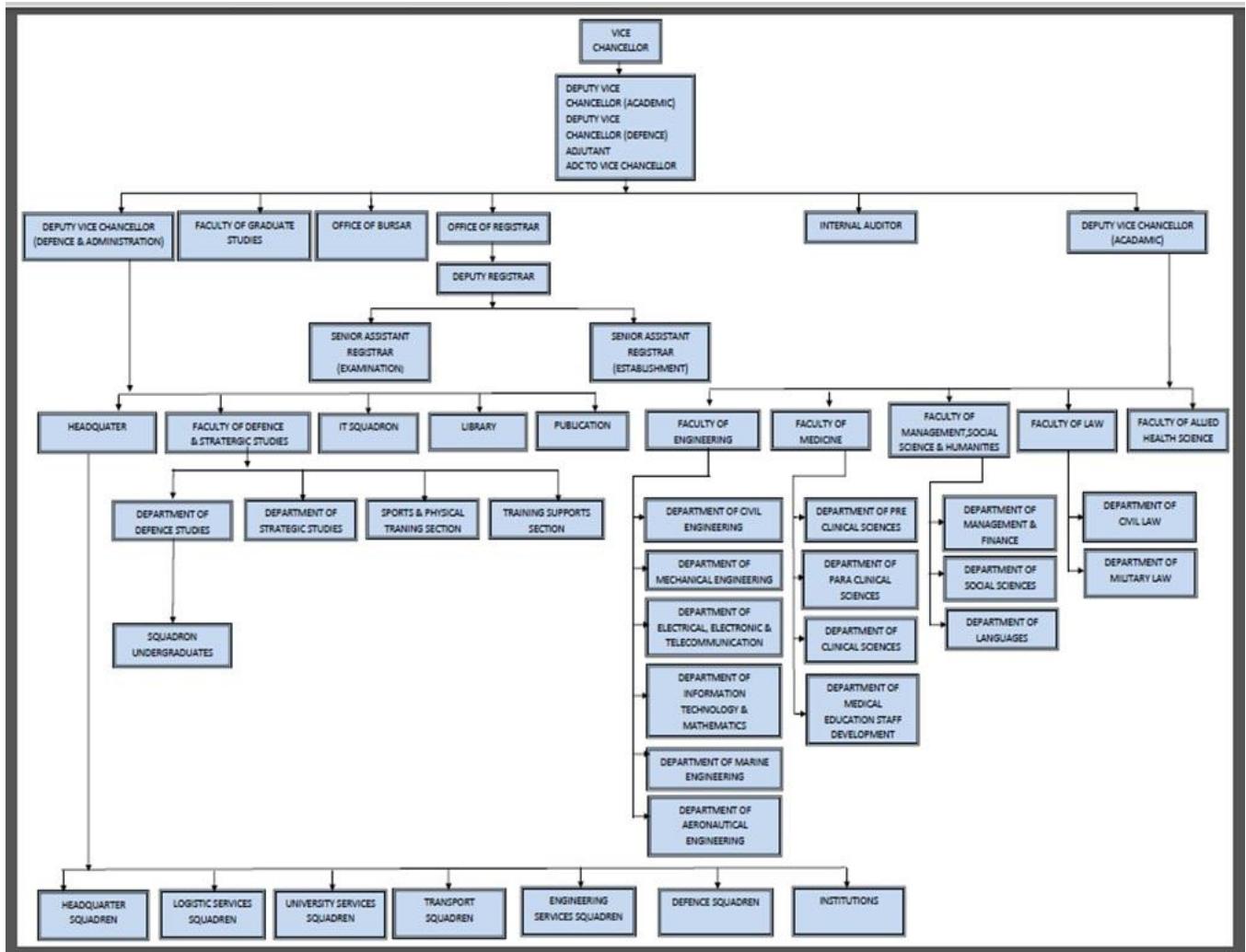


Figure 1.0: Organizational Hierarchy

Source: Official Website of KDU(2013)

In the above shown wide hierarchy of KDU, several officials have to engage with several tasks among each other within the KDU. In the manual task allocation procedure several issues like keep tracking of the task assigned to a person, keep tracking the deadlines and many more may arise. Working with a manual task allocation procedure is a challenge which will get more and more sophisticated in the long run of the organization. In the modern world in which computer technology is developing at a remarkable pace many manual procedures are automated using computerized system.

Therefore, this report investigates the development of a new computerized Task Management System for KDU over the existing manual task allocation process.

1.2 Presenting Problem

According to the mentioned hierarchy in the situation overview, tasks are assigned by higher order officials to the lower order officials. In this system the main problem which arises is that there is no comprehensive method to keep track of the tasks assigned to whom and by whom. Followings are the specifically identified issues with the current manual system.

When assigning tasks, there is no efficient way to keep track of tasks to know whether they are ready, assigned, forwarded, finished, failed, expired or terminated and what tasks are assigned to whom and by whom. At present there is no proper documentation on these records, and also current KDU system does not have good method for the communication between superiors and subordinates to get updated information about task details.

The different kinds of progress reports to monitor the progress of various undergoing tasks in the system cannot be evaluated by the people who are in the top order of the hierarchy. Because of that superiors are unable to get decisions about tasks to get a better output in order to achieve particular goals on correct time.

In present system environment where the number of jobs is done simultaneously selecting the right person for the job is also a difficult task due to the fact the person who is assigned to the task does not have the necessary skills of the particular task, due to the lack of details of previous records about the task done by particular assigned person.

Another problem present in the current system is there is no efficient way to know how many task are assigned to a single employee. If an employee is assigned too many tasks it will reduce the overall performance of that employee. Moreover by introducing a TMS it can keep track of the number of tasks that have been successfully completed by an employee and which they have failed since it provides a better way to monitor employees performance.

Therefore, there is a timely need for a simplified software system for KDU to handle their internal communications related to various tasks.

1.3 Significance of the Project

To overcome the above mentioned problems in the current task allocating procedure in KDU, this research is driven to develop a software based solution to the organization. Although there are available task management systems which some of them are to be purchased, the outcome product of this research will have significant benefits over them since it is built focused on the requirements mentioned by the KDU employees. Since there are no such system in the present KDU environment introducing such system will help to the development process of organization in the long run.

In order to achieve this task, due to the limitations and constraints a project scope was declared and necessary employees were engaged during the project phases to identify the suitable requirements for the problem domain. The product developed will provide considerable benefits over the manual task allocating procedure of the KDU. It will help to increase the efficiency of inter communication within KDU employees while they are inside the KDU premise and also when they are anywhere in

the world with an internet connection and a computer since the proposed solution is based on web technologies.

Furthermore the outcome product will assess the KDU environment in different perspective such as Economical, Social and Technical. Benefits which can be gained are discussed in the Strategic IT Value sub section.

1.4 Proposed Solution- An Overview

The solution provided by the project is a TMS, which can manage tasks among employees of the organization. It will help to enhance the efficiency of the task management of the organization. The proposed system will be a web based solution which will allow user to access into the system from anywhere in the world with a internet connection and a compatible device.

Some of the basic proposed functions for the system are creating new tasks, assigning tasks to employees, managing contacts and producing various types of reports. In addition to that, to improve the communication relevant to tasks within KDU employees an email alert generation function is also suggested. Situation is thoroughly analyzed and a detailed requirement specification is produced in the requirement analysis phase.

1.5 Overview of the Research Plan

This sub section describes the overview of the research plan under the headings research methodology, research design, Primary Data Spotlight and Actors, Research Outcome, Strategic IT Value.

1.5.1 Research Methodology

A mix of quantitative and qualitative methodologies will be used as the main research methodology for the development of TMS. Selection of mix methodologies will adhere because the collected data may have both quantitative and qualitative data characteristics. Moreover the emphasis of quantitative research is on collecting and analyzing numerical data; it concentrates on measuring the scale, range and frequency. The design initially is usually highly detailed, structured and results can be easily collected and will be presented statistically.

Furthermore qualitative research is more subjective in nature than quantitative research and involves examining and reflecting on the less tangible aspects of a research subject. Interviews, observation of workflow in sites is examples for qualitative methods which will be used in the project.

1.5.2 Research Design

Below diagram shows the summary of the system development plan for the TMS.

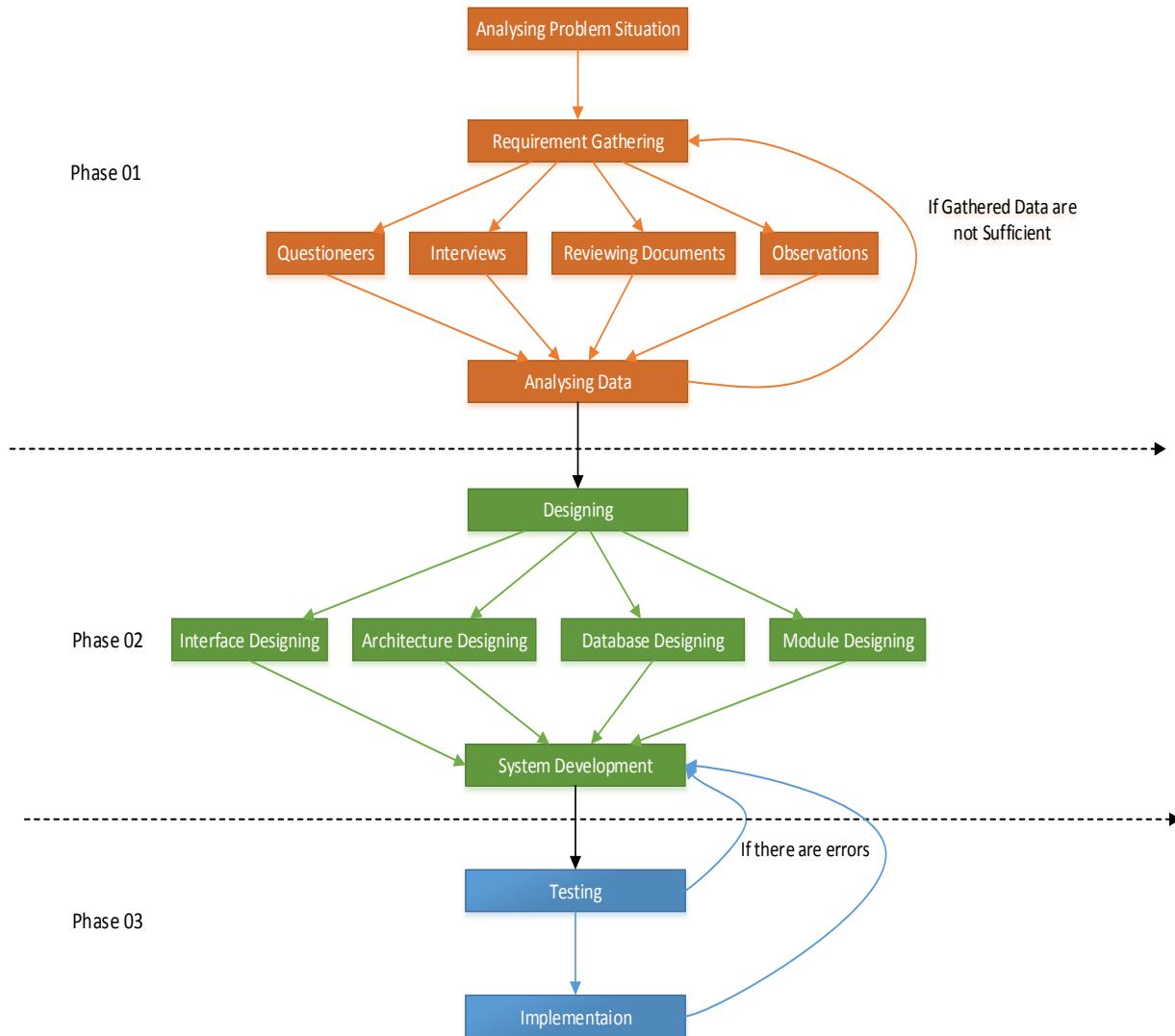


Figure 1.1: Summary of the System Development Plan

Source: Author

1.5.4 Primary Data Spotlight and Actors

Kotelawala Defence University is the location used to collect essential information to build up the system and to implement the system. The main client for the system will be Deputy Vice Chancellor (Defense) and other actors who will be involved are all the Faculty Deans, Head of Departments, Registrar and OCLS Officer.

1.5.4 Research Outcome

The desired outcome of this project is to develop a computerized task management system for KDU over the existing task allocation procedure to increase the efficiency and reliability of task handling among KDU officials.

1.5.5 Strategic IT Value

In the below it is explained about the Strategic IT value that can be gained in three perspectives namely Economical, Technical and Social perspectives.

Economical Perspective:

Financially this system will provide long term benefits to the KDU. The initial cost for the stages of implementation, maintenance of the system, in according to the time periods is shown as below figure. Although the initial cost is high with the time it will gradually decrease and come to an lower value. Cost will increase during maintenance process. Since KDU already has basic requirements like computers and other requirements to implement the TMS it will help to reduce the initial cost of the project.

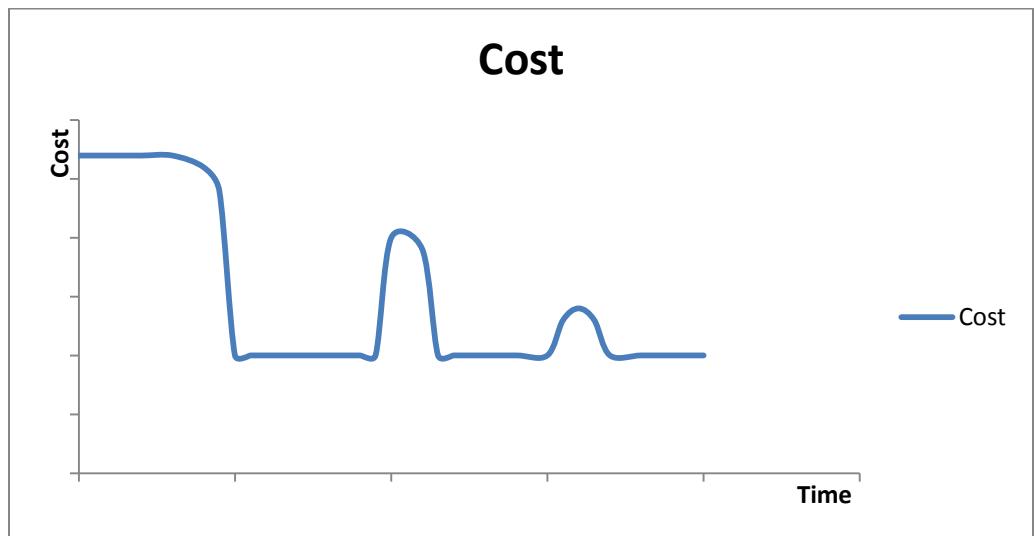


Figure 1.2: Cost vs. Time
Source: Author

Technical Perspective

With introducing the new TMS KDU can engage with new technical hardware components and the new technology .The manual file systems to store task details is more time consuming , difficult to handle and it will not provide an efficient way to retrieve necessary data. Those identified problems would be eliminated by implementing a TMS for KDU. The user friendly interface and details provided efficient, smooth and consistent TMS.

Social Perspective

By using the TMS employees will be able to keep in touch with their responsible task details, assigning tasks and to monitor updates of their tasks daily from any computer with access to the internet, and with the aid of the TMS communication between employees in the KDU will improve its speed and reliability. Another fact is that the employees those are reluctant to work with technology can be reduced and it help to them improve their skills since to work with the system complicated technical knowledge is not needed. With the introducing of the TMS KDU can shift into new technology from the old traditional methods.

1.6 Scope of the Project

Task Management System will be developed to improve the efficiency of coordinating tasks which undergo within the KDU environment. Since KDU has a very wide organizational hierarchy, with the time limitations for the development of project, system will be initially developed up to a certain hierarchy level. Boundaries for accessing the new system will be starting from the VC and up to HOD level in the academic path in the organizational chart and up to one level below the DVC (D) in the administration path.

1.7 Ethical Overview

In the supposed system, confidential information related to the tasks and personal information of the employees will be stored in the database. It is guaranteed that all the gathered information is secured and will only be used for system purposes. When conducting interviews the people who will be interviewed will not face any difficulties and they have the full capability to leave the interview process any time that they wish. It is assured that the data gathering methods will be handled in a legal manner.

1.8 Aim

The aim of this project is to build a TMS that improves the flexibility of the internal communication regarding to various tasks done in KDU by employees.

1.9 Objectives

To achieve the above mentioned aim, followings are the key milestones which needed to be achieved successfully during the project.

1. Gather required data and information from relevant authorities by using appropriate data gathering methods.
e.g.; - Questionnaires, Interviews, Observations and Document review
2. Investigate the most suitable tools to design the TMS.
3. To analyze the gathered data, then design a suitable system and develop the system using an appropriate programming language/s.
4. Designing appropriate interfaces to the system such as Tasks, Calendar, Contacts, My Account, Scheduler tasks and Reporting.
5. To test the developed system for errors and bugs and implement the error and bugs free system in the KDU.

1.10 Constraints to the Project

Since this project is an 8 month group project with 6 members, the main constraints was the limited time available to involve in project work along with managing other academic studies. In addition to that the current technical knowledge base of the group members may not be adequate for the project. Furthermore when come to the budgetary constraints since the project is self funded researchers has to bear up all the costs involved in the project. A detailed discussion of constraints and limitations are provided in the chapter 3.

1.11 Summary

This chapter has started with a description of the overview situation of the problem domain and followed by the presenting problem. The significance of the project is also discussed and an introduction has being given about the proposed solution. The overall research plan has being also discussed and In order to identify the intended effects of the research its target and strategic business IT value has been explained. Furthermore in order to make this research successful aim has being established and objectives needed to achieve the establish aim is also discussed. In addition, a brief description about limitations and constraints to the project has being given.

Hence, this chapter identifies the present problem in the problem domain and discusses a successful research plan to provide a solution to the problem along with achieving the desired objectives and aim.

The following chapter will elaborate on various sides of the research through a literature review.

2.0 Literature Review

This chapter conducts a study on the theme, task management systems to find out and study about similar researches to analyze the underlying research ideas behind those researches. Furthermore similar products have been studied to provide a quality outcome from this research project.

2.1 Introduction to TMS

In the field of project management, according to Zoho (2013) "a task is an activity that needs to be accomplished within a defined period of time or by a deadline". A task can be an impermanent process undertaken production of something or service to achieve organizational goals, which bring favorable change or added value to particular organization. Task contains deadlines, participants, estimated effort and actual effort spent in each task, generating several reports and graphics of productivity. Task Management is the discipline of organizing and managing tasks in such a way that the task is completed within defined scope, accepted quality, on time and cost constraints. Task management can be done manually or using computerized systems which are emerging with the advancements in technology and becoming popular day by day.

Furthermore, in the modern software market there are several TMS software solutions available from different vendors. The goal of software Task Management System is to understand, plan, measure and control the task such that it is delivered on time and on budget. In general Task Management System involves gathering requirements, managing risk, monitoring and controlling progress. Some of well-known task managing applications available on the web are Producteev, Flow, Todoist, Doit.im, Wunderlist and Google tasks. Although some systems can be used free of charge but majority of the web task managing applications which consist of most rich functionalities and prominent features should be purchased and they are relatively expensive.

The basic features of task managing applications are the manipulations of task details, task assignment, maintaining the employee or contact details and report generations. These features can be used in different perspectives in different organizations. On the current software market there are some open source task management applications like TaskUnifier and dotProject which allow you to customize their product to your needs.

Next subsections will discuss about the history of task management software, available technologies associated with development of such software and the benefits of using such software.

2.2 History of Task Management Systems

Before the time of automated Task Management Systems, all the managing tasks were done manually and individually from one another. Employees created the task and assigned the tasks to the employees manually, Employees had to store the task details and store it in a file, and that file evolved in the process. Most of the times employees had to keep written records and if there are too many records data retrieval is difficult.

Then improvement of the computer technology introduced automated or integrated software programs like AceProject, Assembla, FastTrackSchedule, MS project, OpenWorkbench, Primavera Systems, and WorkPLAN to the industry.

One of the earliest approach towards task management can be considered as 'Project' which was an MS-DOS software application originally written in Microsoft 'C'. Then it was also developed for Macintosh for some time. The first commercial type of Project was released for DOS in 1984. According to Microsoft (August 13, 2013), Microsoft bought all rights to the software in 1985 and released version 2. Version 4 for DOS was the final DOS version. According to ipmtalk(2013) the first Windows version was released in 1990, and was labeled version 1 for Windows.

2.3 Task Management System: An Overview of the Technology

When we look at the todays software market, we can see several kinds of software uses separate technologies like Stand-alone applications, Web based systems, and Mobile applications. These technologies can be applied to make task management system and each technology may have its pros and cons. The quality and the consistency of the system will depend upon how it has built.

Then improvement of the computer technology introduced automated stand-alone software programs like FastTrackSchedule, MS project, OpenWorkbench, WorkPLAN to the industry. Stand-alone system software cannot access by using web. It can work only offline, network connection is not necessary for this kind of software. Above mentioned applications are best rated applications for stand-alone systems. As an example OpenWorkbench software application is known as stand-alone software because it doesn't use any network to process. According to 'Open-Workbench' (June 2005), Open Workbench was originally developed by Applied Business Technology, Corporation of New York under the name "Project Management Workbench"

Another technology that can be used is wide area network (WAN). It is a network that covers a broad area (i.e., any telecommunications network that links across metropolitan, regional, or national boundaries) using private or public network transports. The Internet can be considered a WAN as well, and is used by businesses, governments, organizations, and individuals for almost any purpose imaginable. AceProject is WAN powered and it is high-level web-based proprietary project management software. The product was launched as Free Task Manager, which was a free and simple task management tool.

Apart from above technology criteria task management systems can be developed to work on different platforms such as Mac IOS, Windows, and Android and so on. According to Gartner (2011) most used operating systems can be named Android, Symbian, iPhone OS, RIM and Microsoft

developed mobile device operating systems. Integrating the task management systems with newly emerging mobile technologies will greatly increase the use of these application since people tends to carry mobile phones always these days.

2.4 Pros and Cons of Using TMS

When considering the use of a computerized task management system, there are pros as well as some cons also. One of the main positive side of a task management system is it can be introduced in to any organization. Since any organization will be coordinating tasks although tasks may be differ in nature in each situation. The pros and cons which can be arisen in TMS can be discussed in different perspectives.

When considering the functions provides by a TMS, it provide functions to keep track of your tasks while keeping all the necessary data required. These are accomplished by using database management systems. DBMS are used to store data within relational tables. These kinds of systems provide mechanisms to retrieve manipulate data very easily. In a manual procedure, if the numbers of records are very high it will take longer time to go through those records. But in a computerized system those data retrieval is much easier. Along with that, when number of record is high it can be used to identify patterns among data as well. But a disadvantage of keeping all the data in a central database is, if the database gets damaged or destroyed there will be no way to get back those data. While using the system if a system crash occurs, it can affect the work flow.

Using TMS will provide better means of communication among employees in the organization. Generation of alerts is the most common way used in TMS to inform any updates on tasks. The accuracy in computerized system is in a high standard when entering and updating data. It leads to an efficient system. Human beings generate more errors than a machine. Computer processing eliminates the human errors of computing and information processing. Different validation techniques can be preprogrammed in the software to detect human errors also.

The use of web base technology will provide several advantages to the TMS since it can be accessed from anywhere in the world if you have a computer and an internet connections. It will help to keep constant communication between the user and the organizations. But in the use of web technology security is a major concern. System should have proper mechanism to prevent unauthorized users like hackers accessing the system. In addition to that when accessing the same database over the network by several users simultaneously will lead to concurrency issues. Concurrency control must be applied successfully to prevent system from crashing or cause read/write operations with errors.

When considering taking of backups of the organizational data, if it is done according to manual procedure it will take much longer time and man power. But using DBMS it is much easier to take backups of very large number of records. Although when taking backups it is less cost comparing with manual procedure, as an overall to get suitable hardware and software to set up the necessary environment for computerized system, there will be a bulky initial cost.

2.5 A Brief Review on Some Extant Task Management Systems

Following table represent a basic review on some of the popular task management systems on the current software market.

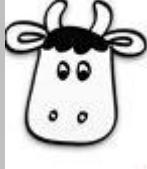
Crest	Product Name	Review
	Asana	Asana is software provides good mechanisms for teams to work together and keep track of tasks on shared projects. It is simple to set up and use.(Asana,2013)
	Google Tasks	Google Tasks is free, and you can access it in a number of ways. It syncs across your devices and services, too. Google Tasks can be used to keep track of the things you need to do. You can create lists of items, set due dates and notes, and even add Gmail messages directly to Tasks.(Google, 2013)
	RememberTheMilk (RMT)	RememberTheMilk service stores all of your important information in one place where it can be easily accessed by nearly any Internet-connected device. For the platform and feature availability RTM offers. Although a free version is available, for all the feature pro version should be purchased.(rememberthemilk,2013)
	Toodledo	Toodledo allows users to set up a task list and access it from anywhere. Tasks can be organized into folders or linked as sub-tasks. It allows you to select fields you want to use and define how you want to view your tasks.(Toodledo,2013)
	Wunderlist	Wunderlist is a very simple application that syncs across the various different platforms, including PC, Macs, Androids and more. Although simple, this app has many of the characteristics of the most used devices (like matches, flashlights, pens and paper) – in that it is extremely necessary for people from all walks of life.(appstorm,2013)
	Producteev	Producteev is simple. It allows you to have tasks that belong to multiple task lists. Producteev is the leading task and project management solution, designed with simplicity in mind.This system should be purchased for the use .(appstorm,2013)

Table 2.0: A Brief Review on Some Extant Task Management Systems

Source: Author

2.6 Summary

In this chapter it is discussed about what are a task management system and also a glimpse of the history of task management systems. Furthermore it has discussed about the pros and cons of using a task management system. In addition to that brief descriptions about some of extant task management software are discussed.

Next chapter is dedicated to discuss about the presenting problem, data gathering and analyzing to produce the requirement specification for the proposed system.

3.0 Requirement Analysis

This chapter contains details under 3 main sections namely 'An analysis of current system, Data collection protocols and Requirement analysis and Requirement specification for the new system'.

First section contains a detailed description about the KDU environment and its extant task allocating procedure followed by the problems and limitations that can be identified in the current task allocating procedure. The next sub section is dedicated to illustrate the current process in the KDU using UML techniques such as activity diagram, flow chart and a rich picture. Furthermore in the final sub sections of this section scope of the project and constraints for the project are stated.

In the next section under this chapter, it is discussed about the data gathering techniques used and the details of the activities done in data gathering process. These details include the justification for using relevant techniques (techniques used for data gathering), pre plan and the actual plan for each and every technique used in the process and the analysis of gathered data using each technique. Followed by the data analysis, the obstacles arisen in the data gathering process and remedied taken are stated.

The last section of this chapter is dedicated for a detailed representation about the new specifications for the new system which is going to be developed. This section starts with giving an overview of a computerized TMS. Overview is followed by a description of functional requirements, non-functional requirements, proposed modules, technical requirements and usability requirement specification for the new system. In the last sub section UML diagrams such as use case, sequence diagrams and class diagrams has being used to represent the functions and event flow of the system.

3.1 An In Depth Analysis of the Extant System

This section of this chapter describes the project problem domain and the problems and limitations that have arisen in the current system. Diagrams have being used to create models of the current system to graphically demonstrate about the situation of the current system.

3.1.1 Description of the Current System

Until 2011 Kotellawala Defence University offered degree programs for officer cadets who will work for the Sri Lankan tri services after the completion of their degree but in 2012 the university has introduced an entrance to civil students who wish to continue their higher studies. There are 8 faculties in the fields namely Defence & Strategic Studies, Engineering, Medicine, Law, Graduate Studies, Research & Development, Allied Health Science and Management, Social Sciences & Humanities. Several departments' works under the above mentioned faculties. General Sir John Kotellawala Defence University currently offers degree courses in both undergraduate and post graduate levels to military personnel's and civilians. Officers with exceptional performance in

reputed universities/institutions can pursue postgraduate studies in accordance with the requirements of the service to which they belong. Civil professionals are also offered a place at postgraduate studies to excel in and study a post graduate degree in their related field of proficiency. There are military personals and civil staff working in the administrations process and as well as highly qualified lecturers.

With the covering of vast areas in defence and other academic areas Kotelawala Defence University has a large number of military and civilian officials for the administrative purposes in the university. All these large number of employees can be categorized into a hierarchy. In the KDU employee hierarchy as the person in the top of the hierarchy Vice Chancellor has the highest authority and responsibility regarding all the KDU processes. As the premium of the hierarchy, Vice Chancellor can assign tasks directly to anyone in the lower level or through the hierarchical order. According to the administration hierarchy, after the Vice Chancellor there is the Deputy Vice Chancellor. In the current administration system there are two deputy vice chancellor officials namely DVC (Academic) and DVC (Defense). DVC (academic) is responsible for all the academic matters in the University while the main responsibility of the DVC defence is administrative matters of the university. In addition to that DVC (defence) also involved in some of the academic matters where his involvement is needed or helpful. All the faculties' Deans and Head of the Departments works under the supervision of DVC (Academic) and in the administrative processes like enlisting of students, purchasing of required goods, financial matters and etc. there are many other several offices like Registrar office, CO Admin, Bursar office and etc. which works under their supervision of vice chancellor and DVC defence.

The following figure 1.0 represents a part of the KDU organizational hierarchy which is relevant to the development of the TMS.

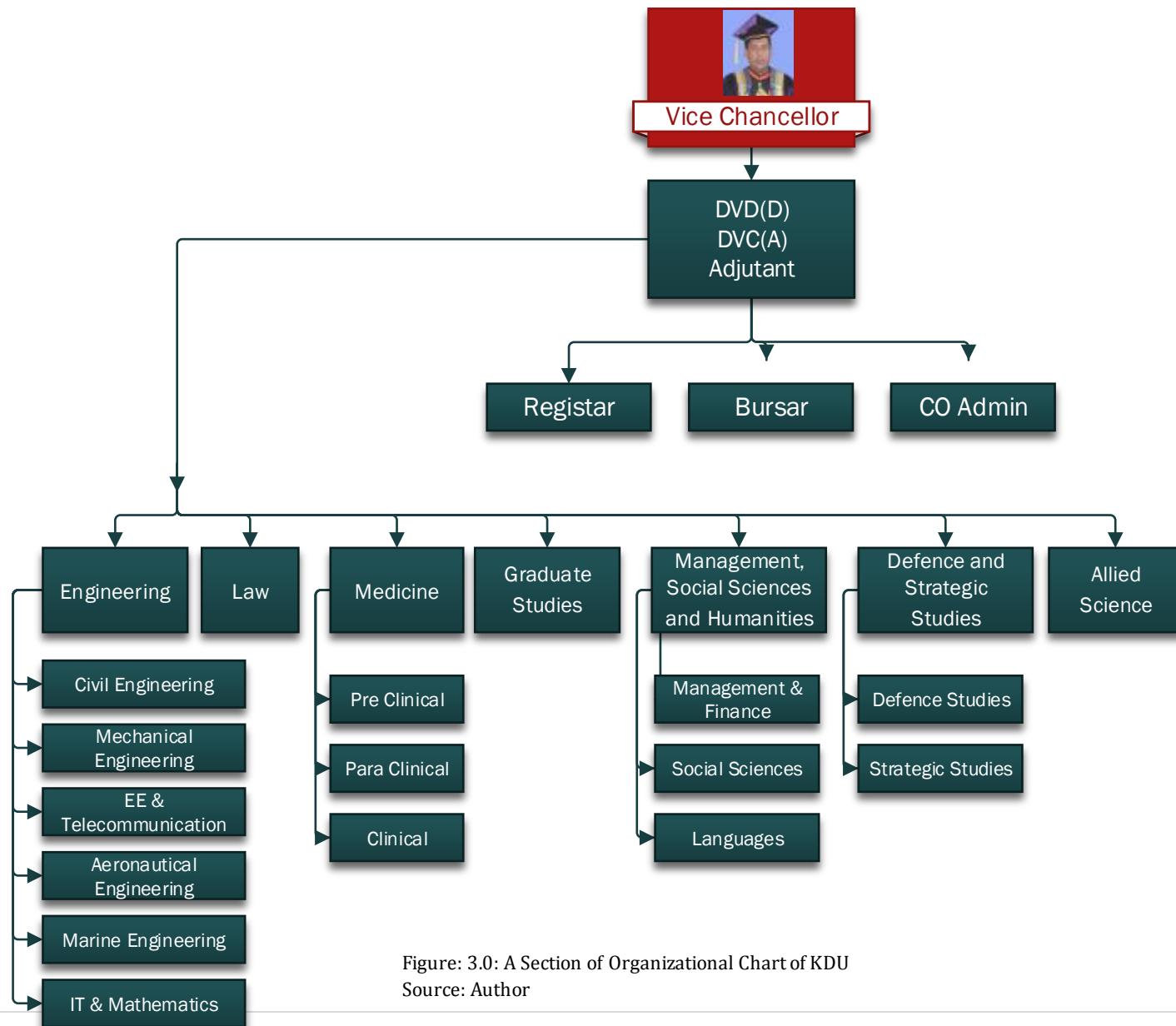


Figure: 3.0: A Section of Organizational Chart of KDU
Source: Author

Therefore in this widely spread KDU hierarchies there are so many tasks which are assigned to various officials from their superiors. When shifting computerized system over manual system, there can be several pros and cons. In order to minimize the cons of new system, lots of facts has to be considered to develop a high quality as well as a user-friendly system according to the user requirements.

In the present KDU work flow there are no efficient and effective ways to keep track of the various tasks undergoing in the system. When an officer needs to assign a task to another official in the current system, the main methods which they are using can be identified as, by sending a letter, by sending a message using another person such as clerks, other rank military personnel's or directly scheduling a meeting with the relevant person which the task needed to be assigned. Furthermore after assigning a task and when the task is in progress, to provide reports and do the inquiries the general way in the current system is to conduct meetings. Although these techniques are used to assign tasks, keeping details such as assigned person, due dates most people prefer to keep written records in their organizers. With the absence of an efficient and effective system it tends to minimize the communication with regards to the tasks undergoing and the officials who are responsible for the particular tasks and it will lead to many inconveniences in the current work flow.

3.1.2 Limitations of Current System.

One of the issues in the current KDU work procedure regarding to task management is when a task needed to be assigned, a person have to use above discussed methods. When considering informing through letters, some problems that can be identified are the man power needed to send the letter to the relevant offices and the misplacement of these letters. As mentioned KDU have a very large number of people working in the administrative procedure, so for the task detail communication through letters may need a large amount of man power and it will take lot of time. Since there are many officials if the letters get misplaced it will be difficult to identify the mistake.

With the successful assigning of the tasks, another problem that arises is the keep tracking to whom you assigned? and what?. Top order officials in the KDU hierarchy have to deal with many tasks during their work schedule. Most of the time those tasks needed to be assigned to officials who are working under them. When considering a task, thing such as to which you assigned the task and the date which it should be completed should be remembered. As the number of task increases it is not practical to keep all the details in your mind. Even if you keep written records when the numbers increase it will be difficult to retrieve the necessary details back.

In present system environment where the number of jobs is done simultaneously selecting the right person for the job is a difficult task. In the current procedure is that there is no way to keep track the list of tasks that a particular employee has face and how many of them he/she has succeeded and failed. With keep tracking these kinds of data and analyzing them, it can be used to select the most appropriate person for the job which will help to improve the quality of the work done. It can

also be used to monitor the performance of people and help them to understand in which areas they are lacking skills to cooperate.

Another problem present in the current system is there is no efficient way to know how many number of task a single employee is involved with. Before assigning a task to an employee it is good to check how many tasks that currently he is involved. If an employee is assigned too many tasks it will reduce the overall performance of that employee.

To overcome the above explained problems and limitations and to establish an efficient and effective communication regarding to tasks done within KDU a computerized Task Management System will be developed.

3.1.3 Models for the Current System

This sub section illustrate a set of figures drawn to represent the details of the existing task allocation procedure using diagram techniques such as activity diagram, flow chart and rich picture.

3.1.3.1 Activity Diagram for Extant Procedure

Following illustrated activity diagram indicates the flow of activities in the process of a user from upper level of the hierarchy assigning a task to a subordinate and until the submission.

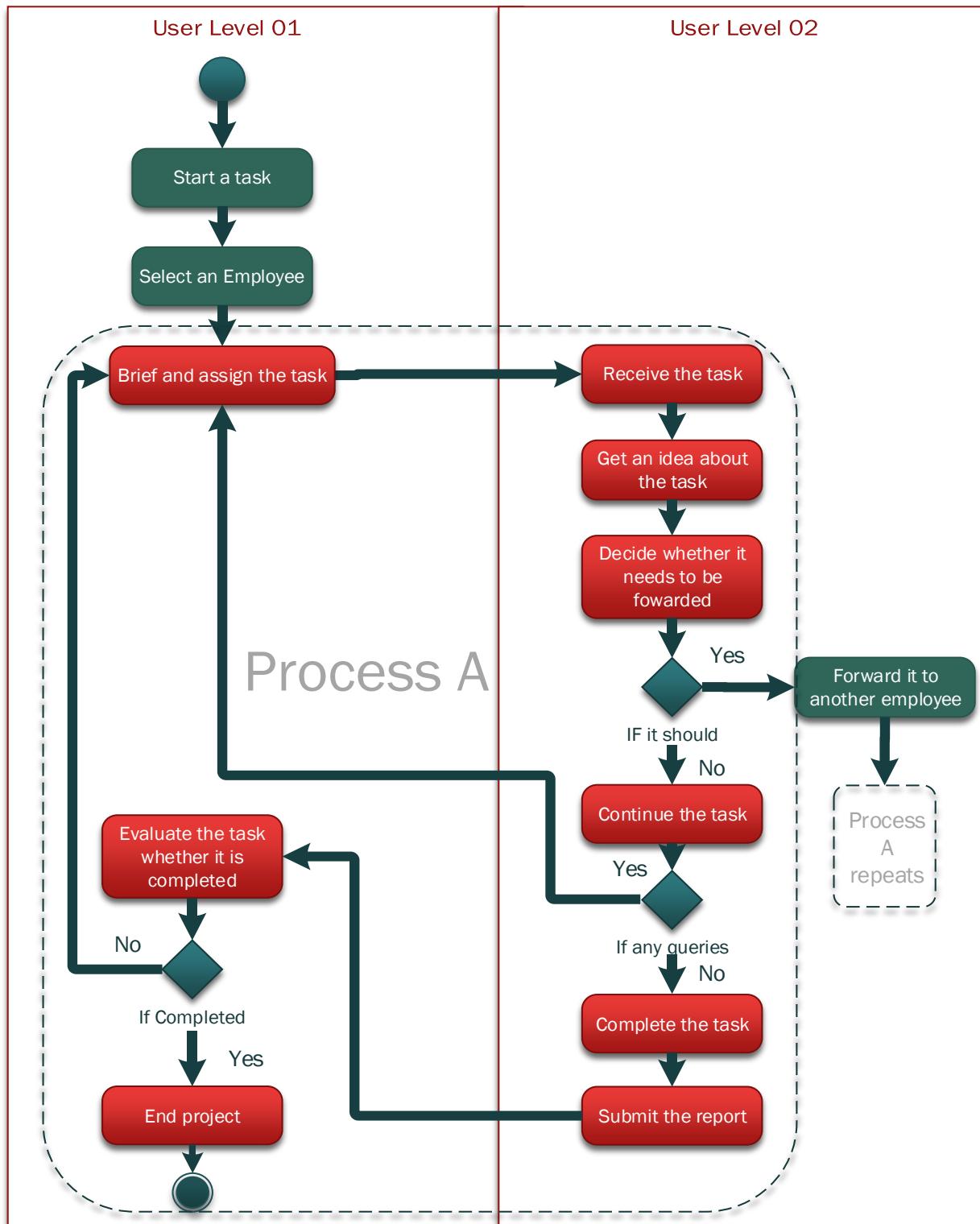


Figure: 3.1: Activity Diagram Representing the current Task Allocating Procedure

Source: Author

3.1.3.2 Flow Chart Representing Extant Procedure

Following flow chart represent the general process involve in a task, from assigning to an employee to the closing of the task.

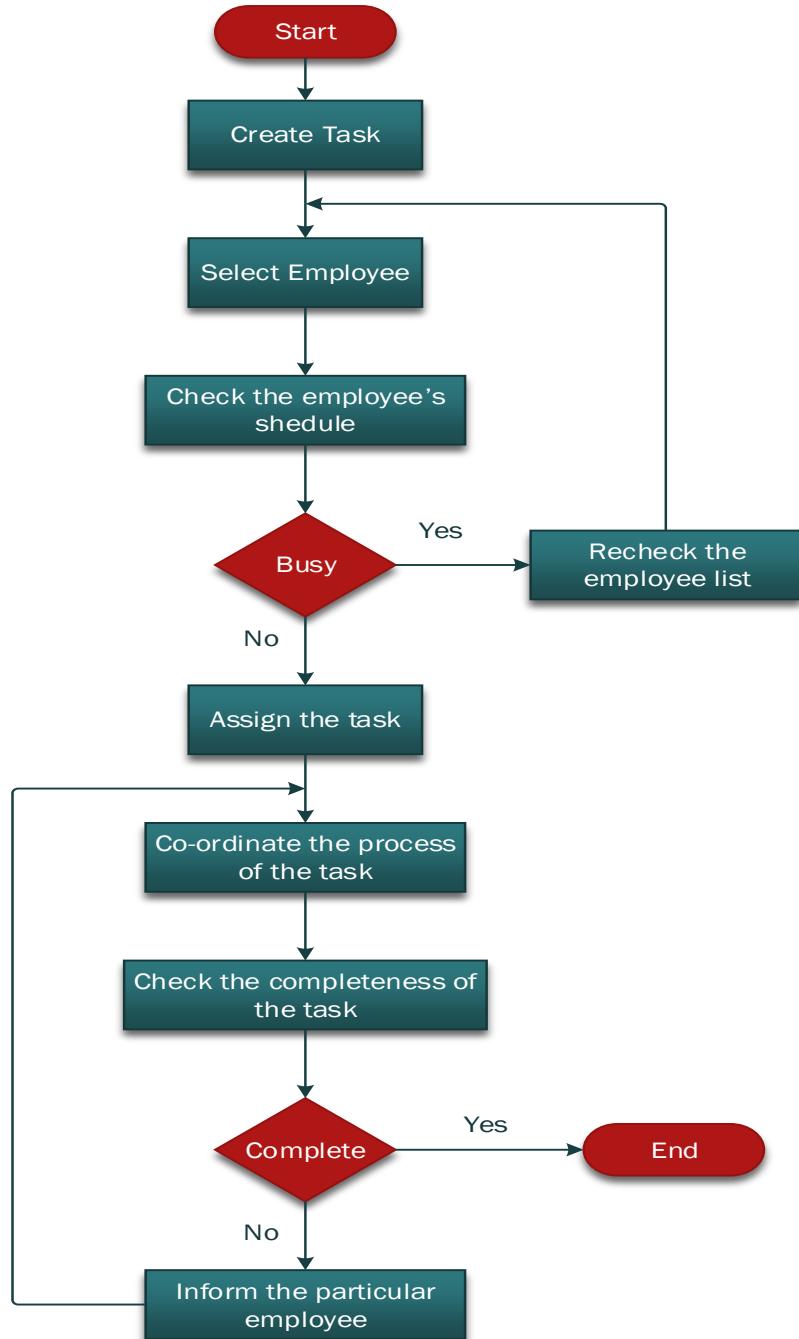


Figure: 3.2: Flow Char for the Current Procedure

Source: Author

3.1.3.3 Rich Picture for Extant Procedure

Below rich picture demonstrates how the current task allocating process happening and what are the circumstances employees are facing during the process.

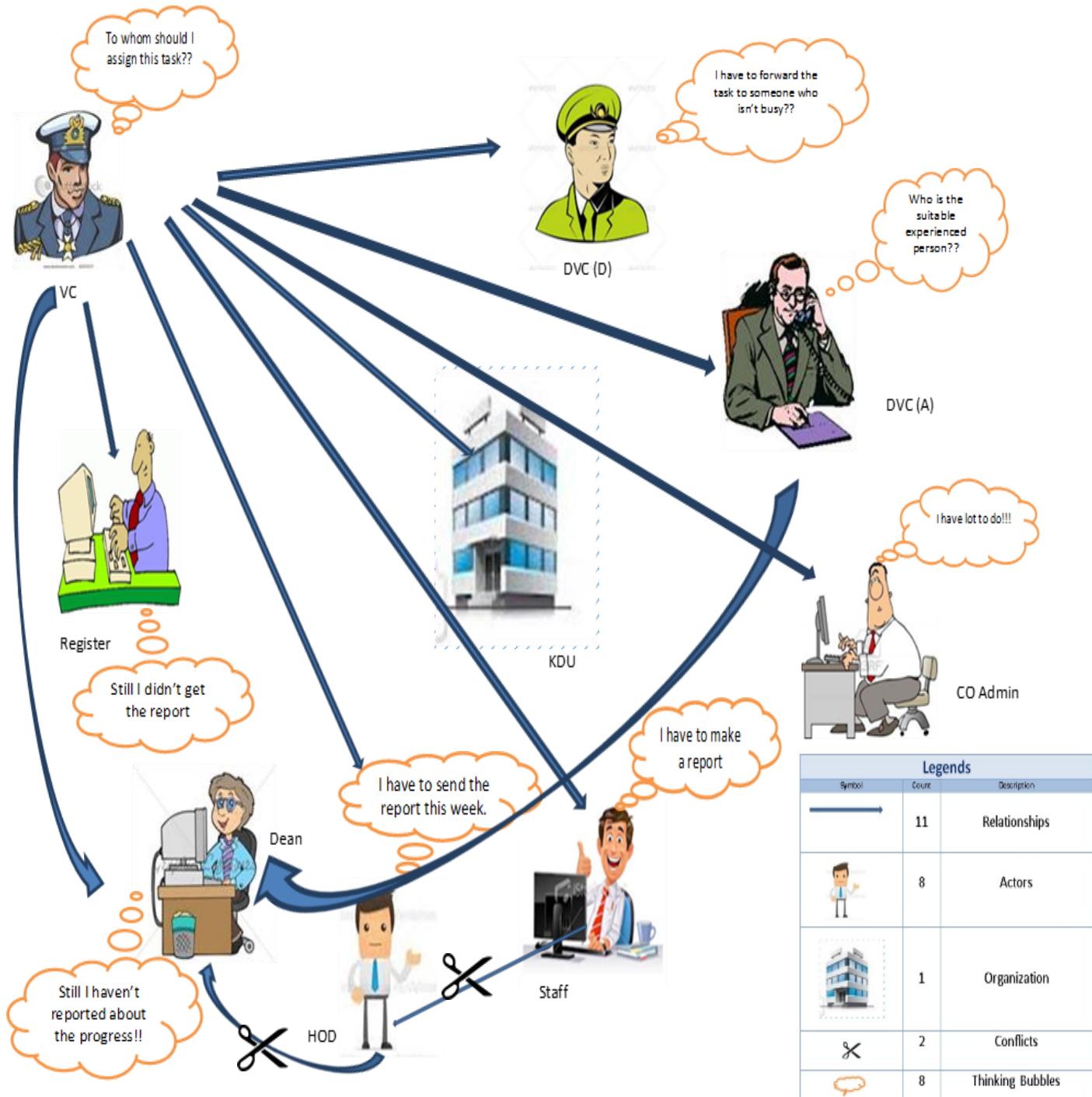


Figure: 3.3: Rich Picture Representing the Current Work Flows in KDU

Source: Author

3.1.4 Scope of the Project

Task Management System will be developed to improve the efficiency of coordinating tasks which undergo with in the KDU environment. Since KDU has a very wide organizational hierarchy, with the time limitations for the development of project, system will be initially developed up to a certain hierarchy level. Boundaries for accessing the new system will be starting from the VC and up to HOD level in the academic path in the organizational chart and up to one level below the DVC (D) in the administration path. (For the organizational hierarchy see figure 1.0)

3.1.5 Constraints of the Project

In the below it is explained about the constraints in the areas such as technical, budgetary, resources and time regarding to the development of new system

Budgetary

- Since the project is self-funded, all the costs regarding to the project such as printing documents to has to be bared by the project team members. Therefore there are certain limitations in the budgets.
- Although there are some advanced software which will provide some additional features in the development, difficulty in obtaining them due to unavailability of free versions.

Resources

- Difficulties in obtaining some software resources for the development of the new system.
- Difficulties in meeting relevant authorities for data gathering process, as they are in the top order of the hierarchy they have a busy work schedule.

Technical

- Current technical knowledge of the team members may not be adequate for the development of some modules in the new system.
- Inadequate knowledge in certain programming languages.

Time

- Difficulties in managing allocated time since the project work have to be done within given deadlines and along with the other academic studies.

3.2 Data Collection Protocols and Requirement Analysis

Under this section of the chapter it is discussed about the data gathering techniques used and the justifications for using those techniques. And also it contains the pre-plan and actual plan of the process and the analysis of gathered data.

3.2.1 Implementation of Research Techniques: Questionnaires

Primary data is collected through questionnaires. Questionnaires facilitate the collection of data by asking a sample of people, to respond to the same questions. Questionnaire was prepared such that they are short as possible and including questions consisting both open ended and close ended questions covering all the related subject areas. Number of Open ended questions in the questionnaire were kept as minimum as possible, because people are reluctant to answer open ended questions. Close ended questions consisted of general questions to gather data about participants, information about the current process. Questionnaires were distributed among Head of the Department officials in the KDU and some administrative officers in the KDU.

Questionnaire was supervised several times by the supervisor. For acquire the real expectations of the client, when the questionnaire came to standardized position it was distributed among the several participants. They were able to answer the questions as per their knowledge and the experience level with the current manual system. Number of questions was limited to maximum 30 questions to avoid the interruption to the process, to save the time of the participants and also to avoid the unnecessary pressure for the participants. When the questionnaires were distributed to respondents, they were given the full liberty to opt-out from answering any questions in the questionnaire. By gathering data through Questionnaires, researchers were able to collect quantitative data which can be used to identify patterns and also very much essential for produce reports.

3.2.1.1 Pre Plan vs. Actual Plan

Following tables represents the pre plan for using this technique and the actual plan represents how it was actually done due to obstacles.

Pre Plan

Resource	Date	Time	Venue	Objective
Deputy Registrar	13/08/2013	1500h	Deputy Registrar Office	<ul style="list-style-type: none"> • To identify the responsibilities of relevant offices and officials. • To analyze the methods they are using to assign tasks to their subordinates.
OCLS	13/08/2013	1430h	OCLS Office	<ul style="list-style-type: none"> • To identify the methods they use to keep track of their tasks.
HOD	14/08/2013	1530h	HOD's Office	<ul style="list-style-type: none"> • To identify the inconvenience in the current task allocating procedure.
CO Admin	14/08/2013	1500h	CO Admin	<ul style="list-style-type: none"> • To get an idea what do they expect from a computerized task management system.

Table: 3.0: Pre Plan- Questionnaire

Source: Author

Actual Plan

Client	Date	Time	Venue	Summary of Gathered Details
Deputy Registrar	14/08/2013	1430h	Deputy Registrar Office	<ul style="list-style-type: none"> • Got the information about the tasks of DR • Collected the information about the officials working under DR • Identified the methods that DR receives tasks.
OCLS	14/08/2013	1430h	OCLS Office	<ul style="list-style-type: none"> • Collected the information about the tasks of OCLS. • Gathered information about the officials working under OCLS
HOD	14/08/2013	1500h	HOD's Office	<ul style="list-style-type: none"> • Discussed about the tasks of a HOD. • Identified the methods that HOD receives tasks.
CO Admin	14/08/2013	1500h	CO Admin's Office	<ul style="list-style-type: none"> • Discussed about the main responsibilities of CO Admin • Identified the expectations of a computerized TMS

Table: 3.1: Actual Plan- Questionnaire

Source: Author

Although there are slight differences in the pre plan and the actual plan schedules, the data gathered were up to the expectations. As an overall result of using questionnaire as a data gathering technique was successful.

3.2.1.2 Analysis of Gathered Data

Following are some of the answers in the questionnaire and the analysis of answers provided by the participants in this process.

In the questionnaire first section was dedicated for demographical questions to get an idea about the participants for the questionnaire. In this section working experience was asked in order to understand the working experience of different officials of the university. What was expected through this question was to identify the practice of current system that they have.

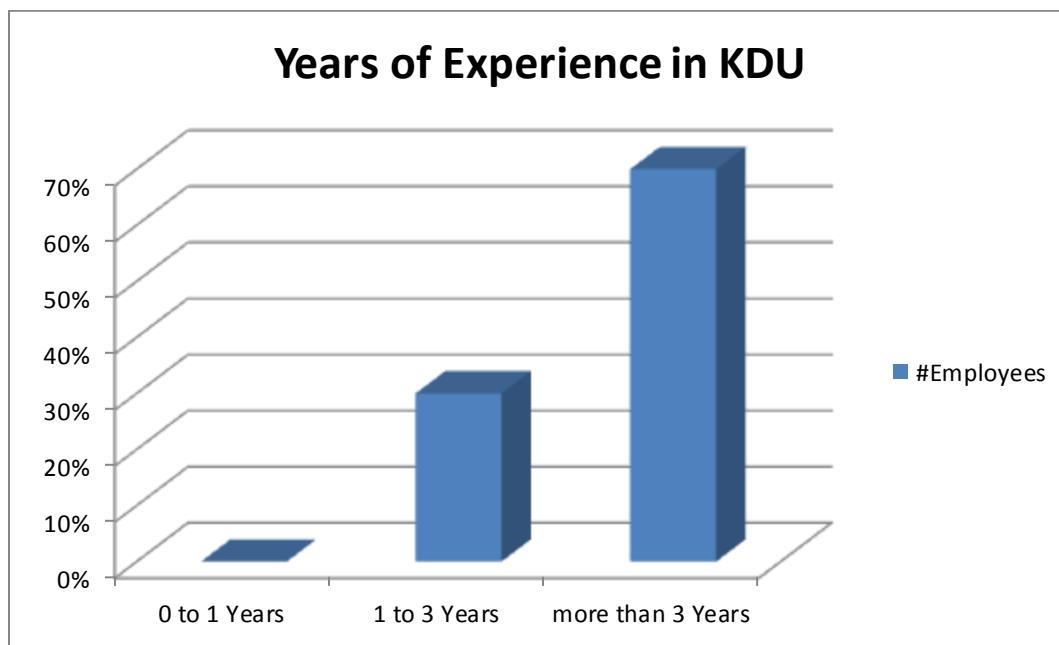


Figure: 3.4: Years of Experience in KDU

Source: Author

According to the above graph, answers can be categorized to two categories as 30% of them have the experience less than 1 year to 3 years while other 70% of them having the experiences are more than 3 years. When compare the whole answers, most of the official's among those 70% had identified that there are issues in the current manual system. With the experience they are having most of them suggest a new system over the current manual system.

Another important point to assess was their familiarity with the web based applications. Since Kotelawala Defence University have several web based applications such as Learning management system, Library management system, officials like HODs and Deans should have to deal with the web based applications.

According to figure 6.0 majorities of them have got the experience of dealing with web based applications. It makes the development team easier. Because the development team does not need to conduct large training session for the clients as they have the practice of dealing with web based applications.

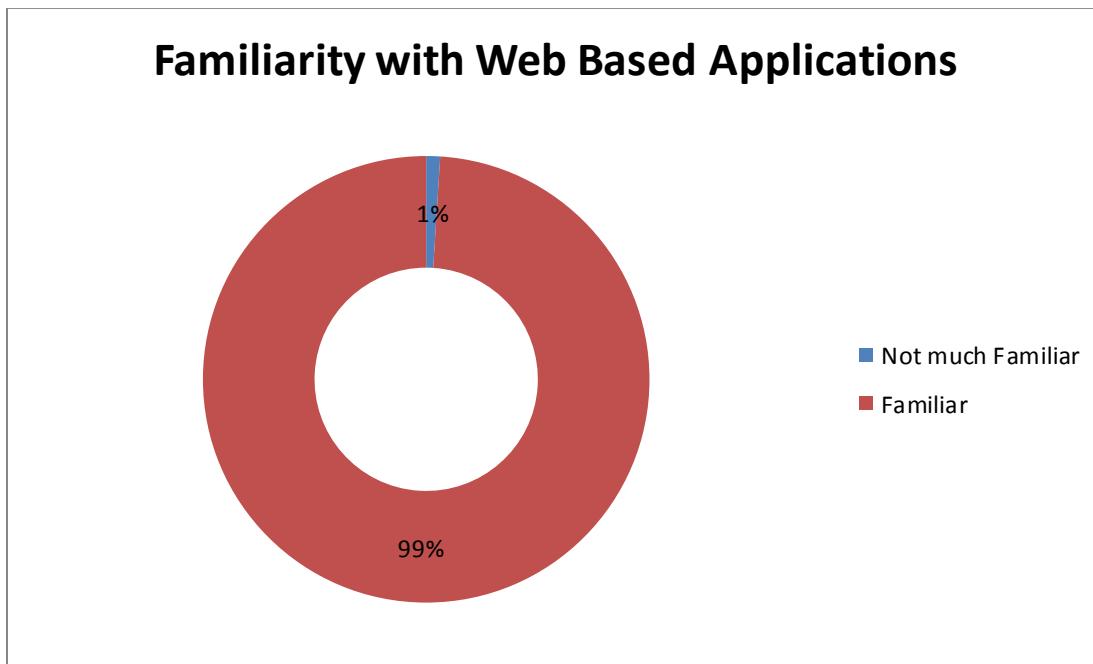


Figure: 3.5: Familiarity with Web Based Applications

Source: Author

Main objective of the section 2 of the questionnaire was to get details regarding the existing task allocating procedure. Questionnaires were distributed to the HOD level of the KDU hierarchy according to the project scope. Organizer was the most popular method for keeping details of employees current tasks and it was followed by memorizing and computerizing.. The figures are almost same that got from the figure 15, the data gathered in the interview process. In here also 58% of them use organizers and 32% of them use the methods of memorize and other methods to keep their records while 10% of them computerize their records. Most of them do not use computers to keep their records. It guides system developers for the difficulty of adapting users for a new computerized system.

The results got from this question are shown in the following figure 7.0.

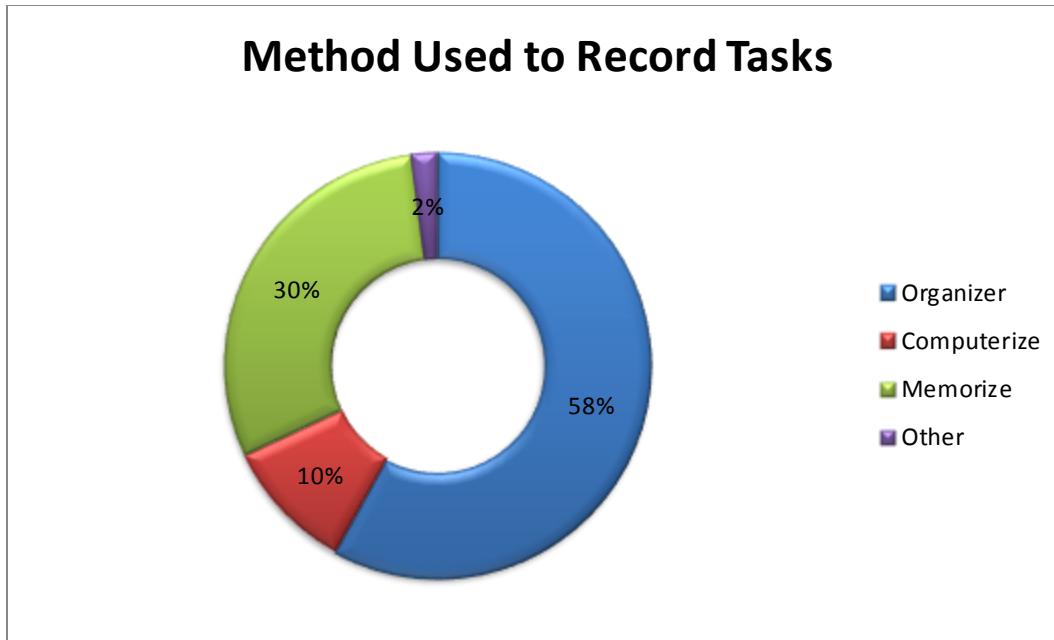


Figure: 3.6: Method Used to Record Tasks

Source: Author

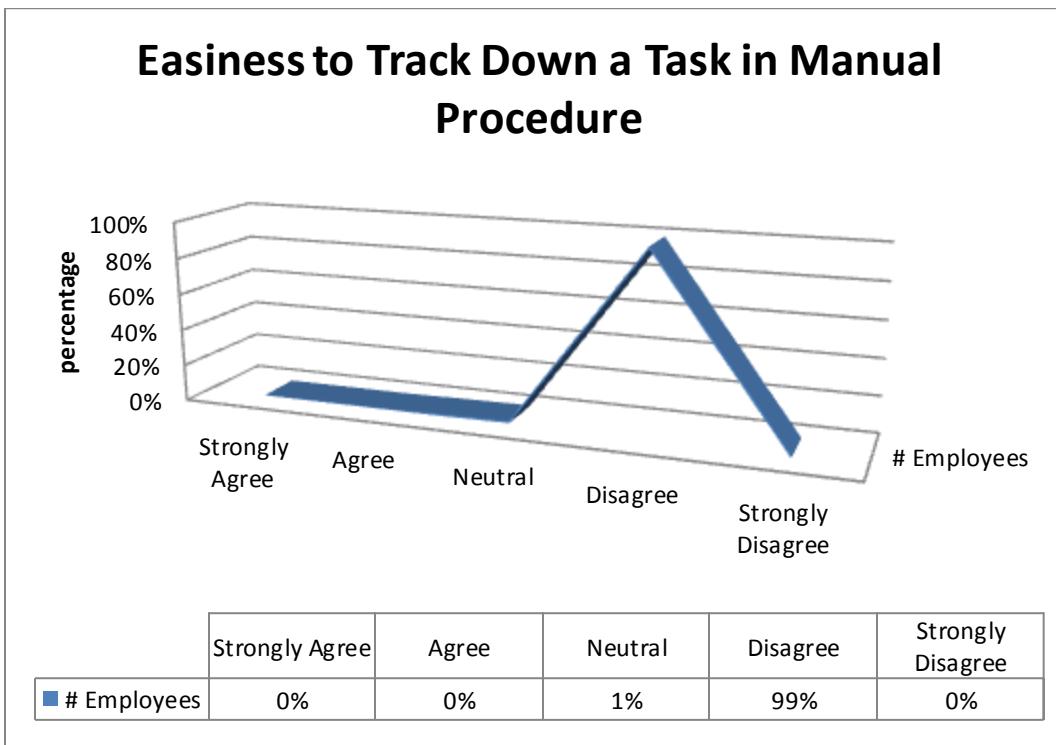


Figure: 3.7: Easiness to Track Down a Task in Manual Procedure

Source: Author

Above figure 8 represents, according to participants of the questioners' process, the easiness of tracking down the progress of an assigned task. Most of the users disagreed to it, because in this current process there is no way to track down a task. So it is very difficult to aware about in between task progress. In this current task management process when the task is assigned, make a record by using above mentioned method and when the task is completed there is a record noting that the task is completed. Except those two records there is no method to keep records about the progress of the task. To see the task progress, superiors have to wait until the task is completed and submitted. This is mattered for the manual task management procedure due to the lack of communication between users when a task goes on. To overcome this issue proposed system automatically sends notifications to the users and it facilitates the users allowing them to communicate through emails within the system.

User satisfactory level with the existing task allocating procedure, as following diagram also shows, most of them were in Agree and Natural levels. Users have been using this manual system for so many years. Since, they engage with manual task management procedure for a long time they do not feel the issues of their procedure. That is because most of the people do not have an idea on the new computerized TMS. They are not awarded that how the new system going to function, and how it adds a value in order to increase the efficiency in task management process. Following numbers of figures would have been changed if the prototype of the proposed TMS were presented them before distributing the questionnaire.

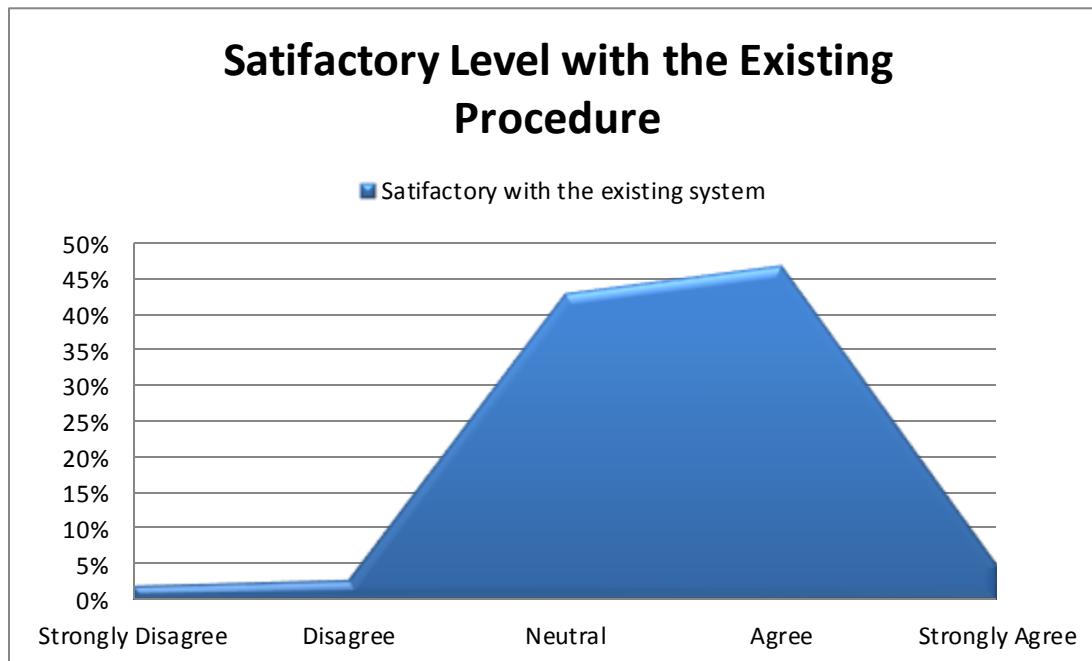


Figure: 3.8: Satisfactory Level with the Existing Procedure

Source: Author

Even though the users are in a satisfactory level with the current manual, for the question which stated that there is a need for an automated system according to do figure 10.0 most of them have given positive answers. Though they satisfy with the current system, they would like to move for a new computerized automated system. As the almost all manual systems moves to a computerized automated system with the development of modern technology, people have to move with the world. It is clear that most of the users are willing to move for a new computerized automated TMS.

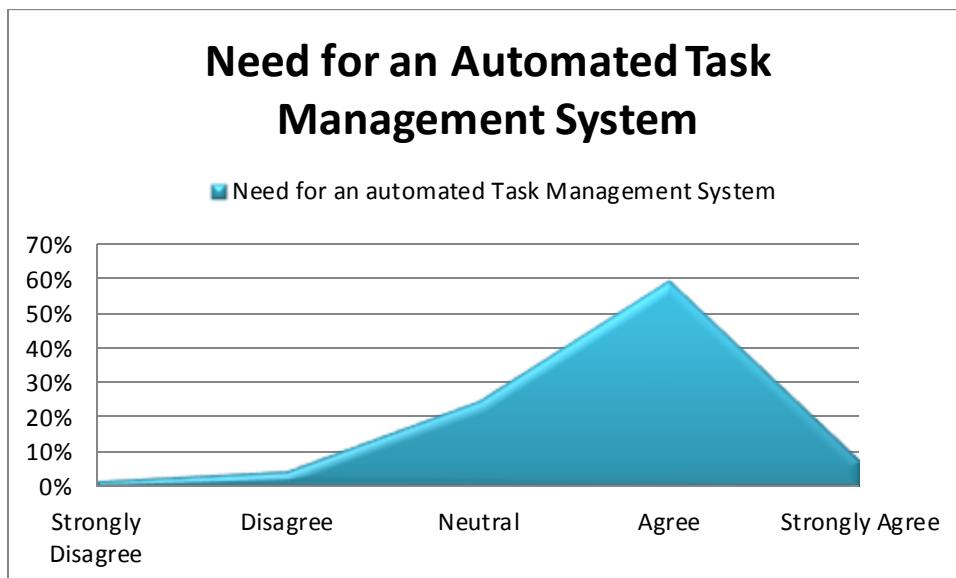


Figure: 3.9: Need for an Automated Task Management System

Source: Author

Another objective of the questioner was focused on the development of new system. For the development of new system, as it is a web based solution it was vital to know their level of using computers in their day today schedules.

The development team needs to know which operating systems are installed in users' computers because when developing the proposed computerized TMS, development team should identify which operating systems should be compatible for the system most. This question was asked to know the operating system that user engages to do their works. Five options were given to select the operating system that they use. Windows XP, Windows Vista, Windows 7, Windows 8 and other were the five options. The number of figures got is shown in following diagram. As the diagram shows most of the users use the windows XP and Windows 7. There is no any other operating system that they use. As all of them use windows platform, the proposed system is developed which will supports to windows platform.

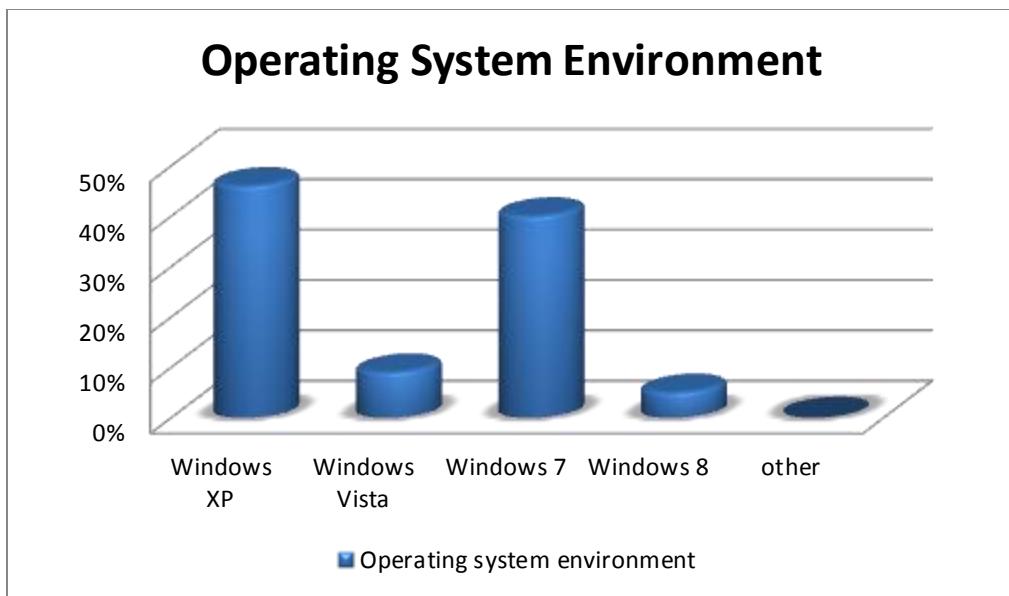


Figure: 3.10: Operating System Environment
Source: Author

The techniques used for the development of the proposed system may not be compatible with some internet browsers. As the proposed system is a web-based one, it was crucial to know which browsers the user are mostly engage in. When analyzing the answers got most of the users use Internet explorer, Chrome and Firefox according to the following diagram. These browsers are compatible with the proposed system. So there will not be any issue when running the system for the end users of the system. Following figure 12.0 graphically represents the comebacks to the question.

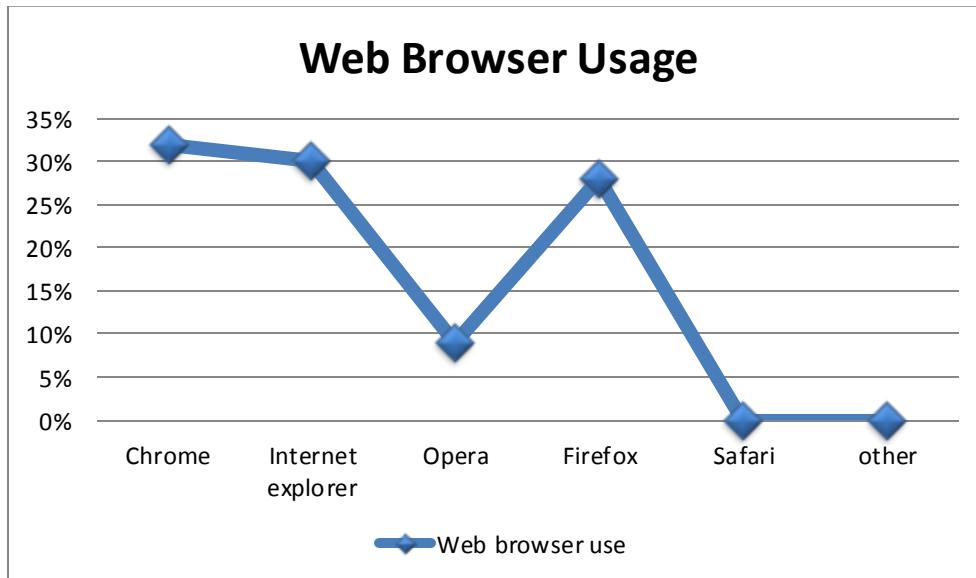


Figure: 3.11: Web Browser Usage
Source: Author

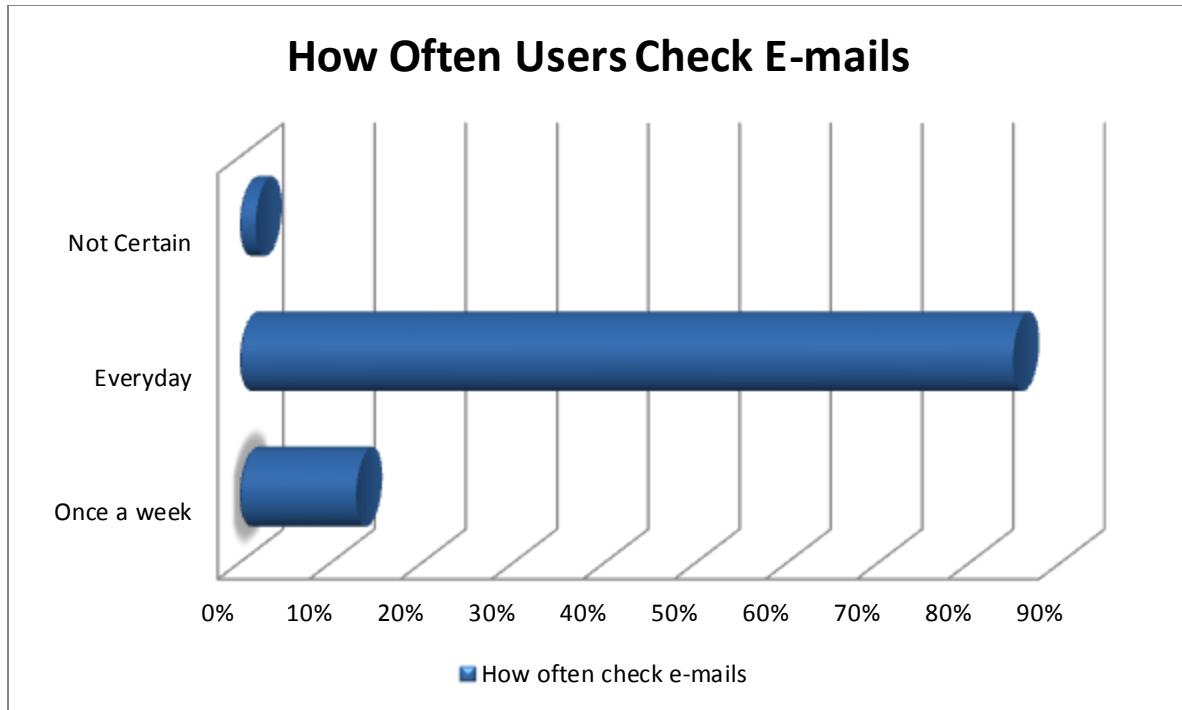


Figure: 3.12: How often Users Check E-mails

Source: Author

Proposed computerized system will send notifications through e-mails time to time for the users to make them update on the progress of the task. To make sure this method is going to be successful it was essential to ensure that the users check their mails often. According to the responses from users 85% of them had selected the option of "everyday" and 13% of them had selected the option "Once a week" while 2% of them had selected "Not certain". When analyzing the answers got to this question, this method is going to be a one of successful functions in this proposed computerize TMS.

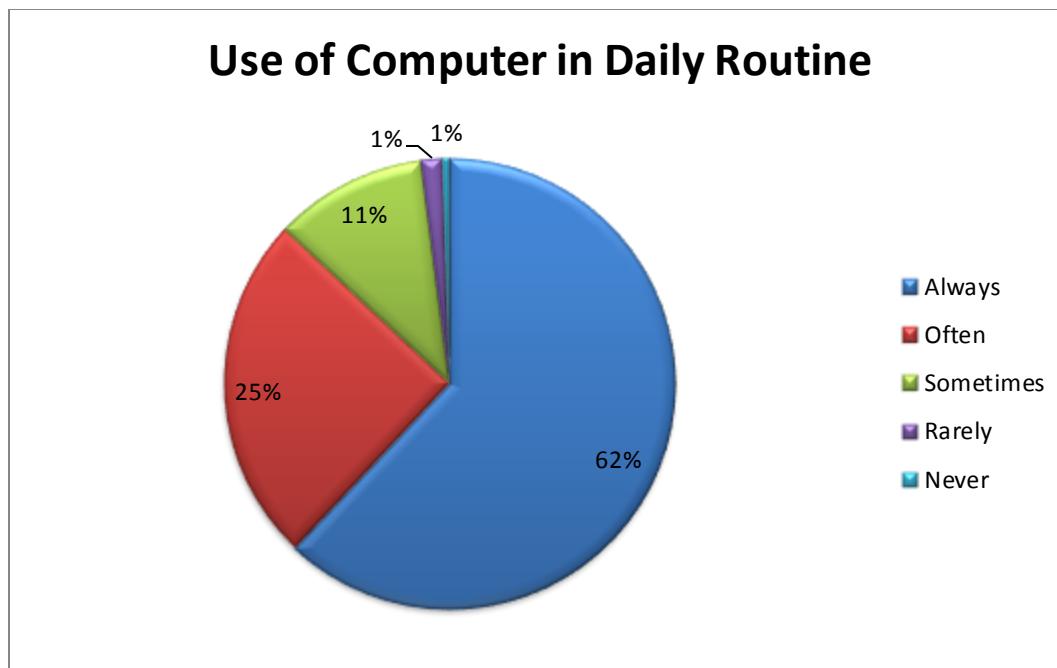


Figure: 3.13: Use of Computer in Daily Routine

Source: Author

User needs to be engaged with the system always in their daily work routine in order to get the maximum benefits of this system. As this is a web based system not only in their daily work routine but also in their day today life whenever necessary they can log in to the system. Majority of them use computers in their daily work routine always. Only few of them rarely use computers in their work routine. The above diagram indicates that more than 60% of them had selected "Always" out of other options. It explains how the proposed system is going to be a very effective and a successful approach solution for task management in the KDU.

3.2.2 Implementation of Research Techniques: Interview

This is the most significant method of gathering data which is used to collect qualitative data in order to develop computer based TMS for the KDU because of the ability to get immediate feedback from the interviewee and clarify the facts. A set of questions covering areas such as current task allocating procedure and expectations from a new system, were prepared for each different personals that were going to involve in the interview process. Both open ended and the close ended questions were included in the interview questionnaire. Since computerized TMS are not widely popular, employees did not have a good understanding about it. Interviews helped to overcome the problems that were arisen due to that factor also.

As officials from the top levels of the hierarchy were involved in the interviews, interviews were kept as short as possible and always pre appointments were taken for their conveniences. All the

interviews were conducted as one to one interviews and they were conducted as face to face interviews. The ultimate expected result of conducting the interviews in the requirement gathering process was to get overall ideas about the current task allocating process in the extant KDU environment and identify the weaknesses in the system.

3.2.2.1 Pre Plan vs. Actual Plan

Following Table 3.0 and Table 4.0 demonstrate the pre plan and the actual plan of the data gathering technique interviews.

						Pre Plan
Planned Date	Resource Personnel	Time	Venue	Mode	Objective	
20/5/2013	DVC(D)	1430h	DVC(D) Office	Face-to-Face	<ul style="list-style-type: none"> • Understand about organizing hierarchy. • Task of the Deputy Vice Chancellor. 	
13/08/2013	Registrar	1530h	Registrar Office	Face-to-Face	<ul style="list-style-type: none"> • Know about the tasks of Registrar. • About the tasks which are assigned by the Registrar. 	
15/08/2013	OCLS	1530h	OCLS Office	Face-to-Face	<ul style="list-style-type: none"> • Who are the officials working under OCLS • What are the tasks that are assigned by the OCLS. 	
17/08/2013	HOD	1330h	HOD-ICT Office	Face-to-Face	<ul style="list-style-type: none"> • Get to know about the tasks of particular HOD and how they handle those. 	
1/08/2013	CO Admin	1500h	CO Admin Office	Face-to-Face	<ul style="list-style-type: none"> • Who are the officials working under CO Admin. • How the tasks handled by CO Admin 	

Table: 3.2: Pre Plan- Interviews

Source: Author

Pre Plan					
Conducted Date	Time	Venue	Resource Personnel	Mode	Summary of Gathered Data
20/5/2013	1430h	DVC(D) Office	DVC(D)	Face-to-Face	<ul style="list-style-type: none"> Gathered details about the organizing hierarchy. Tasks and responsibilities of the Deputy Vice Chancellor.
15/08/2013	1430h	Registrar Office	Registrar	Face-to-Face	<ul style="list-style-type: none"> Got an idea about registrars' tasks. Collected details about the tasks which are assigned by the Registrar.
19/08/2013	1430h	OCLS Office	OCLS	Face-to-Face	<ul style="list-style-type: none"> List of officials working under OCLS. Tasks and responsibilities that are assigned by the OCLS.
21/08/2013	1430h	HOD's Office	HOD-ICT	Face-to-Face	<ul style="list-style-type: none"> Get to know about the tasks of particular HOD and how they handle those. Discussed about the organizational hierarchy.
10/08/2013	1430h	CO Admin Office	CO Admin	Face-to-Face	<ul style="list-style-type: none"> Who are the officials working under CO Admin. How the tasks handled by CO Admin

Table: 3.3: Actual Plan- Interviews

Source: Author

There were slight draw backs in the process of interviews that caused differences in the pre plan and actual plan, which are discussed in the under the obstacles and remedies but as an overall all the necessary data were gathered and the using interview technique was a successful approach.

3.2.2.2 Analysis of Gathered Data

Some of the general question asked in the interview process and the analysis of the given answers are stated below

How the officials usually handle a task, was a common question which was asked from the most of officials to identify the methods that they are used to handle the tasks currently. Several types of methods were mentioned for this question. It was helpful to identify the areas that they make slips in their task management process as well as the areas that should be mainly focused in the development of proposed TMS. Following figure 15.0 explains the methods used to record tasks and the percentage of them. Only 12% of officials uses the method computerize to keep records and all other 88% of officials uses other non-computerized methods. It clarifies the lack of computation that they use to keep records.

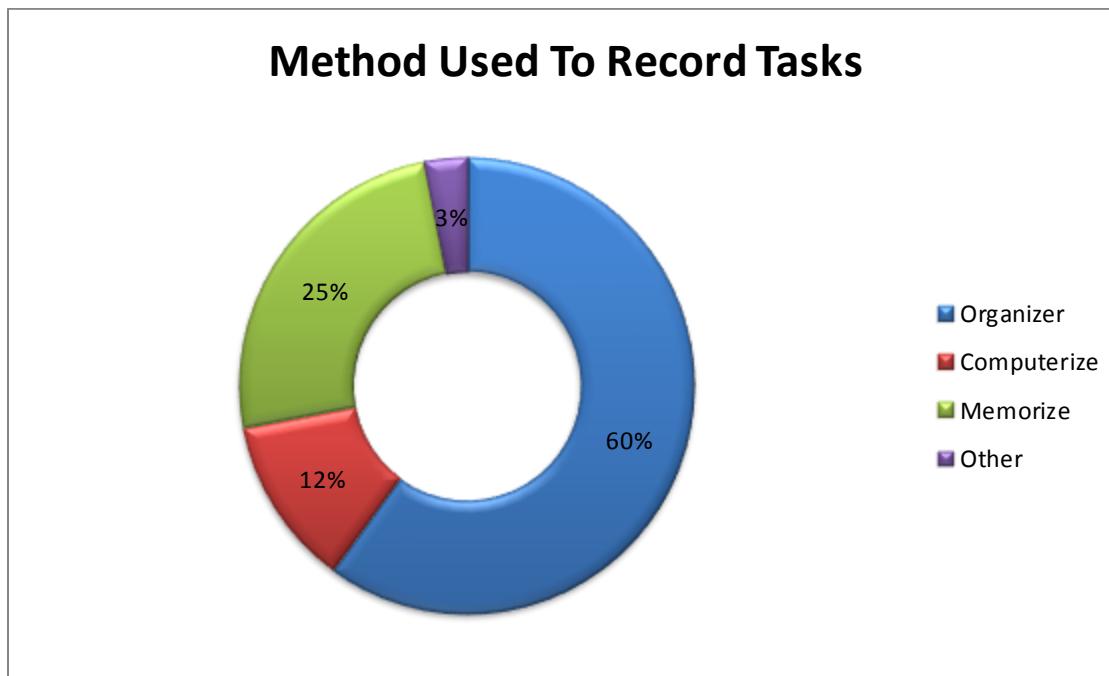


Figure: 3.14: Method Used To Record Tasks

Source: Author

The method that officials used to assign a task in current task management process was questioned while conducting the interviews. In current manual system, there are several communication methods are used when assign a task. From the discussion it was discovered that conducting a personal meeting, sending a letter, sending a message through a person or making a call are the recognized main methods used to assign a task in current procedure. They are shown in the figure 16 with the data gathered in interview process.

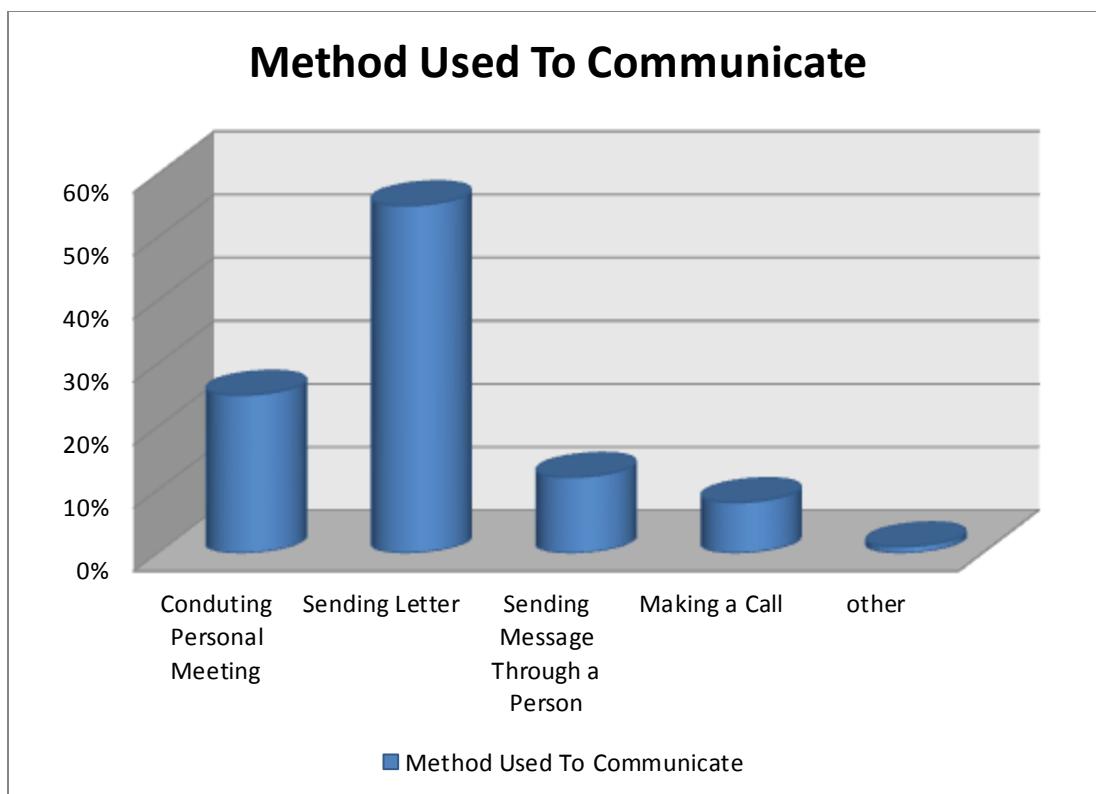


Figure: 3.15: Method Used To Communicate

Source: Author

Using these methods is very time consuming. This was one of the issues with the current task management process which was identified through the interview process. It also wastes a lot of man power. Communicate through emails and notify the users through notification facilitate the users for a better communication among them in this proposed computerized Task Management System, to overcome their constraints with the current system.

To know the ideas on extant system need to be innovated with a new technology several questions were asked. Expectation of these questions is to identify the need of a new system over the typical manual system. Most of the difficulties face with current system could be able to identify through this question. Most of the officials highly recommended that the extant system needs to be innovated with a new technology. They made their suggestions and comments that should be included if there would be a new extant system. Out of those applicable raised suggestions and comments will be applied for the development of the computerized automated system.

To analyze the support that the transition from the extant procedure to a computer based task management some questions were used. 92% of the interviewees were interested on a new automated Task Management System while around 1% of them rejecting a new computerized system. That 1% of interviewees is satisfied with the current manual system rather than a

computerized system. Remains of them stayed neutral stage but still they were positive with a new system over the current system. These figures of willing to adapt with new system further explains in figure 17.0. Overall majority of interviewees were willing to adapt with new computerized system.

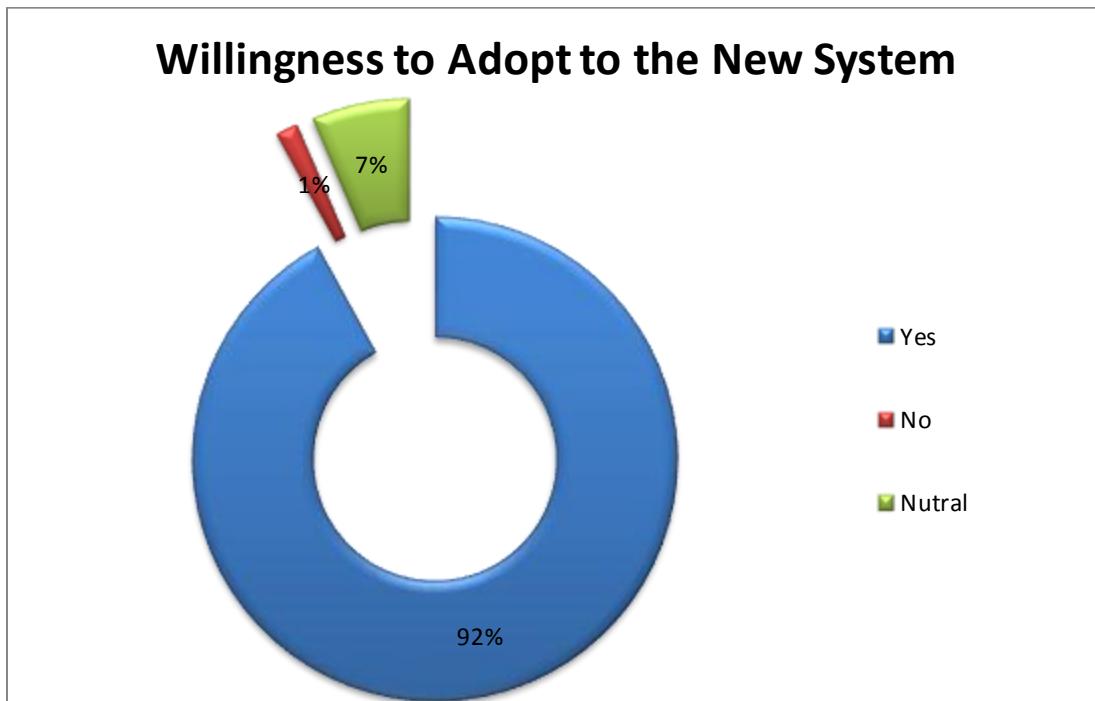


Figure: 3.16: Willingness to Adapt to the New System

Source: Author

To identify the expectation from a computer based task management system some straight forward question was asked from the interviewees what kind of system that they expect. It helps the development team to identify the main key functions and modules of the proposed system. It was helpful to justify the functions and modules which are going to be applied for the proposed automated system. People who engage with the TMS need to be updated time to time through the notifications. Status of the each task needs to be included and it needs to be updated from initial stages until the particular task is finished. Record of the tasks each employee engages and engaged need to be stored to identify the evaluations of the employee such as how many of tasks are successfully completed and how many of them are failure. The system needs to be accessed within anywhere of the world. Through this question above mentioned functions are the main identified areas to be considered in the development process. The proposed system needs to be a web based system, is the identified solution to satisfy all above mentioned areas.

3.2.3 Implementation of Research Techniques: Document Reviews

Documentation review is one of major data gathering technique used to review a variety of existing sources such as documents, reports, data files, and other written artifacts with the intention of collecting independently verifiable data and information. It helps to gather accurate data related to the current task allocating procedure to be analyzed. If some important data is missed while gathering data using other techniques, this technique will help to track those data. Document review is typically less expensive rather than other data gathering techniques. Existing documents helps to understand the history, philosophy, and operations of the current manual system step by step. In this process some people of the organization have to be involved to get a better understand about the documents. To determine the accuracy of the information which has been gathered, comparison of the documents that contain similar information is done by checking the documents against other data have been collected. At last all the gathered information is summarized in order.

3.2.3.1 Pre Plan vs. Actual Plan

Following tables demonstrate the pre plan and the actual plan of the data gathering technique document reviewing.

Pre Plan				
Resource	Date	Time	Document Type	Objective
Mr.ADAI Gunasekara(Lecturer)	10/08/2013	1445h	Internal Memo	To identify the information included when a task is assigned through an internal memo
Mr.ADAI Gunasekara(Lecturer)	12/08/2013	1500h	Internal Memo	
Mr.PPNV Kumara(Lecturer)	11/08/2013	1530h	Internal Memo	To identify format of letters used to assign tasks.

Table: 3.4: Pre Plan- Document Reviewing

Source: Author

Actual Plan				
Resource	Date	Time	Document Type	Summary of Gathered Data
Mr.ADAI Gunasekara(Lecturer)	15/08/2013		Internal Memo	Identify the data when a task is assigned through an internal memo.
Mr.ADAI Gunasekara(Lecturer)	15/08/2013		Internal Memo	
Mr.PPNV Kumara(Lecturer)	16/08/2013		Internal Memo	Got an idea of the format used in an internal memo

Table: 3.5: Actual Plan- Document Reviewing

Source: Author

Although there are slight differences in the pre plan and the actual plan tables, the important data were gathered for the development of the new system. As an overall result of using document reviewing was successful.

3.2.3.2 Analysis of Gathered Data

Most of the documents observed in this stage were letters regarding assigning of various tasks to subordinates. All the letters had the KDU header and in the right top there is indicated that to where the document is belong to. In these letters key points such as from whom the letters, to whom letters are addressed in to, date and time, the subject title were kept in the top of the letter separated from the body area to highlight those facts since they are the facts that anyone is first searching in a letter.

In the body part of the letter, the above mentioned subject title is elaborated describing all the needed information. All the necessary information has being given clearly, sometimes with the aid of tables also. In all the letters in the bottom it is mentioned about to whom the copies of the letters has being sent also. Using the analysis details of the documents reviewed, the data which should be stored in the database were identified.

3.2.4 Implementation of Research Techniques: Observation

Observation is another fact finding method which was used in the requirement gathering process in the project. By looking and observing how real system's activities and actions which are carry out throughout the process, will give a broad understanding about the work flow of the system. By using this technique it will help to identify the incomplete or inaccurate information gathered using other fact finding techniques used in this data gathering process.. The system can be investigated through an observation process which will help to verify the previously gathered data. The employees with the real performance tailor with the actual work processes illustrate the work flow of the system. HOD offices, Registers Office, OCLS are the some of the work areas were observed. After a successful assessment, the identifying constraints arise while work process is more benefited to the development of the system.

3.2.4.1 Pre Plan vs. Actual Plan

Below tables pre plan and actual plan indicates the details of process Observation, which was a used as a data gathering technique for the project.

Pre Plan			
Date	Time	Venue	Objective
24/07/2013	1500h	Registrar Office	<ul style="list-style-type: none"> • Observe about the officials working under Registrar
30/07/2013	1445h	OCLS Office	<ul style="list-style-type: none"> • Observe the officials working under OCLS

Table: 3.6: Pre Plan- Observation

Source: Author

Actual Plan			
Date	Time	Venue	Status
24/07/2013	1500h	Registrar Office	Successful
28/07/2013	1500h	OCLS Office	Successful

Table: 3.7: Actual Plan- Observation

Source: Author

Due to certain obstacles (mentioned under obstacles and remedies) data collection for the new system using observation was difficult. Although some information was gathered as an overall results of observation process was not up to expectations.

3.2.4.2 Analysis of Gathered Data

In the below it is described the analysis of data gathered using the research technique observation in different venues.

Registrar Office

The method of observation was used to gather the data which was unable to be gathered through other methods. Registrar Office was observed to observe how the different officials under registrar work. Most of the officials go for the registrar office with documents to get them approved, to get them signed and etc. In this process, they have to go to the office again and again to accomplish their tasks. It wastes lots of main power as well as a lot of time. The main reason for this issue is the

method that they use to communicate while dealing with the tasks that they have been given. Similarly, they do not have any way to upload documents without going to the bursar office.

To overcome this matter, proposed computerized TMS facilitates the user by providing a better communication method. Through the system they are able to communicate via emails. Moreover, the proposed system provides a module to upload documents within the system. Through these mentioned functions, users are able to get the maximum benefits to accomplish the assigned tasks by saving their manpower as well as the time.

OCLS Office

All the services and physical objects for the KDU are purchased under the guidance of OCLS office. In this process, the people who work in the OSLS office have to deal with bulk of documents to get done their tasks. In this case, as it is one of huge processes in KDU they have to maintain large number of documents to keep track of each task given to the officials under OCLS. It is a difficult task to be handled which leads to a lot of mistakes. It is also hard to retrieve data when they are needed in current manual system.

Proposed computerized TMS helps users to keep track of the assigned tasks in efficient manner to prevent above mentioned barriers. Each module is well connected and organized with each other so; it is easy to retrieve data from the system when they are required. Users are able to get the maximum benefits and use through this proposed system to achieve their tasks on time.

3.2.5 Obstacles Faced During the Data Gathering Process and Remedies Taken

Obstacles:

- In the process of preparing the questionnaire, main problem that arose was to keep the questionnaire as short as possible but covering all the aspects which needed to develop the system.
- Difficulties were arisen with meeting parties for the distribution of the questionnaires with their tight work schedules as the selected participants were from the top level of the KDU hierarchy.
- All the distributed questionnaires were not answered properly by some participants due to their tight work schedules and some participants were reluctant to answer the questionnaire due to personal reasons. Furthermore some participants needed much more time to answer the questionnaires which were difficult to accept due to project deadlines. In the questionnaire although the close ended questions were answered most of the participants were reluctant to answer the open ended questions.
- Since as the initial end users for the TMS will be officials from the Head Of Departments and above, they have very busy work schedule as they are in top level in the organizational chart. It was difficult to interview them for a longer time and it was difficult to get a time

frame for the interview. Although time frames were given they could not conduct the interview due to important reasons.

- Since TMS are not a widely used application many officials did not completely understand the concept of a computerized TMS. Most of the time the interviewee talked details out of the scope of this project.
- Some stakeholders were unable to contact and conduct face to face interview with them to absorb their real response for the particular domain.
- There were some obstacles when gathering data through the method of documentation review. There were documents which are important to the development of TMS. Because, they are very confidential documents which were not given under certain circumstances.
- Some documents were out of date as well as several were highly damaged due to several reasons. Details in those documents were not clear and it was hard to go through them.
- It was a very time consuming method in this data gathering phase. To get the important key details whole documents have to be gone through several times.
- The method of observation was conducted in data gathering phase was done informal way in initial stages to get the idea how the actual process goes in that particular office. In this phase there were several obstacles that had to be faced while gathering data. One of them is the people who works in offices were reluctant to being observed as well as it was a disturbance for their routine.

Remedies:

- Questionnaires were prepared short as much as possible by excluding questions which the answers can be found in using a different research technique.
- Participants were given the fill freedom to avoid from answering any question or from answering the complete questionnaire if they wish not to involve in the process.
- With some of the participants who were reluctant to answer the questionnaire changing the research technique was a solution but with the time constraints it was also difficult.
- Interviews were made as much as short for the convenience of the interviewee and always given the priority for their work schedule. They were contacted multiple times and got a time slot which is comfortable for both parties.
- Best try was given to explain them about what is a TMS as much as possible and the data gathered from them were mapped as per to our knowledge and experience how they can be used in a computerized TMS.
- Although it was difficult to interview the highest rank officer in certain offices, as a solution lower rank officials in the same offices were participated in the interview process. Required details were gathered using this method when the desired was unable to participate in the interviews.
- The documents only which were given have to be referred and get the maximum details which can be extracted regards to the development of TMS ,as some important documents were not given.

- The key information which were on damaged documents were extracted that could. In that case some of documents had to be repaired to get the important details which are essential for the development of the system.
- In order to reduce time consuming, Staff members were involved for the document reviewing process. It was easy to find the correct details from the correct documents which are related for the process of development of TM
- Observations were conducted formally after facing that barrier. The people who work in offices were early informed about the observation that was going to be conducted. Further, they were informed why and how this observation process is done to make them comfortable. It was easy to gather required details through the observation after they were informed.

3.3 Requirement Specification for the New System

This section contains a description about the functionalities of a task management system and a detailed description about the modules, functions of the new system and the technology which will be used to develop the new system. Furthermore UML diagrams such as Use Cases, Sequence Diagrams and Class Diagrams have been used to explain the functionalities of the new system.

3.3.1 Overview of a Task Management System

Task Management is the discipline of organizing and managing tasks in such a way that the task is completed within defined scope, accepted quality, on time and cost constraints. A task is a temporary and undertaken to create a product, service or to achieve organizational goals, which brings beneficial change or added value to particular organization.

Task contains deadlines, participants, estimated effort and actual effort spent in each task, generating several reports and graphics of productivity. To keep track mentioned details there should be a proper system. The best solution is, using a software Task Management System rather than typical manual system. The goal of software Task Management System is to understand, plan, measure and control the task such that it is delivered on time and on budget. In general Task Management System involves gathering requirements, managing risk, monitoring and controlling progress.

3.3.2 Functions and Modules

In this sub sections it is described about the functional, non-functional, technical and usability requirements. And also there is an enumerated list of modules to be used in the new system.

3.3.2.1 Functional Requirements Specification

In the below it is described the main functional requirements designed for the development of the Task Management System. System has two defined user types Administrators and General Users.

General Users of the system,

- Shall be able to create a new task and assigned it to the particular employee.
User can create task and fill the details such as task title, task description, status, priority level, start date and due date. At the time which the task is created it can be assigned to an employee in the employee database or it can be assigned later.
- Shall be able to manage task details
User who created the task can edit all the information filled when creating a task. User will be able to reassign the task to another employee in the database also. Managing tasks details will help to control the duration of the task since you can edit the due date of the task. After the completion of a task user have to update the task status such as 'Complete' or 'Pending' in the TMS to close a task.
- Shall be able to remove unnecessary task.
When a user no longer requires keeping details in the system he can remove it from the database
- Shall be able to provide reports.
Users can produce number of reports such Task details, reports related to tasks of a particular employee, successfully completed tasks and pending tasks. Details of these reports will be depending on the access level that the user who needs to produce the report. With the higher access level a user can access to more data and produce reports with more information.
- Shall be able to view tasks assigned by the user, assigned to the user and filter and order them.
User can assign task to his sub ordinates while his superiors can assign tasks to him. Users can view these entire tasks in a data grid. Task can be filters according to the start date, due date, priority levels and status. Furthermore records can be search using employee names and task titles.
- Shall able to the notifications when assigned or any update in the involved task.
When a task is assigned to an employee he will get an email notification about it. And also if a details of a task which an employee is currently working is updated that employee will receive an email notification of that also.
- Shall be able to add new employee record to the system
According to the access level granted users will be able to add employees to the system for task assigning purposes. But will not able to edit or delete records.
- Shall be able to edit their personal details and password of the system.

- Shall be able to send an email to administrators via a system specified email address.
Administrators shall be able to engage with every function that General Users are allowed with. Apart from them administrators of the system,
- Shall be able to add, edit and remove employees to/from the database.
According to the access level granted users will be able to add employees to the system for task assigning purposes. Details of these employees can be edited when necessary. User will be able to remove employee from the data base when they are no longer needed or available in the KDU work procedure.
- Shall be able to manage employee user accounts.
User will be able to edit employee details. Furthermore users are provided with a unique username and password for the access of the system initially which can be changed according to their wish from time to time.
- Shall be able to track the login history of users and produce reports regarding login history in certain time periods.
- Shall be able to manage database master files.

3.3.2.2 Non -Functional Requirements Specification

Main non-functional requirements designed for the development of the Task Management System are as follows.

- Provide different access levels to the access TMS
KDU has a wide employee hierarchy. With respect to their place in the organizational hierarchy and their responsibilities accesses to the data in the database are granted (Ex: Different access levels of data for Vice Chancellor, Deputy Vice Chancellor, Faculty Deans Head of the Departments and etc.) Each user will be provided with a strong username and a password which can be changed at any time according to their wish.
- Accessibility to system from any place with an internet connection and a computer
TMS will be developed using the web base technology so that any person with an authorization can access to the system from anywhere in the world at any time with an internet connection and a computer.
- User shall be able to set different status to tasks
When task are created and finished as their status **Inprogress, Closed, Completed and Pending** can be applied in order to keep the task list organized. It will also be helpful in using them as task filtering criteria.

- User shall be able to set priority levels to tasks
Different tasks done in KDU may have different priority levels. In the TMS task can be assigned with **High, Medium and Low priority** levels so that they will provide an added advantage in identifying the most important task to be done first. It will also be helpful in using them as task filtering criteria.
- User friendly interfaces
Design user friendly interfaces such that users can work with the system easily and efficiently.
- Bug free reliable software
Developed system will be thoroughly tested for bugs and errors. If any bug may appear it will be debugged using demo test to provide a smooth and error free software.

3.3.2.3 Modules Proposed for the New System

Following is an enumerated list of requirements for the new system development.

Module 1: “Task Administration”

- 1.1: Create a task
- 1.2: Assign a task
- 1.3: Forward a task
- 1.4: Close a task
- 1.5: Edit a task
- 1.6: Remove a task

Module 2: “Employee Detail Administration”

- 2.1: Add new employees
- 2.2: Edit old employee details
- 2.3: Remove employees

Module 3: “View Tasks”

- 3.1: View all the tasks assigned to user
- 3.2: View all tasks assigned by the user
- 3.3: Search task by the task title and assigned employee name
- 3.4: Filter task by using start date, due date, status, priority and assigned employee

Module 4: "User Account Administration"

4.1: Create/edit and delete user accounts.

4.2: Change account password

Module 5: "Report Generation"

5.1: Produce task detail reports.

5.3: Produce Employee and assigned tasks reports.

5.3: Produce login history reports.

Module 6: "Login History and Master files"

6.1: Keep track of the login history of users

6.2: Add/edit and remove details from database master files.

3.3.3 Technical Requirement Specification

Task Management System will be implemented using a web based technology to provide the end user to access into the system using a computer with an internet connection regardless the location. This proposed system will be developed using a combination of several languages. HTML will be the base while JEeasyUI frame work which is based on jquery will be used to develop the interfaces. Mysql will be used as the DBMS and PHP will be used as the scripting language.

3.3.4 Usability Requirement Specification

Following are the usability requirements to be considered when implementing the TMS.

- Display area of the 1st interface is very much limited so front end will be designed and developed by making use of the maximum display area. Data and entities will be displayed either by using the text format or image format.
- Because of the data rate, latency of wireless network can be bulky at times the volume of data to be send/receive will keep at minimum.
- New system shall be developed for the use in Microsoft Windows based environment.
- New system shall be developed for an 800x600 resolution for web.
- Interfaces of the system shall be designed with appropriate fonts, font sizes, colors and menus in way such that users are more comfortable to work with.
- System shall be designed ideally with the principle "Recognition rather than recall in mind."

3.3.5 Models for the New System

This section illustrate a set of figures drawn to represent the details of the new TMS using UML techniques such as sequence diagrams, use case diagrams and class diagrams.

3.3.5.1 Sequence Diagrams for the New System

Following diagrams represents how the processes in the new system operate with one another and in what order.

Figure 18 illustrate the general sequence of actions for entering in to the TMS and selecting a service.

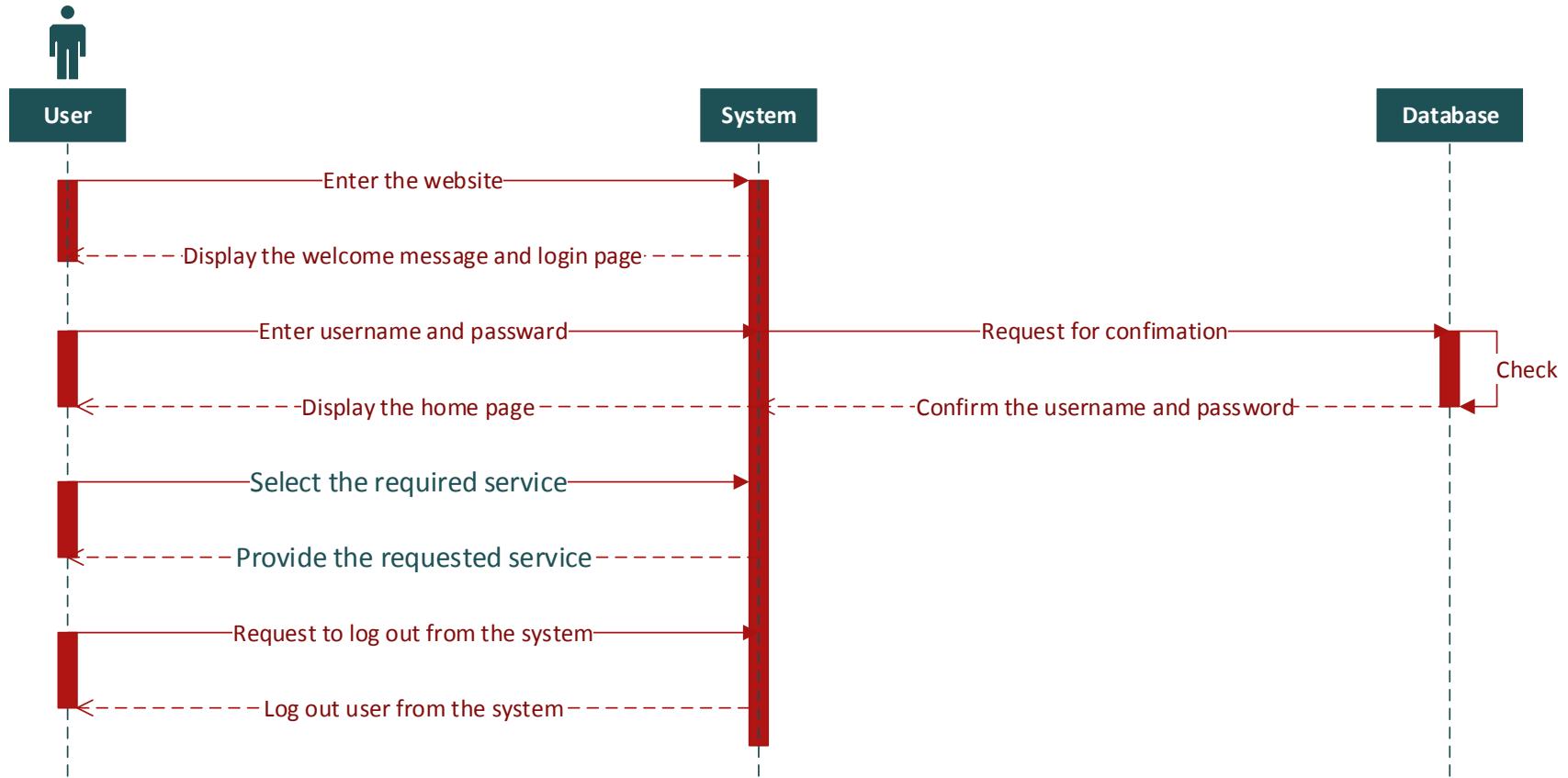


Figure: 3.17: General SQ Diagram for Getting a Service

Source: Author

***Note: Required services can be services such as create task, edit task, remove task, and add employee and other functions which are included in the system.

Following diagram illustrate the sequence of actions for entering in to the TMS and using creates a task service.

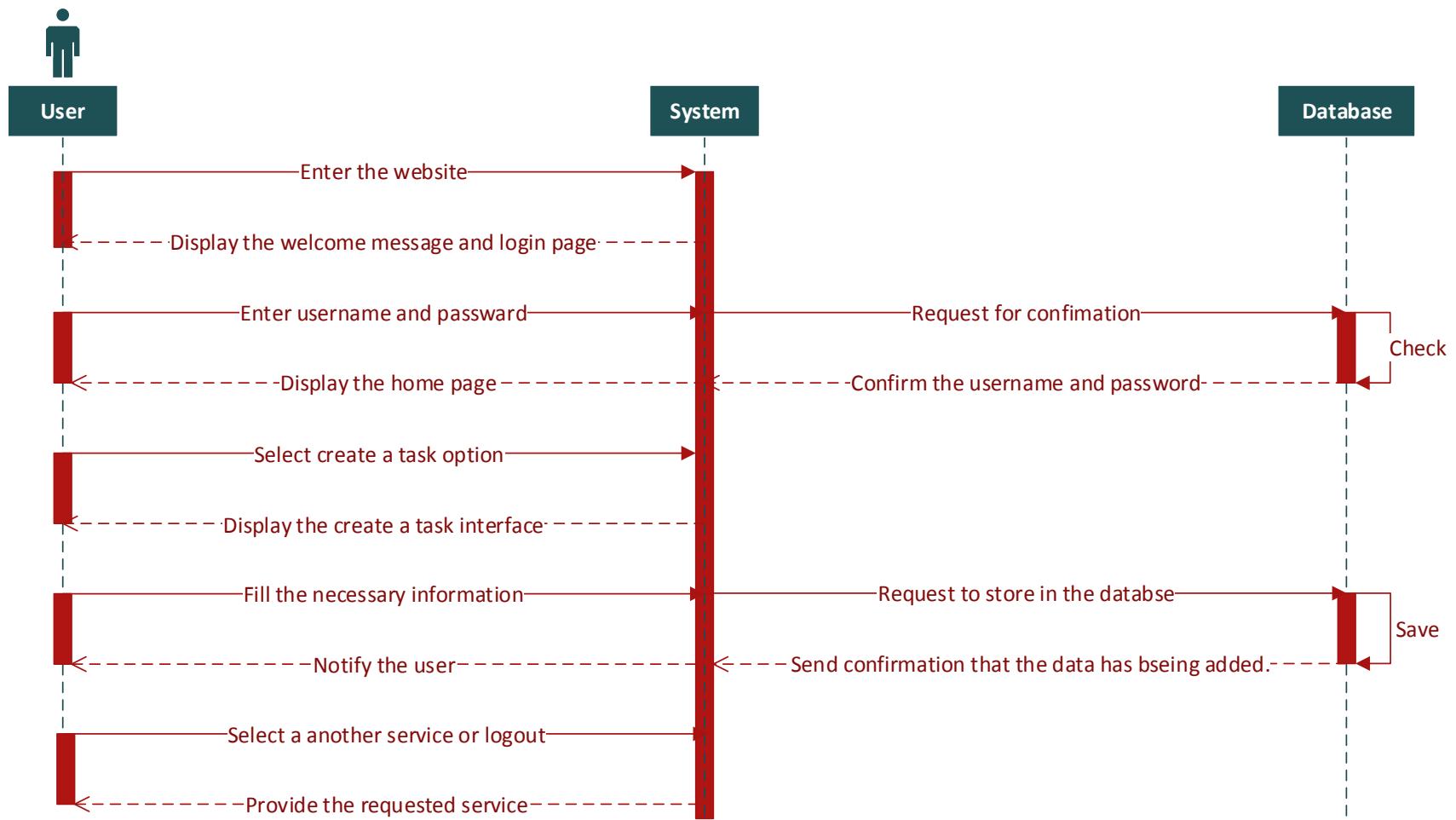


Figure: 3.18: SQ Diagram for Creating a Task Option

Source: Author

Following diagram illustrate the sequence of actions for entering in to the TMS and using the add an employee service.

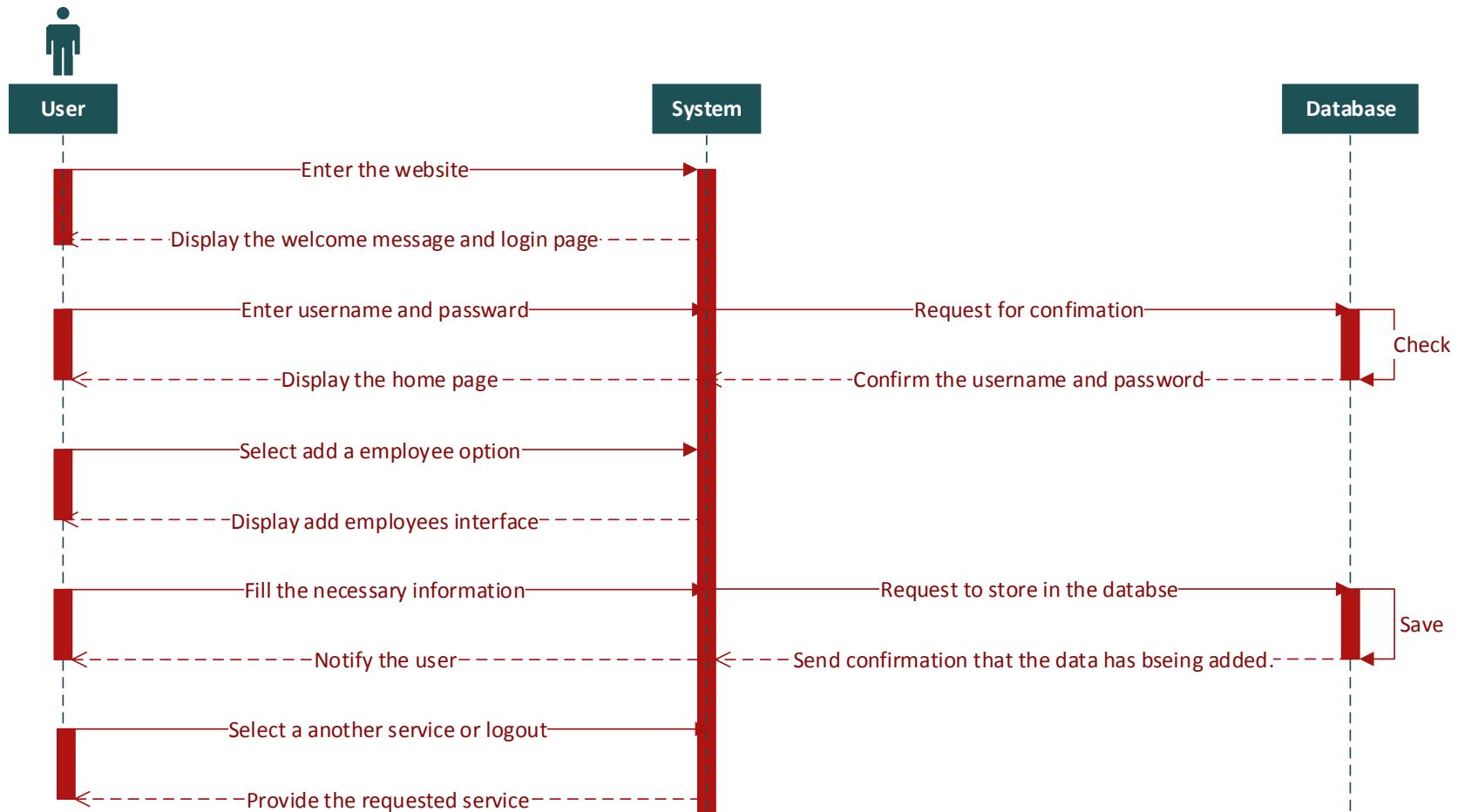


Figure: 3.19: SQ Diagram for Adding an Employee Option

Source: Author

3.3.5.2 Use case Diagram for the New System

The diagram contains the main functionalities and the users who are involving in the newly implementing task management system. Primary scenarios are followed by this diagram.

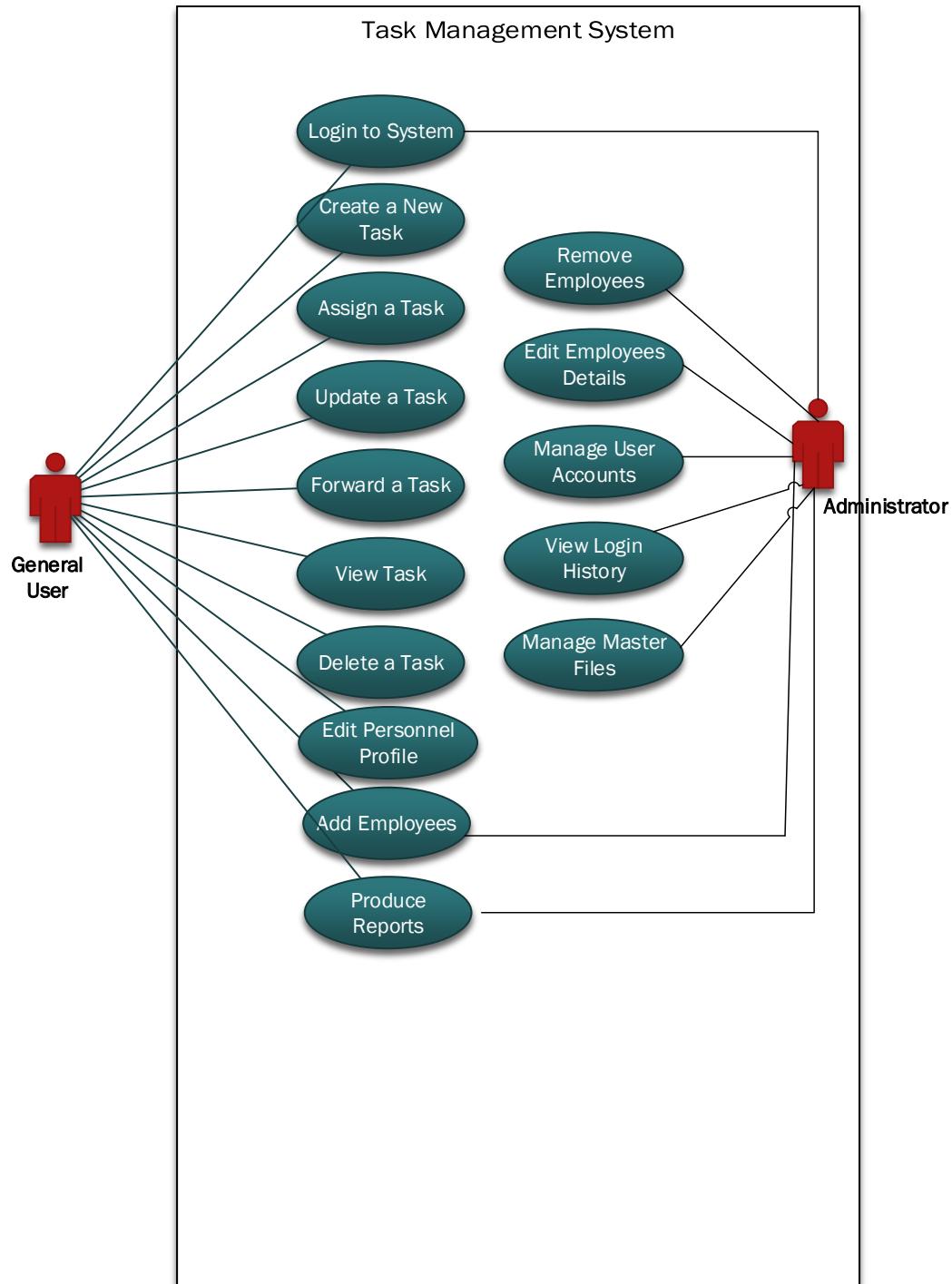


Figure: 3.20: Use case Diagram for New System

Source: Author

Primary Scenario

Use Case: Login to system

Pre-Condition: User needs to have a valid username and password.

Flow of events:

1. User enters to the website.
2. User gets the login window.
3. User enters username.
4. User enters password.
5. Select the submit button.

Post Condition: Login to the system.

Use Case: Create a new task.

Pre-Condition: User needs to be logged in to the system.

Flow of events:

1. Select the “New Task” button.
2. Fill the task form.
3. Select the “Save” button.

Post Condition: Task is created

Use Case: Assign a task.

Pre-Condition: 1. User needs to be logged in to the system.
2. A task needs to be created.

Flow of events:

1. Select the “Task” button from the menu bar.
2. Select the task needs to be assigned.
3. Select the employee who needs to be assigned the task.
4. Select the “Save” button.

Post Condition: Task is assigned to an employee.

Use Case: Delete a task.

Pre-Condition: 1. User needs to be logged in to the system.
2. Tasks should be in the database.

Flow of events:

1. Select the “Tasks” button from the menu bar.
2. Gets the tasks window.
3. Select the task from the tasks list.
4. Select the “Remove” button.
5. Confirm the Deletion.

Post Condition: Task is deleted.

Use Case: Update a task.

Pre-Condition: 1. User needs to be logged in to the system.
2. Tasks should be in the database.

Flow of events:

1. Select the “Tasks” button from the menu bar.
2. Gets the tasks window.
3. Select the task from the tasks list press edit.
4. Make changes of the task.
5. Select “Save” button.

Post Condition: Task is updated.

Use Case: Forward a task.

Pre-Condition: 1. User needs to be logged in to the system.
2. A task needs to be created.
3. Task needs to be assigned to an employee.

Flow of events:

1. Select the “Tasks” button from the menu bar.
2. Gets the tasks window.
3. Select the task from the tasks list.
4. Select the “Assign To” box.
5. Select an employee.
6. Select “Save” button.

Post Condition: Task is forwarded.

Use Case: Produce Reports.

Pre-Condition: 1. User needs to be logged in to the system.
2. A task needs to be created.

Flow of events:

1. Select the “Reports” button from the menu bar.
2. Select the report type from the list.
3. Select the “Proceed” button from the menu bar.

Post Condition: produce a report.

Use Case: Add Employee.

Pre-Condition: 1. User needs to be logged in to the system.

Flow of events:

1. Select “Employee” button from the menu bar.
2. Select “Add Employee” button.
3. Fill the employee form.
4. Select the “Save” button.

Post Condition: Employee is added.

Use Case: Edit personnel details.

Pre-Condition: 1. User needs to be logged in to the system.

Flow of events:

1. Select the “Profile” button from the menu bar.
2. Make changes to the employee details.
3. Select the “Save” button.

Post Condition: Employee details are updated.

Use Case: Edit employee details.

Pre-Condition: 1. User needs to be logged in to the system as administrator.
2. Employee needs to be added.

Flow of events:

4. Select the “Employee” button from the menu bar.
5. Select the employee needs to be edited.
6. Make changes to the employee details.
7. Select the “Update” button.

Post Condition: Employee details are updated.

Use Case: Remove Employees.

Pre-Condition: 1. User needs to be logged in to the system as administrator.
2. Employee should be there to delete.

Flow of events:

1. Select the “Employee” button from the menu bar.
2. Select the employee needs to be removed.
3. Select the “Remove” button.
4. Confirm the Deletion.

Post Condition: Employee is removed.

Use Case: Manage User Accounts

Pre-Condition: 1. User needs to be logged in to the system as administrator.

Flow of events:

1. Select the “User Accounts” button from the menu bar.
2. Add/Edit or Delete User accounts.

Post Condition: User account is Added/Edited or Deleted.

Use Case: View Login History.

Pre-Condition: 1.User needs to be logged in to the system as administrator.

Flow of events:

1. Select the “Login History” button from the menu bar.

Post Condition: Login History is viewed.

Use Case: Manage Master File

Pre-Condition: 1.User needs to be logged in to the system as administrator.

Flow of events:

1. Select the “Master Files” button from the menu bar.
2. Select master file type.
3. Add/Edit or Delete data.

Post Condition: Master files are Added/Edited or Deleted.

3.3.5.3 Class Diagram for the New System

Below class diagram explains the structure of classes in the new system.

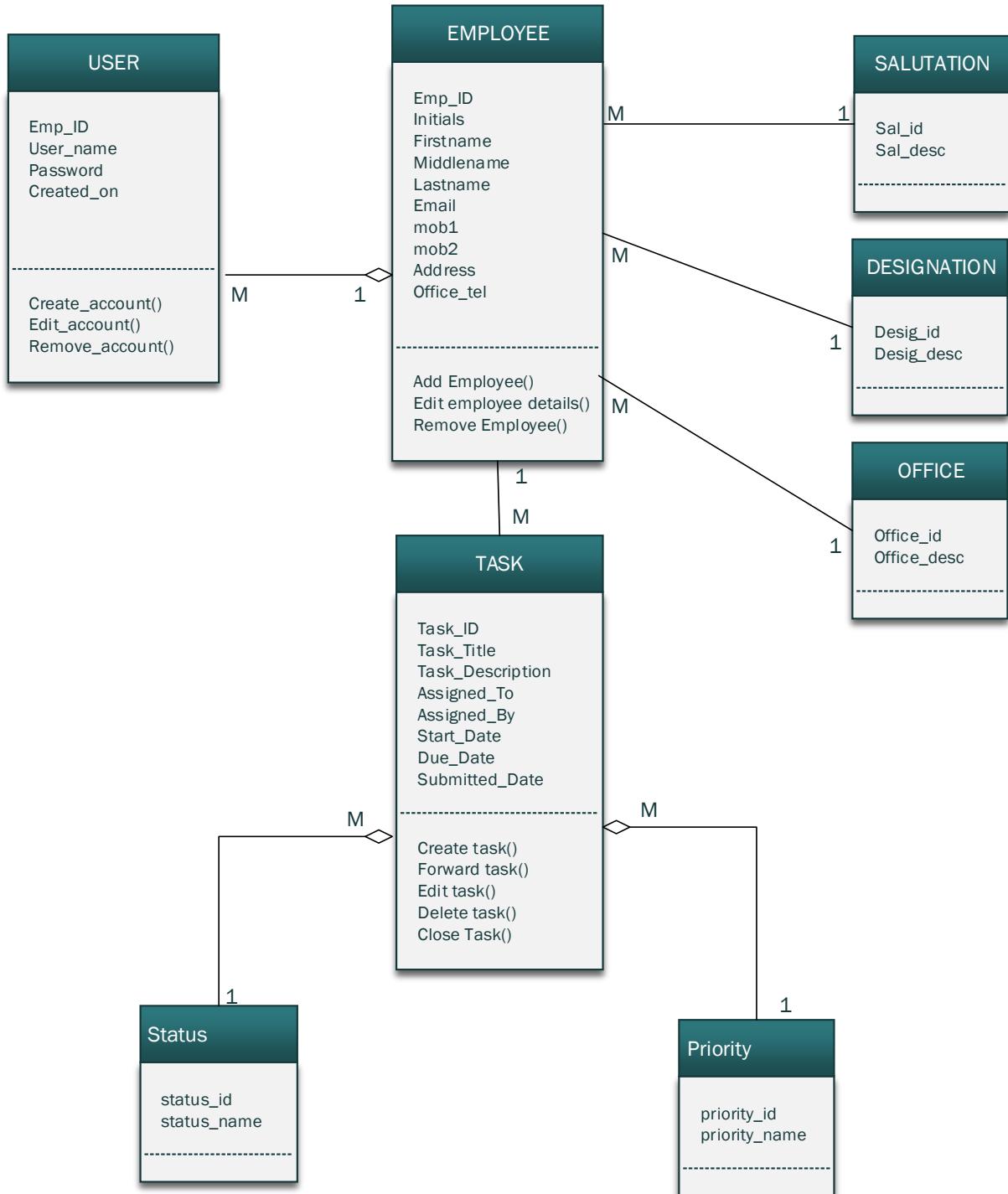


Figure: 3.21: Class Diagram for the New System

Source: Author

3.4 Summary

As the initial step in this chapter the situation of the current task allocation procedure is studies in detail and the present problems in the existing procedure is clearly identified to provide a reliable solution through the project. Various diagram types has being used to demonstrate the procedures and workflow in the current system to get a better understanding.

After clearly identifying the presenting problem, a data gathering phase is piloted to gather requirements from the users for the new proposed system. Several fact finding techniques such as questionnaires, interviews, observations and document reviews were used to collect different kind of data. Although a pre plan was made due to several constraints it was difficult to conduct exactly to the plan. Number of obstacles was arisen during this phase and suitable remedies were taken to overcome those obstacles.

After gathering data successfully, they were analyzed thoroughly quantitatively and qualitatively to specify the new systems functional requirements, non-functional requirements and usability requirements. After completing the requirements specification, the new system is modeled in different perspectives using UML techniques such as SQ diagrams, Use cases and class diagrams.

4.0 Designs for the New System

This chapter discusses the design phase for the development of a computerized task management system for KDU. It contains details under 4 main chapters namely 'Overall System Architecture, Software Architecture, Data design & Interface Design.

In the Overall system architecture it is described about the presentation layer, application layer and the data link layer of the developing system with the aid of diagram. In the next section it is explained about the software architecture of the system. It contains the information about the modules which are presented in the system, roles and privileges of accessing these modules. First there is an overview of the overall software architecture which is followed by the list of modules and the detailed explanations about the key modules.

In this chapter 3rd section is dedicated for describing the data design of the system. It contains the conceptual data design, which is the EER model and then the conversion of EEP in to the relations. This section also contains the database relationship diagrams followed by a description of tables in the data base with their attributes and their data types with lengths.

As the final section it contains the interface designs for various forms available in the system with brief description about each of them followed by a summary of this document to end the report.

4.1 Overall System Architecture

Architectural design defines the overall structure of the system and form a solution before move on to the detail design or the low level design which includes the design of specific components details. The architectural design is given according to the three-tier-architecture where overall design is spilt in to three layers of Client Tier, Application Tier and Data Tier. The overall system architectural design for the proposed system is as follows;

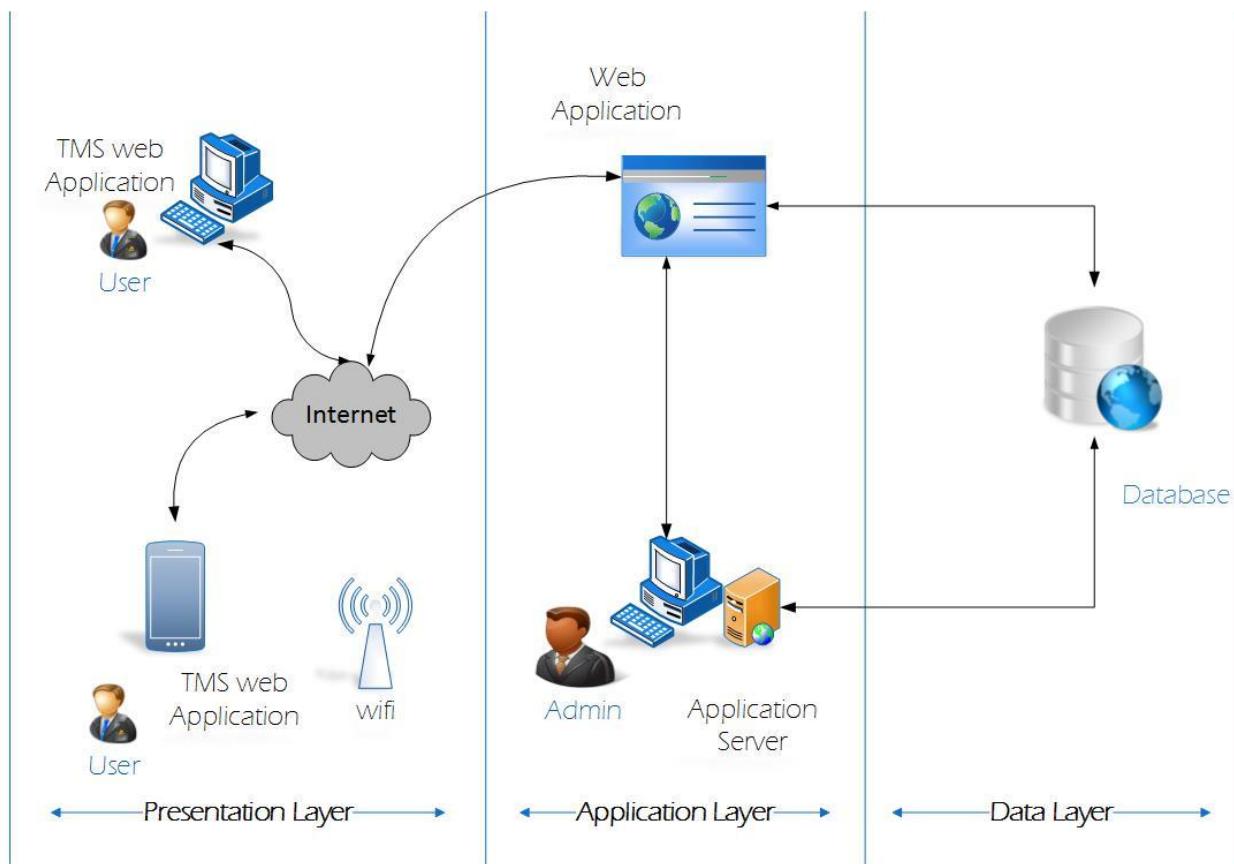


Figure 4.0: Overall System Architecture
Source: Author

The architectural design in the above figure shows essentially it would be a web based application. And for the purpose of accessing the proposed system would use the internet and Wi-Fi as data communication media. The web based application has being developed and hosted in a server computer and through internet users can access the TMS web application.

4.1.1 Application Layer

The logics and processes of the TMS will be executed at this application layer in order to achieve objectives of the TMS and this layer can be named as the heart of the overall system. Application layer will interact with both presentation layer where the interfaces of TMS are running and the data layer where the information is stored. The information gathered from user inputs will be stored according to the predefined operational instructions at this layer. The information about the employee and the tasks assigned for particular employee will be displayed in the application for the user who enters the information and particular user can update the information about the task.

4.1.2 Data Layer

Data layer manage the data storage operations of the overall system where the database management applications are running. A database containing the information about tasks and employees will be stored in several tables in the TMS in order to improve the efficiency. Information gathered from the interfaces of the application layer will be stored in respective tables after updating the information of the specific task at the application layer.

4.1.3 Presentation Layer

Presentation layer is responsible of control interactions with users by monitoring interfaces to current requested information and retrieve the inputs delivered by the user. Information gathered by this layer will be provided to the application layer in order to manipulate according to the given instructions. The presentation layer is the layer that registered users of TMS are interacting with. They will input the required facts for the Task Management System. The log in interface is same to all the access levels. Although other interfaces designed to get the inputs such as tasks details, employee details, login information, tasks assign details are similar, the access to the information will differ according to user access levels.

4.2 Software Architecture

Software architecture was based on modularized approach where the software is divided into parts. Each module is assigned to execute one or more tasks of the overall system in order to achieve the ultimate objectives expected. Since the program is developed using open resource platform such as PHP, HTML, CSS, and JEasy UI designs will ease the development and maintenance of the system.

4.2.1 Overall Software Architecture

Following figure represents the overall software architecture of the developing system.

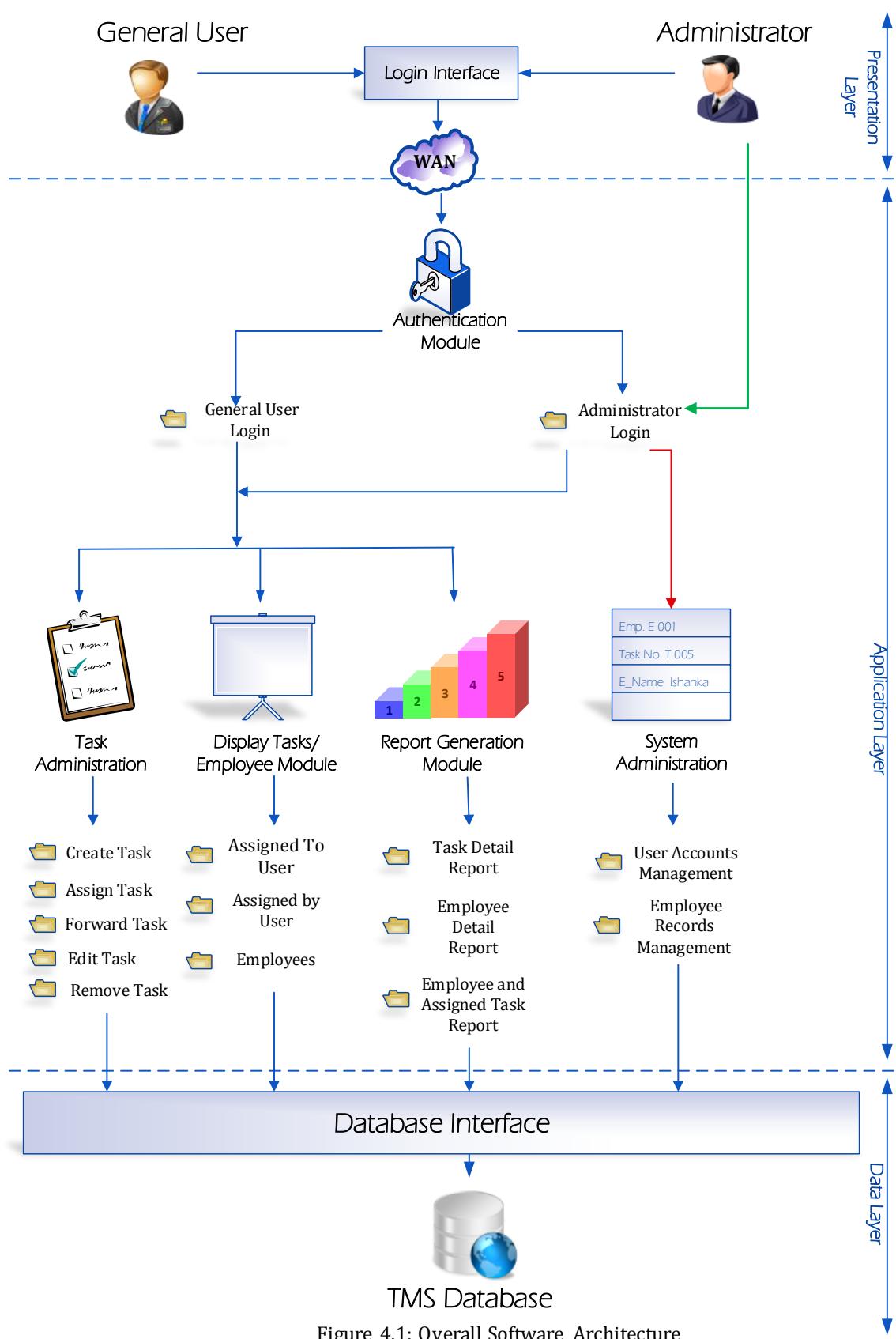


Figure 4.1: Overall Software Architecture
Source: Author

The TMS will be developed according to two main approaches, Administrative user approach and General user approach. The TMS interface module will be differ through User Authentication module which ensures the security of the system. Both main approaches of the system are then break into core modules to perform required tasks of the system. Further details of these modules and their tasks will be discussed in detailed in below sections

4.2.2Module Architecture

The developing computerized TMS contains several modules to make the complete system. This section will describe about the organization of the modules that it consists.

4.2.2.1An Overview of Module Architecture

In the below shown is an enumerated list of requirements for the new system development.

Module 1: "Task Administration"

- 1.1: Create a task
- 1.2: Assign a task
- 1.3: Forward a task
- 1.4: Close a task
- 1.5: Edit a task
- 1.6: Remove a task

Module 2: "Employee Detail Administration"

- 2.1: Add new employees
- 2.2: Edit old employee details
- 2.3: Remove employees

Module 3: "View Tasks"

- 3.1: View all the task assigned to user
- 3.2: View all tasks assigned by the user
- 3.3: Search task by the task title and assigned employee name
- 3.4: Filter task by using start date, due date, status, priority and assigned employee

Module 4: "User Account Administration"

- 4.1: Create/edit and delete user accounts.
- 4.2: Change account password

Module 5: "Report Generation"

- 5.1: Produce task detail reports.
- 5.3: Produce Employee and assigned tasks reports.
- 5.3: Produce login history reports.

Module 6: "Login History and Master files"

- 6.1: Keep track of the login history of users
- 6.2: Add/edit and remove details from database master files.

4.2.2.1Module Architecture in Detail

There are several modules for various functions in the developing TMS. In the below it is described in detail about those modules.

Module1: "Authentication/Login Module"

Mod 1.1 Administrator Login

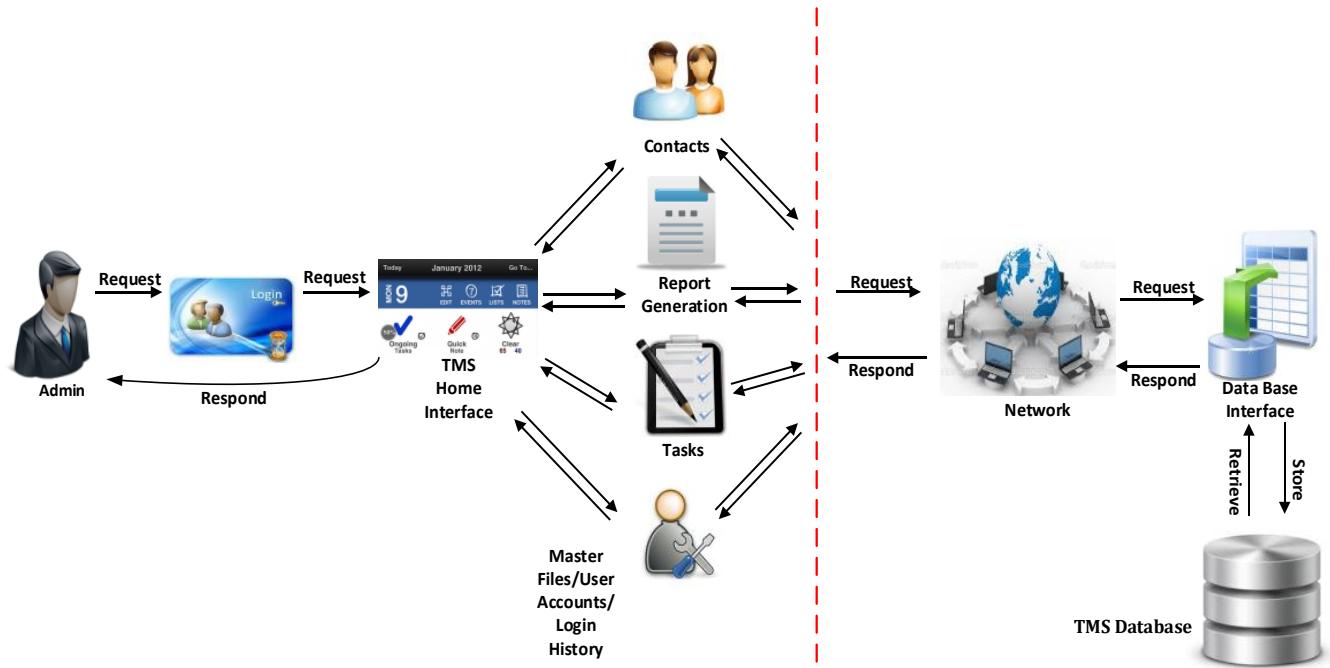


Figure 4.2: Administrator Login Module
Source: Author

Administrator can log into the system and access every module that a user can access and an additional module called Administration module. At the login screen when the username and password are entered in will verify it from the database and redirect it into the administrators' home page.

Mod 1.2 General User Login

Each and every general user of the system needs to be logged on to the system before using the system. Each user will be provided with a unique username and password to access the system by the administrator. When they are entered in the login interface those values will be verified using the data in the data base and redirect the user to the system with relevant access levels.

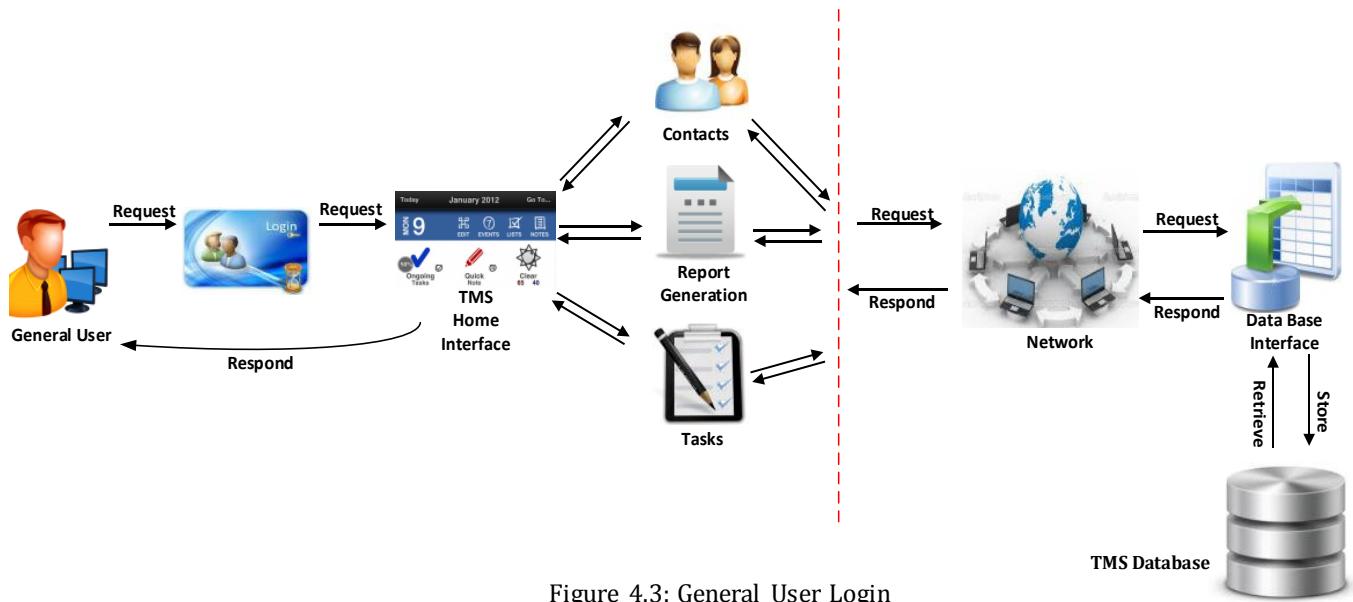


Figure 4.3: General User Login
Source: Author

Module 2: “System Administration”

Mod 2.1 Manage user accounts for employees

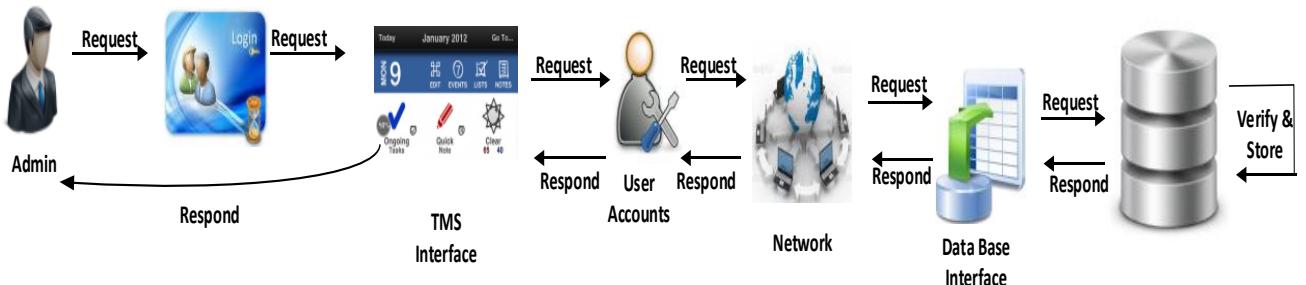


Figure 4.4: Manage user accounts for employees
Source: Author

Using the username and password administrator will be able log into the administrators' home page. Only administrator can create a user account with username and password to access the system. Each user account is relevant to an employee records. Administrator can access all the modules which can be accessed by the general users of the system, with the additional administration module. Administrator is the only person who will be able to manage the employee records of the database.

Mod 2.2 Employee Records Management

Mod 2.2.1 Add new employees

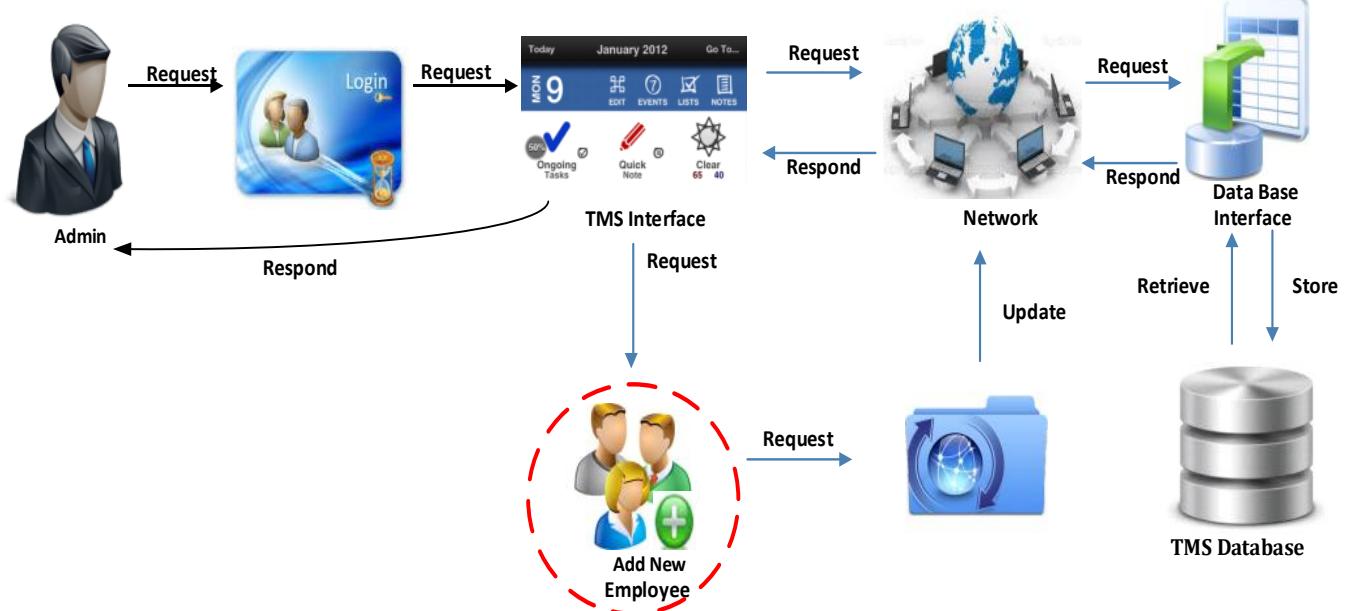


Figure 4.5: Add New Employee
Source: Author

This module is for adding new records to the employee records table. Admin can fill the new employee form and submit the relevant data in to the database through the network.

Mod 2.2.2 Edit old employee details

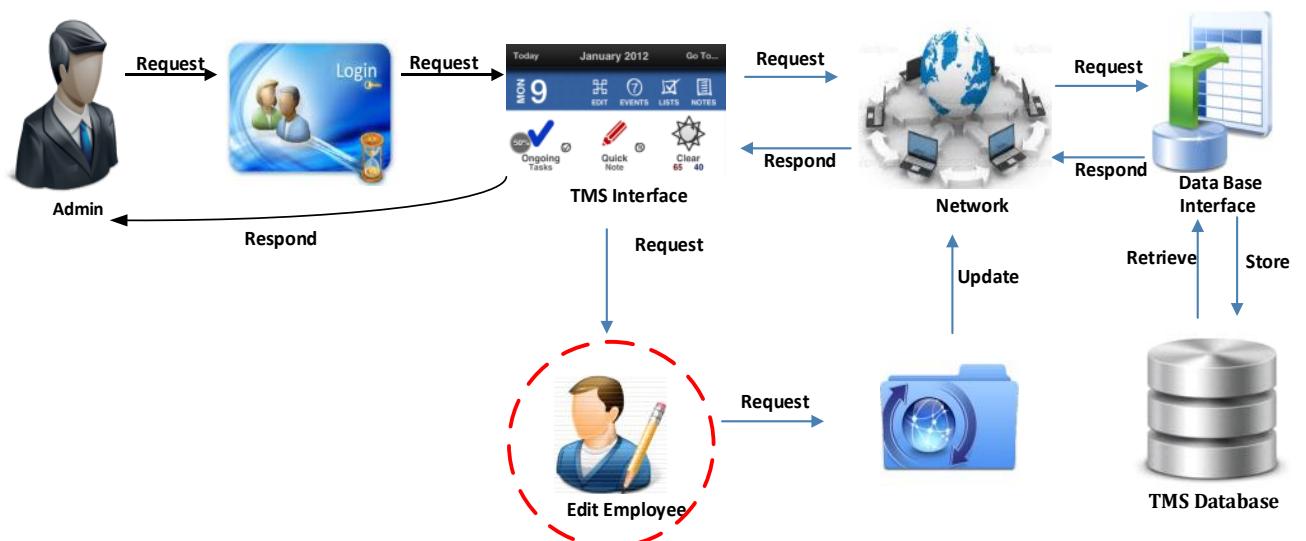


Figure 4.6: Edit old employee details
Source: Author

The admin who responsible for this module should view all the employees list in order to edit an old employee. From the list of employees in the database admin can select a record to be edited. The edited employee details are updated and move in to the database through the network.

Mod 2.2.3 Remove employees

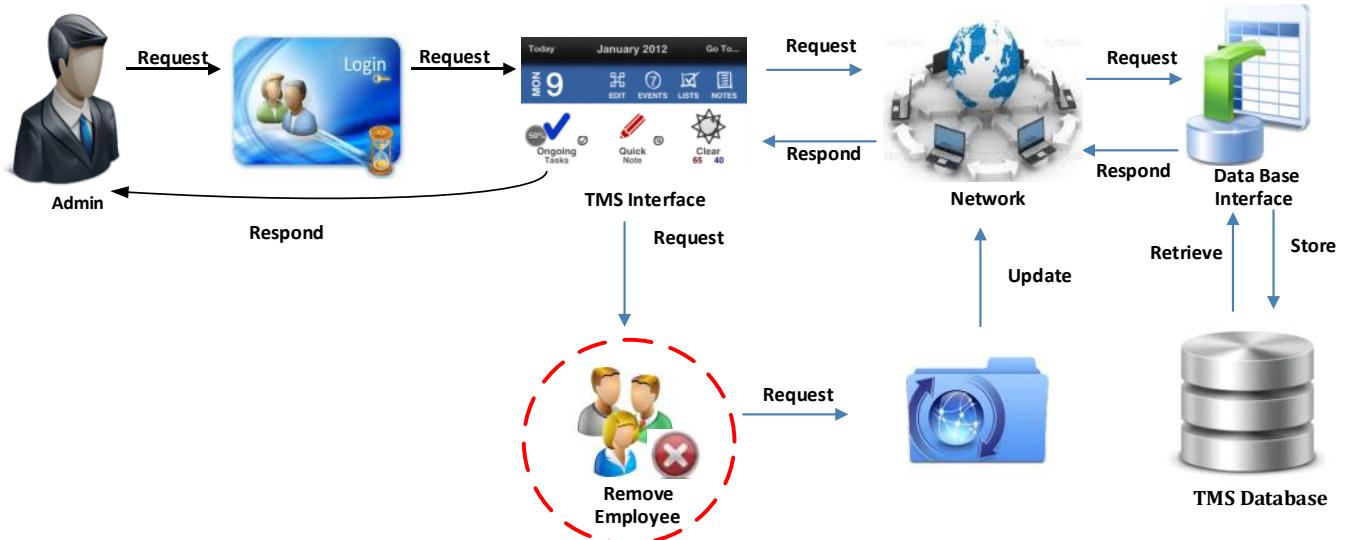


Figure 4.7: Remove employees

Source: Author

Remove Employee module is for delete records of the employees. Only the administrator can remove employees from the database. Before deletion of an employee the admin should view all the tasks which stored in data base connecting through the network. After deleted the employees the updates are stored in to the database through the network. Then user can view the updated information of the employees table which provided by the database.

Module 3: “Task Administration”

Mod 3.1 Create a task

Create Task module is to input records regarding to the task. Users can create the tasks and assign them to their subordinates. The user access levels are defined by the log in function. Before create a task the user should view all the tasks which stored in data base connecting through the network. After creating a task the updates are stored in to the database through the network. Then user can view the created task information of the tasks table which provided by the database.

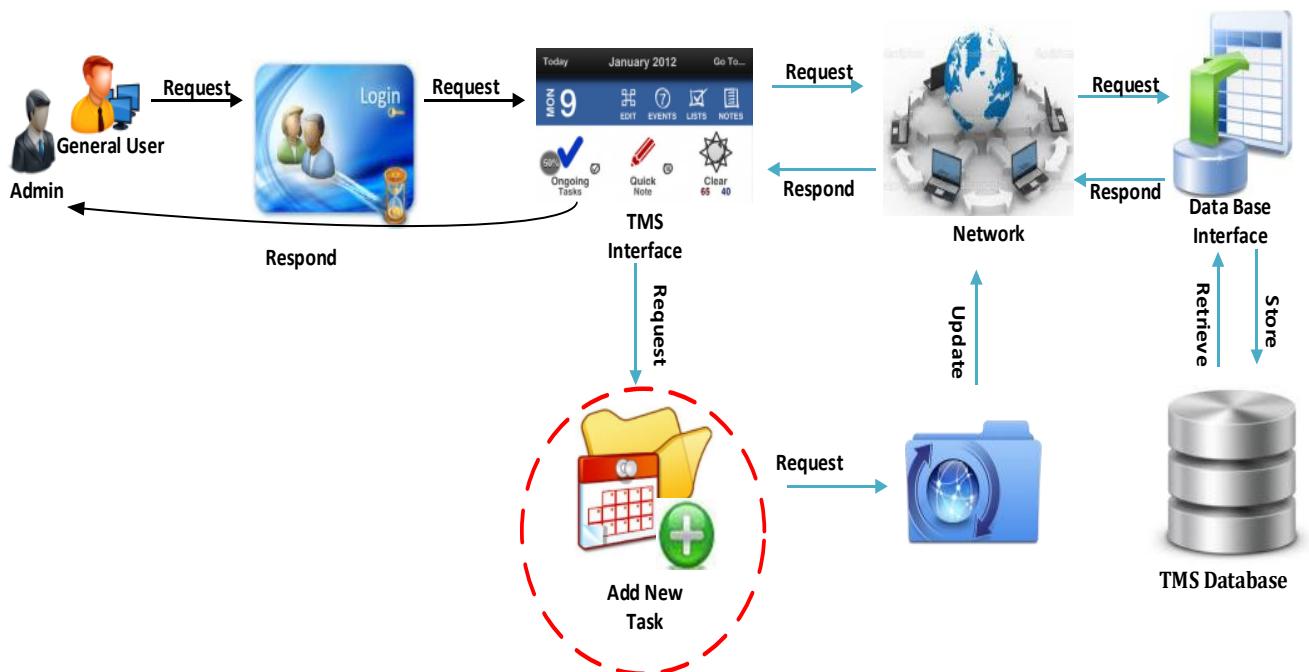


Figure 4.8: Create a task

Source: Author

Mod 3.2 Assign a task

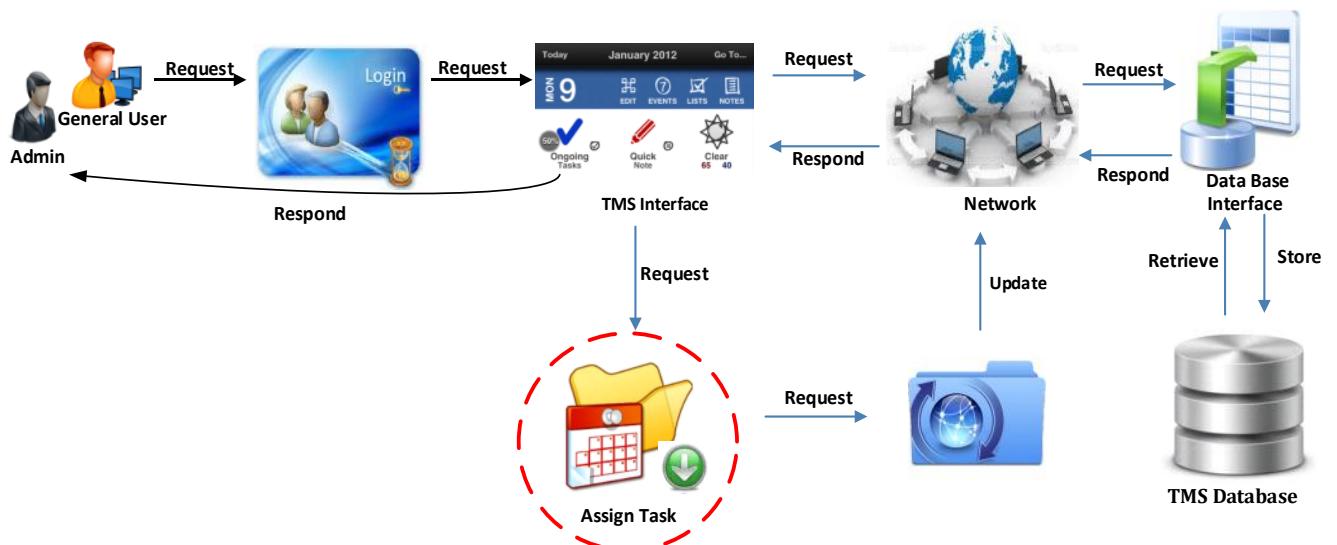


Figure 4.9: Assign a task

Source: Author

Assign Task module is to assign the tasks to employees which are created. Users can assign tasks only to their subordinates. After assigned a task the updates are stored in to the database through the network.

Mod 3.3 Forward a task

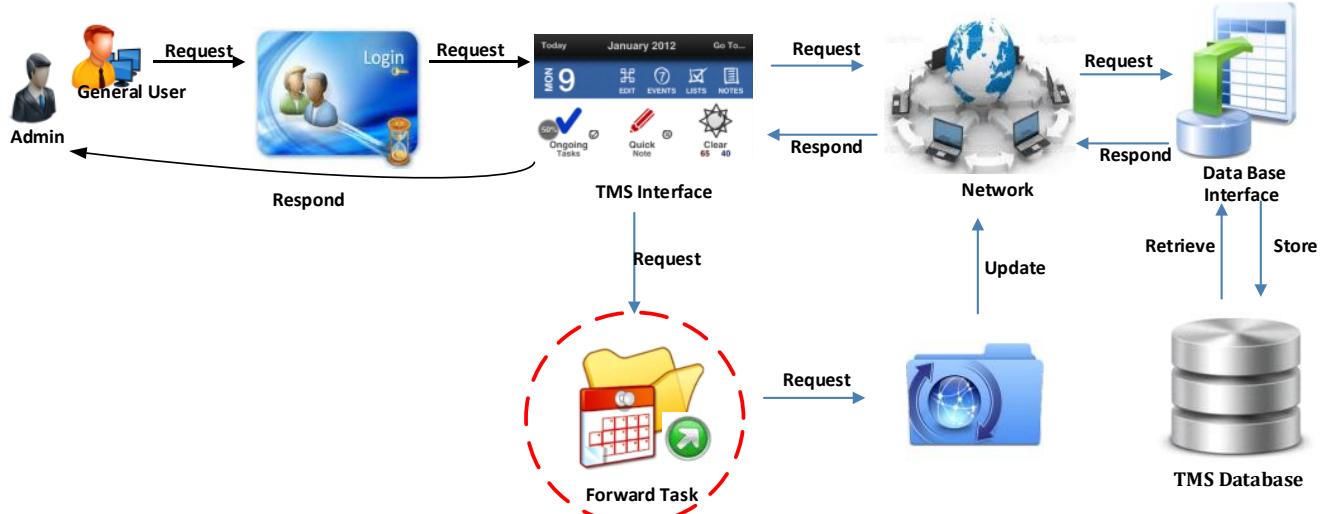


Figure 4.10: Forward a task Assign a task

Source: Author

A task received by a user can be forwarded to another user in the system. After successfully logging into the system user can select a task which is assigned to him and can be forwarded in to a subordinate. After forwarding a task the updates are stored in to the database through the network.

Mod 3.4 Edit a task

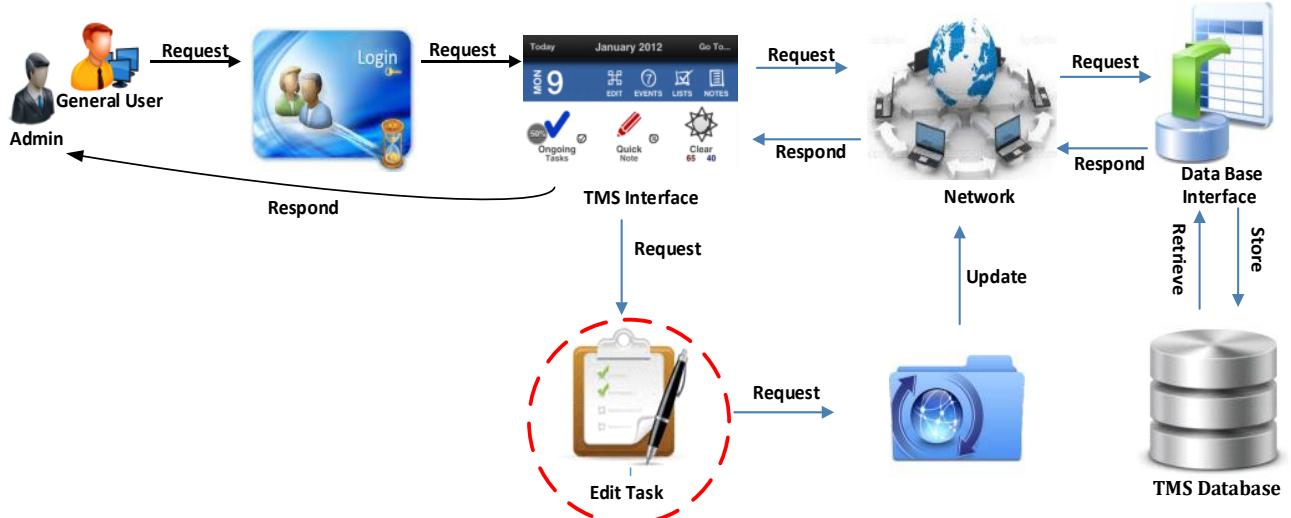


Figure 4.11: Edit a task

Source: Author

Details of the created tasks can be edited again or updated. There will be a restriction such that only the user who created the task can edit the details of the task. After editing a task the updates are stored in to the database through the network.

Mod 3.5 Remove a task

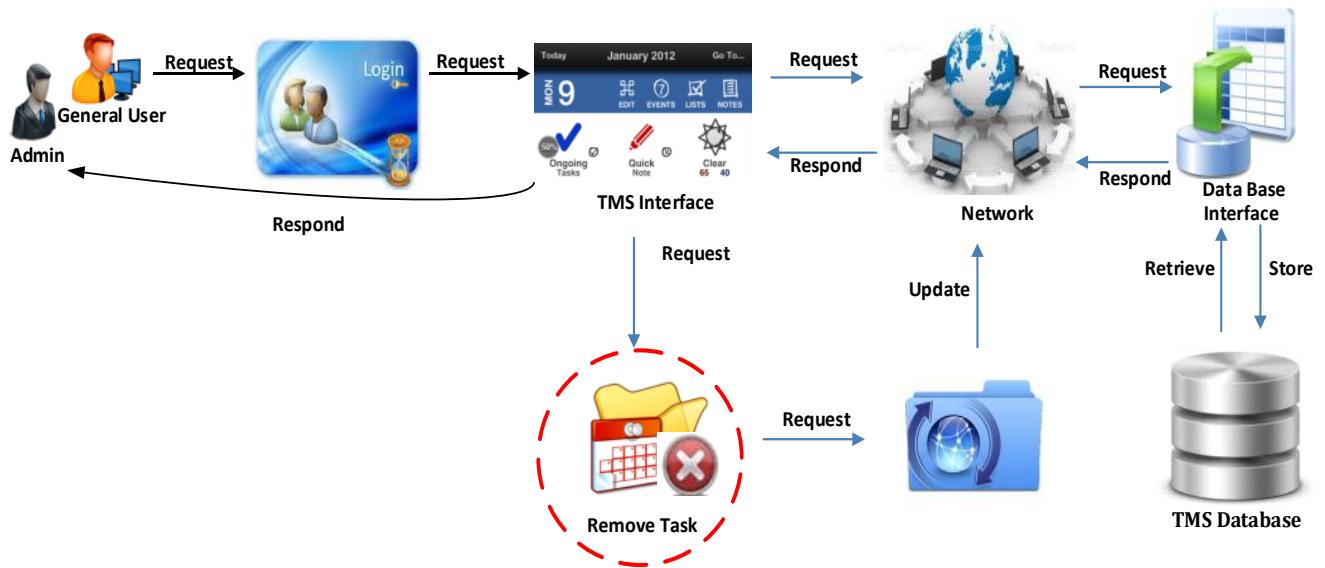


Figure 4.12: Remove a task

Source: Author

Remove Task module is for delete records regarding to the task. Removing a task will move it into a history table. Only the user who created the task can remove the task. For removing the task purpose user can select the task from the grid and choose remove task option. After removing a task the updates are stored in to the database through the network.

Module 4: “View Tasks & Employee Records”

Mod 4.1 View tasks assigned to/by user

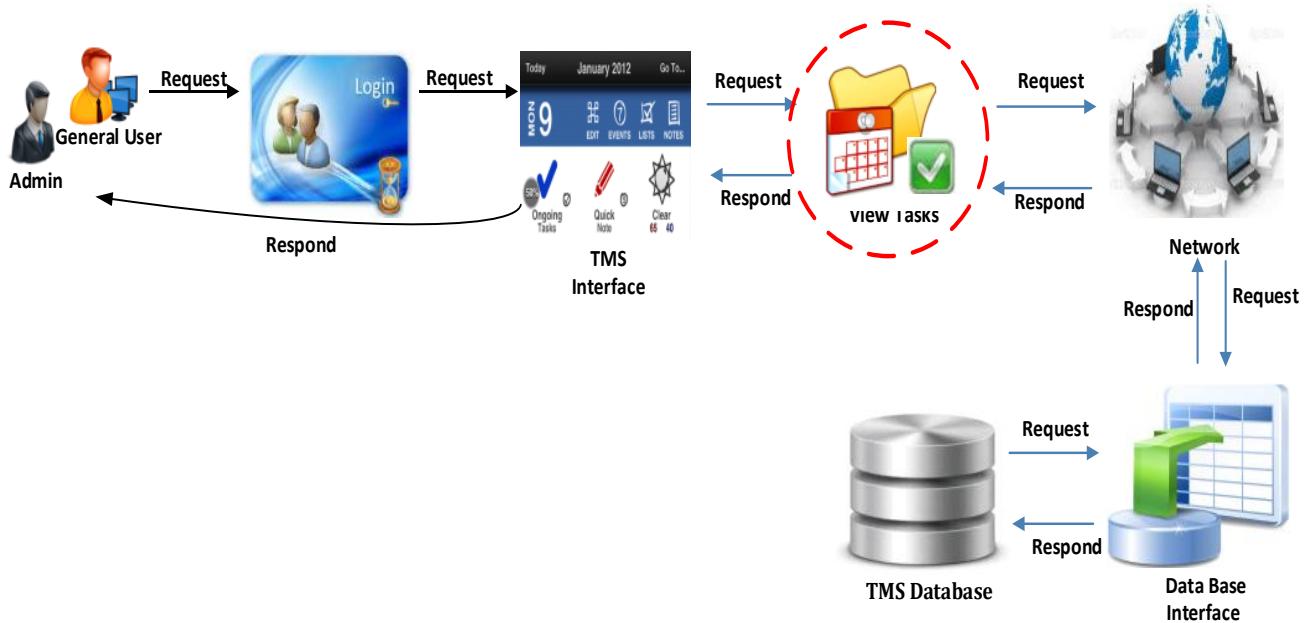


Figure 4.13: View all the task assigned to/by user

Source: Author

View Task module includes 4 sub modules to view all the tasks assign to user, view all tasks assign by user, tasks can be viewed by searching by the title or assigned employee and by using start date, due date, status, priority and assigned employee the task can be filter viewed.

Mod 4.2 View Employee Records

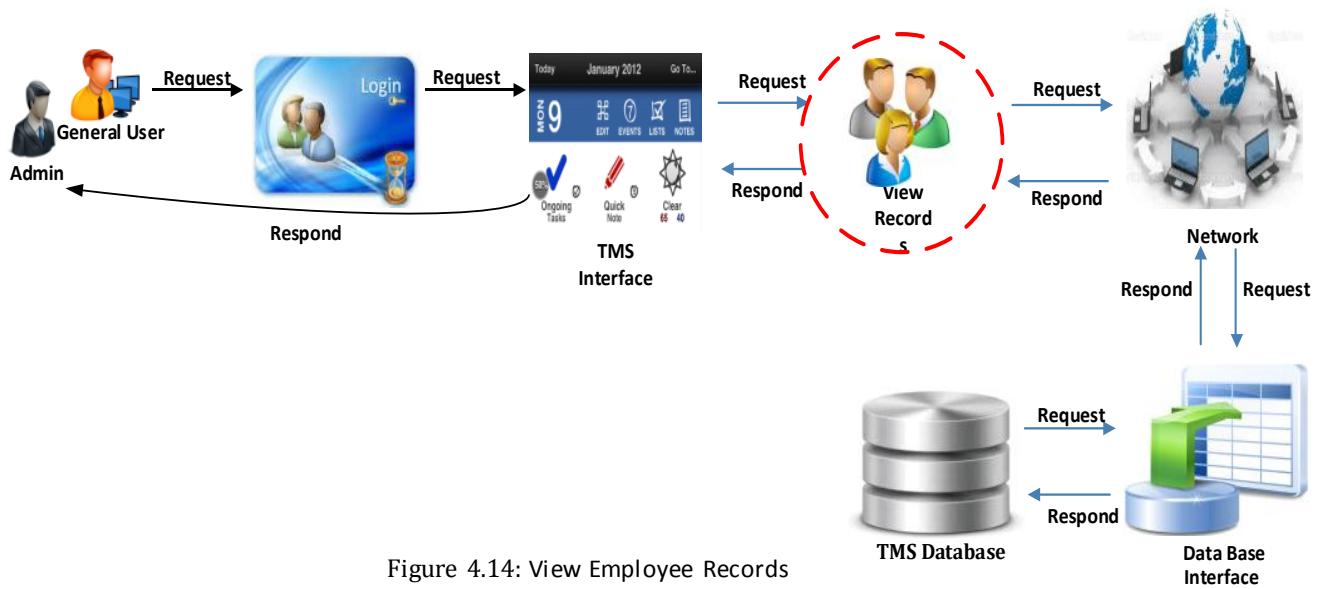


Figure 4.14: View Employee Records

Source: Author

Users can view the record off the employees in the database. There are restrictions such that a user will be able to view the records of the officials working under them.

Module 5: Report Generation

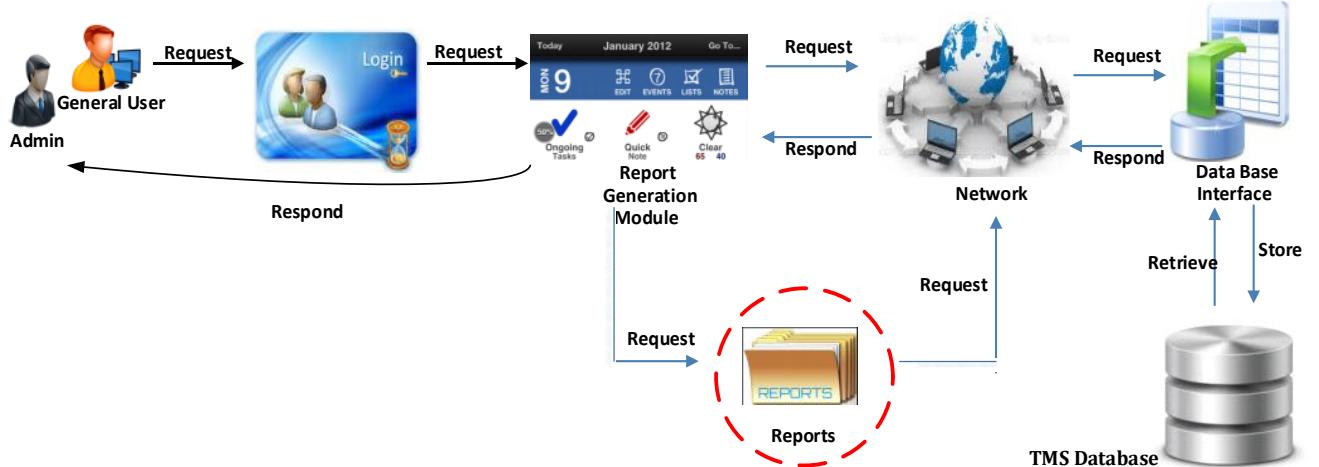


Figure 4.15: Report Generation

Source: Author

The report producing module for generate reports to assess tasks progress. Reports can be produced only by higher and mid user levels according to their requests. According to the user requests reports are produce by the application layer by gathering data from database.

4.3 Data Design

The TMS will have a one centralized database in the server. MySQL database will be used for this purpose. This section of the document represents the conceptual data design of the system, the process of converting the EER diagram in to tables and the database relationship diagram. Furthermore, the tables of the database are also stated with their attributes and data types.

4.3.1 Conceptual Database Design

Following figure shows the EER model for the TMS database.

Figure 4.16: Conceptual Data Design

Source: Author

4.3.2 Mapping of Logical Database to Relations

The above shown EER model is converted into relations using the 8 step process.

1st Step-Reguler Entity Types

DESIGNATION(Desg_id,Desg_desc,Desg_value)
EMPLOYEE(Emp_id,Initials,First_name,Middle_name,Last_name,e-mail,office_tel,mob1,mob2)
USER(User_name,User_password,User_type,created_date)
TASK (Task_id, Task_title,Task_desc,Start_date,Due_date,Create_on,Create_by)
OFFICE (Office_id, Office_desc)
SALUTATION (Sal_id,Sal_desc)
STATUS (Stat_id,Stat_desc)
PRIORITY(Pri_id, Pri_desc)

2nd Step-Weak Entity Types

USER(User_name,User_password,User_type,created_date)
LOGIN_HISTORY(Login_date_time,User_name)

3rd Step-Binary One To One

No one to one relationships

4th Step-Binary One To Many

EMPLOYEE(Emp_id,Initials,First_name,Middle_name,Last_name,email,office_tel,mob1,mob2,
Office_id_FK)
OFFICE(Office_id,Office_desc)

DESIGNATION(Desg_id,Desg_desc,Desg_value)
EMPLOYEE(Emp_id,Initials,First_name,Middle_name,Last_name,email,office_tel,mob1,mob2,
Desg_id_FK)

USER(User_name,User_password,**Emp_id_FK**)
LOGIN-HISTORY(Login_date_time,User_name)

EMPLOYEE(Emp_id,Initials,First_name,Middle_name,Last_name,e-mail,office_tel,mob1,mob2)
USER(User_name,User_password,User_type,**Emp_id_FK**)

PRIORITY (Pri_id, Pri_desc)
TASK (Task_id, Task_title,Task_desc,Start_date,Due_date,Create_on,Create_by,**Pri_id_FK**)

STATUS (Stat_id,Stat_desc)
TASK (Task_id, Task_title,Task_desc,Start_date,Due_date,Create_on,Create_by,**Stat_id_FK**)

EMPLOYEE(Emp_id,Sal_id_FK,
Initials,First_name,Middle_name,Last_name,email,office_tel,mob1,mob2)
SALUTATION (Sal_id,Sal_desc)

5th Step-Binary Many To Many

EMPLOYEE(Emp_id,Initials,First_name,Middle_name,Last_name,e-mail,office_tel,mob1,mob2)
TASK (Task_id,Task_title,Task_desc,Start_date,Due_date,Create_on,Create_by)
EMP_TASK(Emp_id,Task_id,Assign_by,Assign_date)

6th Step Mapping of Unary Relationships

No unary relationships

7thStep Mapping of Ternary Relationships

No ternary relationships

8th Step Mapping Super/Sub type Relationships

No super/sub type relationships.

Final Set of Tables

TASK (Task_id,Task_title,Task_desc,Start_date,Due_date,Create_on,Create_by_id_FK,Stat_id_FK,
Pri_id_FK)

EMPLOYEE(Emp_id,Sal_id_FK,Initials,First_name,Middle_name,Last_name,e-mail,office_tel,mob1,mob2,Office_id_FK,Desg_id_FK)

EMP_TASK(Emp_id_FK,Task_id_FK,Assign_by_FK,Assign_date)

USER(User_name,User_password,User_type,Emp_id_FK)

LOGIN-HISTORY(Login date time,User_name_FK)

DESIGNATION(Desg_id,Desg_desc,Desg_value)

OFFICE(Office_id,Office_desc)

SALUTATION (Sal_id,Sal_desc)

STATUS (Stat_id,Stat_desc)

PRIORITY (Pri_id,Pri_desc)

After the normalization into 3rd normalized form there were no changes in the tables. Therfore the final 3NF tables are indicated below.

TASK (Task_id,Task_title,Task_desc,Start_date,Due_date,Create_on,Create_by_id_FK,Stat_id_FK,Pri_id_FK)

EMPLOYEE(Emp_id,Sal_id_FK,Initials,First_name,Middle_name,Last_name,e-mail,office_tel,mob1,mob2,Office_id_FK,Desg_id_FK)

EMP_TASK(Emp_id_FK,Task_id_FK,Assign_by_FK,Assign_date)

USER(User_name,User_password,User_type,Emp_id_FK)

LOGIN-HISTORY(Login_date_time,User_name_FK)

DESIGNATION(Desg_id,Desg_desc,Desg_value)

OFFICE(Office_id,Office_desc)

SALUTATION (Sal_id,Sal_desc)

STATUS (Stat_id,Stat_desc)

PRIORITY (Pri_id,Pri_desc)

4.3.3 Database Relationship Diagram of the Database

The diagram shown in the next page indicated the relationship among tables in the database.

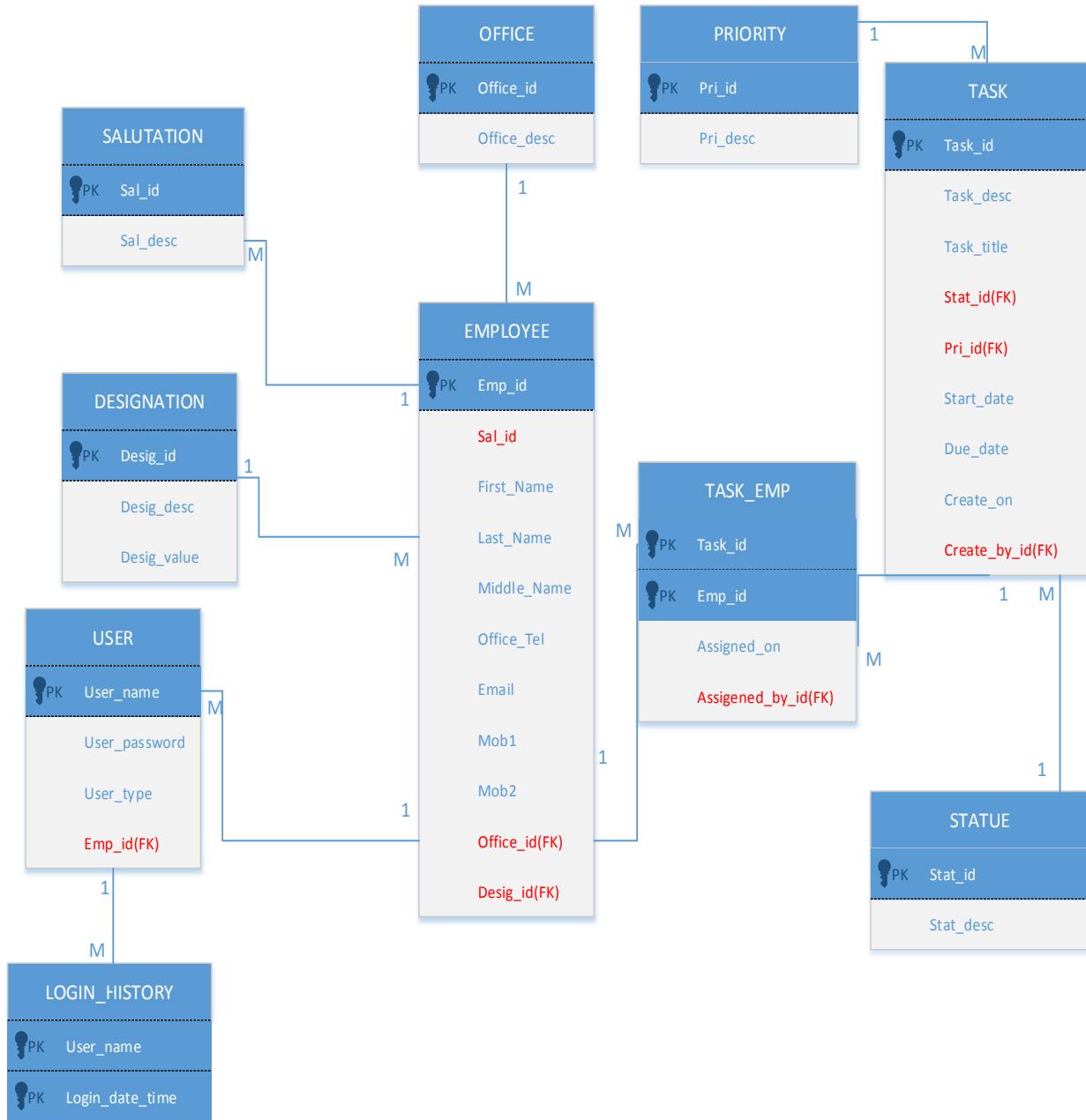


Figure 4.17: Database Relationship

Source: Author

4.3.4 Data Type Design for the Database

This section shows the tables of the TMS database with their attributes and respective data types.

TABLE: USER		
Attribute	Data Type	Length
User_name	varchar	20
User_password	varchar	20
User_type	varchar	10
Emp_id	bigint	10
Created_date	timestamp	-

Table 4.0: User

Source: Author

TABLE: TASK		
Attribute	Data Type	Length
Task_id	bigint	20
Task_title	varchar	100
Task_desc	varchar	250
Start_date	date	-
Due_date	date	-
Priority	varchar	10
Task_status	varchar	10
Create_on	timestamp	-
Create_by_id	bigint	15

Table 4.1: Task

Source: Author

TABLE: EMPLOYEE		
Attribute	Data Type	Length
Emp_id	bigint	10
Salutation	varchar	10
First_name	varchar	25
Middle_name	varchar	25
Last_name	varchar	25
Email	varchar	50
Office_tel	varchar	15
Office_id	varchar	10
Desg_id	varchar	10

Table 4.2: Employee

Source: Author

TABLE: EMP_TASK		
Attribute	Data Type	Length
Emp_id	bigint	15
Task_id	bigint	15
Assign_by	bigint	15
Assign_date	timestamp	-

Table 4.3: Emp_Task

Source: Author

TABLE: DESIGNATION		
Attribute	Data Type	Length
Desg_id	varchar	10
Desg_desc	varchar	50
Desg_value	int	10

Table 4.4: Designation

Source: Author

TABLE: OFFICE		
Attribute	Data Type	Length
Office_id	varchar	10
Office_desc	varchar	50
Emp_id	bigint	10

Table 4.5: Office

Source: Author

TABLE: LOGIN_HISTORY		
Attribute	Data Type	Length
User_name	varchar	20
Login_date_time	timestamp	-

Table 4.6: Login_History

Source: Author

TABLE: Salutation

Attribute	Data Type	Length
Sal_id	varchar	10
Sal_desc	varchar	25

Table 4.7: Salutaion

Source: Author

TABLE: Status

Attribute	Data Type	Length
Stat_id	varchar	10
Stat_desc	varchar	50

Table 4.8: Status

Source: Author

TABLE: Priority

Attribute	Data Type	Length
Pri_id	varchar	10
Pri_desc	varchar	50

Table 4.9: Priority

Source: Author

4.4 Interface Design

The user friendly interface designs for the developing system are shown below.

User Login Interface

To enter the Task Management System, users need to login to the system. In that case, user needs to have a valid username and password given by the admin of the system. When submitting the username and password database checks the validity of entered username and password. Then it checks the user levels and provides the window according to the user. For the users and the admin, there are separate windows. Following figure shows the interface of the login window.

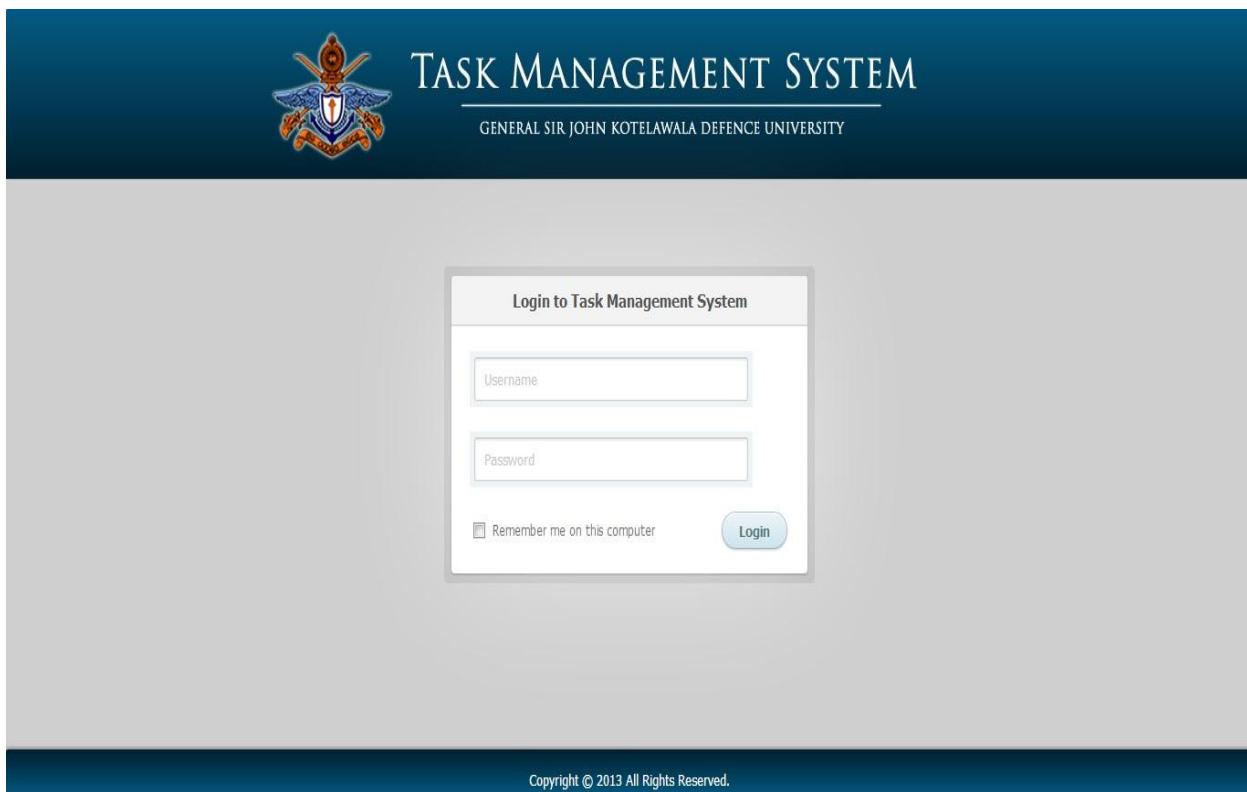


Figure 4.18: Login Window

Source: Author

Interface of Home Window

After successfully login, user gets the home window. In right, the main menu tab of the system which contain home, task, contact, report and my profile menus display. In left, there are few widgets which are calendar, time and notepad which contain the summary of task of particular users.

Interface of Task Assigned by Me Tab

In home page there are five tabs about the records of the tasks. This tab shows the task details of the tasks assigned by particular user. The user is able to filter the tasks according to task title, employee, status and priority of the task. Following figure shows the interface of task assigned by me page.

The screenshot displays the 'Task Management System' homepage. At the top, there is a logo of a crest with wings and a sword, followed by the text 'TASK MANAGEMENT SYSTEM' and 'GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY'. On the right side, there is a 'Logout' link. Below the header, there is a navigation bar with icons for 'Home', 'Task', 'Contact', 'Report', and 'My Profile'. A 'Widgets' sidebar on the left contains a 'Summary' section with links for 'Assigned To Me : (1)', 'Due Next 7 Days : (3)', 'Assigned By Me : (0)', 'Due Next & Days : (0)', and 'Not Assigned : (3)'. It also includes a calendar for December 2013 and a clock. The main content area is titled 'Tasks Assigned By Me' and shows a table of tasks. The table has columns for Title, Assigned To, Start Date, Due Date, Priority, Status, and Assigned On. The data in the table is as follows:

	Title	Assigned To	Start Date	Due Date	Priority	Status	Assigned On
1	Exam	Mr WMIL Wasalage	2013-12-13	2014-01-13	High	Inprogress	2013-12-30 09:26:27
2	Sport Meet	Mr WMIL Wasalage	2014-01-01	2014-01-15	Medium	Closed	2013-12-30 09:00:22
3	Sport Meet	Lt Col S Pakshaweera	2014-01-01	2014-01-15	Medium	Closed	2013-12-30 09:00:11

At the bottom of the content area, there is a pagination control showing 'Page 1 of 1' and a note 'Displaying 1 to 4 of 4 items'. The footer of the page contains the copyright notice 'Copyright © 2013 All Rights Reserved.'

Figure 4.19: Interface of Task Assigned By Me Tab

Source: Author

Interface of Task Assigned to Me Tab

This tab shows the task details of the tasks assigned to a particular user. The user is able to filter the tasks according to task title, employee and priority of the task. Following figure shows the interface of that page

The screenshot shows the Task Management System interface. At the top, there is a logo of General Sir John Kotelawala Defence University and the text "TASK MANAGEMENT SYSTEM" and "GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY". On the right side, there is a "Logout" link. Below the header, there is a "Widgets" section with a "Summary" card displaying user information and a calendar for December 2013. There are also links for "Assigned To Me (1)", "Due Next 7 Days : (3)", "Assigned By Me : (0)", "Due Next 8 Days : (0)", and "Not Assigned : (3)". A clock icon is also present. At the bottom of the summary card, there is a copyright notice: "Copyright © 2013 All Rights Reserved.".

Tasks Assigned To Me																						
New Tasks Tasks Assigned By Me Tasks Assigned By Me(Passed Deadline) Tasks Assigned To Me(Passed Deadline) Tasks Assigned To Me																						
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	Title	Assigned By	Start Date	Due Date	Priority	Status	Assigned On															
1	Admin	Mr WL Alwis	2013-12-29	2014-01-22	Medium	Inprogress	2013-12-29 22:14:57															
50 Page 1 of 1 Displaying 1 to 1 of 1 items																						

Figure 4.20: Interface of Task Assigned to Me Tab

Source: Author

Interface of Task Assigned by Me (Passed Deadline) Tab

This tab shows the task details of the tasks assigned by particular user but passed the deadline of the task. Following figure shows the interface of task assigned by me (Passed Deadline) page.

The screenshot shows the Task Management System interface. At the top, there is a logo of General Sir John Kotelawala Defence University and the text "TASK MANAGEMENT SYSTEM" and "GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY". On the right side, there is a "Logout" link. Below the header, there is a "Widgets" section with a "Summary" card displaying user information and a calendar for December 2013. There are also links for "Assigned To Me (1)", "Due Next 7 Days : (3)", "Assigned By Me : (0)", "Due Next 8 Days : (0)", and "Not Assigned : (3)". A clock icon is also present. At the bottom of the summary card, there is a copyright notice: "Copyright © 2013 All Rights Reserved.".

Tasks Assigned By Me(Passed Deadline)																						
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	Title	Assigned To	Start Date	Due Date	Priority	Status	Assigned On															
1	Check	Maj Gen MP Peiris	2013-12-17	2013-12-24	Low	Closed	2013-12-29 21:55:51															
50 Page 1 of 1 Displaying 1 to 1 of 1 items																						

Figure 4.21: Interface of Task Assigned By Me (Passed Deadline) Tab

Source: Author

Interface of Task Assigned to Me (Passed Deadline) Tab

This tab shows the task details of the tasks assigned to the particular user but passed the deadline of the task. Following figure shows the interface of task assigned to me (Passed Deadline) page.

The screenshot displays the 'TASK MANAGEMENT SYSTEM' interface for 'GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY'. At the top, there is a logo and a 'Logout' link. Below the header, a navigation bar includes 'Home', 'Task', 'Contact', 'Report', and 'My Profile' icons. A 'Widgets' sidebar on the left shows summary statistics: Logged in as : Mr WMJ Wasalage, Assigned To Me :(1), Due Next 7 Days :(3), Assigned By Me :(0), Due Next 8 Days :(0), and Not Assigned :(3). It also features a calendar for December 2013 and a clock icon. The main content area has tabs: 'New Tasks', 'Tasks Assigned By Me', 'Tasks Assigned By Me(Passed Deadline)', 'Tasks Assigned To Me(Passed Deadline)' (which is selected and highlighted in blue), and 'Tasks Assigned To Me'. Under the selected tab, there is a search bar with 'Inform Progress' and 'Forward Task' options, followed by a table with columns: Title, Assigned By, Start Date, Due Date, Priority, Status, and Assigned On. The table is currently empty, displaying 'Displaying 0 to 0 of 0 items'. At the bottom, there is a pagination control with '50' items per page, showing 'Page 1 of 1'.

Figure 4.22: Interface of Task Assigned To Me (Passed Deadline) Tab

Source: Author

Interface of New Tasks Tab

This tab shows the newly assigned tasks to a particular user since the last login of the user. Following figure shows the interface of New Tasks page.

The screenshot shows the Task Management System interface. At the top, there is a logo of General Sir John Kotelawala Defence University and the text "TASK MANAGEMENT SYSTEM" and "GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY". On the right side, there is a "Logout" link. Below the header, there is a "Widgets" section with a "Summary" tab. The "Summary" tab displays various statistics: Logged in as : Mr WMIL Wasalage, Assigned To Me :(1), Due Next 7 Days :(3), Assigned By Me :(0), Due Next & Days :(0), and Not Assigned :(3). There is also a calendar for December 2013 and a clock icon. To the right of the summary, there are five tabs: Home, Task, Contact, Report, and My Profile. Under the "Task" tab, there is a table titled "New Tasks" with columns: Title, Assigned By, Start Date, Due Date, Priority, Status, and Assigned On. The table is currently empty, displaying "Displaying 0 to 0 of 0 items". At the bottom, there is a copyright notice: "Copyright © 2013 All Rights Reserved."

Figure 4.23: Interface of New task Tab

Source: Author

Interfaces of the Task Window

The tasks that are created by the particular user and the tasks assigned to that particular user can be edited and forwarded in this page. Creating and deleting the tasks also done in this page. When clicking the buttons a form will be pop upped. Then user is able to fill the forms and send the data to the database by submitting the data. Following figures shows the interfaces of mentioned modules.

The screenshot shows the Task Management System interface. At the top, there is a logo of General Sir John Kotelawala Defence University and the text "TASK MANAGEMENT SYSTEM" and "GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY". On the right side, there is a "Logout" link. Below the header, there is a "Widgets" section with a "Summary" tab. The "Summary" tab displays various statistics: Logged in as : Mr WMIL Wasalage, Assigned To Me :(1), Due Next 7 Days :(3), Assigned By Me :(0), Due Next & Days :(0), and Not Assigned :(3). There is also a calendar for December 2013 and a clock icon. To the right of the summary, there are five tabs: Home, Task, Contact, Report, and My Profile. Under the "Task" tab, there is a table titled "New Task" with columns: Title, Start Date, Due Date, Priority, Status, and Created On. The table contains five entries:

	Title	Start Date	Due Date	Priority	Status	Created On
1	Report Submission	2013-12-30	2014-01-22	Low	Inprogress	2013-12-30 12:45:43
2	Check	2013-12-29	2014-01-23	Low	Closed	2013-12-29 22:05:47
3	Check	2013-12-29	2014-01-22	Low	Pending	2013-12-29 22:02:59
4	Exam	2013-12-13	2014-01-13	High	Inprogress	2013-12-29 18:43:03
5	Sport Meet	2014-01-01	2014-01-15	Medium	Closed	2013-12-29 18:32:44

At the bottom, there is a copyright notice: "Copyright © 2013 All Rights Reserved." and a page navigation bar showing "Page 1 of 1".

Figure 4.24: Interfaces of the Task Window

Source: Author

Task Details

Title:	Report Submission
Desc:	Project reports should submit within next month.
Start Date:	2013-12-30
Due Date:	2014-01-22
Priority:	Low
Status:	Inprogress

Save Cancel

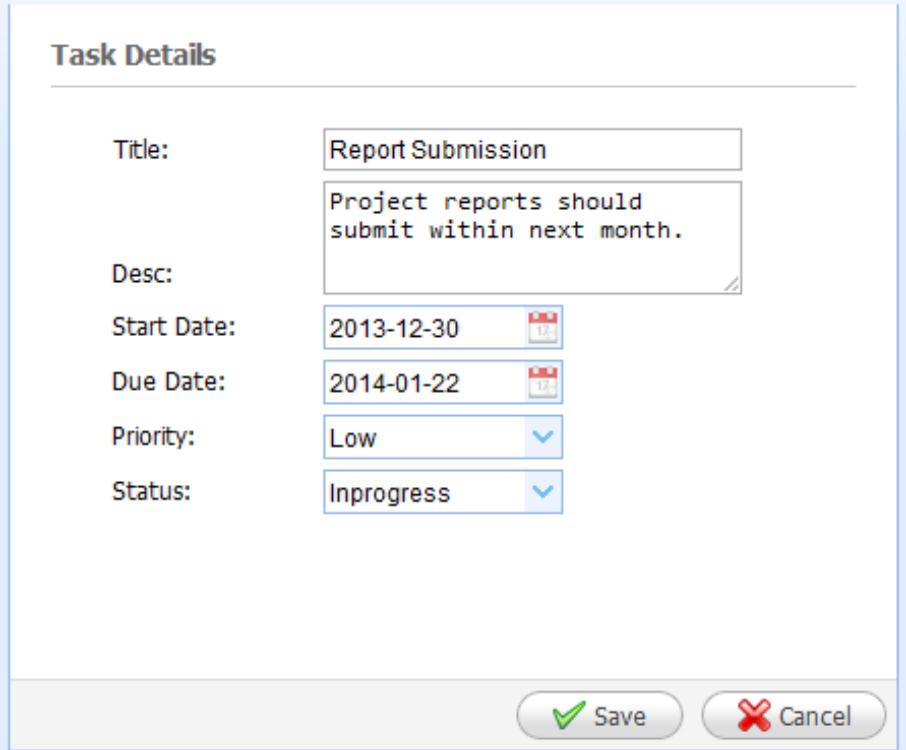


Figure 4.25: Form of Creating a New Task

Source: Author

Assign Task

Select Task:
Report Submission

Select Employee:
Mr WMIL Wasalage

Save Cancel

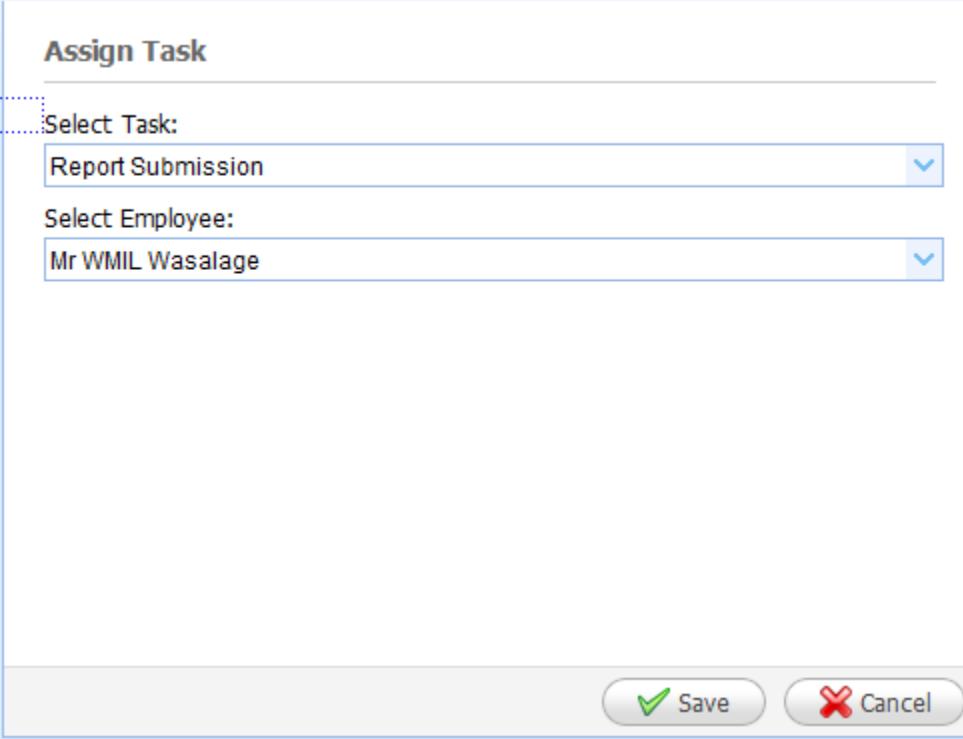


Figure 4.26: Form of Assigning a Task

Source: Author

Interface of the Contact Window.

The details of the employees contain in this contact page. User is allowed to keep the records of the employees who engage with carrying task. Following figure shows the interfaces of the contact page of the system.

The screenshot displays the 'Task Management System' dashboard for 'GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY'. At the top right, there is a 'Logout' link. Below the header, a navigation bar includes icons for Home, Task, Contact (which is selected), Report, and My Profile. On the left, a 'Widgets' sidebar shows various status metrics and a calendar for December 2013. The main content area is titled 'New Employee' and lists three entries:

Name	Office	Designation	Office Tel	Email	Mobile No1	Mobile No2
1 Lt Col S Pakshaweera	Department of IT & Head of Department	113090496		suresh61626@yahoo.com	773865180	773865180
2 Mr WML Wasala	Department of IT & Student	0		isankalshan@gmail.com	716405220	716405220
3 Brig A L D M Gunasekara	DVC (D)	Deputy Vice Chancelk	112632027	kdudefence@kdu.ac.lk	112632027	112632027

At the bottom of the main content area, there is a pagination control showing 'Page 1 of 1' and a note 'Displaying 1 to 6 of 6 items'. The footer contains the copyright notice 'Copyright © 2013 All Rights Reserved.'

Figure 4.27: Interface of the Contact Window

Source: Author

The form is titled 'Employee Details' and contains the following fields:

Salutation:	<input type="text" value="Mrs"/>
Initials:	<input type="text" value="WC"/>
First Name:	<input type="text" value="Darshani"/>
Middle Name:	<input type="text" value="Kumari"/>
Last Name:	<input type="text" value="Fernando"/>
Email:	<input type="text" value="kumari@kdu.ac.lk"/>
Mobile No1:	<input type="text" value="718132721"/>
Mobile No2:	<input type="text" value="718132721"/>
Office:	<input type="text" value="Department of Ci"/>
Designation:	<input type="text" value="Head of Departm"/>
Office Tel:	<input type="text" value="112622995"/>

At the bottom of the form are two buttons: a green checkmark labeled 'Save' and a red X labeled 'Cancel'.

Figure 4.28: Form of adding contact

Source: Author

Interface of Report Window

Users are able to generate reports on tasks details by selecting an employee. After selecting the employee system generate a report which contains task details of that particular employee. User is able to filter the task according to the status, priority and time period of the tasks. There are three tabs Assign To, Assign by Me and Assigned by Me (Custom Duration) which allows user to customize the task report selecting employee who assigned the tasks to the particular user and the employees who are assigned by particular user. Following figure shows the interface of report window and the form of selecting employee.

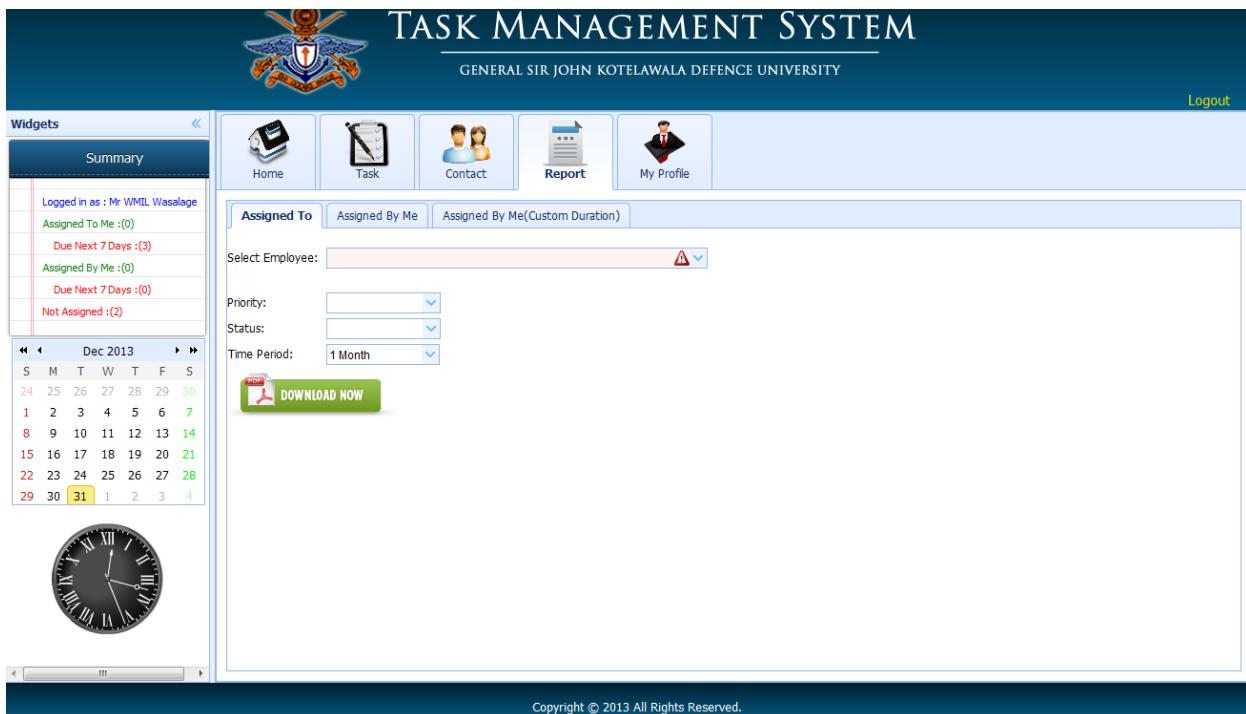


Figure 4.29: Interface of the Report Window

Source: Author

Interface of My Profile Window

All the details of particular user who logged into the system are displayed in this menu. User is able edit the profile details including account password but no username or user type.

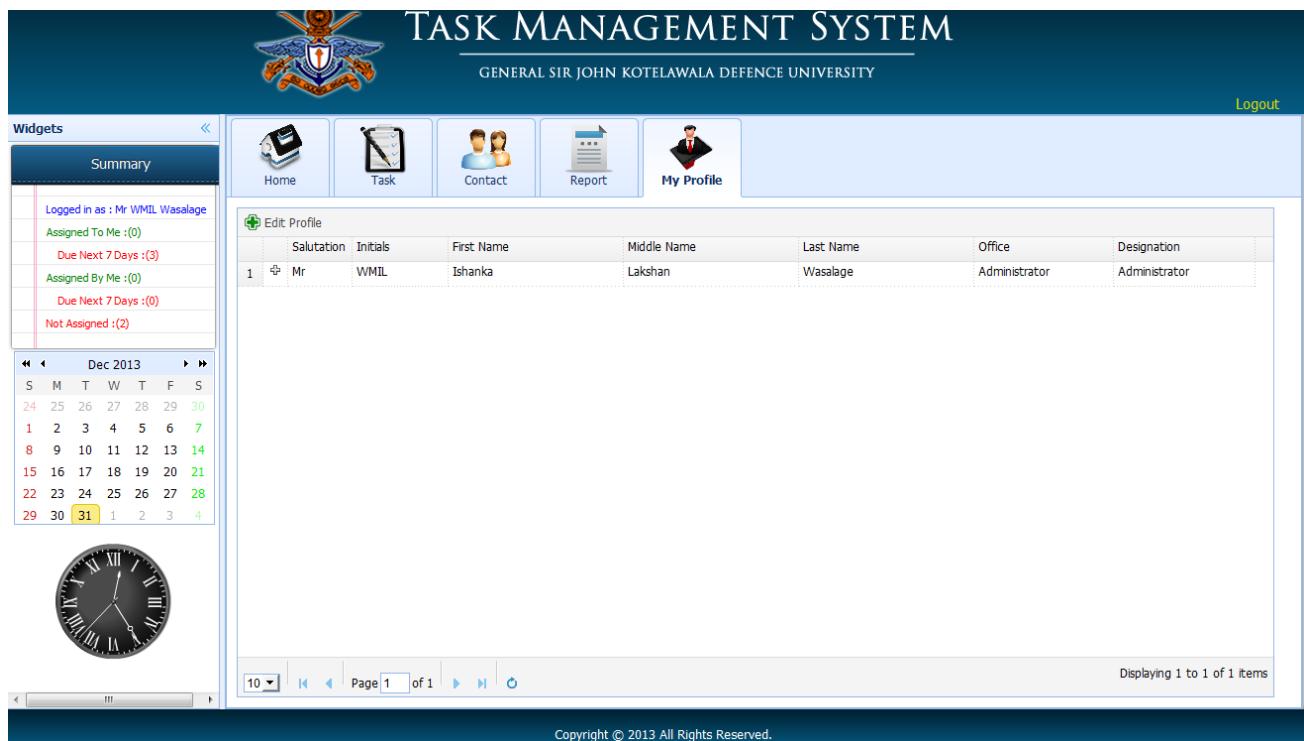


Figure 4.30: Interface of My Profile Window

Source: Author

Employee Details

Salutation:	Mr
Intials:	WMIL
First Name:	Ishanka
Middle Name:	Lakshan
Last Name:	Wasalage
Email:	isankalakshan@gmail.com
Mobile No1:	716405220
Mobile No2:	87674
Office:	Administrator
Designation:	Administrator
Office Tel:	552223547
Username:	isankagu
Password:	123
User Type:	Guser

Save Cancel

Figure 4.31: Form of Edit My Profile Window

Source: Author

Interface of Admin Home Window

After login as an admin, system admin gets the admin home window. In right side, the main menu tab of the system which contain Admin home, task, contact manager, user accounts, report, History log and Master Files menus display. In left side, there are few widgets such as calendar, time and notepad which contain the summary of task of particular users. In the admin home page, it contains all the tasks details of the system. Following figure shows the interface of the admin home page.

Title	Assign By	Assign To	Start Date	Due Date	Priority	Status	Assigned On
1 Exam	Maj Gen WMIL Wasalage	Maj Gen MP Peiris	2013-12-13	2013-11-13	High	Inprogress	2013-12-30 02:17:26
2 Exam	Lt Col WMIL Wasalage	Lt Col S Pakshaweera	2013-12-13	2013-11-13	High	Inprogress	2013-12-30 02:17:34
3 Exam	Mr S Pakshaweera	Mr PP Kumara	2013-12-13	2013-11-13	High	Inprogress	2013-12-30 19:43:56
4 Sport Meet	Lt Col WMIL Wasalage	Lt Col S Pakshaweera	2014-01-01	2014-01-15	Medium	Closed	2013-12-30 15:11:21
5 Sport Meet	Mr S Pakshaweera	Mr WMIL Wasalage	2014-01-01	2014-01-15	Medium	Closed	2013-12-30 20:02:03
6 Project	Mr S Pakshaweera	Mr WMIL Wasalage	2013-04-23	2014-01-01	High	Inprogress	2013-12-29 20:02:29
7 Intake 31	Mr MP Peiris	Mr WMIL Wasalage	2013-12-02	2013-12-31	Medium	Inprogress	2013-12-29 20:37:58
8 Games Night	Brig MP Peiris	Brig A L D M Gunasekara	2013-11-01	2013-12-13	Low	Completed	2013-12-29 21:42:11
9 Check	Maj Gen WMIL Wasalage	Maj Gen MP Peiris	2013-12-17	2013-12-24	Low	Closed	2013-12-29 21:55:51
10 Check	Maj Gen WL Alwis	Maj Gen MP Peiris	2013-12-29	2014-01-22	Low	Pending	2013-12-29 22:15:13

Figure 4.32: Interface of Admin Home Window

Source: Author

Interface of Admin Task Window

Same as the users of the system admin has the authority to take the same actions on tasks. The tasks that are created by the particular user and the tasks assigned to that particular user can be edited and forwarded in this page. Creating and deleting the tasks also done in this page. When clicking the buttons a form will be pop upped. Then user is able to fill the forms and send the data to the database by submitting the data. Following figures shows the interfaces of mentioned modules.

	Title	Start Date	Due Date	Priority	Status	Created By	Created On
1	Exam	2013-12-13	2013-11-13	High	Inprogress	Mr WMIL Wasalage	2013-12-30 18:43:36
2	Sport Meet	2014-01-01	2014-01-15	Medium	Closed	Mr WMIL Wasalage	2013-12-29 18:32:44
3	Project	2013-04-23	2014-01-01	High	Inprogress	Lt Col S Pakshaweera	2013-12-29 19:55:46
4	Intake 31	2013-12-02	2013-12-31	Medium	Inprogress	Maj Gen MP Peris	2013-12-29 20:13:33
5	Games Night	2013-11-01	2013-12-13	Low	Completed	Maj Gen MP Peris	2013-12-29 20:29:34
6	Meeting	2013-12-04	2013-12-05	Medium	Completed	Brig A L D M Gunasekara	2013-12-29 21:48:19
7	Check	2013-12-17	2013-12-24	Low	Closed	Brig A L D M Gunasekara	2013-12-29 21:53:54
8	Check	2013-12-29	2014-01-22	Low	Pending	Mr WMIL Wasalage	2013-12-30 17:05:06
9	Check	2013-12-29	2014-01-23	Low	Closed	Mr WMIL Wasalage	2013-12-29 22:05:47
10	Organizing Tournement	2013-12-31	2014-01-15	High	Inprogress	Maj Gen MP Peris	2013-12-30 01:42:13

Displaying 1 to 10 of 12 items

Figure 4.33: Interface of Admin Task Window

Source: Author

Interface of Contact Manager Window

Admin is able to do the changes to the employee details. The details of the employees contain in this contact manager page. Creating a new user, editing current employees' details and deleting the employee records can be done within the contact page. Like the task page when clicking the buttons a form will be pop upped. Then user is able to fill the forms and send the data to the database by submitting the data. Following figures shows the interfaces of mentioned modules related to the contact manager page.

The screenshot shows the Task Management System interface for General Sir John Kotelawala Defence University. The top navigation bar includes a logo, the system name, and a logout link. Below the navigation is a toolbar with icons for Admin Home, Task, Contact Manager (selected), User Accounts, Report, History Log, and Master files. On the left, there's a summary panel with user statistics and a calendar for December 2013. The main content area displays a grid of employee contacts with columns for Salutation, Initials, First Name, Middle Name, Last Name, Office, and Designation. The grid shows 8 items, with page 1 of 1 displayed. At the bottom right, it says 'Displaying 1 to 8 of 8 items'.

Figure 4.34: Interface of Admin Contact Manager Window

Source: Author

The form is titled 'Employee Details'. It contains fields for Salutation (dropdown: Mrs), Initials (WC), First Name (Darshani), Middle Name (Kumari), Last Name (Fernando), Email (kumari@kdu.ac.lk), Mobile No1 (718132721), Mobile No2 (718132721), Office (Department of Ci dropdown), Designation (Head of Departm dropdown), and Office Tel (112622995). At the bottom are 'Save' and 'Cancel' buttons.

Salutation:	Mrs
Initials:	WC
First Name:	Darshani
Middle Name:	Kumari
Last Name:	Fernando
Email:	kumari@kdu.ac.lk
Mobile No1:	718132721
Mobile No2:	718132721
Office:	Department of Ci
Designation:	Head of Departm
Office Tel:	112622995

Figure 4.35: Form of Creating an Employee of Admin Contact Manager Window

Source: Author

Interface of User Account Window

This is the especial menu for the system admin in order to manage the use accounts of every users of the system. In here admin is able to create, edit and delete user accounts. Following figures show the User account menu and the form of adding a new user account. The same form will pop up when editing the user account details.

The screenshot shows the 'Task Management System' interface for managing user accounts. At the top, there is a logo and the text 'GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY'. On the right, there is a 'Logout' link. Below the header, there is a navigation bar with icons for Admin Home, Task, Contact Manager, User Accounts (selected), Report, History Log, and Master files. The main content area is titled 'User Accounts' and displays a table of existing users:

	Employee Name	Username	Password	User Type	Created On
1	Brig A L D M Gunasekara	dvcld	dvcld	Guser	2013-12-29 21:46:49
2	Lt Col S Pakshaweera	hod	hod	Guser	2013-12-29 19:53:03
3	Mr WML Wasalage	isankad	123	Admin	2013-12-23 02:33:55
4	Mr WML Wasalage	isankagu	123	Guser	2013-12-18 19:12:37
5	Mr PP Kumara	nandana	nandana123	Guser	2013-12-30 02:00:30
6	Mr WL Alwis	thilinaad	123	Admin	2013-12-29 19:52:14
7	Maj Gen MP Peiris	vc	vc	Guser	2013-12-29 19:52:44

Below the table, there are buttons for 'New User', 'Edit User', and 'Remove User'. At the bottom, there is a footer with the text 'Copyright © 2013 All Rights Reserved.' and a page number 'Displaying 1 to 8 of 8 items'.

Figure 4.36: Interface of Admin User Account Window

Source: Author

The form is titled 'User Account' and contains the following fields:

Employee Name:	<input type="text" value="Mrs WC Fernando"/>
Username:	<input type="text" value="kumari12"/>
Password:	<input type="text" value="123"/>
User Type:	<input type="text" value="General User"/>

At the bottom right, there are two buttons: 'Save' with a green checkmark icon and 'Cancel' with a red X icon.

Figure 4.37: Form of Creating New User Account of Admin Contact Manager Window

Source: Author

Interface of Admin's Report Window

Admin is also able to generate reports on tasks, contacts, user accounts, Login history of user and the login history. Tasks and Login history generates reports within specified time period by selecting number of months. Reports of contact generate filtering contacts by office and designation. User accounts created during selected time period filtering the accounts according to the user type reports are generated. Login history of particular user within specified time period can be generated as a report. Following figure shows the interface of report window.



Figure 4.38: Interface of Admin Report Window

Source: Author

Interface of Login History Window

This interface shows the login history of all users of the system. Employee name, username of the user, user type and the login date and time are shown through this window. Admin is able to filter the record by employee last name and user name of the employee.

TASK MANAGEMENT SYSTEM
GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY

Logout

Widgets

Summary

Logged in as : Mr WMIL Wasalage
No of Total Tasks:(12)
No of Assigned Tasks :(10)
Admin Accounts:(2)
Gneneral Accounts:(6)
No of Contacts:(8)

Employee	Username	User type	Login Date & Time
1 Mr WMIL Wasalage	isankaad	Admin	2013-12-31 12:32:09
2 Mr WMIL Wasalage	isankagu	Guser	2013-12-31 12:13:49
3 Mr WMIL Wasalage	isankaad	Admin	2013-12-31 11:45:32
4 Mr WMIL Wasalage	isankagu	Guser	2013-12-31 11:32:54
5 Mr WMIL Wasalage	isankagu	Guser	2013-12-31 08:56:00
6 Mr WMIL Wasalage	isankagu	Guser	2013-12-31 08:49:37
7 Mr WMIL Wasalage	isankagu	Guser	2013-12-31 08:20:10
8 Mr WMIL Wasalage	isankaad	Admin	2013-12-30 22:38:20
9 Lt Col S Pakshaweera	hod	Guser	2013-12-30 19:25:19
10 Lt Col S Pakshaweera	hod	Guser	2013-12-30 19:24:15

Displaying 1 to 10 of 78 items

Copyright © 2013 All Rights Reserved.

Figure 4.39: Interface of Admin History Login Window

Source: Author

Interface of Master Files Window

Admin has the authority to add, edit and remove different master files such as Designation, Office, Salutation, Priority and Status. Following Figures shows the interface of the master file window and the forms of adding and editing designation details. Same as the designation all the master files office, priority, status and salutation can be added edited and removed.

The screenshot shows the 'Task Management System' interface for 'GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY'. The top navigation bar includes a logo, the university name, and a 'Logout' link. Below the navigation is a 'Widgets' section with a 'Summary' card displaying user statistics: Logged in as : Mr WMIL Wasalage, No of Total Tasks :(12), No of Assigned Tasks :(10), Admin Accounts:(2), General Accounts:(6), and No of Contacts:(8). To the right of the summary is a calendar for December 2013. Further right is a clock icon. A main content area displays a table of 'Designation' records with columns for Designation ID, Designation, and Designation value. The table contains 10 entries. At the bottom of the page is a footer with copyright information.

Designation ID	Designation	Designation value
1 10	Administrator	120
2 6	Dean	95
3 4	Deputy Vice Chancellor (A)	99
4 5	Deputy Vice Chancellor (D)	99
5 7	Head of Department	90
6 9	Lecturer	70
7 11	Registrar	98
8 8	Senior Lecturer	80
9 1	Student	50
10 2	Vice Chancellor	100

Figure 4.40: Interface of Admin Master File Window

Source: Author

The form titled 'Designation' has fields for 'Designation ID' (disabled), 'Designation' (set to 'Registrar'), 'Value' (set to '98'), and a note at the bottom: '**When adding a new record leave the ID field empty.' At the bottom are 'Save' and 'Cancel' buttons.

Figure 4.41: Form of Adding Designation

Source: Author

Designation

Designation ID:	<input type="text" value="11"/>
Designation:	<input type="text" value="Registrar"/>
Designation	<input type="text"/>
Value:	<input type="text" value="97"/>

**When adding a new record leave the ID field empty.

Save Cancel

Figure 4.42: Form of Editing Designation

Source: Author

4.5 Summary

This document represented data under 4 main sections namely Overall System Architecture, Software Architecture, Data design & Interface Design regarding to the development of the computerized TMS.

Overall architecture of this system is divided in to 3 main layers namely presentation layer, application layer and data layer. Presentation layer focuses on the how the system interfaces are presented to the user while the application layer builds interaction between the presentation layer where the inputs of the interfaces and the data link layer where the required data are contained. Data layer includes the database management applications which will be helped to store the data of each module. There is only one database to handle the records and this database will consist of several tables. JEeasy UI frame work will be used for the interface designing with html and php as the scripting language for the system. MySQL will be used as the database management application.

Software architecture of the developing system will be based on a modularized approach where system in divided in to different modules. TMS will contain main 5 modules namely Authentication/Login Module, System Administration, Task Administration, View Tasks & Employee Records and Report Generation. Each module will have specific functions under them. Access to modules will be divided into two sections that is Administrator and General user where Administrator can access to all modules while Genera users can access all modules except system administration module.

When it comes to the data design there will be one central database using MySQL database management application hosted in the web server. Access to the database should be done through the network. An EER is modeled as for the requirements of the developing system and it is then converted into relations. Database contains several tables according to the logical design to store information about tasks, employees and etc. Relationships between these tables are also established according to the requirements.

All the interfaces and forms needed such as Interface of task assigned by me, interfaces of the task window, form of Creating a New Tasks, Form of Assigning a Task and etc. are designed with using html and jeasyui frame to produce user friendly interfaces.

5.0 Testing and Implementation

The chapter of Testing and Implementation mainly focus on explaining the testing and implementation of the project. The chapter has been started with a description about the knowledge and tools required in development and implementation. Then it is illustrated about the testing of the developed software product. As the last main topic in this document it is discussed about the implementation plan, which includes the factors need to be considered when system is implemented in the real environment.

5.1 Program Development - Technologies and Tools for Design Implementation

This section starts with explaining the development strategy used in the development process and the justification for using that approach. For the development of the system with guarantee the security, efficiency and other qualities a suitable programming language must be selected along with proper tools. It is discussed about the choosing of the programming language and essential tools for the development process.

5.1.1 Order of Development

It is very important to decide about the order which the components would be developed. Top-down development order was selected which begins with interface designing to develop the proposed TMS. The primary advantage with the top-down development order is that there is always a working version. Once the interface modules are completed development moves down to the next set of components of the software design as shown in the figure 1.0 in the next page.

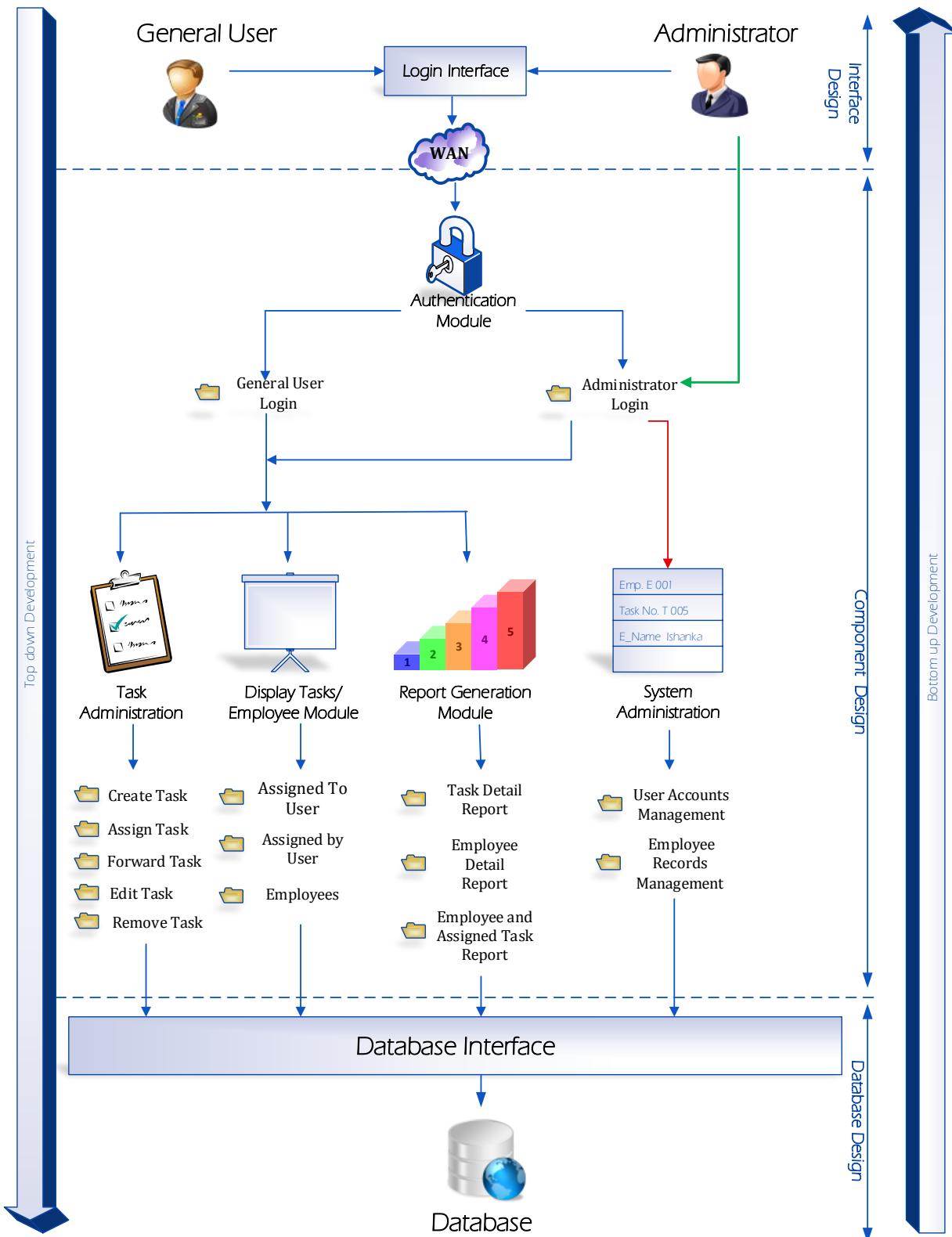


Figure 5.0 Software Architecture Design with Order of Implementation
Source: Author

5.1.2 Developing Language Selection

Several programming languages were considered for the development of the proposed system. Considered languages were equipped with the functionalities that will cater for the high performances, interactive and reliable even to use for complex projects. Along with above mentioned qualities, the clear cut factors that had to be considered are

- Availability of network tools and resources
- Efficient database connectivity
- Development/coding time
- Accuracy
- Re-usability and flexibility
- Availability of resources to learn.

There are several popular programming languages which can be used to develop web application are found from the present market which are capable of providing above qualities such as

- C# with .net framework
- Html
- Php
- Java
- Jquery Mobile framework
- Jquery Easy UI framework

With relevance to the fact that the system is a web based solution, after doing several studies it was decided to use JEeasyUI for the interface development and php as the scripting language. JEeasy UI framework provides number of components such as validate box and data grids which are rich with various inbuilt functions. JEeasy UI is easy to use because all the coding will be basically html tags. Furthermore they provide the resource materials to learn the language very easily. Since it is based on jquery platform system will be used using any major browser. On the other hand php is selected as the scripting language since it is a fast, flexible and pragmatic language with many resource materials readily available in the web. Developing language selection requirements are

- Familiarity
- Web based Programming Support
- Rapid Development
- Execution Speed and Efficiency
- Support commonly used Data bases.
- Compatibility
- Availability of learning resources

5.1.3 Tools

In the process of development of the proposed system, several tools were required to support various activities such as creating models or other components required in the development process. Most of the tools have been designed and developed with several specific functions to make easy the system developers role in the system. Some of the tools that may be required are described below.

IDEs (Integrated Development Environment)

An integrated development environment (IDE) is a programming environment that has been packaged as an application program, typically consisting of a code editor, a compiler, a debugger, and a graphical user interface (GUI) builder. . Some IDE has facility to generate the source codes as well. These tools are specially designed to help the software developers to ease the development process interactively. Adobe dream viewer can be taken as an example for such an IDE which is used for development of web pages. It has the code generating feature for html elements.

Text Editors

Text editors are is a program which is used to edit various texts such as Ms Word or notepad. Some editors are developed such that they support various programming languages. they contains functions such as showing the keywords of a programming language in separate color which will increase the readability of the code. Notepad++ is a free source code editor and Notepad replacement that supports several languages like html, php, java and many more.

Image Processors

The image processing software such as Adobe Image Ready, Adobe Photoshop, and Illustrator are to images processing. These software packages provide various functions to users to do modifications to the existing images as they desired and convert vector image in to bit mapped image.

DBMS

The proposed software is essentially developed as a database product, therefore the system needs to interact with the database and the DBMS in order to query, store the data from and to the database. Mysql is a example for a open source DBMS which is the #1 database for Web-based applications, used by Facebook, Twitter, LinkedIn, Yahoo!, Amazon Web Services and virtually all the largest Web properties and successful startups.

5.2 Testing

Testing of Task Management System is critical for the delivery of a successful project. The key purpose of testing is to check whether that the developed system is fulfilled the user requirements and confirms to the test results expected under a wide range of conditions which could have been tested. To accomplish a successful system implementation, all aspects of the testing segment should be reviewed with the contribution of the developer as well as users.

5.2.1 System Testing Objectives

System testing enables the developed Task Management System to be analyzed entirely in order to ensure that the specifications and business functions which it was intended are being met. The components of the system are being tested at the development of those components. But it is necessary to test those components to confirm the combinations of the system components were properly done.

System testing is conducted by checking the following checkpoints are tailored with the developed system.

- **Performance** - This testing is performed to verify the system operate under peak and continuous loads of processes at a significant speed.
- **Accuracy** - Inaccurate information leads the whole system failure if the information is not stable. The test is performed to verify the outputs of the system are accurate in various operational environments.
- **Functionality** – Test is performed to make sure the system meet requirement specifications and hence supports business requirements of the company. Functionalities should address the problems existed in current system and its processes.
- **Interfaces** – New system is developed to provide more information using less number of interfaces and users should be able identify them easily and separately. Testing is performed to make sure the interfaces are done according to the specifications and the interfaces are linked each other in well-organized manner.
- **Volume** – Because the new Task Management System allows more information about faults and employee details to be stored, this testing is identified as important to verify the system is capable of monitoring a large no of tasks while handle large volume of input data.
- **Security** – Since the system handles sensitive information of the organization's and it's users security of the system should be well-ensured, this testing is performed to verify the feature of the system ensure access, integrity and recovery features operate as expected.

5.2.2 Testing Strategy

Testing strategy ensures that all the tests which are to be conducted have been identified and the test will cover each and every part of the system according to the scope of the system. Testing strategy concern project scenario as well as the strategy has been used for system development. Following tests will be carried out to ensure the delivery of high quality product.

5.2.2.1 Unit Testing

Unit testing is intended to verify that a module of the system has been developed according to the specifications. It also ensures the modules communicate with each other properly.

Unit testing will only tests the components of the Task Management System themselves. It does not help to identify each and every error in the system such as performance problems, integration errors. Therefore unit testing will be helpful only when it used in combination with other testing techniques.

5.2.2.2 Integration Testing

Integration testing will identify the errors that were not or couldn't identify in the previous testing. Purpose of conducting the integration testing is verifying the functional and performance requirements defined on project design specifications.

There are different types of integration techniques. Integration testing will take the modules of the system which are tested under unit testing, as inputs for testing and group them in better collection. Then it will apply tests defined in test plan to those grouped units to verify system integration and delivers the output as integrated Task Management System which is ready for the next testing which is known as system testing.

5.2.2.3 System Testing

Overall functionalities of the system including the modules integrated modules and interfaces will be tested out of the system testing. System testing will not receive many errors since the input which is taken to the system testing is the system and modules which are tested under unit testing and integration testing. But the errors which identify during this testing process will be critical since it will be affected to the integration of the Task Management System's modules and will have to do changes of the system.

5.2.2.4 Acceptance Testing

Acceptance testing will be the next testing is to be conducted. It is designed to ensure that all the changes made come across with the original system specifications and user requirements of the Task Management System during the design, development and other initial stages. Basically this will decide the how the extend system has completed the user requirements.

5.2.3 Test Plan

Test plan defines a systematic approach to test a system. This will discuss the process of conducting the above mentioned testing strategies. Under test plan, test strategies which are identified as to be carried, will be separated into testing plans as unit testing and system testing. Components of the system and integration of components will be carried under unit testing. System testing and acceptance testing will be carried under System testing. Concerns made when designing the test plan are,

- Identifying the components and features to be tested and not tested
- Ensuring all required elements are in place for testing
- Who conducts the testing for particular component or feature
- Plan for make necessary changes for issues arise on testing

5.2.3.1 Test Plan – Unit Testing

Unit testing is performed before the implementation and integration of system components to ensure the functionality. Main components of the system will be tested during the unit testing.

Module	Description
Task Administrations	Basic functions such as create, delete, update and etc. are carried out before integration to make sure they are error free.
Report Generation Module	Report module is tested by producing various types of pdf reports. The objective of this testing is to minimize the errors that can be occurred in this module and to provide smooth functioning.
Email Generation Component	This component is tested to make sure it triggers relevant alerts which are set on functions such as task assignment and update of task details.
Authentication module	This component is tested by entering various user names and passwords to make sure it validates the authorized employee names and passwords. User login details database is checked to make sure the authentication components stores the login session details in the database.
Employee Detail Administration Module	Functions of this module are tested by adding, editing and removing contact details to/from database.
User account Administration	This module is in charge of making user accounts for employees in the database. Functions available such as add/edit and deletions of user accounts are tested.

Table 5.1 Test Plan – Unit testing

Source: Author

5.2.3.2 Test Plan - System Testing

System testing will be carried under three areas as monitoring system, fault management, and report generation in order to test the functions of the overall Task Management System. First system test will be carried to test the functionalities of the monitoring system. These tests consist of testing, monitoring activities, status display, system maintenance and employee login activities.

Test plan for the monitoring system testing is shown below.

Test Scenario	Description
Testing and validating logon menu	Test user login for valid user name and password. User login should identify the user's privileges, name and the employee's department. Only the users which are registered to use the monitoring system should be allowed to login.
Monitoring system interface	Test whether the status of monitored devices are displayed correctly. System should show the active tasks in green color and the expired tasks in red color. Also should display the faults summary of base stations with color indications.
Add/edit/delete employee details	Test employee details modifications module. This should allow user to add new employee to the system by clicking "add new employee" button or edit employee by clicking "edit" button. Existing employee details should retrieve upon selecting the particular employee's raw and then selecting the edit in order to edit the employee details. After adding the employee or editing the employee details save option should save the employee details to the database.
Add/assign/forward/edit/ delete task details	Test task details modifications module. This should allow user to add new task to the system by clicking "add" button forward the task by clicking "forward" button or edit task by clicking "edit" button. Existing task details should retrieve upon selecting the particular tasks raw and then selecting the edit in order to edit the task details. After adding the task or editing the task details save option should save the task details to the database.
Log system activities	Check the user login session details are recorded in the database. User should be able to retrieve the login session details such as login ID, logged system, date and time from the database through this interface.
Employee status log	Test whether system logs the status of the employee at each of the polling session. User should be able to view the response received from the employee devices.

My Profile Component	This component is tested to make sure that any employee can update the information relevant to his or her account. Users have to use this module to change their passwords also.
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Table 5.2 Test Plan – Monitoring System Testing

Source: Author

Next system testing will be carried to test the main functionalities of the Task management System. These tests consist of user login to the system, managing tasks, managing employee details etc.

(Report generation and test logs for the Task Management system are attached to the appendix.)

5.2.4 Errors and Bugs Uncovered

Many errors are found during the testing which tested the system using different kind of data inputs and with large volume of data. Important errors and bugs which found are,

- **Run-time errors**

When running the system in lower memory conditions this error occur. It is fixed by increasing the system memory and fixing the invalid algorithms. It was found in various situations. Many reasons are found which led to occur this error, such as invalid algorithm given on report generation.

- **Storing null values in database**

Because of not using validation techniques during some data inputs, null values are stored in the database and later raised problems when retrieving data. These errors were fixed using validation techniques and setting default values to the tables.

- **Error on connecting to SQL server**

This error was found in many situations. Error is found to be occurred due to

- Not running the database – fixed by starting the database connection
- Invalid name given to the server – resolve by fixing the invalid entries
- Using of data environment option with fixed server name – fixed by avoiding the use of data environment during report generation.

- **Segmentation fault**

This error occurred because the arrays are set to refer outside of its declared length. Also cause the use of inappropriate data types to store values. These errors were fixed by changing the data types and fixing the coding errors on defining arrays.

5.3 Implementation

Implementation Plan is designed to identify how the developed system will be deployed and transitioned into an operational system. Plan will provide an overview of the system, major tasks which will be involved during the implementation and other requirements which supports to the implementation process.

5.3.1 Major Tasks on System Implementation

Some of the major task on the implementation process of the developed system is listed in the below.

- Planning overall implementation and co-ordination of the system implementation
- Testing the server for internet connection
- Identifying resource requirements for the implementation
- Providing training sessions for the users
- Ensure all the required hardware and software are available

5.3.2 Installation

Once the system is developed and tested, it needs to be installed and placed in an appropriate environment for the use. The implementation should be planned within a time period after identifying the resources need for the implementation.

TMS is developed as a web application which will work with client server architecture. Once the software is placed in the server (KDU server) with a proper domain name, clients will be able to access the system via internet. Since the KDU server is up- and running the main steps in the installation process will

- Install the Task Management System
- Restore the database
- Make necessary configurations for the system

5.3.3 Data Conversion / Loading

When an information system is installed and introduced it requires the data entered from the existing system. The existing system could be a manual system or computerized system or both of the systems. The data from those systems must be collected, converted into necessary formats and entered to the new system. This data conversion and loading is essential to smooth process of the new implemented system.

When considering the developed TMS, it has being developed for an alternative for the existing manual task allocating procedure. Details such as employee records and task details have to be freshly and manually entered into the database through the system interfaces.

5.3.4 System Changeover

The Parallel Change Over methodology is recommended for the implementation of the TMS in the KDU environment. In parallel change over, the new developed system will be put into use while using the current task allocation procedure also for a certain period of time. During that period the TMS is tested for the system testing and acceptance test with its users of the environment where it is installed. The existing system continues operating until the new TMS is tested thoroughly and determines to be error free and ready to operate independently.

Advantage of using parallel changeover is the new system will get ample of time to be observed for testing while minimizing the risks can be occurred by system failure. It will also enable users to get trained while using the old system.

5.3.5 User Training

The users are a main part of the developed system. It is essential for users to know about the available functions and how to use them properly to take the maximum benefits of using the system after implementation.

There are two types of user roles defined in the system namely General Users and Administrators. General users are users who use the TMS for day today task management purposes and administrators are responsible for administrative functions and maintaining the system to keep it operational. The recommended training methods are as follows.

General Users	System Administrators
<ul style="list-style-type: none">• Training Sessions for hands-on experiences• Practical exercises• One-on-one tutorials• Group training sessions	<ul style="list-style-type: none">• Training Sessions for hands-on experiences• Practical exercises• Questions and answers• Group training sessions

Table 5.3 User Training Plan

Source: Author

5.4 Summary

The system development activities that occur after the system design stage and the activities that occur before the delivery of the product called implementation were expressed. The program development part described the order of implementation, language selection and tools. Testing is independent from the system development and the testing has been done in several test runs to determine all the defects. Implementation plan has the sequence order of set of activities such as installation, data conversion, and change over and user training.

6.0 Evaluation of Outcome and Practice

This chapter will present the reader a detailed evaluation on project and the developed product while evaluating the objectives were achieved, how the project deviated from its original specifications and the problems aroused during the lifetime of the project. Furthermore it will also discuss the remedies that have been taken to overcome the aroused problems and knowledge which have been gathered by providing solutions for such issues. On the other hand as product evaluation, it will further discuss about the product while evaluating how far it met the functionally requirements set by users during the initial stages of the project.

6.1 Evaluation of Project Practice

Evaluation of project practice is done to evaluate the project plan and the deviation occurred during the phases of project. In this sub section it is also discussed about the successfulness of the project and the obstacles faced during the project and how they have being tackled. Phases of the project identified as to carry the evaluation are analysis, design and implementation.

6.1.1 Analysis phase

Analysis phase is responsible on identifying the requirements of the users for the development of the new system. It is done using fact-finding techniques such as interviews, observations, questionnaires and other. This is a vital process since successful identification of user requirements will help to complete the project successfully on time with less number of modifications after implementation.

Key process of Analysis phase

- Fact finding
- Identifying problems and limitations of the current system
- Modeling current system
- Identifying functional and non-functional requirements for the system
- Modeling the proposed system

Evaluating Analysis phase

As the system scope defines the end users of the developing system are in higher levels of the KDU organizational hierarchy, they have a very busy work schedule. Due to that fact difficulties were aroused in conducting interviews with accordance with the planned schedule. But other methodologies such as questionnaires, observations and document reviews were greatly helpful in the data gathering process. Identifying different users of the system and involving them in the data gathering phase helped to look at the system from different perspectives. Although the busy schedules of the participants in the data gathering phase made the analysis process to drag over the scheduled deadlines, as an overall the process of requirement collection and analysis was completed successfully with great help of staff members.

Learning Experiences

Since the analysis phase is carried with the assist and guidance of higher rank official in the organizational hierarchy, it helped to learn about the how to analyze the situation critically by looking at the core of the problem scenario. Along with that, since most of the personnel's who involved in the process has high academic qualifications and experience, always they gave guidance and advises to make this project successful with accordance with their experience. Gathering information from different kind of staff members enabled to look at a problem in different views and have a clear picture about it.

In addition to the project analysis processes, it helped to understand some of the official procedures which are maintained in the daily routines inside the KDU.

6.1.2 Design Phase

This is a vital phase on the project because design can be named as the blue print of the system which is going to be developed. Designing of system components, databases, interfaces and overall system architecture will be carried out during this phase.

Key Processes of Design Phase

- Designing system, software and module architecture
- Designing database
- Designing interfaces
- Integration of modules

Evaluating Design Phase

With the successful identifications of user requirements after the completion of the analysis phase of the project, design phase was conducted without many difficulties. Overall system architecture was designed with the major functions and components identified on the proposed system. Software architecture has been designed to give a clear picture about the components of the system and communication between them. Database was initially logically designed using ER diagrams and then converted into set of relations to make the proper database. Interfaces were designed successfully along with ideas from users to make it as much as user friendly and it also were helped to develop the prototype of the system.

Learning Experiences

Design phase allowed gaining experience on deriving important data which needed to the product development from the data gathered during analysis stage. It also helped to identify how the design theories can be applied in real time scenarios. For example in the case of designing the dataset, theories for mapping a logical database to tables were greatly helpful in identifying the attributes, primary keys and foreign keys.

6.1.3 Implementation Phase

This phase is responsible for all the construction, testing and implementation of the system. The coding of the system is done and several testing strategies are used to test the system before implementation to provide an error and bug free system.

Key processes of Implementation phase

- Identifying testing strategies
- Design of Test plan
- Identifying major tasks on implementation
- Planning implementation

Evaluating Implementation phase

System was developed as separate components and integrated into the development of overall development. Unit testing was done to make sure the components were ready to integrate into the system to provide successful error free software. Because of the modularized development of system, it was not difficult on making modifications on errors found during the testing. Identifying the major tasks of implementation was helped on making a proper implementation plan. Planning of implementation was identified as an important task because the implementation is a process which should be carried systematically. Due to the fact that a failure in TMS will affect the daily routine of KDU officials' parallel changeover method was selected for the implementation process. Selection of proper testing strategies and proper implementation methods helped to finish the implementation process successfully.

Learning Experiences

Key learning experience in this phase was the testing strategies which used to identify bugs and errors. It includes how the testing was done and how the testing logs were maintained. After that implementation of a system on a real time scenario gave a good understanding about approaches such as direct change over and parallel change over.

6.2 Evaluation of Product

Evaluation of the project is done to make sure the newly developed system has met the functional and non-functional requirements requested by the clients. Each component of the system is evaluated using several methods along with getting feedback from the users.

6.2.1 Methods of Evaluation

In order to complete this phase successfully several evaluation methods were planned considering different users of the system. Methods which were used are,

- **Interviews**

After the system has been implemented and the user training programs have been conducted, several employees of the institute were interviewed. In the interviews they were given the functional requirement which were obtained in the data analysis phase and evaluated according to them how far the system has achieved them.

- **Questionnaire**

In order to identify the failures of the system and future enhancements to the system, a suitable questionnaire was distributed.

- **Observation**

Since the parallel changeover was adopted in the implementation phase, the use of new system and the old system was observed to check whether the new system is functioning properly and to determine whether the user training has been successful.

6.2.2 Evaluation Criteria

The evaluation of product was done by examining the problem arisen and the solution provided by the developed system, comparing the functional requirements with the components developed in the system to provide them. Apart from them system is also evaluates using the user friendliness of the system. System is evaluated considering following criteria,

- Achieving specification requested by users
- Smooth functionality of the system
- User friendliness
- Efficiency of the system

6.2.3 Evaluating Functional Requirements

Functional requirement specified by the user at the analysis phase was compared with the components developed to address them.

Functional Requirements	User Type	Component developed
Ability to create a new task with associated attributes(Status, Priority, Start date, End Date)	General user	Task administration module
Ability to view tasks, group and order them and see the new tasks since last login desperately.	General user	Task administration module
Update information in the created tasks and ability to delete tasks created by user	General user	Task administration module
Assign task to other employees through the system while getting the task assigned to the user by other employees	General user	Task administration module
Email alerts when a new task is assigned, task details are updated	General user	Email generation component

Ability to inform the completion of a task through email alerts	General user	Email generation component
Ability to produce various kinds of reports	General user/Administrator	Report generation module
Ability to edit the personnel information of the user	General user	My profile component
Can add/edit and delete employees to/from the system.	Administrator	Contacts module
Create user accounts with unique username and password to employees.	Administrator	User accounts module
Ability to view the login history of users to the system	Administrator	Login History component
Ability to add/edit and delete master files of the database	Administrator	Master files components
Logs the user activities to ensure the security of the system	General user/Administrator	User module / Authentication module

Table 6.0 Evaluating Functional Requirements

Source: Author

6.3 Significance of the Solutions

The following table shows the key problems found in the manual procedure and the solutions provided by the newly developed TMS to address those problems.

Problem to Address	Solution Provided	Justification	Remarks
No accurate way to keep track of the task list to do	When a task is assigned to the user it will be displayed in home page and also receive an email.	In early stages, when studying the problems and limitations of the system this was identified as a major issue. In the requirement specification for the new system this function was given a high priority.	Successful
Difficulties in tracking what task assigned to whom	Allowed to track it along with all the details related to the task through task module.	This was also a common issue mentioned by users in the data gathering process. In the task administration module, this feature was included.	Successful
To identify the available employees who works under the user to assign tasks.	Display all the available employees in the contacts.	Along with the assigning function of the tasks, it was mandatory to maintain a contact list. In addition to that providing a contact list will provide a list all available lists to assign a task. This feature was	Successful

		included in the Employee administration module.
Lack of utilities as communication methodology.	Auto email alert generation to notify users about new tasks, tasks detail updates and completion of tasks.	When a new task was assigned to an employee and when a task is updated or completed, there was a necessity of an accurate way to inform it. Therefore this function was introduced as an inbuilt component of the tasks administration module.
Unavailability to obtain previous records of tasks done by an employee	System database store data relative to tasks and can be accessible over a long period of time and allows producing reports.	To monitor the performance of an employee, a separate report module was introduced to system to retrieve different kinds of reports. Under this feature several kinds of reports were introduced.
Difficulties in keep tracking the task with different priorities and statuses	Allocating distinct color code to identified priority levels and statuses.	When all the tasks are listed, it was difficult to identify the tasks with different priorities. Therefore to overcome this issue it was decided to add different color codes to indicate them separately.

Table 6.1 Significant of Solutions Provided

Source: Author

6.4 Summary

This chapter was dedicated to provide a detailed evaluation on the project practices and the product developed to the reader. Process evaluation was done by evaluating phase by phase while product was evaluated discussing the problems of the current system and functional requirements of the new system.

7.0 Conclusion

The aim of this chapter is to conclude the research project through discussing the overview of the achieved project result and project achievements along with lessons learnt. Furthermore it is discussed about the future enhancements which can be used to improve the productivity of the system.

7.1 Project Results Overview

The aim of this system development project was to build a TMS that improves the flexibility of the internal communication regarding to various tasks done in KDU by employees. In the early stages of the research problems and limitations were found out and data gathering and analysis was done to identify user requirements to overcome those problems. In the end of the project a working prototype of a computerized Task Management System was developed to address those issues along with several value added services over the process.

The main problem in the manual task allocating procedure was to keep track of the details of the tasks handled by an employee. This issue was the main focus of developing the system and it was successfully addressed introducing several functions such as creating new tasks, assigning them to employees and many more. An in detail list of problems to address and the solutions that were provided successfully through the system are discussed in the evaluation chapter.

By the feedback got from the users of the system in the Evaluation chapter, it imply that the developed system helps to manage their tasks in daily routine far more easily than the manual procedure and these feedbacks indicates that the aim of the project has being achieved successfully.

7.2 Overview of Practice and Lessons Learned

Starting from May 2013, this system development project was carried until the end of year 2013 which means a total of 8 months. In these 8 months researchers had to engage in several phases relevant to the System Development Life Cycle. Each engaged phase had its own set of tasks to do and objectives to achieve. In this long process several lessons were learned and experience was gained. In the following table it is discussed about the Overview of Practice and lessons learnt in each phase.

Phase	Objective
Literature Review	To identify what is a computerized task management system and to study similar existing system A good literature review on the project base idea will set a good foundation for the project. Several resources from the internet were used to complete this chapter successfully. During this chapter a thorough knowledge within project scope as well as outside the scope about task management systems have being gained. It includes areas such as functions, suitable technologies, advantages/disadvantages have being studied.

Data Gathering and Analysis	To produce the functional and non-functional requirement specification for the system	Using several techniques data has been gathered and after analyzing the data set of requirements has been produced. In this phase experience and knowledge gained on how to apply data finding and analyzing theories in real system development environment. Detailed explanation is provided on chapter Evaluation section 6.1.
Design Phase	To design the overall system architecture, module architecture, database and interfaces.	Using diagrams architecture was clearly presented and using proper programming languages the interfaces were designed. In this phase several new frameworks consisting rich inbuilt functionalities based on jquery language which can be used to develop interface easily and efficiently were discovered and learnt. For more details on this phase refer to chapter Evaluation section 6.1.
Testing and implementation	To testing the developed solution and implement the system in real environment	The system was completely developed and tested for errors and bugs, testing strategies have been used to improve the yield of testing. Implementation was carried out adapting to the parallel changeover method. Experience on use of testing strategies in the real environment and method of implementing the system according a plan was gained through this phase. For more details on this phase refer to chapter Evaluation section 6.1.
Evaluation Phase	To evaluate process and product to ensure whether it has achieved its aim and objectives.	In this phase process of the project and product has been evaluated separately along with the feedbacks from the users through interviews, observations and questioners. This phase helped to gain knowledge on how to evaluate a process of a project from different perspectives. Furthermore it assisted in identifying the fields that needs to be evaluated when evaluating a software project

Table 7.0 Overview of Practice and Lessons

Learned Source: Author

Learning experiences gained throughout the project are much important to face the challenges in future project developments as well as day to day tasks. Some key things gained from the project throughout the entire project life are

- Helped to improve the IT project management skills.
- Working on given time scheduled.

- New programming languages and tools available.
- Improved writing skills by preparing a comprehensive project report

Hence, it is the belief of researchers that the lessons learnt and experience gained on this project can be successfully incorporated in conducting researches in different context so that the researchers can produce quality outcomes.

7.3 Path to Future Enhancements

As this project was carried out as 8 month project while engaging with the other academic studies researchers had to limit the scope which is stated in the introduction chapter. Stated scope defines the system for a part of organizational hierarchy only. As in the future, the scope of the use of this product can be widened to the entire organizational hierarchy.

In addition to widening the scope, several new functionalities can be added in the long run. Some of desired examples for new functions are document uploading function relating to tasks, provide ability to analyze tasks, enable exchange of messages through the system directly (Not via email) and getting alerts to personal mobile phones as SMS can be stated. Furthermore, the producing reports function can be enhanced by introducing new set of customizable reports.

Furthermore for since the developed TMS is a web application, for mobile phone users an application on famous platform such as Android, Apple and Windows can be developed so that user can retrieve the updates to their mobile application.

7.4 Conclusion to the Project

The project was started on May 2013 and continued throughout the year. Project consisted of main phases and each phase was aligned with a set of goals to drive the project to the success. Initially a literature review was done to gain a firm foundation on the project theme.

As the next step data gathering was conducted using suitable techniques to gather data from user and the gathered data have been analyzed to produce the requirement specification for the new system. Then according to the specification produced the architecture of the system, data base design and interface designing were conducted in the designing phase. Afterwards the software was coded and tested using apposite testing strategies to find errors and bugs before the implementation to provide a reliable software solution.

After the implementation users feedbacks were taken during the evaluation process using several techniques and it was used to evaluate the product while evaluating the project process also. To represent the project a comprehensive project report was prepared.

From this research study, it has proven that there was a timely need of an computerized task management system which will provide utter advantages over the manual task allocating

procedure and by implementing the developed TMS that need has being fulfilled lucratively up to a certain scope.

7.5 Summary

As a summary in this chapter, in the first section contains an overview of the project result. Then it was discussed about the project process and learning outcomes during the project life time. Furthermore as it is very vital discuss the future enhancements for the project, next section was dedicated to suggest some developments as future enhancements. Finally this chapter ends with a brief conclusion about the activities done from start to the end of the project.

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Appendix A – Initial Research Schedule and Subsequent Alterations

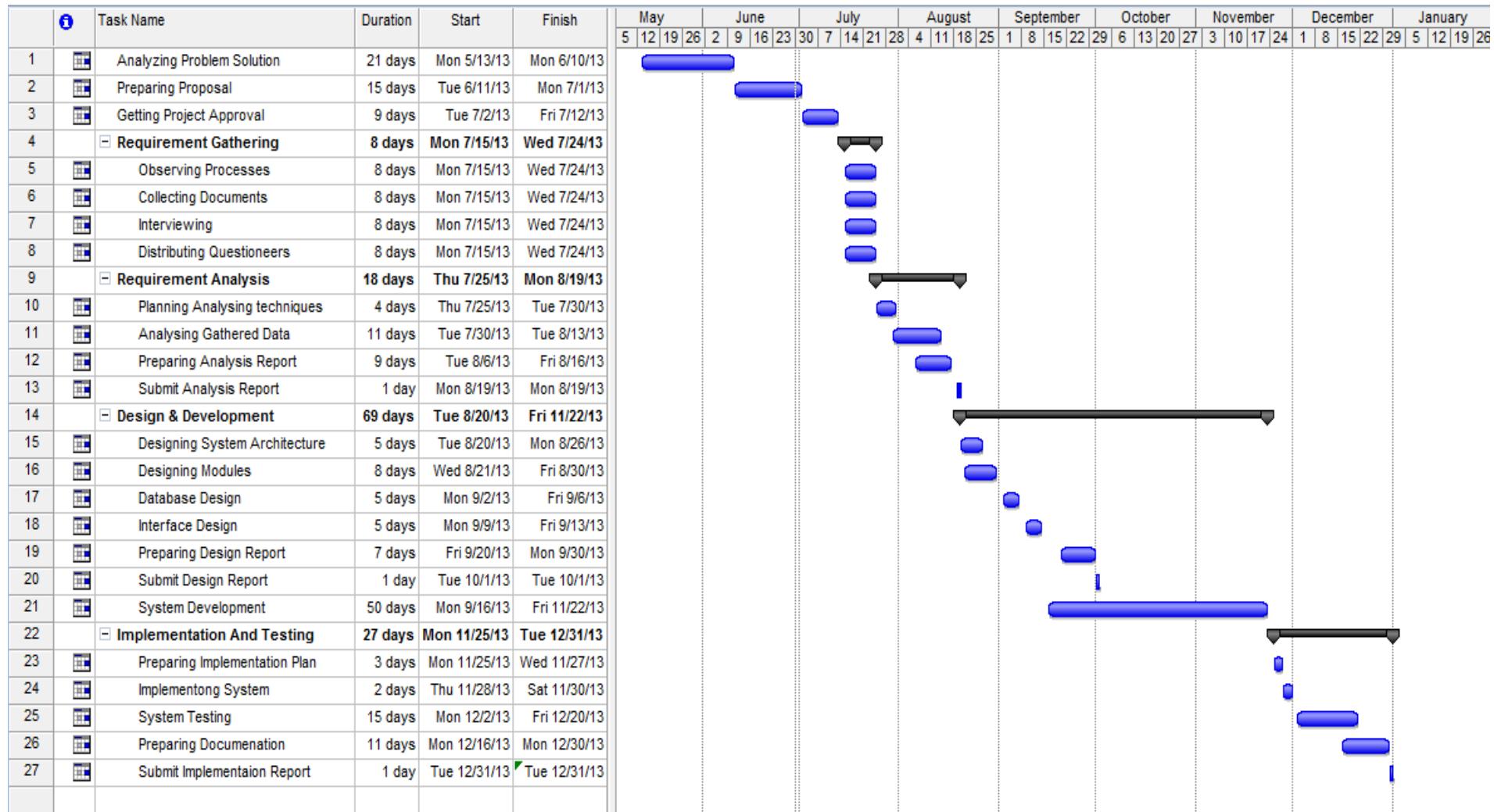


Figure 1.0 Project Time Plan

Source: Author

Milestone	Time Span		Causes for alteration and the nature of alteration
Introducing the problem and discerning its outline	Planned Start Date	5-13-2013	This is identified as one of great important milestone because it laid the basic groundwork for the entire project. Since considerable part of this milestone distributed with details found in project proposal, was completed in this phase within first five days. Further this chapter was enhanced by following the instruction of the supervisor.
	Planned End Date	7-12-2013	
	Actual Start Date	5-14-2013	
	Actual End Date	7-8-2013	
Requirement Gathering	Planned Start Date	7-15-2013	As the preceding milestone was reached in due time, this phase could be started with time to spare. With using specific requirement gathering methods, the requirement gathering is almost completed within the planed time period.
	Planned End Date	7-24-2013	
	Actual Start Date	7-15-2013	
	Actual End Date	7-23-2013	
Requirement Analysis	Planned Start Date	7-25-2013	Because the earlier phase was completed ahead of time, this phase was started around week early than the originally scheduled date. The analysis of raw data, presentation of data in graphical forms and subsequent identification of trends and patterns demanded a considerable amount of time and energy.
	Planned End Date	8-19-2013	
	Actual Start Date	7-26-2013	
	Actual End Date	8-16-2013	Several doubts as to where the generalizations ought to be included in the research report resulted in some delays during the documentation phase. With the time buffer allowed by the early completion of preceding chapters, this phase too was completed ahead of time.
Design and Development	Planned Start Date	8-20-2013	Design and development of the system is started as immediately after the requirement analysis completed. Therefore preparing several designs according to the gathered requirements within the planed time period is not difficult.
	Planned End Date	11-22-2013	
	Actual Start Date	8-23-2013	
	Actual End Date	11-21-2013	
Implementation and testing	Planned Start Date	11-25-2013	As with earlier chapters a considerable time buffer was available for this chapter. It took some time to complete the final report as several alterations were made to the document following the feedback received. As with previous chapters
	Planned End Date	12-31-2013	
	Actual Start Date	11-26-2013	

Start Date	the chapter was completed well in advance of the planned deadline.
Actual Date	12-31-2013
End Date	

Table 1.0 Actual Time Plan

Source: Author

Appendix B – Data Collection Strategies: Deviations and Circumnavigation

However much thoroughly the initial plans are made, in this research the actual implementation will results in deviations from the original plan as necessitated by circumstances. Hence, in this research too, in several instances research had to amend its course from the original design due to the influence of inevitable circumstances. The instances of such deviations and how the researcher circumnavigated those seemingly daunting Obstacles are explained in following table.

Stage	Instances of deviation	How they were circumnavigated
Literature Review	Difficulty in accessing some literature sources due to their sensitive nature as necessitated by limitations imposed by authorities.	Although occurred rarely due to the particular permission taken early in the research whenever such restrictions were applied researcher took measures to take explicit authorization from the authorities.
	Unavailability of updated data in some subject.	Made apply of existing most recent data.
	To access some online sources needed to be purchased.	Researcher, depending on the importance of the sources, purchased those.
Data Collection: Questionnaire	Inadequacy of some section to yield the required amount of information	Maintain refinement of questionnaire to confirm that all necessary details were gathered.
	Changes in the schedule of questionnaire distribution.	Flexibility from the part of researcher in distributing questionnaires in terms of conducting numerous sessions where necessary.
Data Collection: Interviews	Excited schedule of participants making it difficult to have longer interview sessions.	Conducting sessions in several parts and changing modes.
	Unwillingness on the part of external interested parties to comment on the process.	Convincing them of the confidentiality of the data and educating them of the ends of the research.

Table 2.0 Data Collection Strategies: Deviations and Circumnavigation

Source: Author

Appendix C – Samples Data Collection Formats

C.1 Sample Questionnaire Paper

Sample No: _____

This questionnaire is prepared for the purpose of data collection for the development of a Task Management System for Kotellawala Defence University in order to overcome the problems arises in the manual task handling system. The confidentiality of the given responses and the anonymity of the respondents will be safeguarded and gathered information will not be misused in any manner.

Instructions for completing the questionnaire

The respondent should be an employee of the Sir John Kotellawala Defence University.

- The questionnaire consists of four sections: General Questions, Existing Process, New Computerized System, Comments and Expectations.
- Please put a tick mark in the corresponding checkbox when multiple alternate answers are given.
- In answering open ended questions write brief answers according to best of your knowledge.
- The respondents are at liberty to opt-out from answering any of the questions included in the questionnaire.

Section 1: General Questions

Please put a check mark (/) in the box corresponding with the appropriate response where necessary.

1. Name (optional) _____

2. Gender

Male

Female

3. Age

Below 20 years
31-40 years old
Above 50 years

21-30 years old
41-50 years old

4. Highest educational qualification

Secondary level
Bachelor Degree
Doctorate

Diploma
Master
Others _____

5. Years of experience in the Kotelawala Defence University.

Less than 1 year
1 - 3 years
3-5 years

5-8 years
More than 8 years

6. What is your current designation _____

7. Are you IT literate?

Yes

No

8. Are you familiar with web based applications?

Yes

No

In answering questions in Section II, III and IV, please follow the ratings system given below where appropriate. Each number represent a level of preference and depending on your response choose a number as a response to each question.

a= Strongly Disagree (SD)

d= Agree (S)

b= Disagree (D)

e= Strongly Agree (SA)

c= Neutral (N)

Section 2: Existing System

This section consist a set of questions about the current existing manual task management procedure.

Block A: Protocol used to track the task details.

1. Who are the main officials you are assigning tasks to?

2. What is the method you are using for keeping records of tasks you assigned? If there is other methods please write



Organizer
Memorize



Computerize
Other

3. How do you keep track the dead lines of the tasks that have assigned to you and assigned by you?

Please encircle the the most appropriate response in the following questions/statements.

4. Ability to perform your task proficiently with the existing manual system is in a satisfactory level.

a	SD	b	D	C	N	d	A	e	SA
---	----	---	---	---	---	---	---	---	----

5. Has the university established an efficient manual Task Management procedure?

a	SD	b	D	C	N	d	A	e	SA
---	----	---	---	---	---	---	---	---	----

6. Are the assigned tasks carried out smoothly and flawlessly with timely updates?

a	SD	b	D	C	N	d	A	e	SA
---	----	---	---	---	---	---	---	---	----

Block B: Inconvenience with the current manual system.

7. Are you satisfied with the existing Task Management procedure?

Yes Neutral No

8. What are the inconveniences you face in the existing procedure?

Please encircle the the most appropriate response in the following questions/statements.

9. It is easy to track down the progress of a task in the manual process

a	SD	b	D	C	N	d	A	e	SA
---	----	---	---	---	---	---	---	---	----

10. Are you satisfied with the procedure to make a final assessment in a completed task?

a	SD	b	D	C	N	d	A	e	SA
---	----	---	---	---	---	---	---	---	----

11. Do you believe that there is need for an automated Task Management system?

a	SD	b	D	C	N	d	A	e	SA
---	----	---	---	---	---	---	---	---	----

Section 3: New Computerized System

This section consist a set of questions regarding to the developing computerized Task Management System

12. Have you ever used any automated system in your career?

Yes No

13. What is the Operating system environment which you are compatible with your work?

Windows XP Windows Vista Windows 7
 Windows 8 Other _____

14. What are the browsers you are using to access the internet?

<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Chrome Internet explorer Opera	<input type="checkbox"/> <input type="checkbox"/>	Firefox Safari
		Other	_____

15. How often do you check your e-mail?

Once a week Everyday Not Certain

16. Do you use computer in your daily work routine.

<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Always Often Sometimes	<input type="checkbox"/> <input type="checkbox"/>	Rarely Never
--	------------------------------	--	-----------------

17. Are you familiar with the application Microsoft Project?

Yes No

18. Do you prefer an automated system instead of manual task management process? If no briefly state the reason.

Yes Neutral No

19. Do you access web via a mobile phone?

<input type="checkbox"/>	Always	<input type="checkbox"/>	Rarely
<input type="checkbox"/>	Often	<input type="checkbox"/>	Never
<input type="checkbox"/>	Sometimes		

Please encircle the the most appropriate response in the following questions/statements.

20. Do you think a computerized Task Management System will add value to your department?

a SD b D C N d A e SA

21. A computerized Task Management System reduces the complexity in the manual system.

a SD b D C N d A e SA

22. A computerized Task Management System will increase the communication among employees in the KDU.

a SD b D c N d A e SA

23. It will be good for the KDU if the Task Management System is a web based system.

a SD b D c N d A e SA

Section 4: Comments and Expectations

This section consist a set of open ended questions which are intend understand your views and expectations with regard to the computerized Task Management System.

24. Briefly state how you are keeping track of the task assigned to you and assigned by you to other officials.

25. In your opinion what aspects of the existing task managing procedure need to be improved?

26. Will you be willing to adopt the proposed computerized Task Management System if it brings efficiency to the current procedure? Please take the reasons for your answer.

27. Anything else you want to say...

~Thank you for your cooperation~

C.2- Sample Interview Questionnaire

(A) Interview questions for the Head of the Departments

1. What is your assessment of the existing task allocating procedure?
2. In your view what are the drawbacks of the existing system?
3. Do you believe that the extant system needs to be innovated with a new technology?
4. What do you expect from a computer based task management?
5. What are the obstacles that hold back the adoption of an automated computer based solution and how do you think the corporation overcome these obstacles? extant

(B) Interview questions for Faculty Deans

1. How do you usually handle a Task?
2. In your view what aspects of the current system that cause inconveniences to you?
3. Do you think these aspects need immediate attention and how do you think the organization should tackle these aspects?
4. What do you expect from a computer based task management system?
5. What are the obstacles that hinder the adoption of a computer based solution and how do you think the company surmount these obstacles?
6. Do you support the transition from the existing procedure to a computer based task management system?

(C) Interview questions for CO Admin

1. How do you usually handle a Task?
2. What are the principals and parameters you use in making an assessment?
3. What are the weaknesses that you witness within the existing system?
4. What do you expect from a computer based task management system?
5. Do you support the transition from the extant procedure to a computer based task management system?

(D) Interview questions for Registrar

1. How long have you been in KDU?
2. Are you satisfied with the existing procedure?
3. What are the inconveniences you encountered due to the task management system?
4. What aspects of the task settlement procedure caused you the most tiring of difficulties?
5. Do you think the existing task management procedure need to be enhanced so that it is worth the premium?
6. Do you have any suggestions regarding to a computerized task management system?

C.3 - Some Interview Question Responses & an Answered Questionnaire

Interview Questions Responses

1. How do you usually handle a Task?

"I assign the task to the officials who should be assigned the task under the direction given from the high levels of KDU hierarchy either by sending a letter or conducting a personal meeting. Then I simply take it down as a note in my organizer noting the person and the deadline of the assigned task. That's it. "

2. In your view what are the drawbacks of the existing system?

"In my point of view the main disadvantage of current procedure is that after assigning a task until the deadline, it's very hard to keep track of particular assigned task. Moreover, there is an issue with the communication between myself and the person who I assigned the task within the task duration. These are the main disadvantages of current procedure as I see with the experience I've got. "

3. Do you believe that the extant system needs to be innovated with a new technology?

"In current world everything is innovated with a new technology for the betterment of human being to do their works in easy manner, in that case in general I agree with that the current system should be innovated with a new technology. I suggest that if we move with the new technology, it will be helpful to overcome above I mentioned issues. "

4. What do you expect from a computer based task management?

"I think that is a good idea converting current task management system into computer based system. As we all, use computers in our day today life, it will be easy for us if it is a computer based one. As I said earlier it is hard to keep track of the tasks after a task is assigned. I would like, if computer based system is able to keep us updated about the

progress of the task within the task period as well as it is better if there is a method to communicate each other within the system. Basically those are the functions that I expect from a computer based task management system.”

Appendix D -Test Log

Test Case: Testing and validating login window.

Description: Test user login is only allowed for valid username and password. User login should identify the user's privileges, username and the password. Only the users whose user accounts are built by the administrators only get the user home window.

Test Data:

1. Try to enter to the system without login.

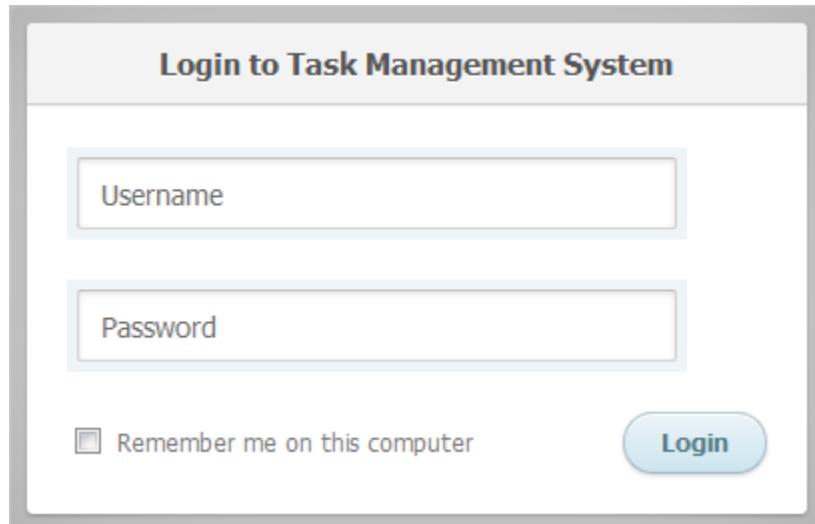


Figure 2.0: Interface Login Window

Source: Author

TestResult: Successfully received the expected error message with login window.

2. Enter invalid username or password.

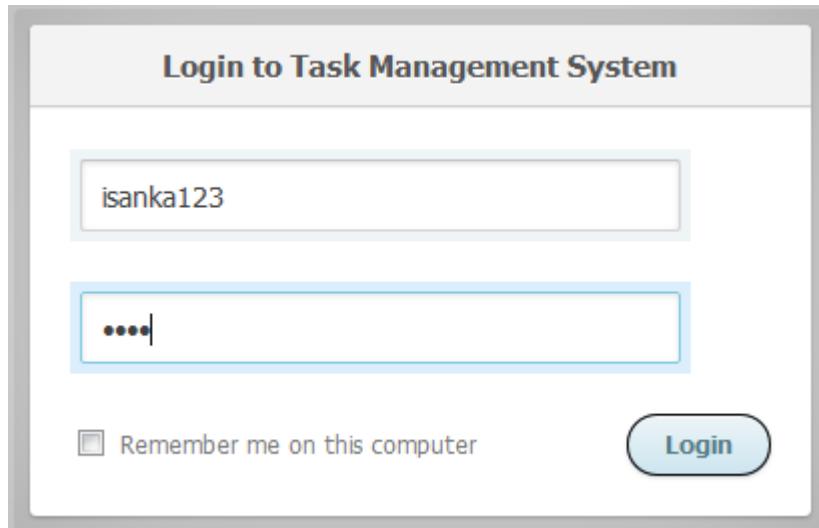


Figure 3.0: Interface of Entering Invalid Username and Password in Login Window

Source: Author

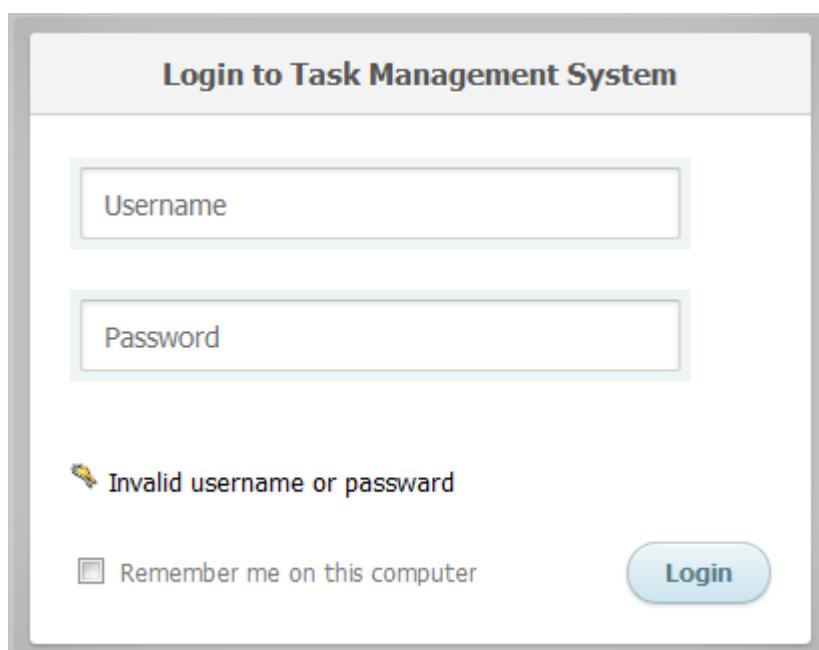


Figure 4.0: Interface of Invalid Username or Password Login Window

Source: Author

TestResult: Successfully received the expected error message with the login window.

3. Enter correct username and password.

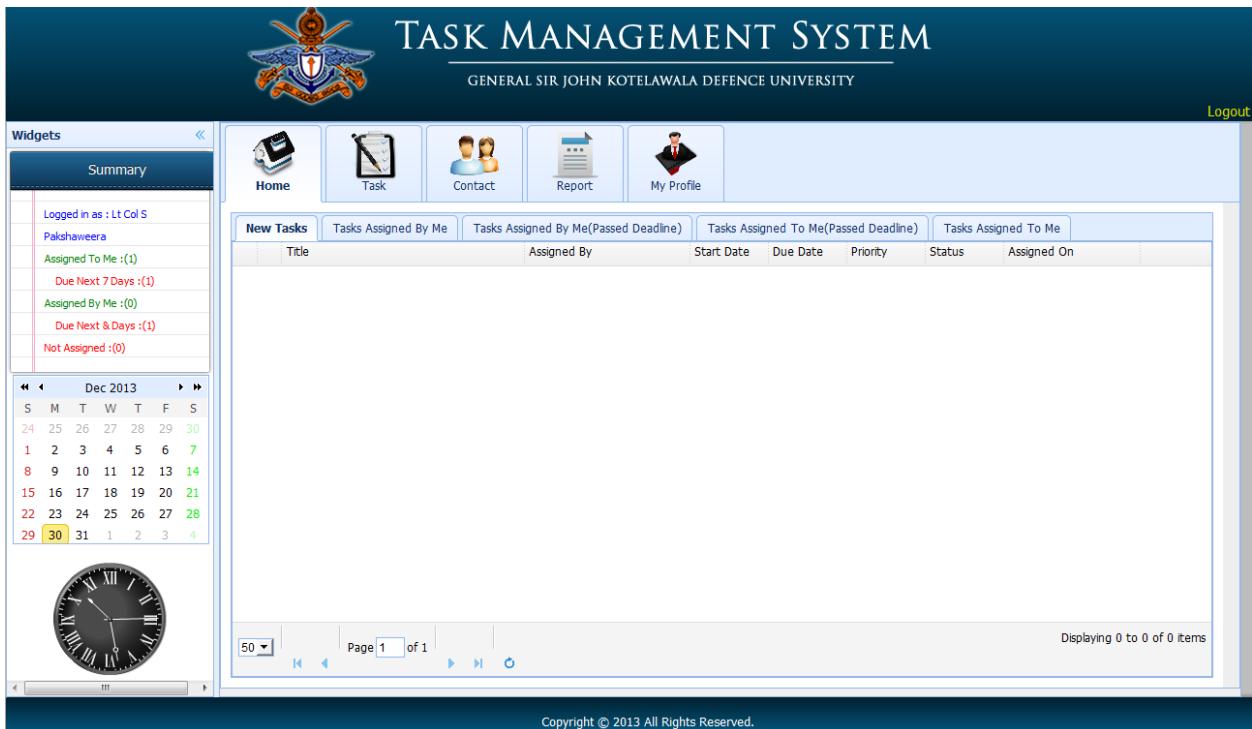


Figure 5.0: Interface User Home Window

Source: Author

TestResult: User logged in successfully. Logged user's name displayed left corner summary notepad.

TestCase: Testing user home interface.

Description: The summary of the whole tasks should be updated and the different status and the different priorities should be shown with different colours. The tasks created by particular employee can be forwarded to other employees. After completing the assigned task user should be able to inform that the assigned task is completed by sending an email.

Test Data:

1. Test whether the tasks and the summary of the tasks are updated correctly.

The screenshot displays the 'TASK MANAGEMENT SYSTEM' interface for 'GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY'. At the top, there is a logo and a 'Logout' link. Below the header, a navigation bar includes icons for Home, Task, Contact, Report, and My Profile. A 'Widgets' section on the left shows task summaries: 'Assigned To Me : (1)', 'Due Next 7 Days : (3)', 'Assigned By Me : (0)', and 'Not Assigned : (3)'. It also features a calendar for December 2013 and a clock. The main content area contains a table titled 'Tasks Assigned By Me' with the following data:

Title	Assigned To	Start Date	Due Date	Priority	Status	Assigned On
1 Exam	Mr WMIL Wasalage	2013-12-13	2014-01-13	High	Inprogress	2013-12-30 09:26:27
2 Sport Meet	Mr WMIL Wasalage	2014-01-01	2014-01-15	Medium	Closed	2013-12-30 09:00:22
3 Sport Meet	Lt Col S Pakshaweera	2014-01-01	2014-01-15	Medium	Closed	2013-12-30 09:00:11

At the bottom, there is a footer with a page number and a copyright notice.

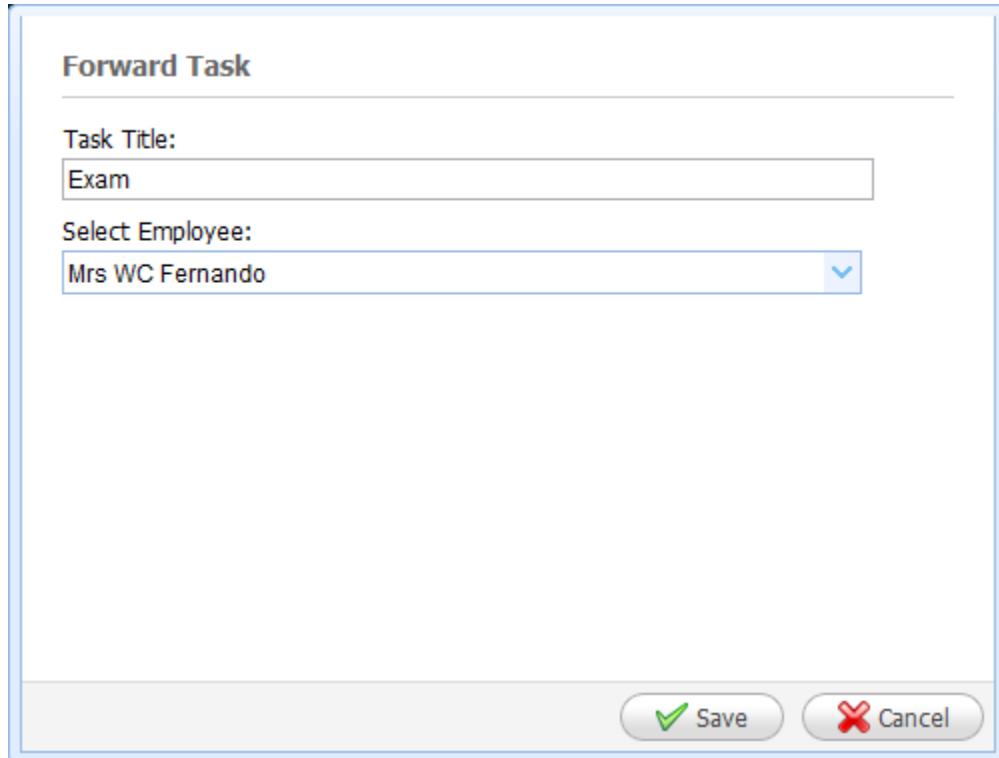
Figure 6.0: Interface of User Home Window

Source: Author

Test result: The task summary has been successfully updated.

Test Data:

2. Check whether the task are forwarded correctly.



The image shows a 'Forward Task' dialog box. At the top, it says 'Forward Task'. Below that, there is a 'Task Title:' label followed by a text input field containing the text 'Exam'. Underneath that is a 'Select Employee:' label followed by a dropdown menu showing the option 'Mrs WC Fernando'. At the bottom right of the dialog box are two buttons: a green 'Save' button with a checkmark icon and a red 'Cancel' button with a cross icon.

Figure 7.0: Form of Forwarding Task.

Source: Author

Testresult: The task has been successfully forwarded to the employee.

Test Data:

3. Test whether the informing the completion of the task correctly functioned and an email successfully sent.

The screenshot shows a 'Task Progress' window with the following fields:

- Task Title:** Admin
- Assigned By:** Mr WL Alwis
- Message:** The task is successfully completed.

At the bottom right are two buttons: **Send** (with a green checkmark icon) and **Cancel** (with a red X icon).

Figure 8.0: Form of Forwarding Task

Source: Author

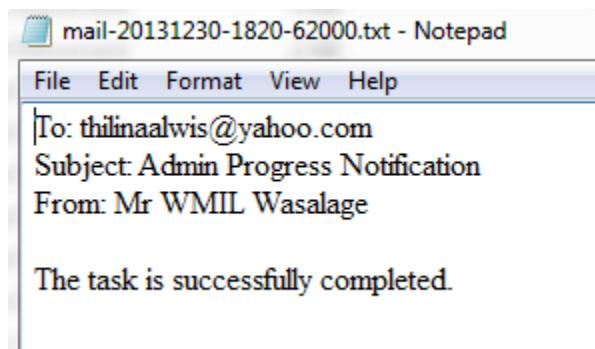


Figure 9.0: Interface of local host Text Email

Source: Author

TestResult: The email has been successfully sent confirming the task is completed successfully completed.

TestCase: Testing Task interface.

Description: logged user should be able to see the tasks that particular user has been created. User should be able to create a new task, edit and remove the tasks and also user should be able to assign any task created by that particular user.

Test Data:

1. Test whether the user is able to create a new task.

The screenshot shows a 'Task Details' form window. At the top, it says 'Task Details'. Below that, there are several input fields: 'Title' with the value 'Report Submission', 'Desc' with the value 'Project reports should submit within next month.', 'Start Date' set to '2013-12-30', 'Due Date' set to '2014-01-22', 'Priority' set to 'Low', and 'Status' set to 'Inprogress'. At the bottom right, there are two buttons: a green 'Save' button with a checkmark icon and a red 'Cancel' button with a cross icon.

Figure 10.0: Form of Creating Task

Source: Author

+ New Task ← Assign Task Edit Task Remove Task						
	Title	Start Date	Due Date	Priority	Status	Created On
1	= Report Submission	2013-12-30	2014-01-22	Low	Inprogress	2013-12-30 12:45:43
Description: Project reports should submit within next month.						
2	+ Check	2013-12-29	2014-01-23	Low	Closed	2013-12-29 22:05:47
3	+ Check	2013-12-29	2014-01-22	Low	Pending	2013-12-29 22:02:59
4	+ Exam	2013-12-13	2014-01-13	High	Inprogress	2013-12-29 18:43:03
5	+ Sport Meet	2014-01-01	2014-01-15	Medium	Closed	2013-12-29 18:32:44

10 Page 1 of 1
◀
▶
◀
▶
○
 Displaying 1 to 5 of 5 items

Figure 11.0: Interface of Task Data Grid

Source: Author

Testresult: The task has been successfully created and saved to the database.

2. Check whether the created task can be assigned.

Assign Task

Select Task:

Select Employee:

✓ Save
✗ Cancel

Figure 12.0: Form of Task Assigning

Source: Author

Testresult: The task has been successfully assigned to the user.

TestCase: Testing Contact interface.

Description: logged user should be able to see the contact list that particular user has been created. User should be able to create new contacts, edit and remove the contacts.

Test Data:

1. Test whether the user is able to create a new task.

The form is titled "Employee Details". It contains the following fields:

Salutation:	Mrs
Initials:	WC
First Name:	Darshani
Middle Name:	Kumari
Last Name:	Fernando
Email:	kumari@kdu.ac.lk
Mobile No1:	718132721
Mobile No2:	718132721
Office:	Department of Ci
Designation:	Head of Departm
Office Tel:	112622995

At the bottom are two buttons: a green checkmark labeled "Save" and a red X labeled "Cancel".

Figure 13.0: Form of Adding Contact

Source: Author

New Employee				
	Name	Office	Designation	Office Tel
1	⊕ Maj Gen MP Peiris	Vice Chancellor Office	Vice Chancellor	112634274
2	⊕ Lt Col S Pakshaweera	Department of IT & Mathem	Head of Department	113090496
3	⊕ Mr WMIL Wasalage	Department of IT & Mathem	Student	0
4	⊕ Brig A L D M Gunasekara	DVC (D)	Deputy Vice Chancellor (D)	112632027
5	⊖ Mrs WC Fernando	Department of Civil Engineering	Head of Department	112622995
Mobile No1: 718132721				
Mobile No2: 718132721				
Email: kumari@kdu.ac.lk				

Figure 14.0: Interface of Contact Details Data Grid

Source: Author

Testresult: The new employee has been successfully added to the contact list.

TestCase: Testing Report interface.

Description: logged user should be able to produce a report on particular employee whom assigned tasks particular time period. Both reports of user assigned and user is assigned should be able to be produced. User should be able to filter the task details by status, priority and also by the time duration.

Test Data: Test whether the report is correctly produced.

Figure 15.0: Interface of Report Window

Source: Author



Task Management System

General Sir John Kotelawala Defence University
Tel: +94-11-2635268
www.kdu.ac.lk

Employee Name: Mr WMIL Wasalage
Duration: Last 1 Month/s
Produced On: 2013-12-30 10:12:38 PM

Title	Description	Priority	Start Date	End Date	Assigned By	Status
Exam	Exam marks.	High	2013-12-13	2014-01-13	Mr WMIL Wasalage	Inprogress
Sport Meet	Time schedule of sport meet.	Medium	2014-01-01	2014-01-15	Mr WMIL Wasalage	Closed
Project	2nd year final project submission.	High	2013-04-23	2014-01-01	Lt Col S Pakshaweera	Inprogress
Intake 31	Students details of new batch.	Medium	2013-12-02	2013-12-31	Maj Gen MP Peiris	Inprogress

Figure 16.0: Interface of Report

Source: Author

Test result: The report is successfully produced as expected.

Test Case: Testing My Profile interface.

Description: User should be able edit the profile details including account password but no username or user type.

Test Data: Test whether the Profile details can be edited.

The screenshot shows a 'Employee Details' form with the following data:

Field	Value
Salutation	Mr
Initials	WMIL
First Name	Ishanka
Middle Name	Lakshan
Last Name	Wasalage
Email	isankalakshan@gmail.com
Mobile No1	716405220
Mobile No2	87674
Office	Administrator
Designation	Administrator
Office Tel	552223547
Username	isankagu
Password	123
User Type	Guser

At the bottom right of the form are two buttons: a green 'Save' button with a checkmark icon and a red 'Cancel' button with a cross icon.

Figure 17.0: Form of Editing Profile Details

Source: Author

Edit Profile							
	Salutation	Initials	First Name	Middle Name	Last Name	Office	Designation
1	= Mr	WMIL	Ishanka	Lakshan	Wasalage	Administrator	Administrator
Email:	isankalakshan@gmail.com						
Mobile No1:	716405220						
Mobile No2:	87674						
Office Tel:	552223547						
Username:	isankagu						
Password:	123						
User Type:	Guser						

Page 1 of 1 | Displaying 1 to 1 of 1 items

Figure 18.0: Interface of My Profile Data Grid

Source: Author

Testresult: The profile details are successfully updated as expected.

TestCase: Testing Admin Home Interface.

Description: When user is login as an administrator, admin should be able to see the count of whole tasks and the count of contacts as well as the count of user accounts with different colours.

Test Data: Test whether the summary is updated.

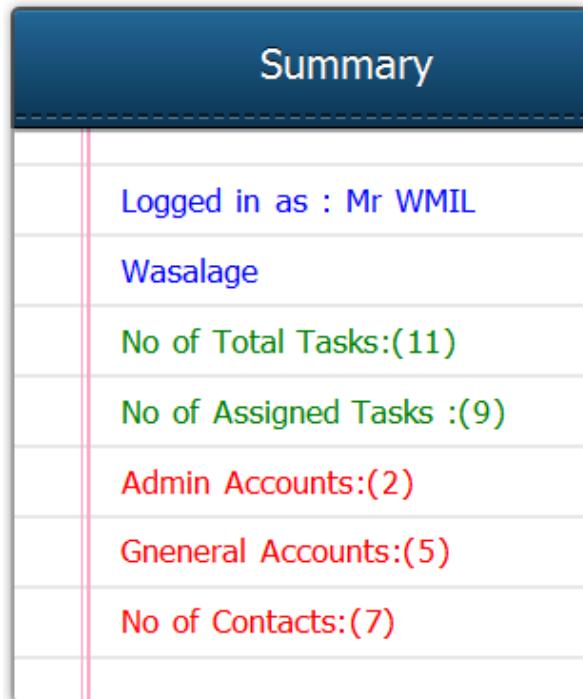


Figure 19.0: Interface of Summary

Source: Author

Testresult: The summary is successfully updated as expected.

TestCase: Testing Admin Contact Manager Interface.

Description: Admin of the system should be able to add new employee details to the system as the general user. Admin should have the ability to edit contact details when the details need to be changed. Admin should also be able to remove any contact details.

Test Data:

1. Test whether the employee details can be edited.

Employee Details

Salutation:	Mr
Initials:	WL
First Name:	Thilina
Middle Name:	Akalanka
Last Name:	Alwis
Email:	thilinaalwis@yahoo.com
Mobile No1:	782708339
Mobile No2:	782708999
Office:	Administrator
Designation:	Administrator
Office Tel:	1324564534

 Save  Cancel

Figure 20.0: Interface of My Profile Data Grid

Source: Author

Employee Details							
	Salutation	Initials	First Name	Middle Name	Last Name	Office	Designation
1	Mr	WMIL	Ishanka	Lakshan	Wasalage	Administrator	Administrator
2	Mr	WL	Thilina	Akalanka	Alwis	Administrator	Administrator
Mobile No1: 782708339 Mobile No2: 782708999 Email: thilinaalwis@yahoo.com Office Tel: 1324564534							
3	Maj Gen	MP	Milinda		Peris	Vice Chancellor Office	Vice Chancellor
4	Lt Col	S	Pinith	Pallyage	Pakshaweera	Department of IT & Mathem	Head of Department
5	Mr	WMIL	Ishanka	Lakshan	Wasalage	Department of IT & Mathem	Student
6	Brig	A L D M			Gunasekara	DVC (D)	Deputy Vice Chancellor (D)
7	Mrs	WC	Darshani	Kumari	Fernando	Department of Civil Engineering	Head of Department

Page 1 of 10 | Previous | Next | First | Last | Refresh

Displaying 1 to 7 of 7 items

Figure 21.0: Interface of Contacts Data Grid

Source: Author

Testresult: The employee details are successfully updated as expected.

2. Test whether the Employee details can be removed.

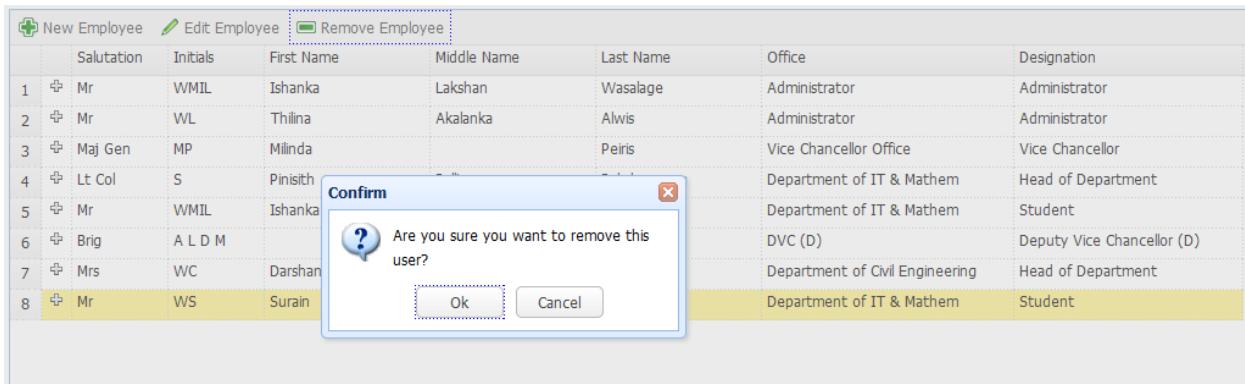


Figure 22.0: Interface of Removing Employee

Source: Author

The screenshot shows a table of employee data with columns: Salutation, Initials, First Name, Middle Name, Last Name, Office, and Designation. The table displays 7 items. At the bottom, there is a navigation bar with page numbers and a message 'Displaying 1 to 7 of 7 items'.

	Salutation	Initials	First Name	Middle Name	Last Name	Office	Designation
1	Mr	WMIL	Ishanka	Lakshan	Wasalage	Administrator	Administrator
2	Mr	WL	Thilina	Akalanka	Alwis	Administrator	Administrator
3	Maj Gen	MP	Milinda		Peiris	Vice Chancellor Office	Vice Chancellor
4	Lt Col	S	Pinisith	Pallyage	Pakshaweera	Department of IT & Mathem	Head of Department
5	Mr	WMIL	Ishanka	Lakshan	Wasalage	Department of IT & Mathem	Student
6	Brig	A L D M			Gunasekara	DVC (D)	Deputy Vice Chancellor (D)
7	Mrs	WC	Darshani	Kumari	Fernando	Department of Civil Engineering	Head of Department

Figure 23.0: Interface of Employee Data Grid

Source: Author

Testresult: The employee record is successfully deleted as expected.

Test Case: Testing Admin User Accounts Interface.

Description: Admin of the system should be able to add new user accounts to the system. Admin should have the ability to edit the user account as well as delete the accounts.

Test Data:

1. Test adding user account to the system.

The screenshot shows a user interface for creating a new user account. The title 'User Account' is at the top. Below it are four input fields: 'Employee Name' (dropdown menu showing 'Mrs WC Fernando'), 'Username' (text input field containing 'kumari12'), 'Password' (text input field containing '123'), and 'User Type' (dropdown menu showing 'General User'). At the bottom right are two buttons: 'Save' (with a green checkmark icon) and 'Cancel' (with a red X icon).

Figure 24.0: Form of Creating User Accounts

Source: Author

	Employee Name	Username	Password	User Type	Created On
1	Brig A L D M Gunasekara	dvcd	dvcd	Guser	2013-12-29 21:46:49
2	Lt Col S Pakshaweera	hod	hod	Guser	2013-12-29 19:53:03
3	Mr WMIL Wasalage	isankaad	123	Admin	2013-12-23 02:33:55
4	Mr WMIL Wasalage	isankagu	123	Guser	2013-12-18 19:12:37
5	Mrs WC Fernando	kumari12	123	Guser	2013-12-31 09:10:28
6	Mr WL Alwis	thilinaad	123	Admin	2013-12-29 19:52:14
7	Maj Gen MP Peris	vc	vc	Guser	2013-12-29 19:52:44

Displaying 1 to 8 of 8 items

Figure 25.0: Data Grid of User Accounts Details

Source: Author

Test result: The new user account is successfully created as expected.

2. Test editing user accounts.

User Account

Employee Name:	<input type="text" value="Mrs WC Fernando"/>
Username:	<input type="text" value="kumari12"/>
Password:	<input type="text" value="456"/>
User Type:	<input type="text" value="General User"/>

Figure 26.0: Form of Editing User Accounts

Source: Author

	Employee Name	Username	Password	User Type	Created On
1	Brig A L D M Gunasekara	dvcld	dvcld	Guser	2013-12-29 21:46:49
2	Lt Col S Pakshaweera	hod	hod	Guser	2013-12-29 19:53:03
3	Mr WMIL Wasalage	isankaad	123	Admin	2013-12-23 02:33:55
4	Mr WMIL Wasalage	isankagu	123	Guser	2013-12-18 19:12:37
5	Mrs WC Fernando	kumari12	456	Guser	2013-12-31 09:26:09
6	Mr WL Alwis	thilinaad	123	Admin	2013-12-29 19:52:14
7	Maj Gen MP Peiris	vc	vc	Guser	2013-12-29 19:52:44

Figure 27.0: Data Grid of User Accounts Details

Source: Author

Testresult: The user account is successfully updated as expected.

3. Test removing user accounts.

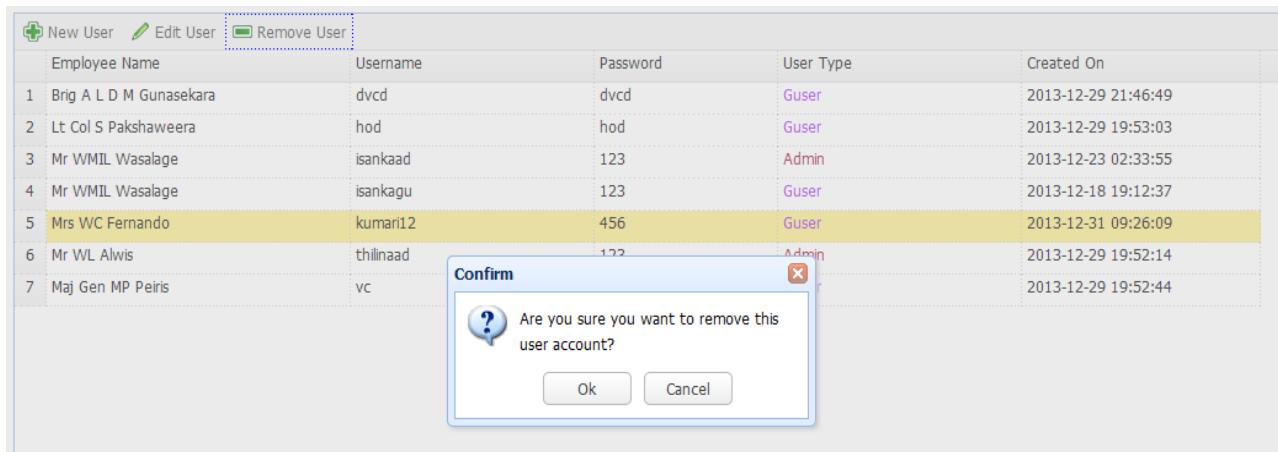


Figure 28.0: Interface of Removing User Accounts.

Source: Author

	Employee Name	Username	Password	User Type	Created On
1	Brig A L D M Gunasekara	dvcld	dvcld	Guser	2013-12-29 21:46:49
2	Lt Col S Pakshaweera	hod	hod	Guser	2013-12-29 19:53:03
3	Mr WMIL Wasalage	isankaad	123	Admin	2013-12-23 02:33:55
4	Mr WMIL Wasalage	isankagu	123	Guser	2013-12-18 19:12:37
5	Mr WL Alwis	thilinaad	123	Admin	2013-12-29 19:52:14
6	Maj Gen MP Peiris	vc	vc	Guser	2013-12-29 19:52:44

Figure 29.0: Data Grid of User Accounts Details

Source: Author

Testresult: The user account has been successfully deleted as expected.

TestCase: Testing Admin Login History Interface.

Description: Admin of the system should be able to see the login history of each user of the system. Employee name, username, employee type and login date and time should be displayed.

Test Data: Test login history table is updating correctly

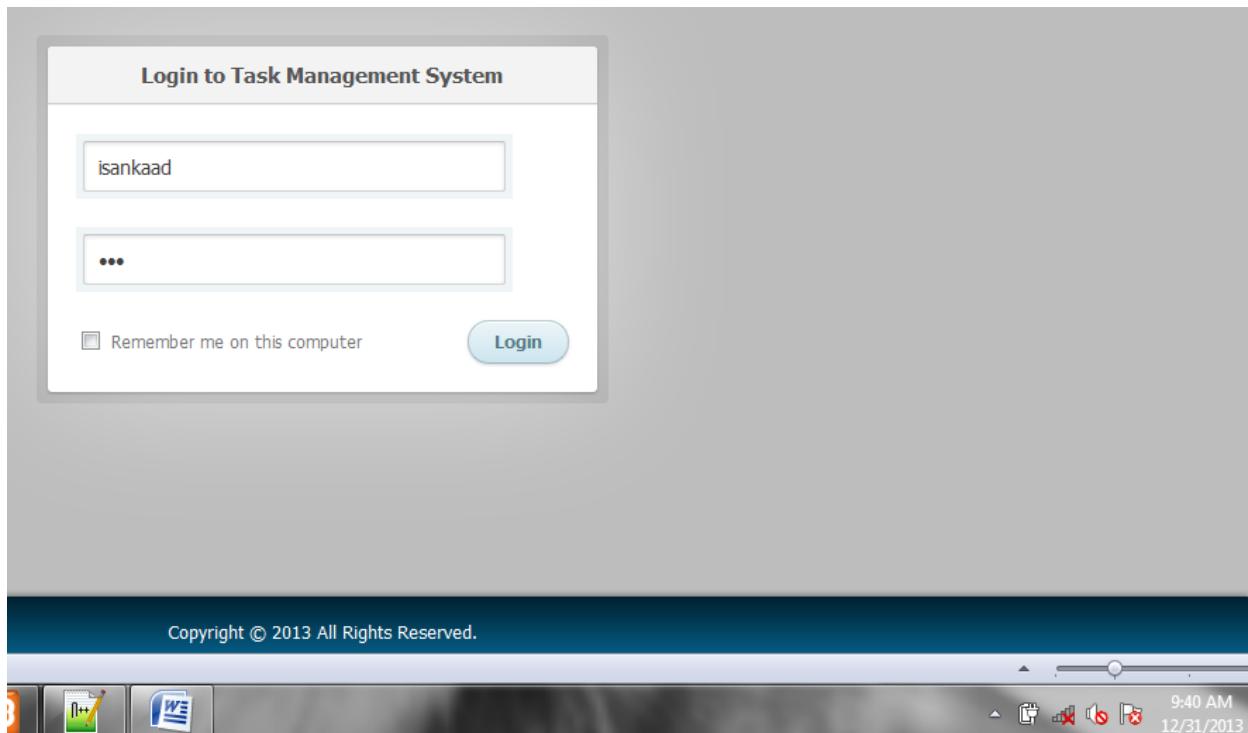


Figure 30.0: Interface of Login Window with System Time and Date

Source: Author

Employee	Username	User type	Login Date & Time
1 Mr WMIL Wasalage	isankaad	Admin	2013-12-31 09:40:25
2 Mr WMIL Wasalage	isankaad	Admin	2013-12-31 08:58:10
3 Mr WMIL Wasalage	isankaad	Admin	2013-12-31 08:35:54
4 Mr WMIL Wasalage	isankaad	Admin	2013-12-31 08:00:15
5 Mr WMIL Wasalage	isankagu	Guser	2013-12-31 07:37:24
6 Mr WMIL Wasalage	isankaad	Admin	2013-12-31 07:31:51
7 Mr WMIL Wasalage	isankagu	Guser	2013-12-31 06:57:11
8 Mr WMIL Wasalage	isankaad	Admin	2013-12-31 06:35:46
9 Lt Col S Pakshaweera	hod	Guser	2013-12-31 06:32:20
10 Mr WMIL Wasalage	isankaad	Admin	2013-12-31 06:30:44

Figure 31.0: Data Grid of Login history Details

Source: Author

Testresult: The login history has been successfully updated as expected.

TestCase: Testing Admin master File Interface.

Description: Admin of the system should be able to add master files to the system. Admin should have the ability to edit the master files as well as delete the files.

Test Data:

1. Test adding a new designation to the system

The screenshot shows a 'Designation' form with the following fields:

- Designation ID: (Input field is grayed out)
- Designation: Registrar (Input field)
- Designation Value: 98 (Input field)

A note at the bottom states: **When adding a new record leave the ID field empty.

At the bottom right are 'Save' and 'Cancel' buttons.

Figure 32.0: Form of Adding New Designation

Source: Author

Designation Details		
Designation ID	Designation	Designation value
1 10	Administrator	120
2 6	Dean	95
3 4	Deputy Vice Chancellor (A)	99
4 5	Deputy Vice Chancellor (D)	99
5 7	Head of Department	90
6 9	Lecturer	70
7 11	Registrar	98
8 8	Senior Lecturer	80
9 1	Student	50
10 2	Vice Chancellor	100

Figure 33.0: Data Grid of Designation Details

Source: Author

Test result: The new designation has been successfully added as expected.

2. Test editing designation details.

Designation

Designation ID: 11

Designation: Registrar

Designation Value: 97

**When adding a new record leave the ID field empty.

Save Cancel

Figure 34.0: Form of Editing Designation Details

Source: Author

	New Designation	Edit Designation	Remove Designation
	Designation ID	Designation	Designation value
1	10	Administrator	120
2	6	Dean	95
3	4	Deputy Vice Chancellor (A)	99
4	5	Deputy Vice Chancellor (D)	99
5	7	Head of Department	90
6	9	Lecturer	70
7	11	Registrar	97
8	8	Senior Lecturer	80
9	1	Student	50
10	2	Vice Chancellor	100

Figure 35.0: Data Grid of Designation Details

Source: Author

Test result: Designation details have been successfully updated as expected.

3. Test removing designation from the system.

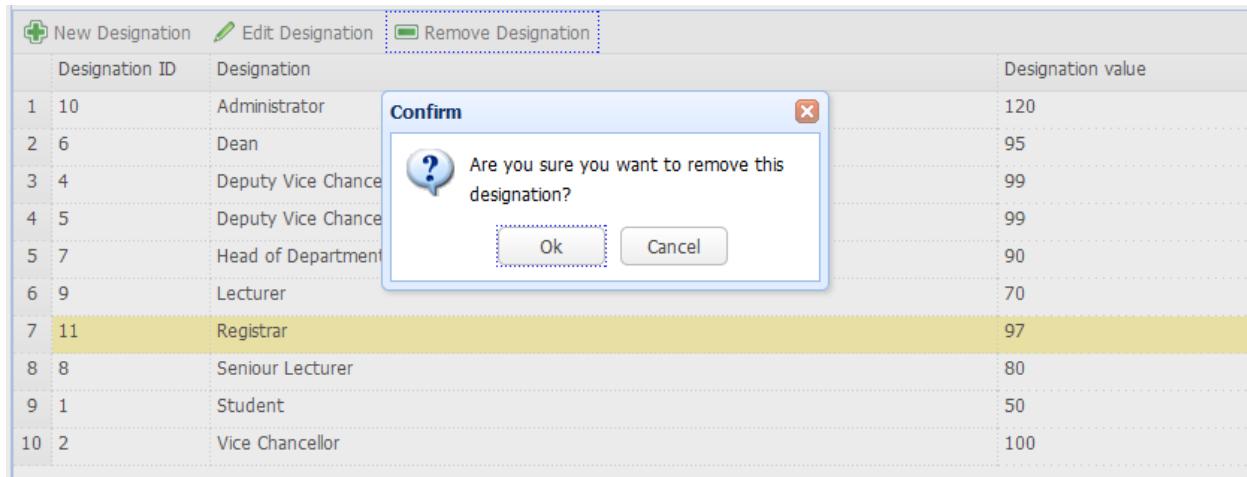


Figure 36.0: interface of Removing Designation

Source: Author

Designation	Office	Priority	Status	Salutation
New Designation	Edit Designation	Remove Designation		
Designation ID	Designation			Designation value
1 10	Administrator			120
2 6	Dean			95
3 4	Deputy Vice Chancellor (A)			99
4 5	Deputy Vice Chancellor (D)			99
5 7	Head of Department			90
6 9	Lecturer			70
7 8	Senior Lecturer			80
8 1	Student			50
9 2	Vice Chancellor			100

Figure 37.0: Data Grid of Designation Details

Source: Author

Test result: Designation details have been successfully removed as expected.

Same as the designation all the master files office, priority, status and salutation have been successfully tested. Adding, Editing and Removing of all master files are successfully functioned.

Appendix E-Installation Guide

1. Install server 2008

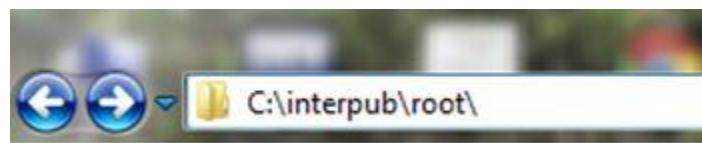


2. Install iis 7(latest version) on windows server 2008.

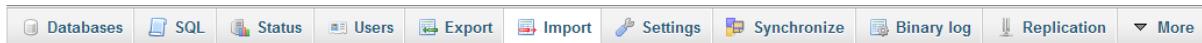


3. Install php to iis using online installer.

4. Copy web application files to inerpub ->wwwroot directory.



5. Import database to server.



Importing into the current server

File to Import:

File may be compressed (gzip, zip) or uncompressed.
A compressed file's name must end in **[format].[compression]**. Example: **.sql.zip**

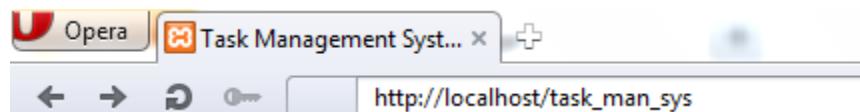
Browse your computer: No file chosen (Max: 2,048KiB)

Character set of the file:

6. Edit the connect.Php file according to server details.

```
<?php  
  
// with your specific database information.  
$host = "localhost";  
$user = "root";  
$pass = "";  
$db = "local";  
$tbl="freeleve";  
// This part sets up the connection to the  
// database (so you don't need to reopen the connection  
// again on the same page).  
$ms = mysql_pconnect($host, $user, $pass);  
if ( !$ms )  
{  
echo "Error connecting to database.\n";  
}  
?>
```

7. from the browser type Task Management System.



8. Submit User Name and Password to check whether the system works properly.



Admin: Username = admin
Password = admin

General User: Username = genuser
Password = genuser

