

**HUMAN RESOURCE MANAGEMENT SYSTEM FOR THE
MINISTRY OF FINANCE AND PLANNING**

By

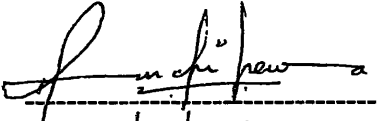
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Dissertation submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science
In
Physical Sciences
Faculty of Applied Sciences
Sabaragamuwa University of Sri Lanka
Buttala
2002

DECLARATION

"I certify that this dissertation dose not incorporate without acknowledgment any material previously submitted for degree or diploma in any university and to the best of my knowledge and belief it dose not contain any material previously published or written or orally communicated by another person except where due reference is made in the text"

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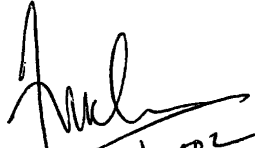


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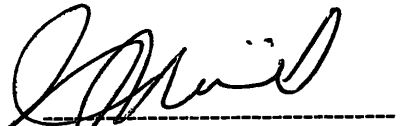
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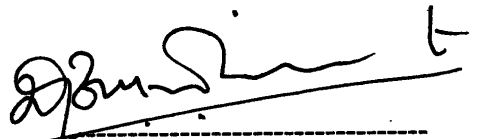
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**AFFECTIONATELY
DEDICATED TO MY
PARENTS AND TEACHERS**

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ABSTRACT

This document is submitted to present the detailed description on the project, which I underwent at the work site of PriceWaterhouseCoopers Lanka (Pvt) Ltd. I was trained under this project as a trainee developer for 6 months in partial fulfillment of the requirements for the degree of Bachelor of Science in Physical Sciences, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka. This project is a team effort and I took part in this project from the designing of the technical specifications. At the time of preparing this document the project was completed only up to the system testing stage. The rest of the stages were documented according to the way it is expected to be completed.

The project objective is to develop a user-friendly Human Resource Management system for the Ministry of Finance and Planning (MoFP) based on the functional specifications given by the MoFP staff. To achieve this objective, Classical Life Cycle/ Waterfall model was used and the below given steps were followed.

- Defining the requirements of the system and get the approval for it from the MoFP. (This step was done by the ADB project staff)
- Designing the technical specifications (ERMs', Table definitions, Table normalization)
- Develop the software
- Test the software and get the acceptance of the MoFP (Unit testing, System Testing, QA testing, Acceptance testing)
- Train the users
- Implement the system
- Post implementation support

This HRM system facilitates the creation and maintenance of all the relevant information related to HRM related information of the Ministry of Finance and planning. This system is developed as a *client server* application in *Visual Basic* with *SQL* server as the database.

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1. Introduction

1.1 PricewaterhouseCoopers Lanka (Pvt) Ltd.

1.1.1 Background

PricewaterhouseCoopers, the largest professional services firm in the world, was created as a result of the merger between the former Price Waterhouse and Coopers & Lybrand, in 1998. Due to some certain regulatory and ownership issues, the firm continues as two distinct units in Sri Lanka – a partnership which is responsible for Audit, Tax, and Financial Advisory Services, and a limited liability company, PricewaterhouseCoopers Lanka (Pvt) Ltd. The latter is responsible for Management Consulting Services (MCS) in Sri Lanka, focusing primarily on Information Technology (IT) Consulting.

The company was created by the former Price Waterhouse in 1995 as it's means of entry to Sri Lanka, with IT as the main focus. At the time, none of the other big firms had a significant IT presence, and PricewaterhouseCoopers Lanka was a pioneer in developing that market in Sri Lanka.

1.1.2 Services

The high comparative cost of IT and the dearth of experienced professionals in Sri Lanka results in greater risks for IT projects, than in the west. Many companies have spent a great deal on the purchase of expensive software and hardware products, but fail to reap the expected benefits due to poor implementation support.

PwCL has built it's own reputation in Sri Lanka by addressing this specific niche. From its inception, the firm aimed to deliver *international level of quality at local costs*. Quality is assured by adopting the methodologies, and practices of the PricewaterhouseCoopers organization world-wide, and by recruiting highly qualified professional staff. Costs are kept low by using the firm's excellent training resources to build on the strengths of the local graduates of high potential rather than relying on international resources for rare skills, wherever possible.

PricewaterhouseCoopers Lanka has built up specialist software development and integration skills, largely motivated by the difficulties encountered in obtaining quality service from local firms. Significant recent achievements of the software division include the design, development and development of a comprehensive, *client-server* application to support the key business processes of a leading local tour company, and a three-tier Internet application developed in *Java* and *DB2*, for the management of a large distributor network for a client in the Fast Moving Consumer Goods sector. Systems for project monitoring and personnel management have also been developed in *Lotus Notes*.

A small but specialised team trained in network technologies has undertaken several recent projects that cover network design, security policies, network management methods and procedures, and implementation of large corporate networks. As part of systems implementation work, the firm has also supplied services to restructure and modernise clients' IT management functions to support the demands of new systems.

The client list consists mainly of the top tier Sri Lankan companies, multi-nationals such as Shell, and various government agencies. This includes several clients engaged in manufacturing (plastics, rubber, apparel), large organisation in the FMCG sector, and the major players in the local energy sector (Shell Gas Lanka, and both local electricity companies). The largest contract at present is an ADB funded project for the Ministry of Finance.

1.1.3 Skills Profile

PwCL has a HR strategy that focused on training and development of staff with good educational qualifications and potential. Most staff has degrees in Science, Engineering or Commerce from both local and western universities, or professional accounting qualifications such as CIMA or ACCA. There are also two consultants with Master Degrees and one with a PhD in IT related disciplines, from UK universities.

The software development division has many staff with over five years experience in project management, system design and analysis, and implementation. Programming skills are maintained in *Visual Basic* and *Java*. Database skills include *DB2*, *SQL* server and *Access*. There is also a small *Lotus Notes* development team with Lotus Certification. The network and systems management team is trained in *WindowsNT* and *Unix* operating systems, and *Cisco* network hardware.

1.2 Project

1.2.1 Project description

Human Resource Management (HRM) system for Ministry of Finance and Planning will be developed based on the functional specification given by the MoFP staff. This project is a sub activity of the ADB funded project of Public Expenditure Management System (PEMS) for the Ministry of Finance and Planning, which targets for an improved public expenditure management by the government of Sri Lanka. PEMS project is delivering 184 staff months of combined international and local input over two and a half years, in collaboration with the US firm's Washington Consulting Practice.

HRM system will be written as a *client server* application in *Visual Basic* with *SQL* server as the database. The architecture was selected in order to support the multiple departments at the Ministry of Finance and Planning.

According to the system specifications the application should support only multiple departments of Ministry of Finance and Planning, but the software will be developed in a more generalized manner in such a way that it supports multiple ministries.

1.2.2 Objectives

The following have been identified as main objective of this project.

1. To provide a **user-friendly** solution to Ministry of Finance and Planning based on their requirements.
2. To develop the application with **minimum resources** with **minimum time frame**.

1.2.3 My Role in the Project

I was with the project since the designing of the technical specifications for the security module and took part in certain decision-makings of the designing stage. In the development stage I had participated in developing unit programs. In the testing stage, I was responsible for testing all the master files and In the system testing, my role was to do the coordination between the ADB project staff and the project team and installing the system at the ADB project office.

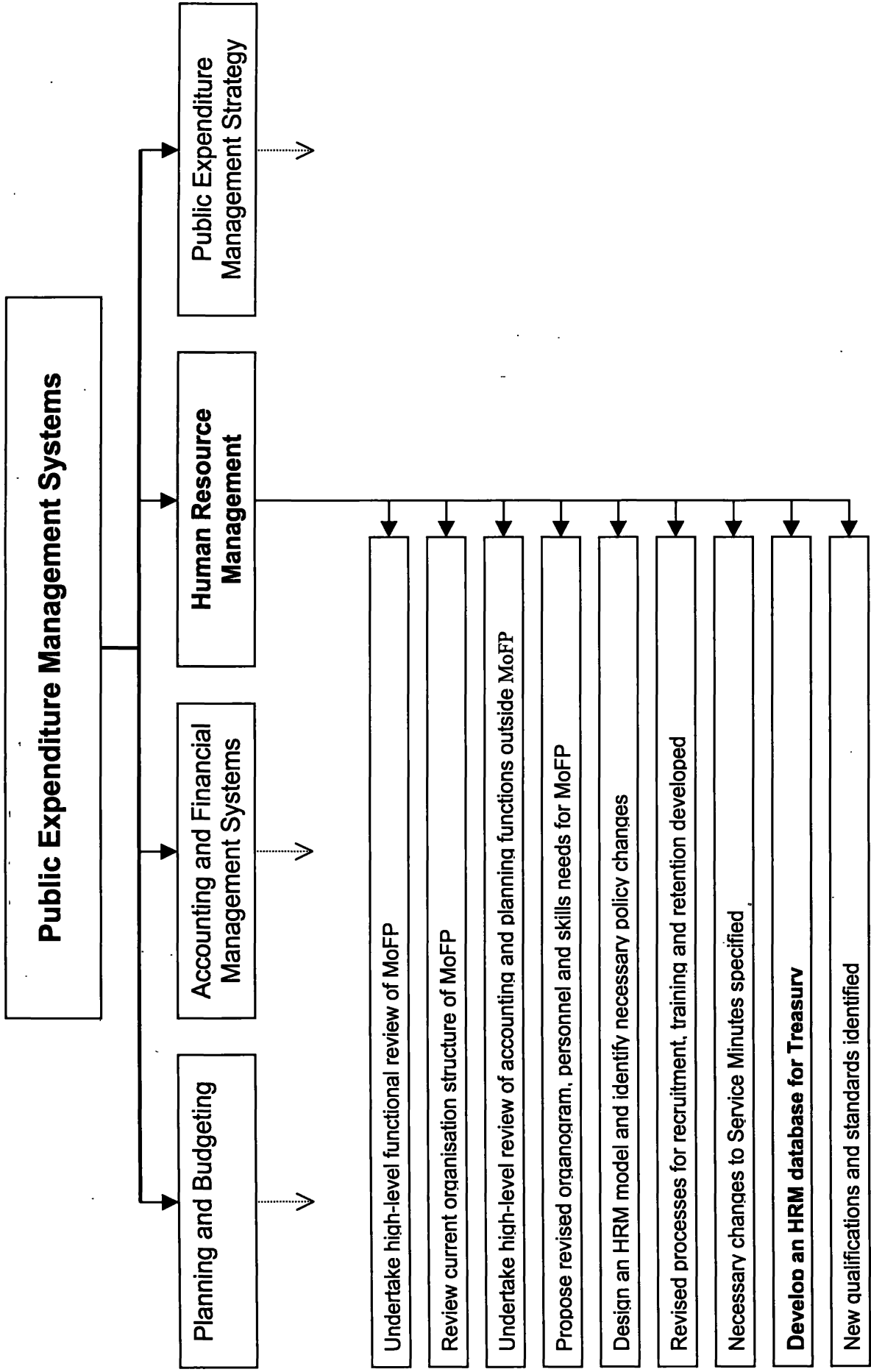


Figure 1.1 Diagram showing the position of the HRM system in the PEMS project (Note: only the relevant data is shown)

2. Theoretical Background

2.1 Development process (Theoretical view)

There are many ways to develop systems, each suit to different kind of problems. Therefore, the methods use for system development may vary from one system to another. According to the development method kind of work practices to be followed is change. Whatever the development method the end product should have certain standards. The *Institute of Electrical Engineers (IEEE)* has proposed a number of standards for this purpose. These guidelines suggest what must be done in the development process and the process steps themselves, through standards.

There are different process models for software engineering. Each represents an attempt to bring order to an inherently chaotic activity. It is important to remember that each of the models has been characterized in a way that assists in the control and coordination of a real software project. Some software process models are give below.

- Linear Sequential Model / Waterfall Model / Classic System life cycle
- Prototyping Model
- Rad Model

2.2 Linear Sequential Model / Waterfall Model / Classic life cycle

The linear or waterfall cycle is a development process that centers around planned work and is best suited for projects where the requirements can be clearly defined. The linear cycle group's development activities into sequence of consecutive phases. Each phase itself is made up of more detailed activities and can only be commenced after the previous phase has been completed. Each phase usually produces one or more models, or products in later phases.

2.3 Stages in a System Life Cycle

When designing a information system using the linear sequential model, there are number of steps to be followed. The number of steps can be changed according to the way that it is categorized. The following diagram shows the stages in a system's life cycle.

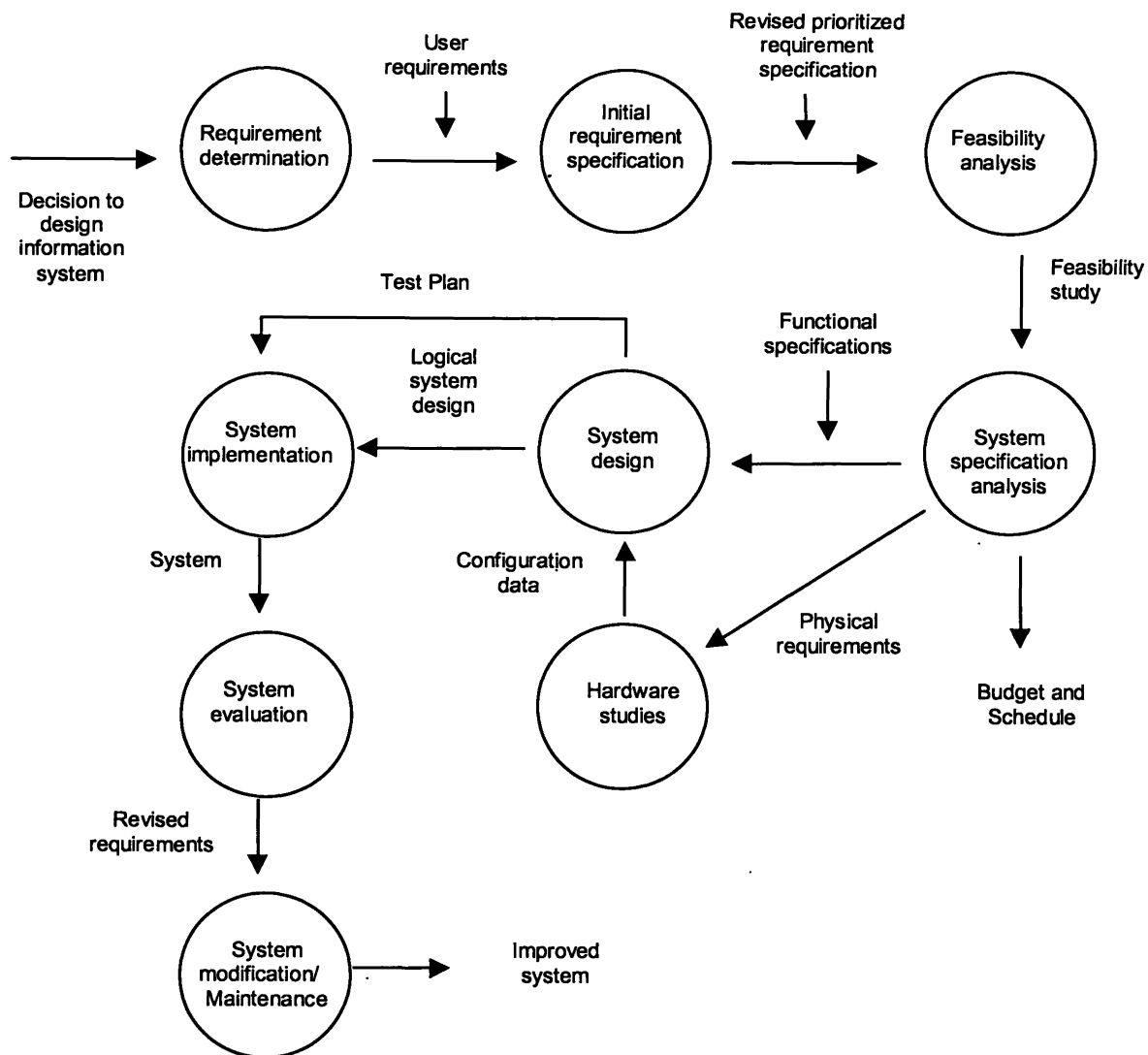


Figure 2.1 Stages in a system's life cycle.

2.3.1 Requirements Determination

An information system is intended to meet the needs of an organization. Thus the first step in the design is to specify these needs or requirements. To determine the requirements to be met by the system is arrived at by a consensus reached among managers in the organization. Meetings of prospective user departments are held and through discussions, priorities among various applications are determined, subject to the constraints of available computer system, manpower, time and budget.

2.3.2 Requirements Specification

During this stage system analyst understands the organization by means of extensive discussions with all levels in the organization hierarchy. Base on this he identifies what

aspects of the operations of the organization need computer based information systems. The analyst discusses with managers and users their functions and determines the areas where a computer base information system can be effective. The applications where a computer can be employed are listed. By consensus among managers and users priorities are assigned to these applications.

It is extremely important to get the users involved right from the initial stages and seriously consider their suggestions. After discussions the analyst finally arrives at the specifications of users' requirements by consensus. This is essential to obtain cooperation in the long run in the development and operation of the system.

2.3.3 Feasibility Analysis

Having drawn up the rough specifications, the next step is to check whether it is feasible to implement the system. A feasibility study takes into account various constraints within which the system should be implemented and operated. The resources needed for implementation such as computing equipment, manpower and cost are estimated, based on the specifications of users' requirements. These estimates are compared with the available resources. A comparison of the cost of the system and the benefits, which will accrue, is also made. This document, known as the feasibility report, is give to the management of the organization.

2.3.4 Final Specifications

The management of the organization studies this feasibility report and suggests modifications in the requirements, if any. Knowing the constrains of the available resources, and the modified requirements specified by the organization, the final specification of the information system to be developed are drawn up by the system analyst. These specifications should be in a form, which can be easily understood by the users. The specification state what the system would achieve. It dose not describe how the system would do it. These specifications are given back to the users who study them, consult their colleagues and offer suggestions to the system analyst for appropriate changes. These changes are incorporated by the system analyst and a new set of specifications are given back to the users. After discussions between the systems analyst and the users the final specifications are drawn up which are approved to implementation. Along with this, criteria for system approval are specified, which will normally include a system test plan.

2.3.5 Hardware Study

Based on the finalized specifications it is necessary to determine the configuration of hardware and support software essential to execute the specified application. This is based on volumes of data to be processed, frequency of reports, whether online enquiry is required, response time for online jobs etc.

2.3.6 System Design

The next step is to develop the logical design of the system. The inputs to the system design phase are functional specification of the system and details about the computer configuration. During this phase the logic of the programs is designed, files or database are designed, and program test plans and an implementation plan are drawn up. The system design should begin with the objectives of the system, namely the information requirement of the users, and use this to find the necessary database.

2.3.7 System Implementation

The next step is implementation of the system. In this phase all the programs are written, database is created, user operational document is written, users are trained and the system is tested with operational data.

2.3.8 System Evaluation

After the system has been in operation for a reasonable period, it is evaluated and a plan for its improvement is drawn up.

2.3.9 System Modification

Modifications will definitely cost time and money, but users expect modifications to be made. Thus an information system which cannot be modified to fulfill the changing requirements of an organization is bad. The strength of a good computer based information system is that it is amendable to change. A good information system designer is one who can foresee what aspects of a system would be changed and would design the system in a flexible way to easily accommodate changes.

3. HRM System for Ministry of Finance and Planning

3.1 Project Plan

3.1.1 System Development Life Cycle

The tasks involved in the development of the HRM System (HRM) are given in the diagram below. It defines the steps involved in the project, the responsibilities of Ministry of Finance and Planning (MoFP) and PwCL, deliverables and approval points during the project life cycle.

Each of the tasks is described in details in the following chapters.

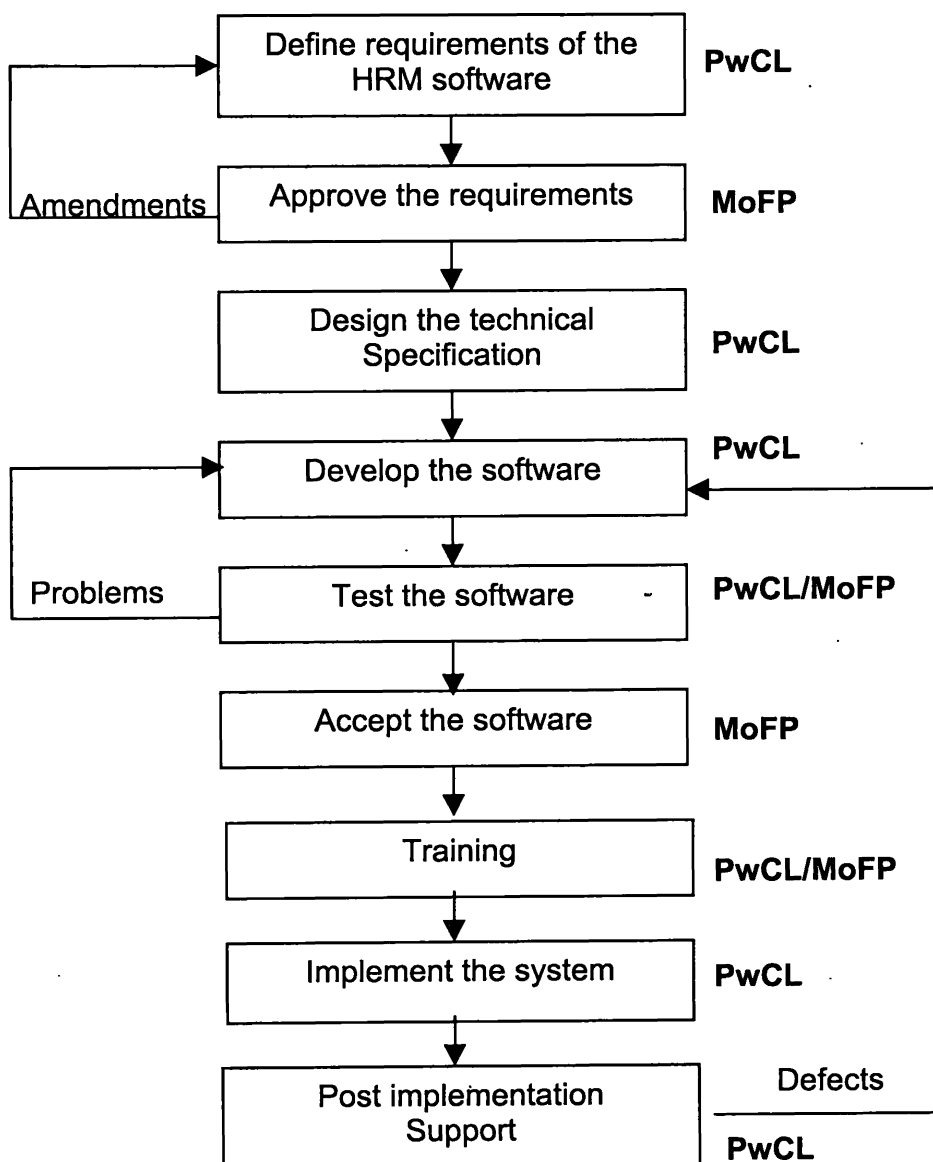


Figure 3.1 HRM system development life cycle

3.1.2 Resource Allocation

The project team consist of the following personals

- Project manager/ System Designer
- Technical Designer
- Senior programmer
- Two trainee programmers
- Crystal Report trainee
- Quality Assurance Team

3.1.3 Time Allocation

Time allocation for each task of the system was estimated in '*Man Days*' which implies the number of days needed for an individual to complete a certain task.

Task	Man Days
Project Planning	8
Functional Design	5
Technical Design	2
Program Design	5
Test Plane creation	5
Database creation	2
Menu Structure creation	2
Develop and unit Test	77
User Documentation	6
Acceptance Test	2
Bug Fixing	6
Final release	1
Training and User Support	24
	145

Table 3.1 Time Estimates for HRM System

3.2 Requirements Specification

3.2.1 Define requirements of the HRM system

The ADB project staff mainly did the task of defining the requirements of the HRM system. The overall requirements were defined through a Workshop carried out with the responsible officials and from work group meetings. Details of specific activities were defined through an interview with users within National Planning Department (NPD).

The requirements have been documented as the 'functional specification document' that was circulated among the responsible officials. This document lists all the functions of the proposed HRM system. All the functional specifications are included in the *Appendix – A* section of this document.

The requirements was formally approved and signed off by MoFP. It is expected that all official who received the functional specifications would formally approved the document.

3.3 Technical Specification

3.3.1 Design technical specifications

Technical specifications define the construction of programs and databases. It will describe the design of the system that will be used by the programmers. It will also help technical personnel to understand the design of the system, which may be required for maintenance or modifications at a later date.

After identifying the functional requirements of the system, it is necessary to develop a *conceptual model*, which specifies the relationships between the data. This is used to group data into a number of tables. The tables are organized to,

- Reduce duplication of data
- Simplify functions like adding, deleting and updating
- Select data which require for processing

The method of organizing or structuring data into tables is known as *Normalization* (In this system tables are in 3rd normal form). The collection of tables is called a *database*. The normalized database is later converted to a physical database. In this project we used the *Entity-Relationship Analysis* to obtain a conceptual model.

The Entity-Relationship model uses three features to describe data.

1. **Entities** which specify distinct real-world items in the application
2. **Relationships** which connect entities and represent meaningful dependencies between them
3. **Attributes** which specify properties of entities and relationships

The technical specifications will consist of following items.

- Entity relationship models of the application.
- Entity relationship models of the security module.
- Description of security tables with attributes
- Description of application tables with attributes
- Security levels

Note that the *attributes* are not shown in the *E-R* Diagrams. Instead they are descriptively included in the Table Definitions.

3.3.2 Technical Specifications

3.3.2.1 Entity Relationship Model – HRM System

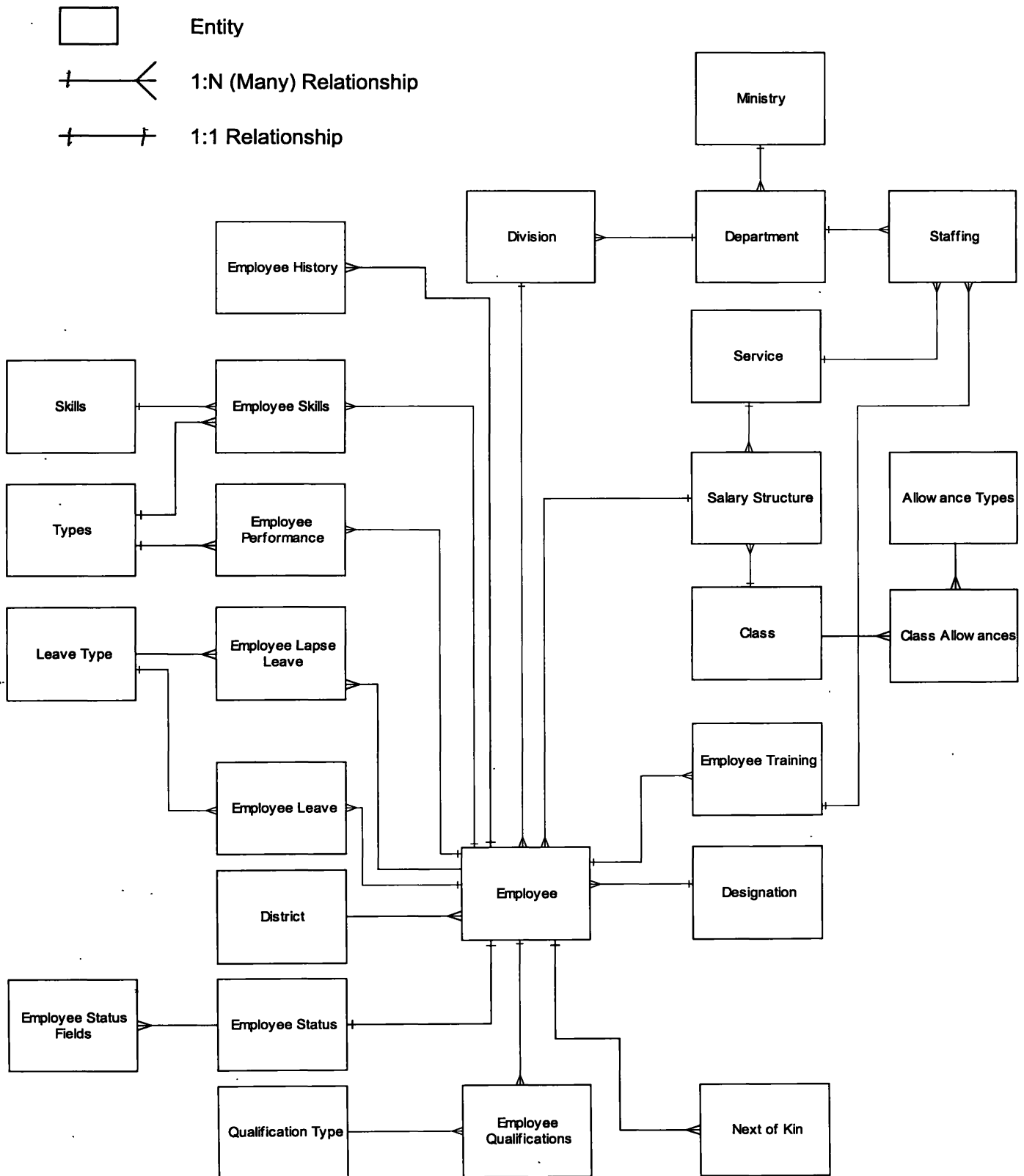


Figure 3.2 E-R diagram of HRM system

Note (Above diagram):

- The Relationships between UserId attribute in Employee, Employee Performance, and Employee Leave Entities with the UserId attribute in User Details Entity is not shown.
- System Parameter Entity, which has no relationship to any of these Entities, is not included.

3.3.2.2 Entity Relationship Model – HRM System Security Module

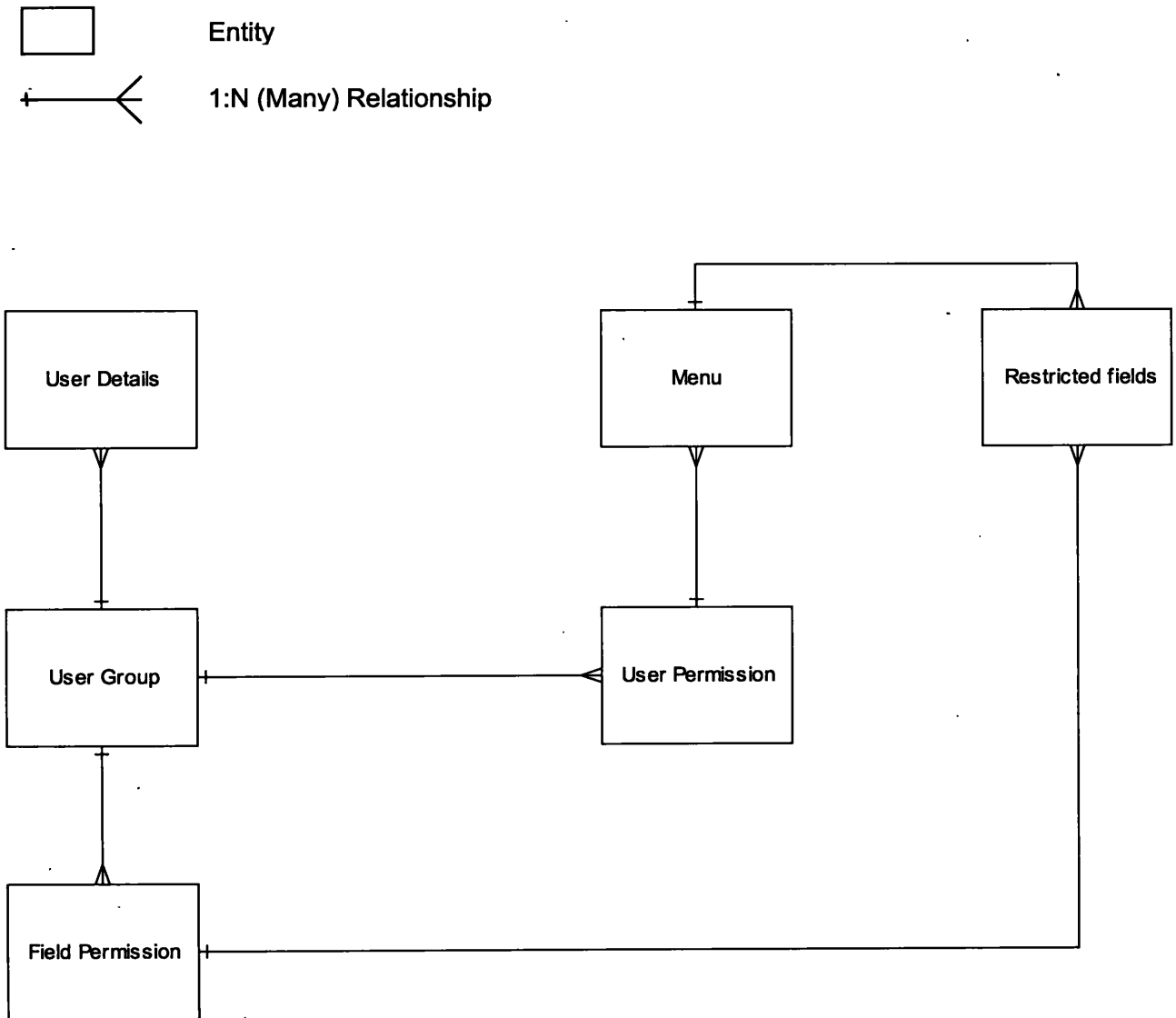


Figure 3.3 E-R diagram of HRM system security module

3.3.2.3 Table Definitions

Tables were developed in the third normal form, except for one or two special cases. All the table definitions are included in the *Appendix – B* section of this document.

3.3.2.4 Security Levels

User access to the application will be handled by the application. Users will be created, maintained and deleted by the application.

The application maintains pre-defined five user groups. Every user is assigned only to one user group. Each user group is allocated with a set of options and possible actions for each option.

1. Operator / Data entry

Users of this user group are entitled to add, view, and modify certain information of employee related records. They are not allowed to delete any type of data from the application, after its confirmed.

2. Officer

Users of this user group are responsible to confirm new employee information. This group is also assigned to delete, modify and view information related to employees. This type of users is only allowed to view the master file data.

3. Manager

Users in this user group are not expected to do any processing activities. Therefore they are allowed to run queries and view information within the allocated ministry or department.

4. Department Administrator

Users of this user group are responsible to add, modify and delete of new users for the application. Users created by this user group will have access only to the data related to the same department.

5. Administrator

Users of this user group have all access rights to all types of data. They will have permission to carry out all types of administrative tasks of the application.

3.4 Development

3.4.1 Development Tools

The system was developed as a *Client Server* application using the '*Microsoft Visual Basic 5.0 (Enterprise edition)*' as the front-end development tool. VB was selected as the development language mainly based on the companies resource availability and application functionality. Although there are number of versions of VB newer than VB 5.0, it was used because the version 5 includes '*Crystal Report*' tool, which was used to create the reports to be generated by the system.

All the reports required by the system were created using the VB 5.0 built-in '*Seagate Crystal Report version 4.6.1.0*' tool.

The system uses '*Microsoft SQL Server 6.5*' as the database. Although there are new versions of *SQL Server* that have more features than version 6.5, it was selected base on the availability of the database at MoFP. Although there were suggestions of installing a new version of *SQL Server* at the MoFP, the extra cost involved to purchase the original product was very high, which made the suggestion not feasible.

3.4.2 Development Procedure

Development of the system was carried out by developing all master files, transaction files and report front-ends individually. All of these individual programmes were then linked using a MDI main form. All the individual programs have three different sections. Namely Form, Class module and the Main module. All the database accessing / Validation procedures are in the Class module. Linking part of the MDI main form and individual programs are in the Main module. The interface creation is in the form.

All the individual programs were created by following a common procedure. The procedure consists of following steps.

- Designing the Screen layout and Process flow diagram
- Designing the Unit Test Plan
- Write the Program spec
- Coding
- Testing the module

3.4.2.1 Screen Layout and Process Flow Diagram

First thing that a programmer should do to develop a program is to design a screen layout of the interface and the process flow diagram, which meets the functional specification. In this project, when creating the screen layouts, the programmers were advised to keep the consistency as much as possible. For example the screen layout of the 'Salary Structure' master file is given below. All the other screen layouts are included in the 'Appendix - D' section of this document.

The screenshot shows a window titled "Salary Structure". In the top right corner, there is a button labeled "Existing Records". Below this button, there are five input fields arranged vertically. The first two fields, "Service Code" and "Class Code", are split into two columns. The "Description" field is a single wide column. The "Min. Basic Salary" and "Max. Basic Salary" fields are also single columns.

Figure 3.4 'Salary Structure Master' screen layout

After designing the screen layout the next step was to design a process flow that meets the requirements of the system in an efficient and effective manner. This was an important step in the development of the program, because the unit test plan and the program spec was designed according to the process data flow. Once the screen layout and the process flow diagram were designed, the programmer needed to get the approval of the project manager before going to the next steps.

The process flow of almost all unit programs has a similar structure. But the body of the process flow changes according to the fields. For example the process flow of the 'Salary Structure' master is given on the next page.

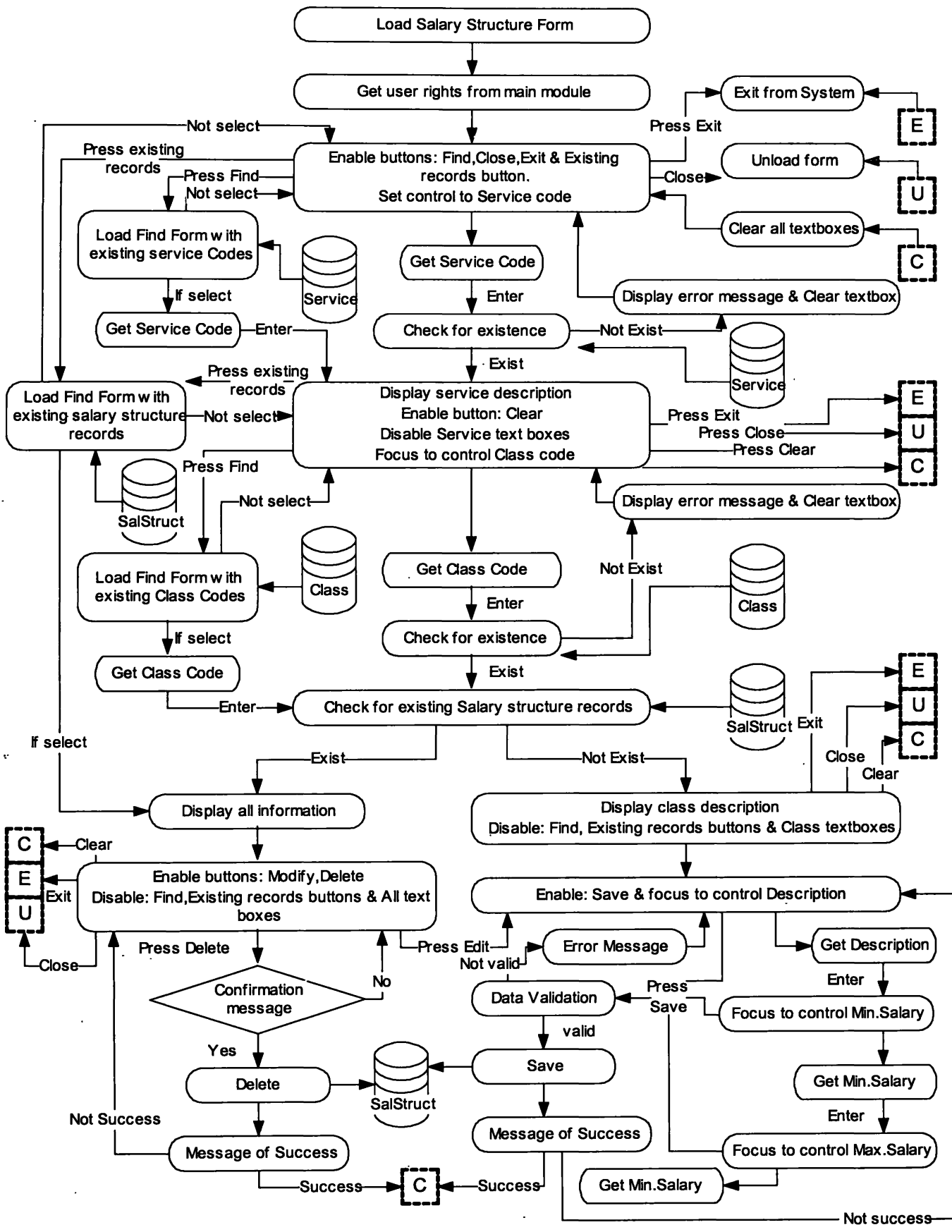


Figure 3.5 'Salary Structure Master' Process Flow Diagram

3.4.2.2 Unit Test Plan

Next step after designing the screen layout and the process flow was to develop a test plan. When developing the test plan the programmer should consider all the possible inputs for the module and what should be the expected outputs for those inputs. Therefore to create a good test plan he/she should have a good understanding of the earlier step.

Initially the programmers have decided on a common format for the test plan and adjusted it to the requirements of the each module. For example, the test plan of the 'Salary Structure Master' is given below. This example shows only the case-Save. Similarly there are cases for Modify and Delete. (Note that for convenient documentation the Min.Basic Salary and Max.Basic Salary are jointly represented as Basic Salary in test data.)

Sample Test Cases for 'Salary Structure Master'

1. Case : SAVE

Prerequisite :

- Service code '1111' and Class Code '11' must exist in their relevant databases to carryout the following tests successfully.
- For the first record test, the database should be empty initially.

Target Field	Criteria	Test Description	Test Data	Expected Result
Common	First record	Saving the first record to the database	Service code:1111 Class code :11 Description :test 1 Basic Salary :1000.00	Record should save.
Service Code	Empty Service Code	Leave the Service code empty	Service code: Class code :11 Description :test 1 Basic Salary :1000.00	Cannot leave the Service Code empty
		Type 2 spaces for the Service Code	Service code: Class code :11 Description : test 1 Basic Salary :1000.00	Cannot leave the Service Code empty
	Length of the Service Code	Type <4 characters for the Service Code	Service code:111 Class code :11 Description :test 1 Basic Salary :1000.00	Should save successfully if service code 111 exists
		Type >4 characters for the Service Code	Service code:11111111 Class code :11 Description :test 1 Basic Salary :1000.00	Cannot Type>4 characters for Service code

		Type 4 characters	Service code:1111 Class code :11 Description :test 1 Basic Salary :1000.00	Record should save	
	Case sensitivity and Data type	Type 4 letters	Service code:AAAA Class code :11 Description :test 1 Basic Salary :1000.00	Record should save	
		Type letters and numbers both	Service code:AA11 Class code :11 Description :test 1 Basic Salary :1000.00	Record should save	
		Try to type lower case characters	Service code:Aa11 Class code :11 Description :test 1 Basic Salary :1000.00	Can not type lower case characters	
Class Code	Empty Class Code	Leave the Class code empty	Service code:1111 Class code : Description :test 2 Basic Salary :1000.00	Cannot leave the Class Code empty	
		Type 2 spaces for the Class Code	Service code:1111 Class code : Description :test 2 Basic Salary :1000.00	Cannot leave the Class Code empty	
	Length of the Class Code	Type <2 characters for the Class Code	Service code:1111 Class code :1 Description :test 2 Basic Salary :1000.00	Cannot enter <2 characters for Class code. Display an error message	
		Type >2 characters for the Class Code	Service code:1111 Class code :1111 Description :test 2 Basic Salary :1000.00	Cannot enter >2 characters for Class code.	
		Type 2 characters for the Class Code	Service code:1111 Class code :11 Description :test 2 Basic Salary :1000.00	Record should save	
	Case sensitivity and Data type	Type 2 letters	Service code:1111 Class code :AA Description :test 1 Basic Salary :1000.00	Record should save	
		Type letters and numbers both	Service code:1111 Class code :A1 Description :test 1 Basic Salary :1000.00	Record should save	
		Try to type lower case characters	Service code:1111 Class code :a1 Description :test 1 Basic Salary :1000.00	Can not type lower case characters	
	Description	Empty Field	Leave the Description empty	Service code:1111 Class code :11 Description : Basic Salary :1000.00	Record should save (System allows Description to be empty)

		Type 2 spaces for the Description	Service code:1111 Class code :11 Description : Basic Salary :1000.00	Record should save (System allows Description to be empty)
	Data Type & Case Sensitivity	Type letters(in both cases), numbers, symbols	Service code:1111 Class code :11 Description : Test-1 Basic Salary :1000.00	Record should save (System allows Description to have any data type and not case sensitive)
	Field length	Type < = 50 characters for the Description	Service code:1111 Class code :11 Description : test 3 Basic Salary :1000.00	Record should save
		Type > 50 characters for the Description	Service code:1111 Class code :11 Description : Test the field length of the description Basic Salary :1000.00	Cannot type more than 50 characters.
Basic Salary	Empty Field	Leave the Basic Salary empty	Service code:1111 Class code :11 Description : Test 4 Basic Salary :	Record should not save, Gives an error message (System do not allow Salary to be empty)
		Type 2 spaces for the Basic Salary	Service code:1111 Class code :11 Description : Test 4 Basic Salary :	Record should not save, Gives an error message (System do not allow Salary to be empty)
	Field Type	Type letters as the Basic Salary	Service code:1111 Class code :11 Description : Test 4 Basic Salary : Test	Cannot type letters as salary
		Type symbols as the Basic Salary	Service code:1111 Class code :11 Description : Test 4 Basic Salary : 90%	Cannot type symbols as salary
	Field Format	Type minus values	Service code:1111 Class code :11 Description : Test 4 Basic Salary : -1000.00	Cannot type minus values as Salary
		Type more than 2 decimals	Service code:1111 Class code :11 Description : Test 4 Basic Salary : 1000.987	Save the record with rounding to the 2 nd decimal (Basic Salary = 1000.99)

		Type a value more than 99999999999.99	Service code:1111 Class code :11 Description : Test 4 Basic Salary : 100000000000.00	Cannot type more than 11 integer values.
		Type without decimal points	Service code:1111 Class code :11 Description : Test 4 Basic Salary : 1000	Save the record with the decimal points as .00
	Validation	If Min.Basic Salary is greater than the Max.Basic salary	Service code:1111 Class code :11 Description : Test 4 MinBasic Salary : 2000 MaxBasic Salary: 1000	Save is not successful, Display an error message.

Table 3.2 ‘Salary Structure Master’ Test Plan

3.4.2.3 Program Spec

After creating the test plan the programmer then needed to write a program spec. The program spec is a pseudo-coded program, which is language independent. It's written with least number of technical terms and it should represent the exact flow of processes included in the process flow diagram. This program spec should be written in such a way that it should pass all the test cases created in the test plan.

When writing the program spec, to keep the consistency the programmers agreed on some common words for the commonly used processes. For example ‘READ’ was used to represent the retrieval of data from storage and ‘WRITE’ was used to represent the saving of data to storage.

3.4.2.4 Coding

Coding is writing the program spec in a computer understandable manner. The coding was done using the VB syntaxes. Coding was made vary easy due to the user friendliness of the VB language. To make the coding more efficient the common functions needed to be used in most of the unit programs, were written in the main module, where individual programmers can call those functions whenever their unit modules need it. At the end of this step the programmer should have a perfectly running program that satisfies the specifications. But the responsibility of the programmer doesn't end from here. He needs to test the program according to the test plan and confirm that it doesn't carry any bugs.

3.4.2.5 Unit Testing

This step was also carried out by the programmer. The programmer's responsibility doesn't stop after the coding is completed. Next he/she needs to test the programme according to the test plan. If the programmer find any bug on the program, he/she needs to go back and fix it. This process has to be done until the bug is fixed. At the end of the unit testing, the programmer should have a document that shows all the test cases, expected outputs and actual outputs. If there are test cases that changes the database (eg:- Saving a record), the programmer should get a printout of the relevant tables of the database before and after the test is carried out as a confirmation of the test results.

After this step the unit program development procedure completes. Once all the unit modules are developed, the system is completed. Then the system should go through the testing procedure of the development life cycle, which is described later in this document.

3.4.3 System Process Flow

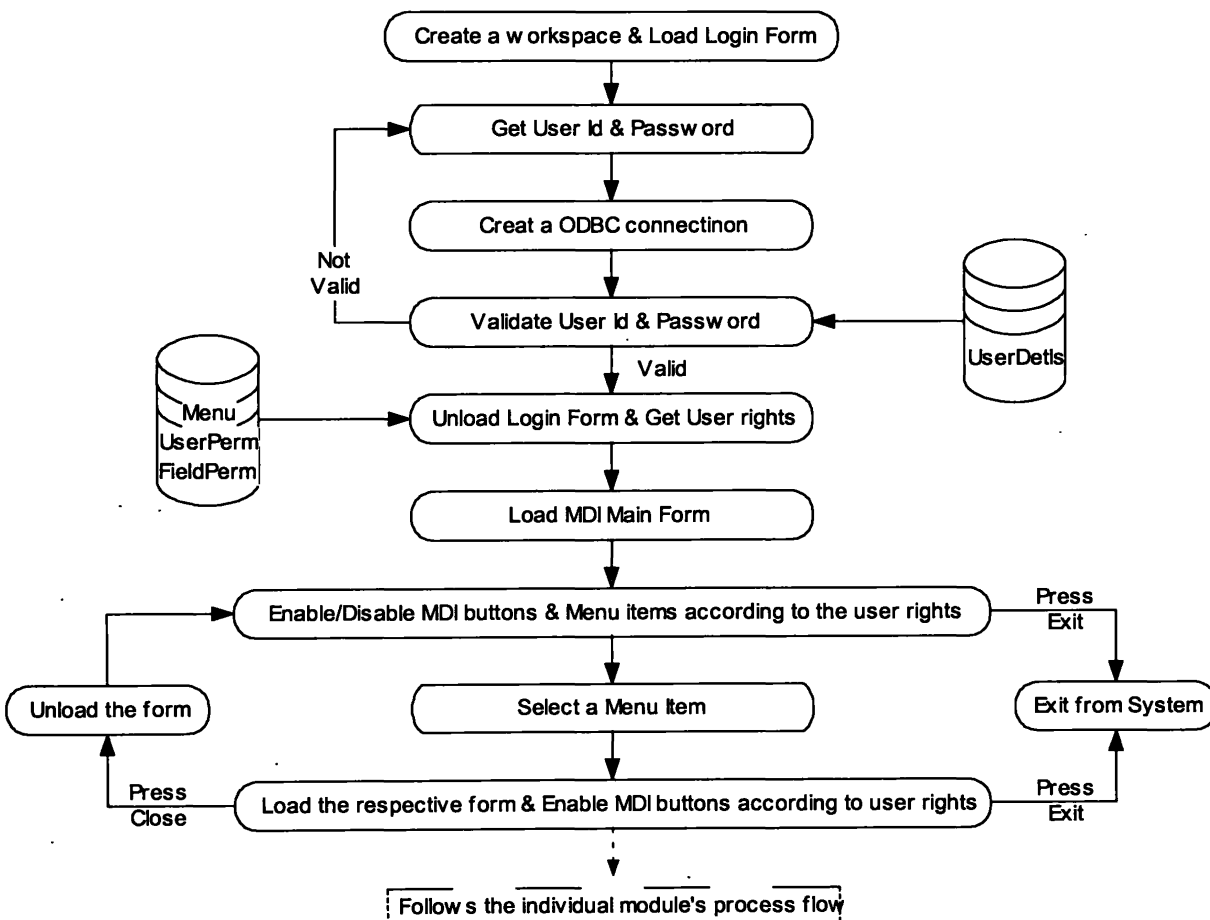


Figure 3.6 System Process Flow Diagram

3.4.4 System Features

Human Resource Management (HRM) system facilitates the creation and maintenance of all the relevant information related to human resource management, of the Ministry of Finance and planning.

There are two sets of buttons to maintain records in the HRM system namely action and process buttons. Action buttons are displayed in each tab. These are to perform any actions such as adding a record in a temporary table, delete from the temporary table, update records and clear the entry screen. Process buttons are displayed in the toolbar. These are to perform necessary processes such as *saving* the screen contents in the database, allowing to *edit* the selected file, *find* – select relevant information from the list, *clear* the screen contents, *close* the file, *delete* the selected record (e.g. employee, ministry), *print* reports, *exit* the HRM system.

User needs to deal with both action and process buttons to complete creating or maintaining records in the HRM system if both buttons are displayed. First, manipulate with action buttons then the process buttons.

The complete set of system features is included in the *Appendix – C* section of this document. System features and user instructions have been documented as the 'User Manual' in this stage.

3.5 Testing

3.5.1 Testing Procedure

When a system is developed, it is hoped that it performs properly. In practice, however, some errors always occur. The main purpose of testing an information system is to find the errors and correct them. A successful test is one, which finds an error.

In this HRM system, a predefined procedure is used for testing. The results of the tests need to be documented and errors or defects found in the system will be reported at this stage. If any errors or defects are found, reverting back to the development step of the life cycle will rectify them.

The testing procedure of the HRM system is given below,

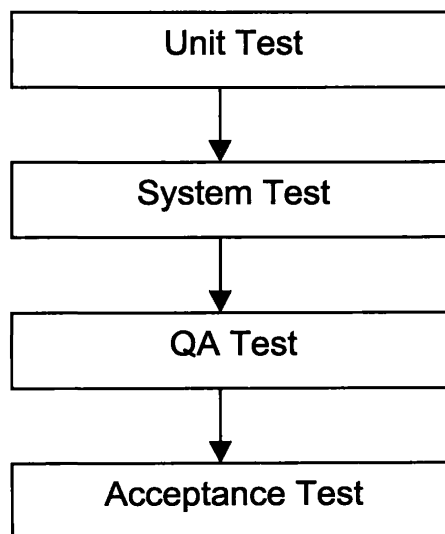


Figure 3.7 Testing Procedure

3.5.1.1 Unit Test

As mentioned in the earlier chapters, the programmer does Unit/Program testing. The responsibility of designing test plan is also lies with him/her. Unit testing is used to test the logic of the program. Individual modules are tested and not the system as a whole. The programmer needs to check all logical paths in the module. If all the unit tests are successfully completed, the system then under goes a system test. For further information of the unit testing, refer section 3.4.2.5.

3.5.1.2 System Test

The system testing is used to test all programs, which together constitute the system. Rather than testing each unit separately the whole process is tested whether it functions properly. Testing is conducted using a test plan designed prior to testing and synthetic data were used. Both valid and invalid transactions are used in this test. For example, non-existing employee Id may be used in a transaction to see if it is rejected. Similarly, some unreasonable data may be used to check whether the input controls function as expected.

A PwCL staff member who is independent of this project carried out the system testing at the ADB project office. He was responsible for the system testing and he was instructed to fill an Error Report form that was designed prior to testing, for each and every error/bug he finds. He should submit these forms to the project manager. All the errors found in the system testing need to be fixed by the programmer and a special test will be carried out only for the test cases that found errors after they are fixed. This process will go until all the bugs are fixed. After a successful system test, the system should undergo a QA test.

3.5.1.3 Quality Assurance Test

A Quality Assurance test is carried out to certify that the system is functioning according to the requirement and its error free, before it is exposed to the users. This is also a similar process as the system testing, but carried out by a team that is specially trained for QA testing. In this HRM system a PwCL QA team consisting of two members is to be used for this purpose.

3.5.1.4 Acceptance Test

Finally the system should undergo an acceptance test. The working group will be responsible for testing the final system with the assistance of the PwCL. The working group consist of responsible personals of the ministry for this project. This test will be carried out based on the pre defined test plan, which will give specific procedures and accepted results that will be agreed upon prior to testing. The PwCL is responsible for designing of the test plan. MoFP staff will provide significant inputs to developing the test plan.

The results of the tests will be documented and errors found in the system will be reported at this stage. Errors will be rectified by reverting back development step. After a satisfactory acceptance test, the software will be accepted by the working group.

3.6 Training / Implementation / Support

3.6.1 Training

PwCL will provide user training at all user levels, including the training of system administrators. First a survey will be carried out to gather the information about the knowledge and the skills of the users in each user level. And according to that a training plan will be developed.

3.6.2 System Implementation

The final version of the proposed system will be piloted at the National Planning Department. Thereafter, the system will be rolled out to all other departments according to a plan. The system administrators at the pilot department will be responsible for the implementation of this system in two other departments in the second phase of the rollout. Subsequently, the administrators of the departments that have already had the system implemented will be responsible for the implementation of this system in the remaining departments as the third phase.

3.6.3 Post Implementation Support

PwCL will provide the technical support required to rectify any **defects** in the software after commencement of the live run for a period of 1 month.

Any changes to the software will follow the change control procedure to ensure orderly control and integrity to the software. The change control procedure will follow the activities in sequence as listed below:

1. Documentation of the required change
2. Assessment of impact on the system
3. Assessment of the feasibility of implementing the change
4. Implement if feasible.

Any modifications that fall beyond the scope of the functional specification will not be accepted.

4. Discussion

In the development stage of this project the developers faced with a major problem of completing the development, according to the budgeted time frame. It took around one and half times more than the expected time limit to complete the development. The main reason for this problem was the changing of the system specifications time to time, which took excess time to do the necessary changes. Another cause for this problem was the time spent on the extra features of the system that were not included in the budget.

The program development procedure that was used for this project is very effective. Although it took more time and effort on individual programs, it helped to develop a successful program. The documents that are developed by this procedure can be used to do the necessary modifications and can be done by any programmer, without depending on the programmer who developed it.

As an individual, I gained lot of skills and knowledge in the area of software development by working on this project. Namely,

- The practical aspect of designing the ER models and table structures
- How to develop and debug software using *Visual Basic*
- How to create reports using *Crystal Report*
- How to handle the main functions of SQL server
- The practical aspect of unit and system testing
- How to develop a *client-server* HRM system using ODBC connection
- The practical problems arise in the software development process and how to handle them.
- And the common things that we need to know about the working environment and the software development field.

But I didn't have the opportunity to gain the skills in designing the functional specifications, which is a major stage in the system development life cycle.

5. Reference

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- Pressman, Roger S. 1997, The Processes. In *Software Engineering*, 4th ed. P 28-36. The McGraw-Hill Companies, Inc.
- 2001. Human Resource Management System, Functional Specification and Quality Plan, Version 2.0. *PRICEWATERHOUSECOOPERS* Lanka (PVT) Ltd.
- 2001. Human Resource Management System, Technical Specification, Version 1.0. *PRICEWATERHOUSECOOPERS* Lanka (PVT) Ltd.

6. Appendices

Appendix – A

6.A.1 Functional Specifications

6.A.1.1 Overview

The HRM system will store basic personnel information such as name, national identification number, start date, employment history, grade, qualifications, training and performance records. The system will allow users to add, modify and delete information as well as to query for information and generate reports. Users will be able to generate standard reports as well as ad hoc reports according to their requirements. Adequate security would be implemented to safeguard the system from unauthorised access.

6.A.1.2 System Features

The system should facilitate users to:

- **Add new details**
The system should allow users to add new information on each of the above-mentioned categories.
- **Modify existing details**
The system should allow users to modify certain information that is already entered into the system
- **Delete details**
The system should facilitate restricted access to delete certain information stored in the system

Maintain Information

The following board categories of information will be maintained in the system:

a. Personal Information

The system will have the facility to maintain the following information about each employee.

- **National Identification Card**
The NIC number will be used to uniquely identify all employees within the MoFP.
- **Surname**
The user should be able to enter or modify surname of the employee.
- **Other names**
The user should be able to enter other names (such as first name and second name) only when creating a new employee record.
- **Permanent Address**
The user should be able to enter or modify permanent address of the employee.
- **Temporary Address**
The user should be able to enter or modify temporary address of the employee.
- **Office Address**
The office address will be maintained for every department so that the office address of a particular employee may be extracted, depending on the department he is attached to.
- **Telephone number**
The user should be able to enter or modify the personal telephone number of the employee.
- **Date of birth**
The user should be able to enter the date of birth only when creating a new employee record.
- **National ID number**
The user should be able to enter the NIC number only when creating a new employee record.
- **Gender**
This should be a predefined field (Male or Female) that can be selected only at the point of creating a new record.

- **Designation**
The user should be able to enter the employee's designation at the point of creating the employee record.
- **Department**
The users should be able to select a department from a pre-set list of values containing all the departments within the Ministry of Finance and Planning (MoFP).
- **Division**
When creating a new employee record, the users should be able to select a division from a pre-set list of values containing all the divisions within the department selected as described above.
- **Service**
When creating a new record, the users should be able to select a Service Board from a pre-set list of values containing all the service categories such as the Sri Lanka Planning Service.
- **Class**
When creating a new employee record, the users should be able to select one class from a pre-set list of values containing all the class categories such as Grade 1 or Grade 2.
Since the special allowances granted to each employee (such as vehicle allowance) depend directly upon his class or grade, the system should automatically record the allowances that are granted to this employee.
- **Salary Range**
Since the salary range depends entirely on the Service and Class of each employee, the system should be able to automatically determine the salary range the employee belongs to, when the Service Board and Class are selected.
- **Salary point**
The actual gross salary received by an employee should be maintained in the system.
- **Date of last increment**

The date of last increment will be maintained in the system. At the initial data entry stage, the user will be allowed to manually enter this information and the system will subsequently allow the user to update it only when the salary point figure is modified.

➤ **Job description**

The user should be able to enter the employee's job description at the point of creating the employee record. However, if the employee has been transferred or promoted within the MoFP the Employee Transfer or Promotion option (described in section 3.8) should automatically modify this field. The user should not be allowed to manually update this field.

➤ **Highest level of education**

The user should be able to select from a list of pre-defined values such as Bachelors, Professional, Masters, Doctorate either at the point of creating a new record or in order to modify an existing record.

➤ **If spouse is in military or foreign service**

This is used to indicate whether the employee's spouse is in the military or foreign services. This information is useful when considering the employee for transfers.

➤ **Number of school going children**

The user should be able to enter or modify the number of school-going children of the employee

➤ **Next of kin**

Information regarding the name, permanent address, temporary address and the relationship to the next of kin should be recorded in the system. The system will also allow multiple "Next of kin" entries to be maintained in the system

➤ **Extension (Whether or not an extension has been granted to employees over 55)**

To indicate whether the employee nearing the age of 55 years has received an extension or not (YES or NO)

➤ **Extension period**

This field should be activated only if "yes" is selected for the extension as described above. This would indicate the length of the extension granted to the employee in number of years.

➤ **Expected date of retirement**

The system should automatically determine the employee's expected date of retirement depending on the date of birth and extension period (if applicable) of the employee.

➤ **Date of appointment**

The user should be able to enter the employee's date of appointment to the public sector. The system should not allow this field to be modified subsequently.

➤ **Date of appointment to present designation**

The user should be able to enter the employee's date of appointment to MoFP if the employee has been newly transferred to the MoFP, (at the point of creating the employee in this system). However, if the employee has been transferred or promoted within the MoFP the Employee Transfer or Promotion option (described later in this document) should automatically modify this field. The user should not be allowed to manually update this field.

➤ **W & OP fund registration number**

The system will allow the user to maintain the W & OP registration number of the employee.

➤ **Concurrent Appointments**

The system will allow users to maintain employees concurrent appointments such as appointments to public boards

➤ **Employee status**

By default the employee status should be "Active" unless he has been transferred out of the MoFP ("Inactive"), "Retired", "Resigned" or "Deceased".

b. Employee Education, Qualification and Experience Details

The system will have the facility to allow the user to create, update and delete the following information on educational and professional qualification of each employee.

- **Type of qualification**
The user should be able to select a type from a list of values such as “Ordinary Level, advanced Level, Bachelor’s, master’s, Doctorate, Professional”.
- **Description of qualification**
The system should allow the user to enter / modify the description as and when needed.
- **Stream**
The user should be able to select the general stream of study (for example Accounts and Finance) from a list of values.
- **Specialisation**
The user should be able to type the subject/field of specialisation (for example Management accounting)
- **Classification**
If the type of qualification is Bachelor’s, the user should be able to enter the classification obtained (for example First Class Honours)
- **Name of Institute/University**
The user should be able to enter the institute or university from which the employee has graduated.
- **Year of Graduation**
The year of graduation should be recorded in the system.

c. Leave Information

The system will have the facility to maintain the following leave information for each employee in the system.

- **Type of leave**
The user has to select the leave category from a list of values derived from Chapter 12 of the Establishment Code, (for example sick leave)

➤ **Number of days taken**

The user has to specify how many days of leave of the selected type has been taken in this instance. When this information is entered to the system, it will calculate the total number of days of leave taken for the specified type of leave and store the revised value in the system.

➤ **Total number of days allowed for each leave type**

The number of days allowed for each type of leave should be available in the system.

d. Skills Information

The system will have the facility to maintain corresponding skill levels for different types of skills for each employee.

The types of skills available in the system would be:

- Financial Analysis
- Project Appraisal
- Language-Sinhala
- Language-Tamil
- Language-English
- Typing-Sinhala
- Typing-Tamil
- Typing-English
- IT skills

The skill ratings available in the system would be Nil, Average, good, Very Good and Expert.

e. Performance Appraisal Information

The system will have the facility to maintain yearly performance appraisal scores for each employee. Thus, employees' current as well as past performance appraisal scores will be maintained in the system.

f. Training information

The system will have the facility to maintain training records of all employees within the system. The following information on the training courses attended will be recorded in the system.

- **Course name**
- **Start and end date**
- **Type of training**
This will be a description on the type of training received (for example: IT training-MS Word)
- **Minimum qualification required for course-**
- **Number of days/hours trained**
- **Examination/Certification obtained**
- **Location**
Specifies whether the training was conducted locally or overseas
- **Name of institution conducting the training course**

g. Staffing Information

The system will have the facility to maintain staffing information for each department based on the service category and the employee class/grade. This would be achieved by entering the number of employees allocated for each service category and grade within a department. The number of employees currently available will be calculated automatically based on the employee information available in the system.

This information would be useful in identifying staffing requirements and to analyse over staffing information.

h. Employee Transfer / Promotion

The system will have the facility to record the transfer of employees into other departments of the MoFP as well as to record the promotions received by them. The employee's "personal information" should be automatically updated to reflect the changes in designation,

class, department, division and date of appointment to current position. If the employee has been transferred out of the MoFP, the employee status should be made "Inactive".

A new entry should be created automatically in the "employee history" record which will keep track of the employees past information in terms of previous designations, grades, previous departments worked in, previous salary information, and time frames. This means that the employee's transfer / promotion information will be archived in the system for future reference.

Reports and Queries

The following reports and queries may be generated through the system:

a. Additional Reports and Queries on Personnel Information

The system should have facility to allow reports and queries to be generated based on certain criteria.

Reports and queries may be generated base on:

- Employee Identification Number
- Name
- Age (from-to)
- NIC number
- Service started
- Class
- Department
- Designation
- Division
- Gender
- Level of Education (exact, greater than, less than)
- Years in public service (from-to)
- Years in present office (from-to)
- External received (yes/no)

The user should be able to query by any combination of the above attributes. For example it should be possible to query for users in the Planning Service who are above 50 years of age and are in Class 1.

b. Standard Queries / Reports

Examples of the queries /reports that may be generated from the Human Resource Management system includes:

- Employee history reports
- Leave information by employee
- Training history by employee (including the number of hours of mandatory training completed)
- Employees due for transfers
- Suitable employees for transfers
- Suitable candidates for promotions
- Vacation and overstaffing information by department
- Salary allowance information by department
- Salary allowance information by employee
- Qualification listing by employee
- Performance appraisal history by employee
- Skills information (IT, Languages, etc.)

Security and Maintenance

- **Data Entry**

All data keyed in to the system will be validated on screen prior to activating it.

- **Security Levels**

The following security levels will be available in the system:

- **Data Entry**

This level of security will be used to enter data.

- **Authorization / delete / modify**

This level will be used to post information keyed in by the data entry operator to the database, delete records and modify information.

- **Report Generation**

This level will be used to generate reports. Reports can be generated for the department represented by the user only.

- **Administration**

This level will provide access to generate reports for all departments as well as have full administrative access to the database.

- **Audit trail**

An Audit Trail will be maintained of modifications made to the following data:

- Personal Identification Number
- Surname
- Date Of Birth
- Personal file number
- Designation
- Service
- Class
- Extension (Y/N)
- Extension period
- Date appointed to **public service**
- Employee status
- Department code
- Performance appraisal **year**
- Performance appraisal **score**.

The audit trail will consist of the **data before and after modifications, timestamp and the user name.**

- **Maintenance**

- History records of employees who have retired, resigned or deceased for more than a user-defined period will be archived and removed from the database.
- The HRM Database would be stored in a secure location within a server and access will be only to the database administrator or system administrator.
- Backups of data resident in the system should be taken weekly

Appendix – B

6.B.1 Table Definitions

Definitions of every application system table and security module table in the database are given below. The attributes used as the identifier (**primary key/s**) of the entity is underlined and the attributes that links with other tables (**foreign key/s**) are shown with a star (*). The 'Table Name' is the name of the table used to represent the entity in the database.

A(n) - Alphanumeric field with a maximum length of 'n' characters

SDT – Small Date Time

Int – Integer

Sint – Small Integer

Dec(x,y) – Decimal field with 'x' number of digits and 'y' number of decimal points

Entity: User Permission Table Name: USERPERM		
Attribute	Format	Conditions
<u>Form/Frame ID</u> *	A(8)	Not null
<u>User group</u> *	A(8)	Not null
<u>Form name</u> *	A(15)	Not null
User rights	A(4)	Not null

Entity: User Details Table Name: USERDETLs		
Attribute	Format	Conditions
<u>User ID</u>	A(15)	Not null
<u>User group</u> *	A(8)	Not null
Password	A(8)	
Ministry Allowed	A(4)	Not null
Department Allowed	A(4)	Not null

Entity: Field Permission Table Name: FIELDPERMISSION		
Attribute	Format	Conditions
<u>Form/Frame ID</u> *	A(8)	Not null
<u>Form name</u> *	A(15)	Not null
<u>Field name</u> *	A(30)	Not null
<u>User group</u> *	A(8)	Not null
Permission	A(1)	Default 'N' (Y/N)

Entity: Menu Table Name: MENU		
Attribute	Format	Conditions
<u>Form/Frame ID</u>	A(8)	Not null
<u>Form name</u>	A(15)	Not null
Menu name	A(25)	
Status	A(1)	Default 'F' (F/R)

Entity: Restricted Fields Table Name: RESTRICTEDFIELDS		
Attribute	Format	Conditions
<u>Form/Frame ID</u> *	A(8)	Not null
<u>Form name</u> *	A(15)	Not null
<u>Field name</u>	A(30)	Not null
Description	A(40)	Not null

Entity: Next of Kin Table Name: EMPNEXTKIN		
Attribute	Format	Conditions
<u>Emp.National ID</u> *	A(10)	Not null
<u>Next of kin name</u>	A(30)	Not null
Relationship	A(15)	Not null
Next of kin address	A(100)	Not null
Telephone No.	A(12)	

Entity: Allowance Type Table Name: ALLOWANCETYPES		
Attribute	Format	Conditions
<u>Allowance type code</u>	A(2)	Not null
Description	A(30)	Not null

Entity: Class Table Name: CLASS		
Attribute	Format	Conditions
<u>Class code</u>	A(2)	Not null
Description	A(20)	Not null

Entity: Employee Table Name: EMPLOYEE		
Attribute	Format	Condition
<u>Emp.National ID</u>	A(10)	Not null
Title	A(4)	Not null
Surname	A(30)	Not null
Other names	A(100)	Not null
Permanent	A(100)	Not null
Address		
Temporary	A(100)	
Address		
Telephone No	A(12)	
Date of birth	SDT	Not null
Personal File No	A(5)	Not null
Gender	A(1)	Not null (M/F)
Marital status	A(1)	Not null (M/S)
Highest level of education	A(15)	Not null
Spouse service	A(1)	Not null (M/F/G/N)
Spouse work place	A(60)	
No. School children	SInt	
Designation code*	A(3)	Not null
Service code*	A(4)	Not null
Class code*	A(2)	Not null
Extension	A(1)	Not null (Y/N)
Expected date of retirement	SDT	
Extension period	Dec(3,2)	
Date appointed to public service	SDT	Not null
Employee status*	A(3)	Default 'INC'
WOP No	A(8)	Not null
Ministry code*	A(4)	Not null
Department code*	A(4)	Not null
Division code*	A(4)	Not null
Start date	SDT	Not null
Salary point	Dec (13,2)	
End date	SDT	
District code*	A(3)	Not null
Concurrent	A(50)	
Appointments		
Last increment date	SDT	
User ID*	A(8)	Not null
Lapse start year	SInt	
Tot. Lapse leaves	Dec(3,1)	
Job description	A(100)	

Entity: Employee Qualification Table Name: EMPQUALIFCN		
Attribute	Format	Conditions
Emp.National ID*	A(10)	Not null
Qualification type code*	A(4)	Not null
Description	A(60)	
Stream	A(35)	
Specialization	A(60)	
Classification	A(35)	
Institute	A(60)	Not null
Graduation Year	SInt	2030>= >=1955

Entity: Salary Structure Table Name: SALSTRUCTURE		
Attribute	Format	Conditions
<u>Service code*</u>	A(4)	Not null
<u>Class code*</u>	A(2)	Not null
Description	A(35)	
Min. Basic salary	Dec(13,2)	Not null
Max.Basic salary	Dec(13,2)	Not null

Entity: Employee Leave Table Name: EMPLEAVE		
Attribute	Format	Conditions
<u>Emp.National ID*</u>	A(10)	Not null
<u>Year</u>	SInt	Not null 2030>= >=1980
<u>Leave type code*</u>	A(2)	Not null
No. Of Days	Dec(3,1)	
User ID*	A(8)	Not null

Entity: Leave Type Table Name: LEAVETYPE		
Attribute	Format	Conditions
<u>Leave type code</u>	A(2)	Not null
Description	A(15)	Not null
No. days allowed	Dec(3,1)	
Status	A(1)	Default 'M' (M/L/O)

Entity: Employee Skills Table Name: EMPSKILL		
Attribute	Format	Conditions
<u>Emp.National ID*</u>	A(10)	Not null
<u>Skill type code*</u>	A(2)	Not null
<u>Type code*</u>	A(2)	Not null

Entity: Employee History Table Name: EMPHISTORY		
Attribute	Format	Conditions
<u>Emp.National ID</u>	A(10)	Not null
<u>Ministry code</u>	A(4)	Not null
<u>Department code</u>	A(4)	Not null
<u>Division code</u>	A(4)	Not null
<u>Start date</u>	SDT	Not null
<u>Employee status</u>	A(3)	Not null
Status description	A(20)	
Ministry name	A(50)	
Department name	A(35)	
Division name	A(35)	
Designation code	A(3)	Not null
Designation description	A(25)	Not null
Class code	A(2)	Not null
Class description	A(20)	Not null
Service code	A(4)	Not null
Service description	A(50)	Not null
End date	SDT	
District code	A(3)	Not null
District name	A(25)	Not null
Job description	A(100)	
Salary point	Dec (13,2)	
Last increment date	SDT	
User ID	A(8)	Not null
Date	SDT	Not null

Entity: Ministry Table Name: MINISTRY		
Attribute	Format	Conditions
<u>Ministry code</u>	A(4)	Not null
<u>Ministry name</u>	A(50)	Not null
<u>Ministry address</u>	A(100)	Not null
<u>Contact Person</u>	A(25)	Not null
<u>Telephone No.</u>	A(35)	Not null

Entity: Department Table Name: DEPARTMENT		
Attribute	Format	Conditions
<u>Ministry code*</u>	A(4)	Not null
<u>Department code</u>	A(4)	Not null
<u>Department name</u>	A(35)	Not null
<u>Dept. address</u>	A(100)	Not null
<u>Contact person</u>	A(25)	Not null
<u>Telephone No.</u>	A(24)	Not null

Entity: Skills Table Name: SKILLTYPE		
Attribute	Format	Conditions
<u>Skill type code</u>	A(2)	Not null
<u>Description</u>	A(25)	Not null

Entity: Employee Performance Table Name: EMPPERFORMANCE		
Attribute	Format	Conditions
<u>Emp.National ID*</u>	A(10)	Not null
<u>Year</u>	SInt	Not null 1980=< =<2030
<u>Type code*</u>	A(2)	Not null
<u>User ID*</u>	A(8)	Not null

Entity: Service Table Name: SERVICE		
Attribute	Format	Conditions
<u>Service code</u>	A(4)	Not null
<u>Description</u>	A(50)	Not null

Entity: Employee Training Table Name: EMPTRAINING		
Attribute	Format	Conditions
<u>Emp.National ID*</u>	A(10)	Not null
<u>Course name</u>	A(30)	Not null
<u>Start date</u>	SDT	Not null
<u>Stream</u>	A(25)	
<u>Duration type</u>	A(1)	Not Null (Y/D/M/W)
<u>Duration</u>	Dec(5,2)	Not null
<u>Qualification obtained</u>	A(30)	
<u>Location</u>	A(1)	Not null (L/F)
<u>Place</u>	A(30)	
<u>Institute</u>	A(30)	

Entity: Qualification Type Table Name: QUALTYPE		
Attribute	Format	Conditions
<u>Qualification type code</u>	A(4)	Not null
<u>Description</u>	A(40)	Not null

Entity: Division		
Table Name: DIVISION		
Attribute	Format	Conditions
<u>Ministry code*</u>	A(4)	Not null
<u>Department code*</u>	A(4)	Not null
<u>Division code</u>	A(4)	Not null
Division name	A(35)	Not null
Division address	A(100)	Not null
Contact person	A(25)	
Telephone No.	A(12)	

Entity: Staffing		
Table Name: STAFFING		
Attribute	Format	Conditions
<u>Ministry code*</u>	A(4)	Not null
<u>Department code*</u>	A(4)	Not null
<u>Service code*</u>	A(4)	Not null
<u>Class code*</u>	A(2)	Not null
Allocated number of employees	Int	Not null
Current number of employees	Int	Not null

Entity: Employee Lapse Leave		
Table Name: EMPLAPSLEAVE		
Attribute	Format	Conditions
<u>Emp.National ID*</u>	A(10)	Not null
<u>Year</u>	SInt	Not null
<u>Leave type code*</u>	A(2)	Default 'LP'
Days earned	Dec(3,1)	Not null
Days used	Dec(3,1)	

Entity: System Parameters		
Table Name: SYSPARAMETERS		
Attribute	Format	Conditions
Current year	SInt	Not null
No. of laps years	SInt	Not null
Retirement age	SInt	Not null
Max. Retirement age	SInt	Not null
Max. Extension period	Dec(2,1)	Not null
No. of annual leaves	Dec(3,1)	Not null
Default Ministry code	A(4)	Not null
Min. age for public service	SInt	Not null

Entity: Designation		
Table Name: DESIGNATION		
Attribute	Format	Conditions
<u>Designation code</u>	A(3)	Not null
Description	A(25)	Not null

Entity: District		
Table Name: DISTRICT		
Attribute	Format	Conditions
<u>District code</u>	A(3)	Not null
District name	A(25)	Not null

Entity: Class Allowances		
Table Name: CLASSALLOWANCES		
Attribute	Format	Conditions
<u>Class code*</u>	A(2)	Not null
<u>Allowance type* code</u>	A(2)	Not null
Allowance	Dec(10,2)	

Entity: Types		
Table Name: TYPES		
Attribute	Format	Conditions
<u>Type code</u>	A(2)	Not null
Description	A(25)	Not null
Status	A(1)	Not null (S/P)

Entity: Employee Status		
Table Name: EMPSTATUS		
Attribute	Format	Conditions
<u>Status code</u>	A(3)	Not null
Description	A(25)	Not null
Start date enable	A(1)	Not null (Y/N)
End date enable	A(1)	Not null (Y/N)
End date compulsory	A(1)	Not null (Y/N)

Entity: Employee Status Fields		
Table Name: EMPSTATUSFIELDS		
Attribute	Format	Conditions
<u>Status code*</u>	A(3)	Not null
Form/Frame ID	A(8)	Not null
Form name	A(15)	Not null
Form control name	A(30)	Not null
Table name	A(30)	Not null
Field name	A(30)	Not null
Field name descript	A(30)	Not null

Appendix – C

6.C.1 System Features

There are two main categories in the system, namely Information and Master files.

6.C.1.1 Information

HRM system consists of the following 8 broad categories.

1. Personal Information
2. Employee Education, Qualification and Experience details
3. Leave Taken
4. Skills
5. Performance Appraisal
6. Training
7. Staffing
8. Employee Transfer or Promotion

➤ Personal Information

Information of each employee is created and maintained under this category. When recruitment is made, the operator at HRM department creates an Employee record in the HRM system for each employee.

Initially the 'Employee status' is set to 'Inactive'. This creates a record in the database and allows modifying or deleting the entire record. The officer can change this to 'Active' after verifying the employee's details. Once the Employee status is set to 'Active', the record cannot be deleted. Modifying details is restricted to managers, administrators and departmental administrators. Officers and operators can modify the file depending on their assigned permission levels. Only the officers can delete the employee records. Managers, Administrators and Departmental Administrators can view the personal information.

At least the details in the Personal Information, Business Information and Salary should be entered in order to create an Employee record in the HRM System.

Next of Kin

Information regarding to the Next of kin of the respective employee is maintained under this category. Details on the next of kin can be created and modified by the operators. Officers can modify and delete the next of kin records. Managers, Administrators and Departmental Administrators can view the next of kin information.

➤ **Employee education, Qualification and Experience details**

Qualifications of the respective employee are maintained under this category. This holds both the professional and academic qualifications that an employee received. Details on the qualification tab can be created and modified by operators. Officers can modify and delete the qualification records. Managers, Administrators and Departmental Administrators can view the education, qualification and experience information.

➤ **Leave Taken**

Leave information of the respective employee is maintained under this category. This is created for each employee in the tab 'Leave' and maintained or updated for all the employees in the option 'Leave Taken' in the HRM system. Managers, Administrators and Departmental Administrators can view the leave information.

Leave

Operators create and modify the leave information in the 'Leave' tab where the optional leaves are selected and number of days allowed is allocated. Mandatory leaves will be allocated automatically by the system(done in the master files). Leave information cannot be modified once they are entered into the system other than the lapsed leave information. Officers can modify and delete the leave records.

Lapsed leave

This tab is used to enter information related to the employee's lapsed leave i.e. details of the leave if the employee is entitled to bring forward the past year leave. Only the officers can modify (delete) lapsed leave by double clicking on the lapsed leave from the table and pressing the button 'Delete'. This will delete the leave from the database. Officers and Operators can re-enter for the year and press the action button 'Update' to add to the leave table.

Leave Taken

Information related to the employee's leave taken is entered and modified in this option. All the employees pertaining to the selected ministry, department and division are displayed in this screen. The operators record this at the end of month or year depending on the ministry's decision. Both operators and officers can modify the information in leave taken option.

➤ **Skill**

Skills that the respective employee obtained through experience are maintained under this category. Operators enter and modify skill details depending on the employee's skill rate by selecting one of the rates such as either basic or intermediate or advanced or expert. Officers can modify and delete the skill records in the system. Managers, Administrators and Departmental Administrators can view the skill information.

➤ **Performance Appraisal**

Information regarding yearly performance appraisal scores of the corresponding employees is maintained under this category. All the employees pertaining to the selected ministry, department and division are displayed in this screen. Operators can enter and modify this depending on the employee's performance by selecting one of the scores such as either excellent or good or satisfactory or unsatisfactory. Officers can modify the performance appraisal records.

➤ **Training**

Training provided to the corresponding employees are entered and modified under this category by the operators. This holds the details of the training courses attended by each employee. The officers can delete and modify the training records. Managers, Administrators and Departmental Administrators can view the training information.

➤ **Staffing**

Staffing is created and maintained by the administrator in the master file option.

➤ **Employee Transfer or Promotion**

This operation is done to record the information regarding to transfer of employees within the MoFP and promotions in the HRM system. Details regarding this is maintained by the officers and operators in the category 'Business Information' from the option 'Employee'.

If an employee is entitled for transfer then change only the fields department, division and district in the 'Business Information'. If an employee is entitled for promotion, then change only the fields designation, service and class.

6.C.1.2 Master Files

Master files are created and maintained by the administrator in the HRM system, to hold the information related to the ministry of finance and planning. There are 15 master files maintained in the system.

➤ **System Parameters**

In order to maintain the HRM system, the parameters are set before commencing any operations in the system.

➤ **Ministry**

This master file is used to maintain the information related to the ministries in the HRM system.

➤ **Department**

This master file is used to maintain the information related to the departments in the HRM system.

➤ **Division**

This master file is used to maintain the information related to the divisions in the HRM system.

➤ **District**

This master file is used to maintain the information related to the districts in the HRM system.

➤ **Qualification Type**

This master file is used to maintain the information related to the qualification types in the HRM system.

➤ **Skill Types**

This master file is used to maintain the information related to the skill types in the HRM system.

➤ **Designation**

This master file is used to maintain the information related to the designations in the HRM system.

➤ **Service**

This master file is used to maintain the information related to the services in the HRM system.

➤ **Class**

This master file is used to maintain the information related to the classes in the HRM system.

➤ **Salary Structure**

This master file is used to maintain the information related to the salary structures in the HRM system.

➤ **Allowance Type**

This master file is used to maintain the information related to the allowance types in the HRM system.

➤ **User Group**

This master file is used to maintain the information related to the user groups in the HRM system.

➤ **User**

This master file is used to maintain the information related to the users in the HRM system. This file can be accessed, added, modified and deleted by Departmental administrators as well.

➤ **Leave Type**

This master file is used to maintain the information related to the leave types in the HRM system.

➤ **Staffing**

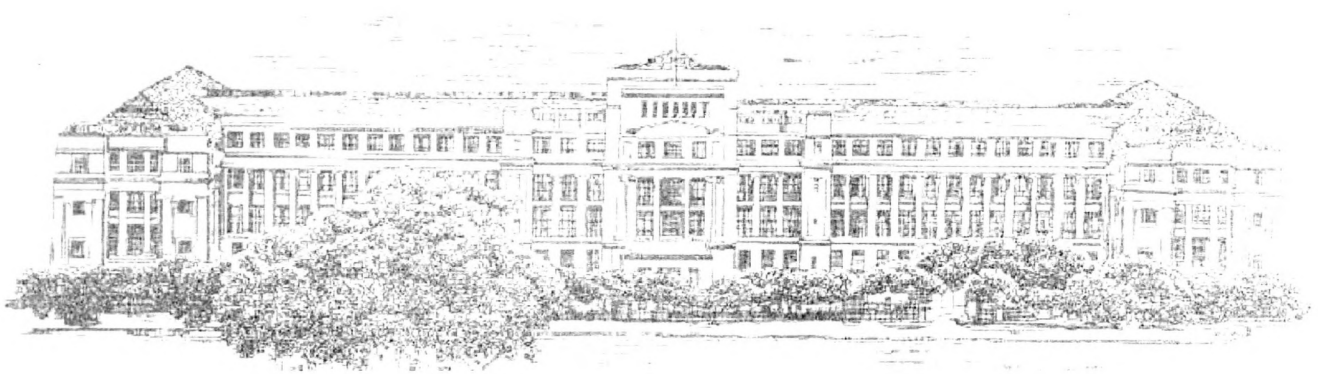
This master file is used to maintain the information related to the staff in the HRM system.

Appendix – D

Screen Layouts



Human Resources Management System



Ministry of Finance and Planning
Towards a strong and modern economy

District

District Code

Name

Employee Details

National ID No <input type="text"/> (No space)		Employee Status <input type="text"/>	
Mr <input type="text"/>			
Title Surname		Other Names	
Salary / Perform Appraisal		Leave	
Training		Skill / Next of Kin 4	
Personal Information		Business Information	
Qualification			
Permanent Address <input type="text"/>		Date Appointed for Public Service <input type="text"/> (dd/mm/yyyy)	
		Extention <input type="text"/>	
Temporary Address <input type="text"/>		No of Extentions Received <input type="text"/>	
		Expected Date for Retirement <input type="text"/> (dd/mm/yyyy)	
Tel No <input type="text"/>		Marital Status <input type="text"/>	
Date of Birth <input type="text"/> (dd/mm/yyyy)		W & OP No <input type="text"/>	
Personal File No <input type="text"/>		Spouse	
Gender <input type="text"/>		Spouse in Govt. Service <input type="text"/>	
Highest Level Education <input type="text"/>		Service <input type="text"/>	
		Work Place <input type="text"/>	
		No of School Children <input type="text"/>	

InActive
 Active
 Retired
 Resigned
 Deceased

System Parameters

Current Year	<input type="text" value="2001"/>
No. of Lapse Leaves	<input type="text" value="2"/>
Retirement Age	<input type="text" value="55"/>
Max.Retirement Age	<input type="text" value="60"/>
Min.Age for Public Service	<input type="text" value="18"/>

Allowance Types

Allowance Type Code	<input type="text"/>
Description	<input type="text"/>

Class Details

Class Code

11

Description

12

Allowance	Description	Amount
A1	Allowance 1	11.00
A2	Allowance 2	123.00
A3	Allowance 3	
A4	Allowance 4	

Salary Structure

Existing Records

Service Code

Class Code

Description

Min. Basic Salary

Max. Basic Salary

Designation

Designation Code

Description

Service

Service Code	<input type="text"/>
Description	<input type="text"/>

Ministry

Ministry Code	<input type="text"/>
Name	<input type="text"/>
Address	<input type="text"/>
Contact Person	<input type="text"/>
Tel No	<input type="text"/>

User

User ID	<input type="text"/>
User Group	<input type="text"/>
Password	<input type="text"/>
<input checked="" type="radio"/> All	
<input type="radio"/> Ministry	
<input type="radio"/> Department	

Leave Types

Leave Type Code	<input type="text"/>
Description	<input type="text"/>
Status	<input type="text" value="Mandatory"/>
No. of Days Allowed	<input type="text"/>

Department

Ministry	<input type="text"/>	<input type="text"/>
Department	<input type="text"/>	<input type="text"/>
Address	<input type="text"/>	
Contact Person	<input type="text"/>	
Tel No	<input type="text"/>	

Skill Types

Skill Type Code	<input type="text"/>
Description	<input type="text"/>

User Group

User Group	<input type="text"/>
Description	<input type="text"/>

Staffing

		<input type="text"/>	Existing Records
Ministry	<input type="text"/>	<input type="text"/>	
Department	<input type="text"/>	<input type="text"/>	
Service	<input type="text"/>	<input type="text"/>	
Class	<input type="text"/>	<input type="text"/>	
Total No. Employees	<input type="text"/>		
Current No. Employees	<input type="text"/>		

Qualification Type

Qualification Type	<input type="text"/>
Description	<input type="text"/>

Division

Ministry Code	<input type="text"/>	<input type="text"/>
Department Code	<input type="text"/>	<input type="text"/>
Division Code	<input type="text"/>	<input type="text"/>
Address	<input type="text"/>	
Contact Person	<input type="text"/>	
Contact Telephone Number	<input type="text"/>	

Leave Taken

Year	<input type="text"/>	Ministry	<input type="text" value="111"/>	<input type="text"/>
		Department	<input type="text" value="EPD"/>	<input type="text" value="31"/>
		Division	<input type="text"/>	<input type="text"/>

Employee ID	Name	Surname	Leave Type	Available days	Total days taken	Change
111111114V	www	www dtdtdtdic dtd	AN	8	8	
			CS	0	2	
			LP	11	2	
			MT	22	8	

Employee Performances

Year

Ministry

Department

Division

Employee ID	Name	Surname	Score
111111114V	www	www dhdhd d d d v	Unsatisfactory
456515424V	eeeeeeeeeeeeee	heedyhweyju	Unsatisfactory

Performance Appraisal History

Employee's Location

Ministry

Department

Division

Employee

National ID No.

Name

Designation

Training History by Employee

Employee's Location

Ministry

Department

Division

Employee

ID

Name

Designation

Leave Information

By Employee

By Location

Year

Select the category for Leave Information Report

Ministry

Department

Division

Select an Employee for the Leave Information Report

Employee ID

Name

Designation

Salary & Allowances Reports

By Location By Employee

Select the category for Leave Information Report

Ministry

Department

Division

Allowance Information

Salary Information

Staffing Information by Department

Select the Location for Staffing Information Report

Ministry

Department

Qualification Details by Employee

Select the category for Qualification Information Report

Ministry

Department

Division

Select an Employee for the Qualification Information Report

Employee ID

Name

Designation

Skills by Employee

By Employee

By Skill

Select the Location for Skill Information Report

Ministry

Department

Division

Select a Skill for the Report

Skill

Select an Employee for the Skill Information Report

Employee ID

Name

Designation

Employee History Information

Employee Details

ID

Name

Ad hoc Reports and Queries

Ministry

Dept.

Division

National ID No

Name

Service

Class

Designation

Level of Education

Date (dd/mm/yyyy)

Age

From

To

Years in Public Service

From

To

Years in Present Office

From

To

Gender

All

Male

Female

Extension Received

All

No

Yes

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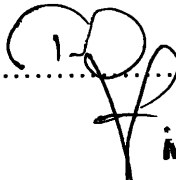
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