"Towards Implementing an Accounting Solution at SEECS (ePay)"

BY

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(2005-NUST-BIT-131)

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"A Project report submitted in partial fulfillment of the requirement for the degree of Bachelors in Information Technology"

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Approval

It is certified that the contents and form of thesis entitled **"Towards Implementing an Accounting Solution at SEECS (ePay)"** submitted by Mr. Nawab Ali Shinwari has been found satisfactory for the requirement of the degree.

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Mr. Muhammad Azim Haider

Co- Advisor: _____

Mr. Muhammad Bilal

DEDICATION

In the name of Allah, the Most Beneficent, the Most Merciful. I would like to dedicate my work especially to my parents, brothers, sisters and my friends.

ACKNOWLEDGEMENTS

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List of Abbreviations

NUST   National University of Science and Technology

SEECS   School of Electrical Engineering and Computer Science

GL   General Ledger

GJ   General Journal

SA   System Administrator

ERP   Enterprise Resource Planning

HQ   Head Quarter

Abstract

Managing accounting data is one of the crucial jobs in every organization. On the basis of this data, organizations formulate its financial strategies. These strategies help in the smooth running of the organization. This project intends to automate the payroll accounting process of the SEECS and to integrate the developed system with currently deployed General ledger application.

NUST-SEECS is currently developing its complete ERP system. This ERP system consists of many modules which SEECS automation team will develop in next two or three years of time period with modular approach. This ERP will help in managing the human and other resources. Payroll is one of the crucial modules.

This system will facilitate the administration in their decision process as it will have the feature of running different analytical reports. The activities like salary statements, payroll register and posting of the payroll to the GL will be done very easily with this system.

Introduction

Payroll management is a fundamental business need demanding compliant and accurate financial controls in a timely manner. An efficient payroll management system will help in controlling the workforce costs; ensure the entire workforce is being paid on time and according to the rules of the organization. The system which monitors the payroll process from end to end, reconcile the errors and process group of employees simultaneously is the requirement of every big, medium and small organization. SEECS is a medium organization which implements the rules of its parent organization i.e. NUST. SEECS is divided into different departments such as Department of Computing, Department of Communication system Engineering, Department of Electronics Engineering, Examination, Accounts, and Administration. These departments have number of employees which are controlled on the basis of employee type i.e. NG, Faculty, Officers and department. SEECS is developing an ERP to manage the human and other resources. This ERP is having a module for the payroll.

This automated payroll management system will help in managing the organization wise workforce payroll and compensation data. This system will fully translate the current partial manual system into an automated system. All the activities of payroll i.e. pay slip, payroll register, salary heads definition, employee's salary templates, posting of salaries to GL will be done by this system in an ease and efficient way. At the end of the day the system will help the administration in their decision process.

1.1 Problem Statement

In this current era, business organizations are facing a lot of global struggle and innovation. Facilitating this is the increasing ability of organizations to make good business decisions based on the large amounts of information their enterprise produces.

In this environment, it is necessary for a successful business to integrate information technology into its basic processes, and, to do that, it needs qualified, skilled information technology employees. In addition, these organizations need executive management and other functional workers who have IT skills. In fact, an organization needs all its workers--accountants and financial executives included--to have a high level of computer and technical skills. In the past few years the accounting information technology has shifted from specialized mainframe based information management system into user friendly integrated web based systems. The integration of the information technology and the managerial and financial principals makes it a need for the every organization to adopt accounting information systems for their accounting processes. Keeping in view this need, SEECS is in process of developing a complete ERP which will have an accounting module as an important sub system. The SEECS automation team has already developed and deployed the GL application for the SEECS accounts department. This GL application needs feeder sub systems. Among them, one is payroll which deals with organization major expense called as Salaries expenses. This need makes our problem statement as follow.

"In order to provide efficient payroll calculations, the currently deployed GL-based application at SEECS requires a payroll feeder subsystem which will allow automatic generation of the double entry journal voucher"

1.1.1 Motivation:

The motivation behind this project is to develop a fully automated payroll subsystem for the GL application which helps in saving the valuable time of the SEECS accounts personnel. It will also help the administration in the decision process. Secondly my personal learning on the topic of this field cannot be overlooked.

1.1.2 Project Scope:

The system will give the power to manage the whole payroll of the SEECS. It will automate the partial manual system. This system will include the following features.

1. It will manage the information of each employee efficiently and accurately.
2. It will maintain the job history of each employee.
3. Generate all the **Reports** related to Branch, Department, employee, attendance/leave, payroll, Bonus etc.
4. Create the complete payroll register
5. Create flexible payroll register.
6. Managing the employees on the basis of departments and type.
7. Create the pay slips for each employee at a mouse click.
8. Create the different analysis reports for management in the shortest possible time .
9. Enabling different summary reports.
10. Creating the salary statement for-each employee.
11. Posting the payroll to the GL according to the correct accounts mapping.
12. Reduce miscalculation and convolution while creating salaries.

1.1.3 Existing Products:

There is large number of softwares available in the market for payroll management i.e. Peach Tree based Systems. Different organization use different software. Every software has its pros and cons. Some have very high cost and some are not that much good which can fulfill the requirements of the organization.

1.2 Technology Used:

The technologies that are used in developing this project are:

* Oracle Developer 10g

* Rational Rose for modeling

For database

Oracle database 10g

1.3 Conclusion

After the completion of this project, SEECS accounts department will be able to process the entire payroll by using this system. The automatic posting of the payroll to the GL will also be done by using this system with ease and efficient way.

Literature Review

This chapter discusses the important literature that I have done in the review phase of this project. For this purpose I studied the payroll accounting process that how the payroll is processed in an organization. I studied the current system which is being used by the organization and a couple others which were used sometimes ago. This Chapter includes a brief of the existing system profile, analysis of existing system of SEECS and problems in existing System.

2.1 Existing System Analysis

At the time of the selection this project, SEECS accounts department was totally manual. All the accounting transaction was paper based. They accounting system was single entry which needed constant auditing. But currently accounts department is become partially manual due to the deployment of the GL application. Although the GL has made the GJ and ledger accounts manual but still accounts department use the traditional manual single entry system for many of its accounting task. The payroll which is the main focus of this project is also partially manual. The processing of the payroll is still a very hectic job. The human creation of this partially manual payroll process makes it still prone to errors.

The process of the creation of the payroll takes a lot of time from its creation to its posting to the GL. First the whole payroll is calculated on the Excel Sheets. The payroll registered is prepared on the excel sheets. It takes 5 to 10 days usually. After calculation of the payroll it is send to HQ for the approval. After the approval the whole payroll is feed into software [System developed by Mr Adnan. This system is used to create the pay slip for the employees. After this step the payroll is transferred to the GL which usually takes 15 days each month.

2.2 Problems in Existing System

Existing System SEECS is partially manual, so there are many problems present in the system. Some problems are identified during the analysis study of existing System, which are as following.

2.2.1 Slow and Lengthy Process

The current system is time consuming. The calculation of the payroll on the excel sheets and then feeding that data into the pay slip generation slip requires a lot of time and makes the process slow. Secondly the posting of salaries to GL requires 15 days which is very time consuming process.

2.2.2 Inaccuracy and impreciseness

The existing system still requires a lot of manual work. This manual work is being done by humans. A minute error makes this system a prey of inaccuracy and impreciseness of data. These inaccuracies and impreciseness in data lead to wrong information which ultimately results in wrong decisions. Secondly books are still maintained for the payroll which may leads to inaccuracy.

2.2.3 Multiple Entries for same Transaction

Current system has a major drawback of multiple entries for a single transaction. A salary for a single employee has to be recorded three times. First on the excel sheet, then to pay slip application and then to GL.

2.2.4 Difficult to Maintain

This system is difficult to maintain because the payroll data is stored in three different disintegrated forms. The errors are hard to be caught.

2.3 System Developed By BIT-3 Student

This system was developed by a student of BIT-3 in oracle in 2004. This system was based on single entry accounting system. It was fulfilling the requirements of the organization. It was capable of managing pay slips and payroll register. But when the organization changed its name, there was no provision for catering this requirement change because the student who developed this system provided only the executable files of the system which were unable to change. This system was automatically superseded.

2.4 Payroll Management System Developed by Webmaster Mr. Adnan

This system is developed by the webmaster Mr.Adnan. This system is currently in use. It handles the payroll up to some extent but it does not fulfill the requirements of the organization. The SEECS accounts department is currently using this system. But this system has also certain

limitation. Firstly, it can only process the pay slip and cannot create the whole payroll register. Secondly it cannot be integrated with currently deployed GL application. In short we can say that this system also cannot fulfill the needs of the organization.

2.5 Peach Tree Based System

A full GL was developed using Peach Tree. The chart of accounts was defined in this system. But this system also became obsolete as the SEECS automation group developed a new GL application in oracle which superseded this system.

Proposed Methodology

After the methodical and logical analysis of the limitations of the existing system, there is strong need to remove the deficiencies of the existing system by developing a complete automated system. This system will automate the partial manual system of the payroll which will help the management and accounts personnel to perform many complex tasks in no time.

The proposed system will perform all the activities that are done in the manual system and will provide necessary information with great precision and accuracy. By keeping in mind all the limitations and disadvantages of the manual system, proposed system will be designed. The scope of the proposed system is to provide consistent and reliable information as soon as possible.

In my proposed system, all the imperative data will be properly organized and stored without any redundancy and will be processed in such a way to provide timely information. Our proposed methodology for this system, divides it into three different modules. These modules are diagrammatically illustrated below.

3.1 Module # 1

This module deals with management of the Jobs, departments and employees. All the relevant data of the employees, jobs and department are stored in this module. This data is used in the other modules.
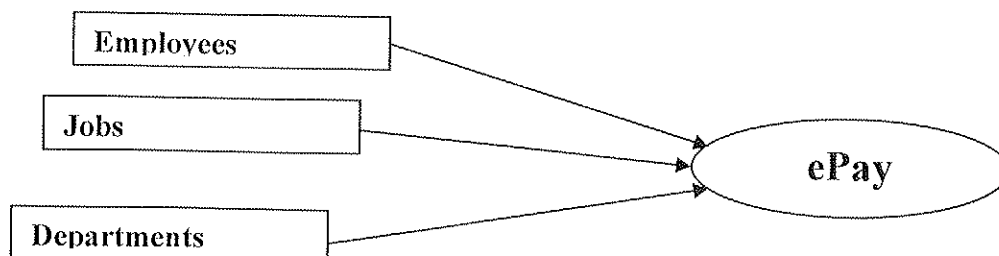
3.2 Module #2

This is the core module of this system which deals with payroll process. All the necessary calculation is done by this module. Creation of the reports like pay slips, salary statements and payroll register are done by this module.
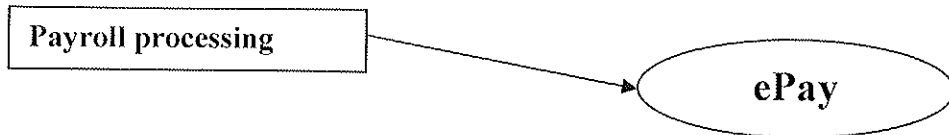
3.3 Module # 3

This module is related with the posting of salaries to the GL application. This module will complete the achievement which we described in our problem statement.

Requirement Elicitation and System Design

This chapter discusses the requirement elicitation and the system design. This chapter tells about the functional and non functional requirements of the system. The specification and the use case model together will result in the complete requirement elicitation for the payroll system.

4.1 System Scope

The system will give the power to

1. It will manage the information of each employee efficiently and accurately.

2. It will maintain the job history of each employee.

3. Generate all the **Reports** related to Branch, Department, employee, attendance/leave, payroll, Bonus etc.

4. Create the complete payroll register

5. Create flexible payroll register.

6. Managing the employees on the basis of departments and type.

7. Create the pay slips for each employee at a mouse click.

8. Create the different analysis reports for management in the shortest possible time.

9. Enabling different summary reports.

10. Creating the salary statement for each employee.

11. Posting the payroll to the GL according to the correct accounts mapping.

12. Reduce miscalculation and convolution while creating salaries.

4.2 Functional Requirements

This system has following functional requirements.

4.2.1 Department Definition

Our system will have the functionality to define the departments in the organizations. This feature will be used to manage the employees on the basis of departments. E.g. there are three departments in SEECS i.e. DoC, EE, CSE and each have different employees. This will make the management of employees easy.

4.2.2 Job Designation

This feature will enables to define the job titles for the employees. Various roles come under the definition of the job titles. This system will have the provision to add and modify new job designation. Examples of various job designations are i.e. Lecture, professor, RVP, TVP, RA, Assistant Professor, Associate Professor.

4.2.3 Employee Registration

This system has the feature of adding, updating and deleting employees. This depends upon the departments, employee type and the job designation features of the system. This feature enables the accounts department to manage the data of employees.

4.2.4 Salary Heads Definition

Every organization defines its own salary heads. This system has the provision of defining the salary heads irrespective of the hard coding. The salary heads mainly comprises of the following two segments.

4.2.4.1 Earnings:

Those heads which are summed to the salary of an employee are called as earnings. Earnings result in gross pay e.g.

- Basic pay

- House Rent

- Medical Allowance

- IT Allowance

- Special Additional Allowance

- Interim

- Utility Allowance

- C.A

4.2.4.2 Deductions:

Those salary heads which are subtracted from the gross pay are called as deduction. The result is the net pay.

e.g.   Income Taxes

Welfare Fund

Tea Break

Student Welfare fund

This system has facility of both formula based calculation and manual calculation of the salary heads.

4.2.5 Management of salary

This system can manage the salary of each employee individually. An appropriate payment method can be specified i.e. Cash, cheque, Draft. Secondly there is a choice for adding of new heads along with amount to salary of the selected employee.

4.2.6 Job History OR Experience Certificate

An employee can work over different job titles for various periods. This system will track the history of the employees being working at different post. When that employee wants an experience certificate at the end (at the time of leaving SEECS), will be printed for him/her at a mouse click.

4.2.7 Printing the Payroll Register

This system also focus on the making a flexible payroll. At the end of each session the whole payroll register will be printed showing the all salaries heads, gross pay and the net pay for each employee.
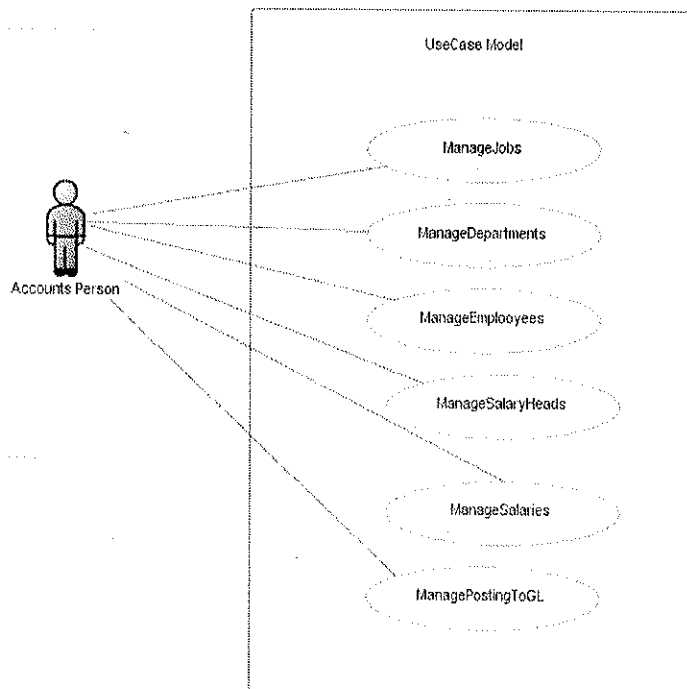
4.2.8 Printing salary Statement

This system enables the employees of the organization to print their salary statement irrespective of any search and complexity. This feature will be accessible by every employee of the employee.

4.2.9 Printing Employee Type Salary

This system has feature to see the employee salary summary on the basis of the type. E.g. Summary of total salaries along with each employee for NG employees can be generated by a single click.

4.3 Use Case Model

4.4 Use Case Description:

4.4.1 Use Case 1:

ManageJobs	
Participating Actors	Accounts Personnel
Flow of events	1. Actor enter create the list of the Jobs. 2. Actor starts the event by pressing "Manage Jobs" option on the main form 3. ePay responds by showing the manage Jobs form. 4. Actor fills the form by entering University_id , institute_id, Job_title and Job_Status while the Job_id is system generated and save in the database by pressing "save"
Exit Condition	Actor has received a message for successful transaction. Actor receive an error message for failed transaction .

4.4.2 Use Case 2

ManageDepartments	
Participating Actors	Accounts Personnel
Pre Condition	Actor is logged in to the system
Flow of events	1. Actor lists the name of department. 2. Actor starts the event by pressing "Manage Department" option on the main form. 3. ePay responds by showing the manage Departments form. 4. Actor fills the form by entering University_id , institute_id, Department _name and Department_Status while the Department_id is system generated and save it in the database by pressing "save".
Exit Condition	Actor has received a message for successful transaction. Actor receive an error message for failed transaction.

4.4.3 Use Case 3

ManageEmployees	
Participating Actors	Accounts Personnel
Flow of events	1. Actor creates the list of the Employee. 2. Actor starts the event by pressing "Manage Employee" option on the main form 3. ePay responds by showing the manage Employee form. 4. Actor fills the form by entering INSTITUTE_ID,EMPLOYEE_ID,EMPLOYEE_CODE, EMPLOYEE_NAME,EMPLOYEE_FNAME, EMPLOYEE_ADDRESS, EMPLOYEE_NATIONALITY,EMPLOYEE_NIC, EMPLOYEE_PHONE,EMPLOYEE_GENDER, EMPLOYEE_EMAIL,EMPLOYEE_RELEGION, EMPLOYEE_PHOTO,EMPLOYEE_MOBILE_NO, EMPLOYEE_PAYMENT_METHOD, EMPLOYEE_PAYMENT_BANK, EMPLOYEE_PAYMENT_ACCOUNT_NO, EMPLOYEE_ACCOUNT_TITLE,EMPLOYEE_STATUS, EMPLOYEE_TYPE, EMPLOYEE_DOB,EMPLOYEE_HIREDATE, DEPARTMENT_ID,JOB_ID, EMPLOYEE_MARITAL_STATUS and at the same time set the Salary template for that Employee and Press "Save".
Exit Condition	Actor has received a message for successful transaction. Actor receives an error message for failed transaction.

4.4.4 Use Case 4

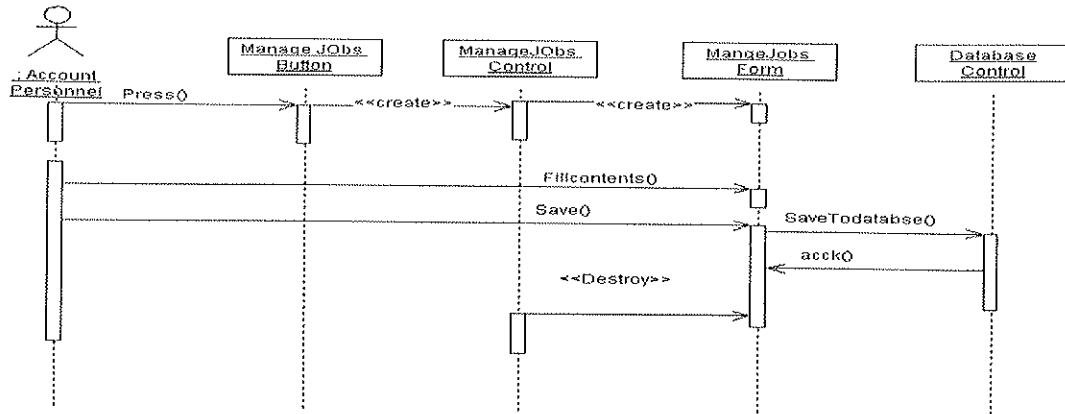| ManageSalaryHeads	
Participating Actors	Accounts Personnel
Pre Condition	Actor is logged in to the system
Flow of events	1. Actor lists the Active Employees. 2. Actor starts the event by pressing "Manage Salary heads" option on the main form. 3. ePay responds by showing the manage Salary Heads form. 4. Actor fills the form by entering ÚNIVERSITY_ID,INSTITUTE_ID, SALARY_HEAD_ID, SALARY_HEAD_CODE, SALARY_HEAD_TITLE, SALARY_HEAD_TYPE, SALARY_HEAD_STATUS, SALARY_HEAD_ORDER_NO and save it in the database by pressing "save" .
Exit Condition	Actor has received a message for successful transaction.Actor receives an error message for failed transaction.

4.4.5 Use Case 5

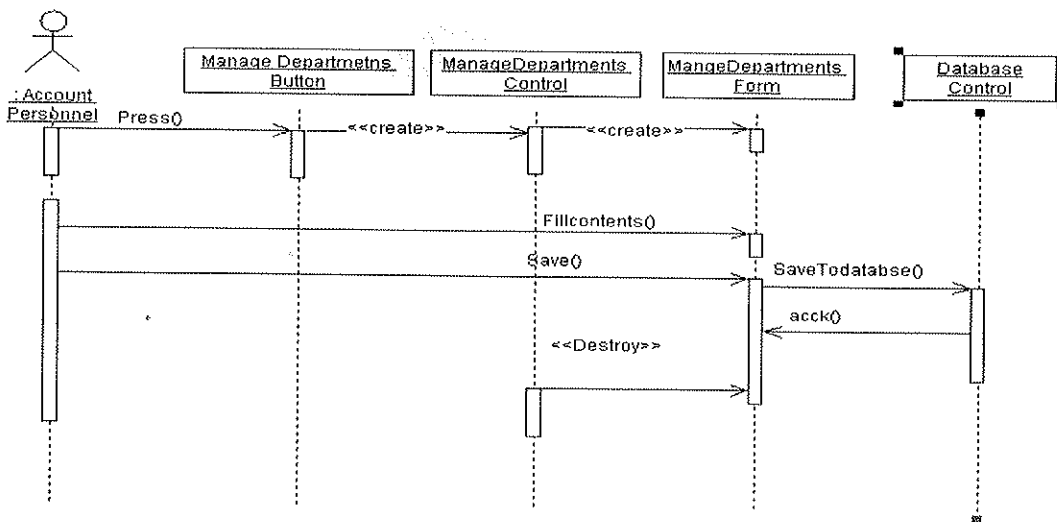| Manage Salaries	
Participating Actors	Accounts Personnel
Pre Condition	Actor is logged in to the system
Flow of events	1. Actor lists the Salary heads. 2. Actor starts the event by pressing "Manage Salaries" option on the main form. 3. ePay responds by showing the manage Salaries form. 4. Actor fills the form by entering all the information on the form and save it in the database by pressing "save".
Exit Condition	Actor has received a message for successful transaction.Actor receives an error message for failed transaction.

4.4.6   Use case 6

| Manage PostingToGL	
Participating Actors	Accounts Personnel
Pre Condition	Actor is logged in to the system
Flow of events	1. Actor lists the Payroll voucher. 2. Actor starts the event by pressing "Manage Posting to GL" option on the main form. 3. ePay responds by showing the manage Posting to GL form. 4. Actor fills the form by entering all the information on the form and save it in the database by pressing "save".
Exit Condition	Actor has received a message for successful transaction. Actor receives an error message for failed transaction.

4.5 Sequence Diagrams:
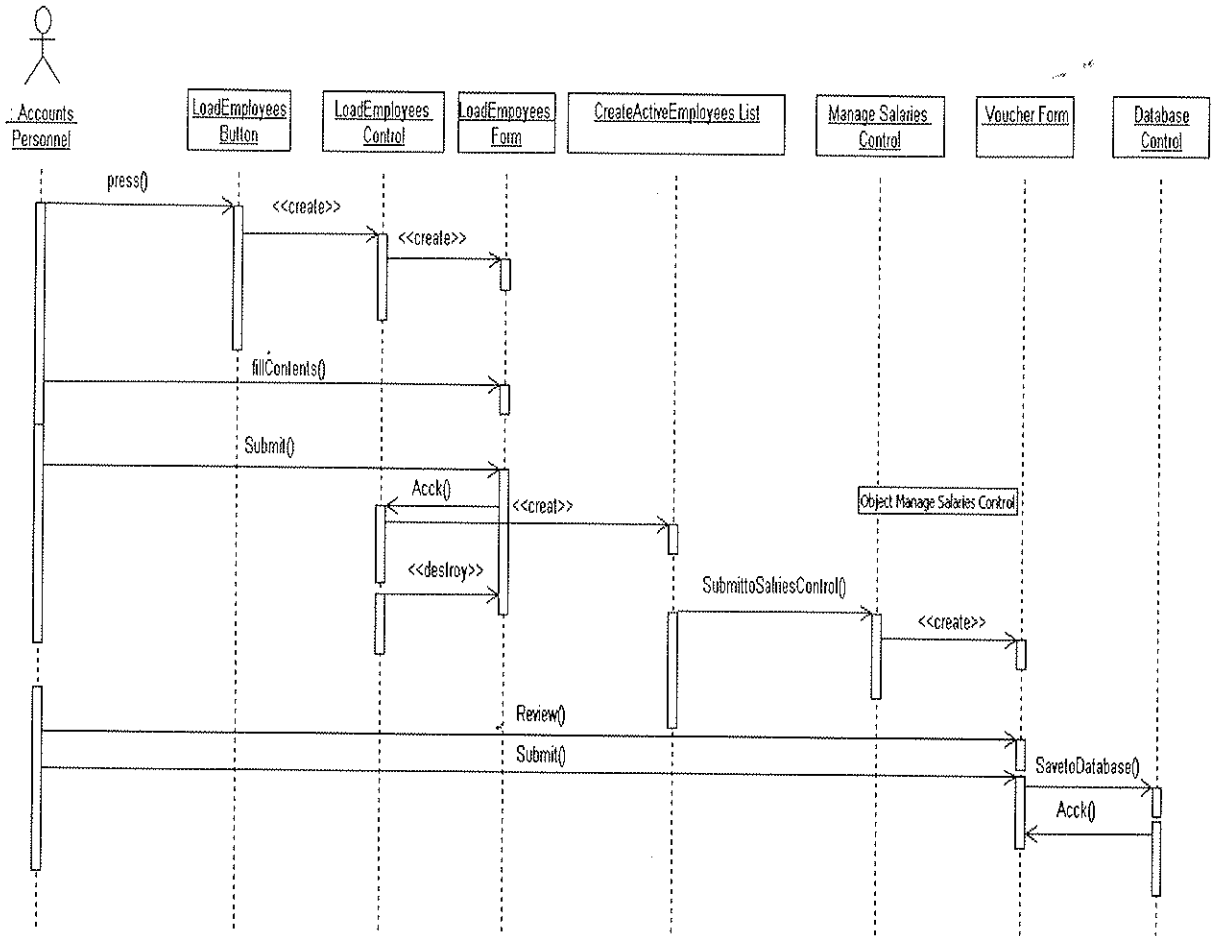
4.5.1 Manage Jobs

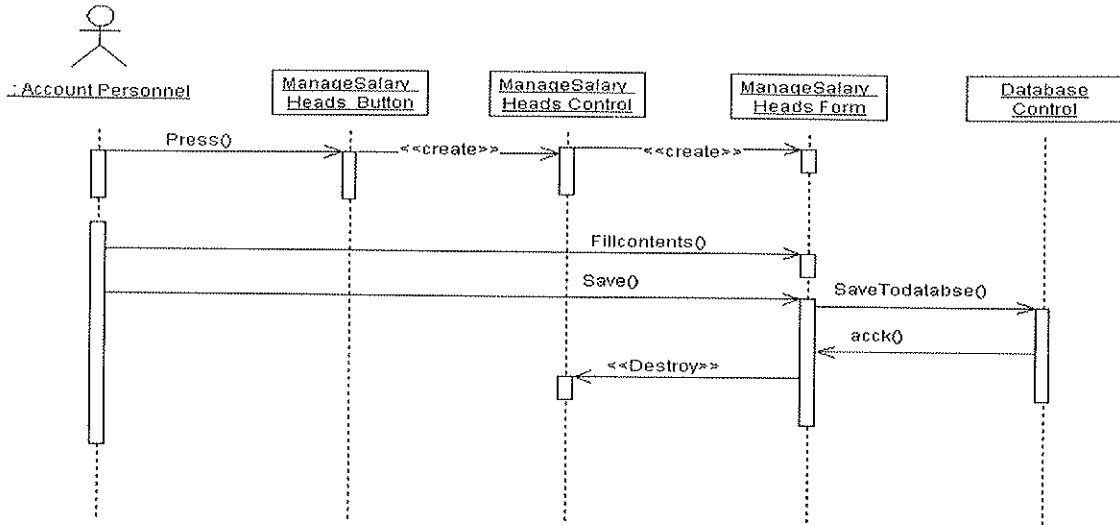### 4.5.2 ManageDepartmets
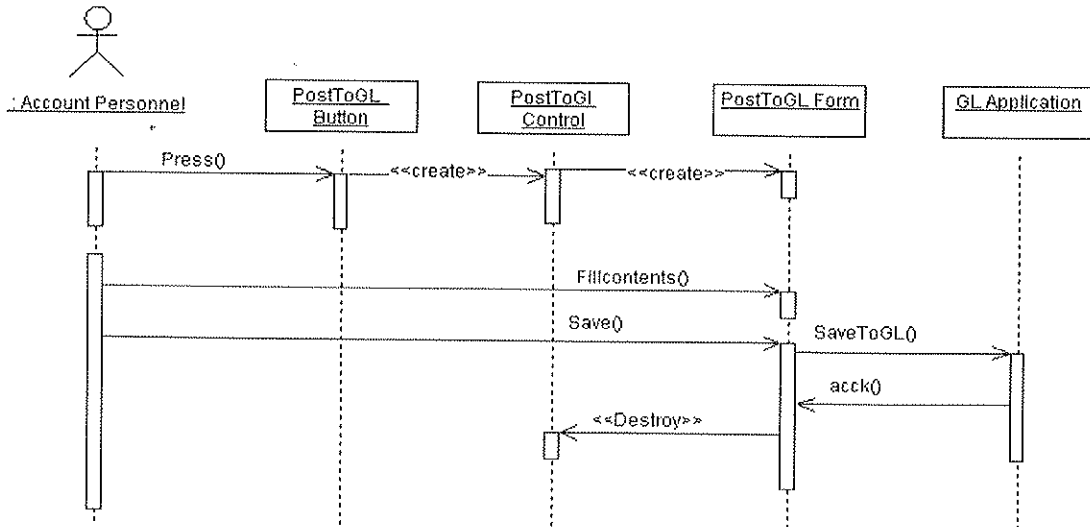
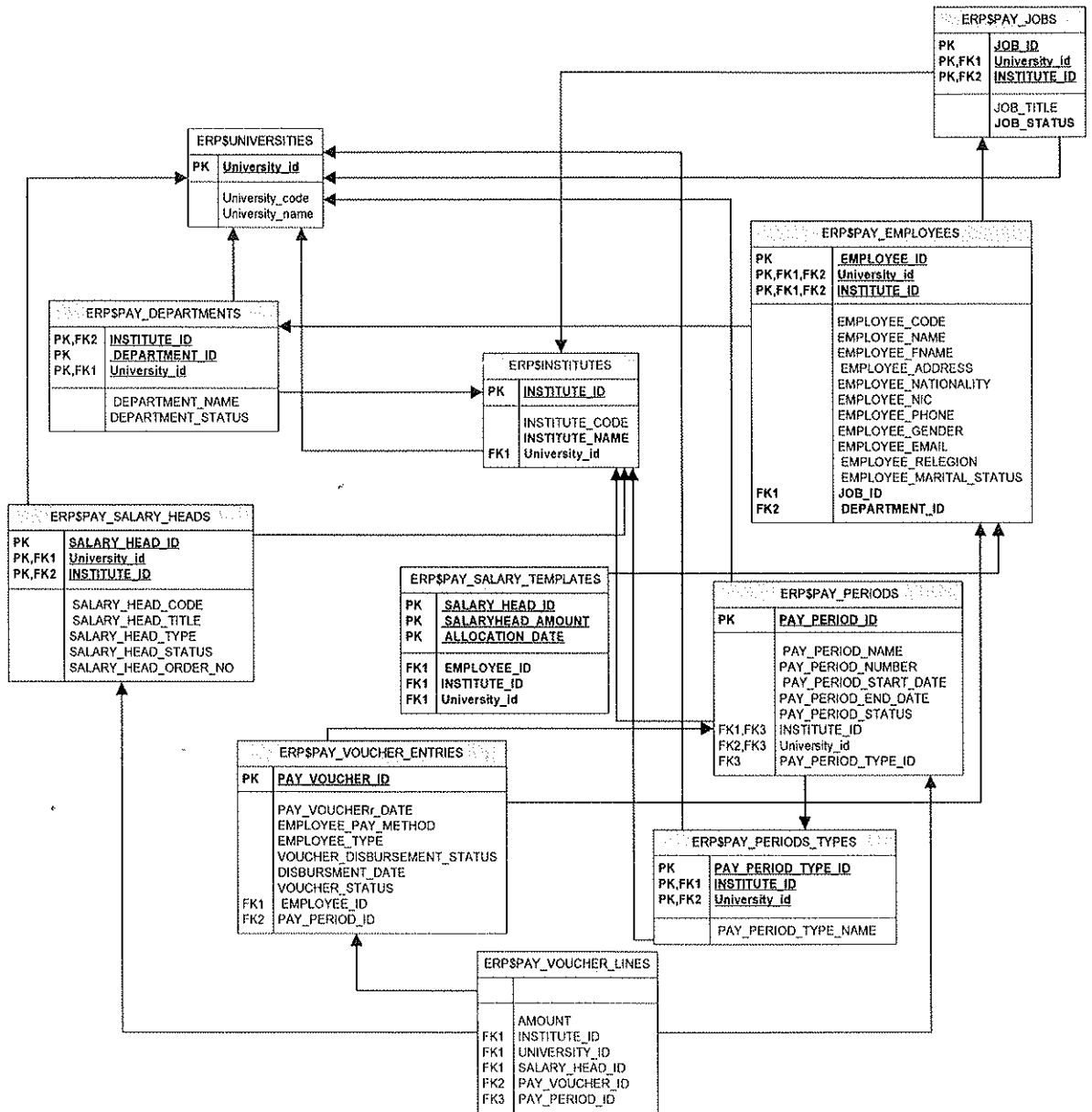### 4.5.3 Manage Employees
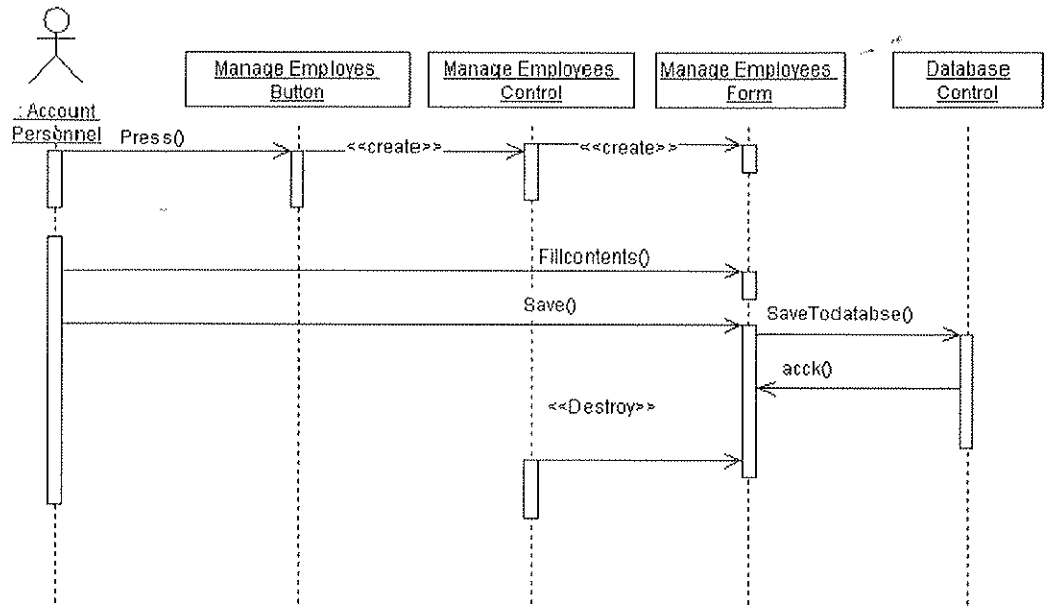
4.5.4 ManageSalaries
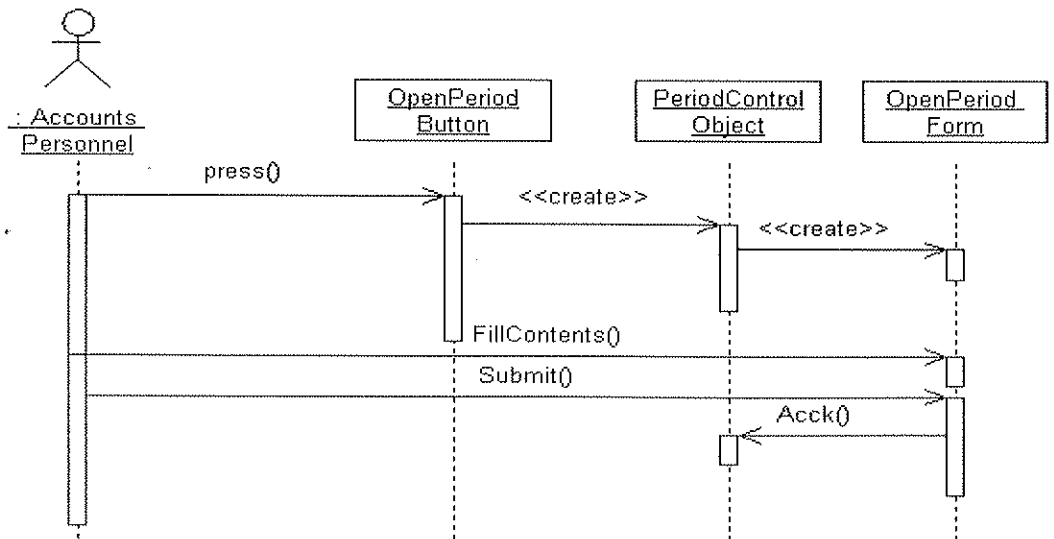
4.5.5ManageSalaryHeads

4.5.5 ManagePostToGL

4.6 Entity Relationship Diagram:

Following diagram represent the ERD of the database for this system.

ERP$PAY_JOBS	
PK	JOB_ID
PK,FK1	University_id
PK,FK2	INSTITUTE_ID
	JOB_TITLE
	JOB_STATUS

ERP$UNIVERSITIES	
PK	University_id
	University_code
	University_name

ERP$PAY_DEPARTMENTS	
PK,FK2	INSTITUTE_ID
PK	DEPARTMENT_ID
PK,FK1	University_id
	DEPARTMENT_NAME
	DEPARTMENT_STATUS

ERP$INSTITUTES	
PK	INSTITUTE_ID
	INSTITUTE_CODE
	INSTITUTE_NAME
FK1	University_id

ERP$PAY_EMPLOYEES	
PK	EMPLOYEE_ID
PK,FK1,FK2	University_id
PK,FK1,FK2	INSTITUTE_ID
	EMPLOYEE_CODE
	EMPLOYEE_NAME
	EMPLOYEE_FNAME
	EMPLOYEE_ADDRESS
	EMPLOYEE_NATIONALITY
	EMPLOYEE_NIC
	EMPLOYEE_PHONE
	EMPLOYEE_GENDER
	EMPLOYEE_EMAIL
	EMPLOYEE_RELEGION
	EMPLOYEE_MARITAL_STATUS
FK1	JOB_ID
FK2	DEPARTMENT_ID

ERP$PAY_SALARY_HEADS	
PK	SALARY_HEAD_ID
PK,FK1	University_id
PK,FK2	INSTITUTE_ID
	SALARY_HEAD_CODE
	SALARY_HEAD_TITLE
	SALARY_HEAD_TYPE
	SALARY_HEAD_STATUS
	SALARY_HEAD_ORDER_NO

ERP$PAY_SALARY_TEMPLATES	
PK	SALARY_HEAD_ID
PK	SALARYHEAD_AMOUNT
PK	ALLOCATION_DATE
FK1	EMPLOYEE_ID
FK1	INSTITUTE_ID
FK1	University_id

ERP$PAY_PERIODS	
PK	PAY_PERIOD_ID
	PAY_PERIOD_NAME
	PAY_PERIOD_NUMBER
	PAY_PERIOD_START_DATE
	PAY_PERIOD_END_DATE
	PAY_PERIOD_STATUS
FK1,FK3	INSTITUTE_ID
FK2,FK3	University_id
FK3	PAY_PERIOD_TYPE_ID

ERP$PAY_VOUCHER_ENTRIES	
PK	PAY_VOUCHER_ID
	PAY_VOUCHERr_DATE
	EMPLOYEE_PAY_METHOD
	EMPLOYEE_TYPE
	VOUCHER_DISBURSEMENT_STATUS
	DISBURSMENT_DATE
	VOUCHER_STATUS
FK1	EMPLOYEE_ID
FK2	PAY_PERIOD_ID

ERP$PAY_PERIODS_TYPES	
PK	PAY_PERIOD_TYPE_ID
PK,FK1	INSTITUTE_ID
PK,FK2	University_id
	PAY_PERIOD_TYPE_NAME

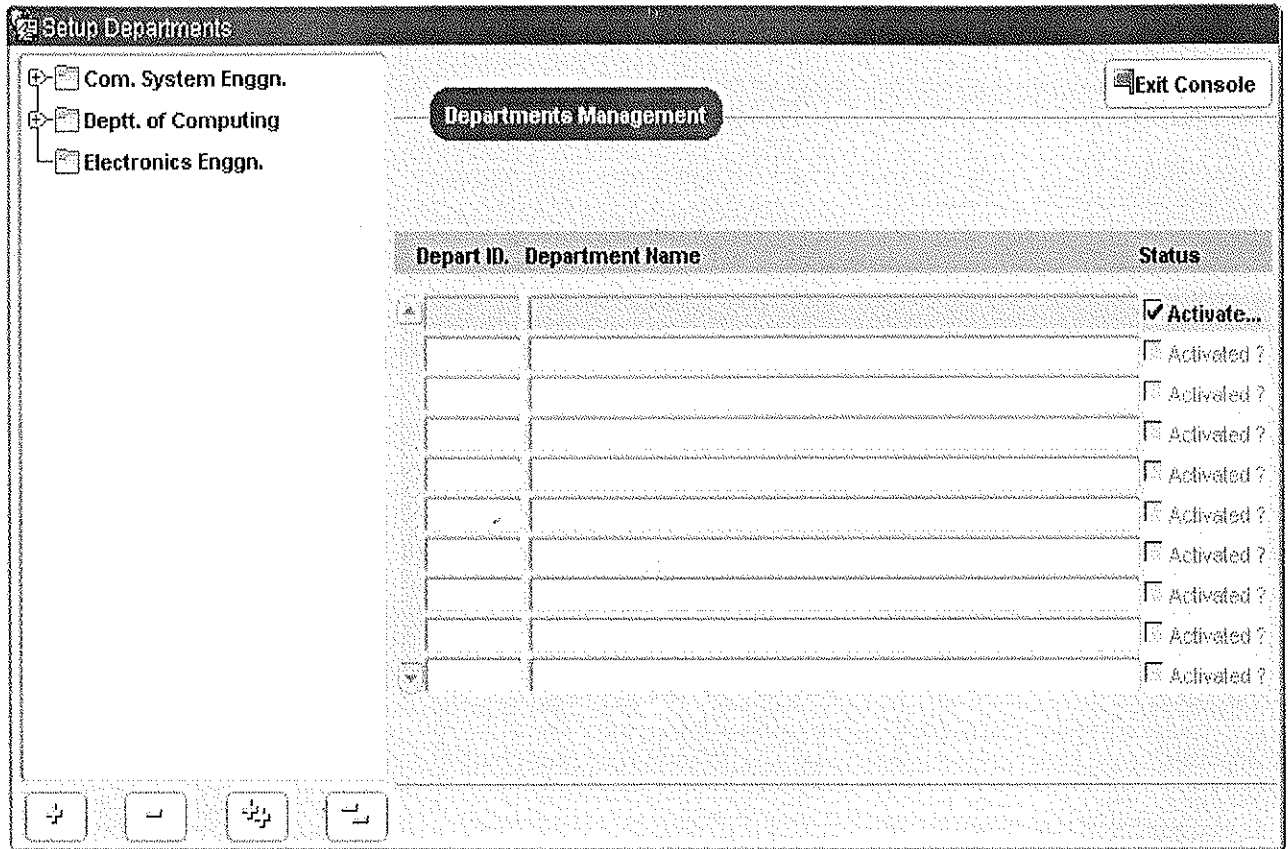| ERP$PAY_VOUCHER_LINES	
	AMOUNT
FK1	INSTITUTE_ID
FK1	UNIVERSITY_ID
FK1	SALARY_HEAD_ID
FK2	PAY_VOUCHER_ID
FK3	PAY_PERIOD_ID

4.7 Interface Design

4.7.1 Manage Departments

This application is a feeder subsystem of the GL application. The login module is controlled by the GL application. The interface is about the Departments Management.

4.7.2 Manage Jobs

This interface is about the management of the Jobs. A user can add, update and delete a Job using this console. A user fill the form and press save.

4.7.3 Manage Employees

This interface is about the management of the employees. A user fills the data of an employee i.e. the payment methods, particulars, salary template and the GL bindings of the salary and press save.

4.7.4 Manage Salary Heads/Payroll Register

This interface is about the setup of the salary heads. A user can add, update and delete salary heads. The interface is an easy one and has similarities with GL application. The end user will feel an ease in using this interface.

4.7.5 Manage Pay Periods

This interface is about the setup of the pay periods. Before processing payroll, a particular pay period has to be defined. This interface provides an easy way of opening a pay period.

Period Id	Period Name	Period Type	Start Date	End Date	Status
1	July2009	Monthly Salary	01/07/2009	31/07/2009	OPENED

4.7.6 Manage Payroll

This interface is about the payroll processing. A payroll voucher is processed for each employee. This is a very ease interface for processing payroll voucher.

Setup Pay Periods

Pay Slip Management

Pay Voucher Id	Voucher Date 12/08/2009
Employee Name	
Employee Type	
Payment Mode	
Payment Bank	
Account Number	

Earnings

Line Id	Pay Head Id	Amount

Deductions

Line Id	Pay Head Id	Amount

Disbursement Status □ Disbursed ?

Disbursement Date

Voucher Status □ Reviewed ?

Conclusion

SEECS payroll management system is an application that automates the partial manual payroll process of SEECS. It will do the following work.

a) Managing the Jobs.
b) Managing the Departments.
c) Managing Employees.
d) Managing Payroll Process.
e) Posting to GL.

The System will help the accounts department and the administration in formulating their decisions. All the manual work is fully translated into this system. The hectic job of calculating the payroll and then the preparation of the Pay slips will done very easily.

This is an effort to make system which will meet the requirements of the organizations. I have left some reports due to the lack of the time. The system interfaces are quite easy to understand. The main user of the system is the accounts department who are good in understanding this system.

The lesson I learned is the famous sayings of Hazrat Umer (RDH) is that "Don't put off till tomorrow what you can today".

Recommendations

SEECS is in a process of developing   its complete ERP system. By the help of this automation it will be very easy to manage all the activities of the organization. This ERP will make this organization as the first organizations in Pakistan to be fully automated. This effort will make this organization as an exemplary institute in Pakistan and in Sub continent also. If this ERP is developed in Oracle it will save the valuable time and money of the organization. I will strongly recommend that this ERP should be developed in Oracle.

References

[1] www.oracle.com/applications/human_resources/**payroll**.html

[2] http://en.wikipedia.org/wiki/Payroll

[3] www.oracle.com/applications/financials/gl.html

[4] "SQL and PL/SQL" Oracle Database 10g PL/SQL   by Christopher Allen

[5] "Oracle Database" Oracle Database 10g New Features by Robert G. Freeman

[6] "Oracle Developer Suite "Oracle application server 10g Web development   By Christopher Ostrowski, Bradley D. Brown Oracle Forms Book 9i

Appendix A

Glossary:

S.No.	Terms	Details
1.	ERP	ERP stands for **Enterprise Resource Planning**. ERP is a way to integrate the data and processes of an organization into one single system.
5.	Use Cases	A **use case diagram** is a type of **behavioral diagram** defined by the Unified Modeling Language (UML) created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals—represented as use cases—and any dependencies between those use cases.
6.	Sequence Diagram	Sequence Diagram shows, as parallel vertical lines, different processes or objects that live simultaneously, and, as horizontal arrows, the messages exchanged between them, in the order in which they occur.
7.	SRS	**Software Requirement Specification** report explaining the system.
8.	Functional Requirements	**Functional Requirement** defines a function of a system.
9.	Non Functional Requirements	**Non-Functional Requirements** are requirements which specify criteria that can be used to judge the operation of a system, rather than specific behaviors

10.	Block Diagram	Sows the overall structure of the system.
11	ERD	Entity relationship diagram shows the entities involved in the database of system. It also tells the relationship between entities.