A PROPOSED LEAVE MANAGEMENT SYSTEM FOR DUTCH-BANGLA BANK LIMITED

MD. NASIRUZZAMAN CHOUDHURY
Student ID: 01101042

Department of Computer Science and Engineering
December 2005

A PROPOSED LEAVE MANAGEMENT SYSTEM FOR DUTCH-BANGLA BANK LIMITED

A Thesis

Submitted to the Department of Computer Science and Engineering

of

BRAC University

by

Md. Nasiruzzaman Choudhury

Student ID: 01101042

In Partial Fulfillment of the

Requirements for the Degree

of

Bachelor of Science in Computer Science

December 29th 2005

DECLARATION

I hereby declare that this thesis is based on the results found by myself while working as an intern in Dutch-Bangla Bank Limited, Mohakhali Branch. Materials of work found by other researcher are mentioned by reference. This thesis, neither in whole nor in part, previously submitted for any degree.

Signature of
Supervisor

Signature of
Author

ACKNOWLEDGMENTS

ABSTRACT

Dutch-Bangla Bank Limited is using a complete automated system for all of its banking sections including General Banking, Credit and finance, Cash and Foreign Trade. But their Leave Management System is totally manual and it takes a long time to process a leave request. In the current system a leave application has to go through a long chain of officials and as a result, several times the competent authorities get manipulated information. While working in the bank as an intern I have analyzed the current Leave Management System and tried to find out the problems of the system. I have proposed a new system to solve the identified problems. I have introduced some new concepts and constraints while developing the proposed solution. The proposed system will minimize the paperwork. Moreover, it will help management in decision making as they will get up-to-date reports. While implementing the system, I have used MySQL for the database and PHP along with HTML as the front end development tools. I believe, the proposed system will make the leave associated activities easier and will also save time and energy.

TABLE OF CONTENTS

Page

CHAPTER III. THE PROPOSED SYSTEM

LIST OF FIGURES

1.1 The Company

Dutch-Bangla Bank Limited (DBBL) is a Bangladeshi-European private joint venture scheduled commercial bank, incorporated in Bangladesh in the year 1995. This public limited bank commenced its formal operation from June 3, 1996. The Netherlands Development Finance Company (FMO) of the Netherlands is the international co-sponsor of this bank with 30% equity holding. Out of the rest 70%, 60% equity has been provided by prominent local entrepreneurs and industrialists and the rest 10% shares is the public issue. During the initial operating year (1996-1997), the bank received skill augmentation technical assistance from the Amro Bank of the Netherlands (ABN). Starting with one branch in Dhaka, DBBL now has expanded to twenty four branches including thirteen branches outside of the capital. To provide client services all over Bangladesh, it has established a wide correspondent banking relationship with a number of local banks, and in order to facilitate international trade transactions, it has arranged correspondent relationship with large number of international banks which are active across the globe. Moreover, DBBL has introduced ATM cards and Internet banking to ensure the customer's freedom to choose his/her own banking hours.

1.1.1 Vision

Dutch-Bangla bank dreams of better Bangladesh, where arts and letters, sports and athletics, music and entertainment, science and education, health and hygiene, clean and pollution free environment and above all a society based on morality and ethics make all our lives worth living. DBBL's essence and ethos rest on a cosmos of creativity and the marvel – magic of a charmed life that abounds with spirit of life and adventures that contributes towards human development [4].

1.1.2 Mission

Dutch-Bangla Bank engineers enterprise and creativity in business and industry with a commitment to social responsibility. Profits alone do not hold a central focus in the bank's operation, because man does not live by bread and butter alone [4].

1.1.3 Core Objectives

Dutch-Bangla Bank believes in its uncompromising commitment to fulfill its customer needs and satisfaction and to become their first choice in banking. Taking cue form its pool esteemed clientele, Dutch-Bangla Bank intends to pave the way for a new era in banking that upholds and epitomizes its vaunted marques "Your Trusted Partner" [4].

1.1.4 Products and Services

DBBL is offering Products and Services in three main forms:

- Deposit
- Term Deposit
- Loan and Advances

1.1.4.1 Deposit

Under Deposit the following products are available:

- Savings Deposit Account
- Current Deposit Account
- Short Term Deposit Account
- Resident Foreign Currency Deposit
- Foreign Currency Deposit

- Convertible Taka Account

- Non-Convertible Taka Account

- Exporter's FC Deposit (FBPAR)

- Current Deposit Account-Bank

- Short Term Deposit Account-Bank

1.1.4.2 Term Deposit

Under Term Deposit the following products are offered:

- Monthly Term Deposit

- Term Deposit 3 Months

- Term Deposit 6 Months

- Term Deposit 12 Months

- Term Deposit 24 Months

- Term Deposit 24 Months 1 Year Payout

- Term Deposit 36 Months

- Term Deposit 36 Months 6 Months Payout

- Term Deposit 36 Months 1 Year Payout

- Term Deposit above 36 Months

- Monthly Term Deposit Banks

- Term Deposit 3 Months Banks

- Term Deposit 6 Months Banks

- Term Deposit 12 Months Banks

- 1 Month TD NFCD

- Months TD NFCD

- 6 Months TD NFCD

1.1.4.3 Loan and Advances

The followings are known as Loan and Advances products:

- Loan against Trust Receipt
- Transport Loan
- Consumer Credit Scheme
- Real Estate Loan (Res. & Comm.)
- Loan against Accepted Bill
- Industrial Term Loan
- Agricultural Term Loan
- Lease Finance
- Other Term Loan
- FMO Local Currency Loan for SME
- FMO Foreign Currency Loan
- Cash Credit (Hypothecation)
- Small Shop Financing Scheme
- Overdraft

1.1.5 Social Responsibilities of DBBL

Dutch-Bangla Bank Limited (DBBL) is the first Bangladeshi-European joint venture bank in Bangladesh addresses social concerns that threaten the structure of society and redress social conditions that adversely affect the well-being of people and society. DBBL practice thus encompass the professional activities of helping individuals, families, groups, organizations, and communities to enhance or restore their capacity for optimal social functioning and of creating societal conditions favorable to this goal.

1.2 Objective of the Project

The advancement in technology in the last few decades has improved our lives in every aspect. Manually driven systems are being substituted by the computerized systems. The existing Leave Management System of DBBL is totally manual to keep track of all the leave associated records such as leave status, employee's availability and creating yearly reports etc. DBBL uses a very lengthy process to grant or refuse leave including finding out the eligibility of the employees for the type of leave applied for. Moreover, the information can be distorted as it has to go through a long chain of officials.

The objective of this project is to formulate a sensible analysis of the current system to find out its problems and thus design a new computerized system which will be more optimized and synchronized. The management will be availed with such a system which may make their task simpler incase of leave related activities and the employees will not need to wait for a long time to know the decision of the management.

1.3 Why Leave Management System?

When I was accepted as an intern by DBBL, I was placed in Mohakhali Branch under the direct supervision of the Branch Manager. The Branch Manager allowed me to observe the functionalities of all the departments and also let me browse the software named "Flex-cube", which they are using for all the transactions. I found that, all the schemes are automated except the Leave Management System and this manual system is creating a lot of problem for the management. I have discussed with the Branch Manager and let him know my interest to automate this system. He accepted my proposal and told me about their expectations from this system.

1.4 Methodology

In the beginning, key data has been extracted from a detailed description of the current Leave Management System as a whole, and then potential problems in the current system have been identified. Next, proposed system has been elaborated and after that the goal of the project has been established to provide better data reliability, more automation and less effort. Efficient real time data storage, data manipulation capabilities and up-to-date report generation are the most important concerns of the proposed system. Then, key aspects of the proposed system are explained in details with prototype-planning phase, analysis phase and design phase.

1.5 Organization of the Report

In chapter II, the Existing System has been described. I have given the complete elaboration of the Proposed System in chapter III. Conclusion is written in chapter IV and then references and appendices are attached.

2.1 Requirements Determination

Requirements determination is one of the most complicated and prolonged part of developing a new system. It is the combination of gathering and analyzing information about the existing system. The primary objectives of the requirements determination are to understand the existing policies, identify the problems of the current system and collecting required data to develop a model of the new system.

The deliverables for requirements determination that I have used are interview transcripts, business mission and strategy statements, job descriptions of the employees, existing written documents and the results of Joint Application Design (JAD) sessions.

With the intention of collecting the required data for my project I have interviewed Mr. Mashiur Rahman, the Manager of Mohakhali Branch of DBBL. He gave me an overall idea about the leave associated activities that he has to go through when an employee seeks leave. Then he referred me to Mr. Almas Uddin, the executive officer of the Human Resource Department (HRD) of DBBL. He explained some part of the leave policy of DBBL and provided me with some documents on service rules of DBBL.

With the due permission of the Branch Manager I have organized two JAD sessions. In these sessions all the employees of Mohakhali branch participated and gave their priceless feedback. The outcomes were summarized and delivered to all the participants of these sessions. The outcomes of these sessions enabled me to find out the problems that both the management and the employees are facing from the existing system and their expectations from the new system.

2.2 An Overview of the Leave Policy

2.2.1 Categories of Leave

Subject to fulfilling the terms and conditions as stipulated rules, the following eight types of leave may be admissible to an employee of DBBL. These are:

1. Earned Leave with full pay
2. Extraordinary Leave without pay
3. Medical Leave
4. Special Disability Leave
5. Quarantine Leave
6. Maternity Leave
7. Study Leave
8. Casual Leave

2.2.2 Description of Different Types of Leave

Earned Leave with full pay: This type of leave is allowed for the employees who have completed 1 (One) year of continuous service in the bank. An employee is allowed to take earned leave once in a calendar year. This period has to be less than 30 (Thirty) days.

Extraordinary Leave without pay: This type of leave may be granted for a maximum period of 2 (Two) months to an employee in special circumstances, when no other type of leave is available. This type of leave is allowed once for an employee in his/her entire service life. At least 3 (Three) years of continuous service is must for this type of leave.

Medical Leave: Leave on medical ground may be granted for the period not exceeding 2 (Two) months. At least 1 (One) year of continuous service is needed for an employee to be eligible for this type of leave.

Special Disability Leave: Special disability leave may be granted by the Human Resource Department to an employee who is disabled by injury inflicted or caused in course of, or in consequence of, the due performance of his/her official duty, or in consequence of his/her official position. This type of leave shall not be granted unless the disability manifested itself within three months of the occurrence to which it is attributed, and the person disabled acted with due promptitude in bringing it to the notice of the competent authority. An employee should comprise at least 3 (Three) years of continuous service to get this type of leave and the leave period should not exceed 6 (Six) months.

Quarantine Leave: Quarantine leave is the leave of absence from duty by an employee as the presence of an infectious disease is found in his/her body. Cholera, Pox, Jaundice, Plague, Diphtheria, Typhoid, Measles, Mumps, Cerebra–spinal and Meningitis are considered as infectious diseases. An employee is allowed to take quarantine leave from his/her joining day at DBBL. The period of quarantine leave should not exceed 1 (One) month.

Maternity Leave: Maternity leave may be granted by the competent authority to an employee for a maximum period of 3 (Three) months at a time. This type of leave shall not be admissible to an employee for more than two occasions during her entire period of service life. To be eligible for this type of leave one must complete 2 (Two) years of continuous service in the bank.

Study Leave: Study leave for a period not exceeding 2 (Two) years may be granted by the HRD to an employee to enable him/her to study or undergo special courses of training considered useful for his/her services under the bank. An employee should encompass at least 3 (Three) years of continuous service to acquire the study leave.

Casual Leave: This kind of leave refers to a leave of absence for a very short period of days granted to an employee who may be unable to attend duty due to sudden illness or urgent private/family affairs. The total number of days for which casual leave shall be admissible in a calendar year to an employee shall not exceed 15 (Fifteen) days. Moreover, not more than 6 (Six) days casual leave can be taken at a time. This kind of leave is allowed for an employee from his/her very first day at DBBL.

2.2.3 Leave is not the Right

Leave cannot be claimed as a matter of right. The competent authority shall have the right to refuse, or grant leave for a shorter period than applied for. No employee shall remain absent from duties, nor leave place of positioning on any ground whatsoever without obtaining prior approval of leave from the authority.

2.2.4 Recall from Leave

An employee on leave may be recalled to duty before expiry of the leave and if recalled, s/he shall be treated on duty from the date on which s/he starts for the station.

2.3 Description of the Existing System

The existing Leave Management System of DBBL is manual. It is a lengthy process and this process is not optimized. The Human Resource Department and/or the Branch Manager are the competent authorities for the approval or refusal of leave depending on the type of leave.

The Leave Management System is initiated with the submission of an application by an employee for leave. This application must be submitted to the Controlling Officer at least one month ahead (with the exception of casual leave and the quarantine leave) from the date of commencement of the leave applied for. For the branches of the bank, the Second Manager of the branch acts as the controlling officer. The controlling officer is responsible for checking out the eligibilities of the employee for the type of leave s/he has applied for. If the applicant is eligible then the controlling officer submits the application to the Branch Manager. The work of the Branch Manager is the most complicated as s/he is responsible for the synchronization of the leave. Moreover, he is also accountable for the smooth functionality of the branch.

In case of Earned Leave with full pay, Medical Leave, Quarantine Leave and Casual Leave the Branch Manager has the sole authority to grant or refuse the leave. If the Branch Manager allows an employee for leave, s/he should inform the HRD by submitting a report, which will contain the details about the approved leave. For these types of leave the HRD do not allow any alternative employee.

For the other four types of leave the Branch Manager sends the application to the Human Resource Department for approval. Then the HRD takes their decision and let the Branch Manager know the result by an official letter. Then the Branch Manager informs the applicant. So, an employee can not but wait for a long time to know the decision of the competent authority. Sometime the HRD sends a backup officer to the branch if they approve the leave of an employee for a long period of time.

Furthermore, the Branch Manager is supposed to send an annual report informing the leave status of a calendar year to the HRD. Each branch maintains a register for the leave associated affairs. The Controlling Officer use to maintain this log. The Branch Manager uses this register to prepare the annual report.

As the annual leave report is nothing but the summary of the leave register for a particular year, it is not that much helpful for taking any managerial decision. There is no opportunity to analyze the report and find out the scopes for improvements as the HRD is not getting any instant data from the report. They are getting present year's leave status in the following year. As a result the top management is not being able to utilize the report in a proper manner.

So, the existing Leave Management System is a time consuming one. It needs to be more optimized and more synchronized which will lead the management to have a more proficient system to support the total employee management scheme.

2.4 Flowchart of the Existing System

The Flowchart of the existing Leave Management System, which has been described above is given below:
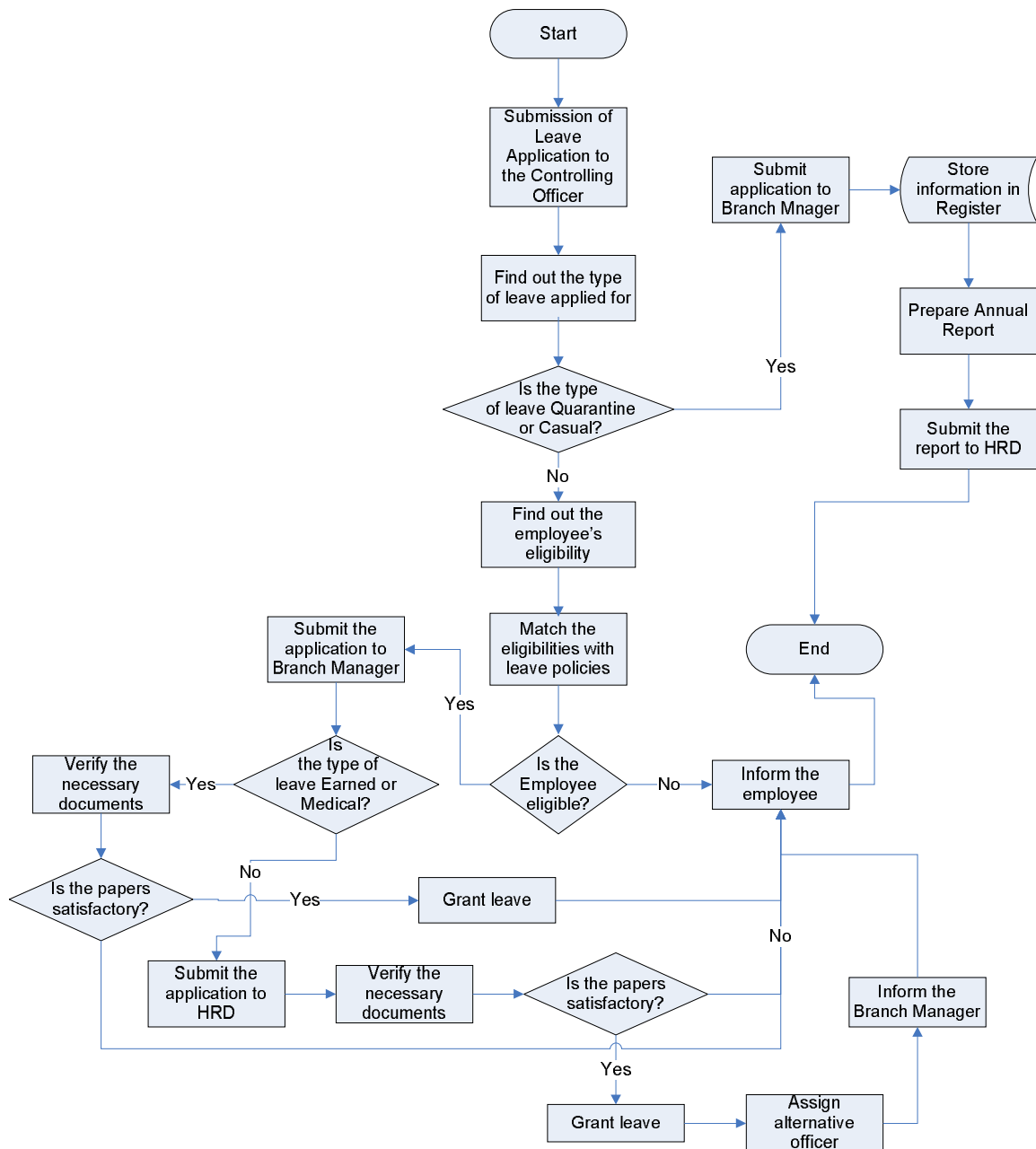

Fig 2.1: The flowchart of the existing Leave Management System.

2.5 Drawbacks of the Existing System

The current Leave Management System that DBBL is using has some drawbacks. The main drawbacks are:

1) Sometimes it happens that the branch runs short of employees as for the Casual leave and Quarantine leave the leave of absence is allowed and more than one employee remains absent on a same day.

2) Employees need to submit leave application one month ahead from the date of commencement of the leave applied for. Consequently, the employees cannot get the leave if it is immediately needed.

3) The leave register only contains the record of the granted leave. There is no pending leave list. So, if an employee failed to get the permission for leave, s/he has to apply again for the next time.

4) There is no priority assigned for the types of leave. As a result, it may happen that a less deserved person is getting the authorization in place of the person who actually needs the leave.

5) Data flow from the branch to the HRD requires many days and gets delayed.

6) The HRD is getting present year's leave report in the following year. As a result they are not getting any current data from the report.

7) The proper synchronization is absent in this system.

8) The Branch Manager may not be totally transparent in case of the approval of leave. S/he may misuse the power as it is hard for the HRD to trace what is going on in the branch.

9) The total process is very lengthy and it can make an employee extremely dissatisfied if s/he waits for a month for leave and finally ends with not getting it.

In conclusion it can be said that, from the existing system it is hard to get accurate, reliable and up-to-date information which ensures better management and thereby more efficiency in the administrative work. So, the existing system needs to be altered with a new synchronized and optimized system.

3.1 Introduction of New Concepts and Constraints

I have introduced several concepts and constrains in the proposed Leave Management System which are not present in the current system. These ideas are used to make the proposed system more synchronized.

3.1.1 New Concepts

Leave Priority: Each type of leave is assigned with a priority. These priorities have been given on basis of the significance of the type of leave.

Employee Priority: The employee priority is given on basis of the designation of the employee. If more than one employee is found with same designation, the service length of the employees is considered while assigning the priority.

Employee Expertise: Employee expertise is given depending on the performance record of an employee in a particular department. The Human Resource Department is responsible for assigning the expertise level for each employee.

Minimum Expertise Required for a Department: Each and every department requires a minimum amount of cumulative employee expertise to operate smoothly. This requirement is calculated depending on the work volume of a particular department.

3.1.2 New Constraints

- If more than one employee applies for different types of leave, the employee who has applied for the type of leave with higher priority will be considered first.

- If more than one employee applies for same type of leave, the employee with higher priority will be considered first.

- The available cumulative employee expertise of a particular department should never be less than the minimum cumulative employee expertise required for the department to operate smoothly.

3.2 Overview of the Proposed System

Considering the existing problems of the Leave Management System, I have come up with a web based solution, which may simplify the work of the Branch Manager along with the Human Resource Department. The proposed system will help the competent authorities to formulate a decision regarding a leave request.

The proposed system will be initiated if an employee fills up the leave request form and submits it. The system will verify the eligibilities of the employee for the type of leave s/he has applied for. If the applicant is eligible then the information will be added to the pending leave list. The system will sort the pending leave list on basis of the priority of the type of leave. If more than one employee requests for the same type of leave, the system will use the employee priority to sort the pending leave list. It is the duty of both the Branch Manager and the HRD to check the pending leave list frequently. In case of Earned Leave with full pay, Medical Leave, Quarantine Leave and Casual Leave the Branch Manager will make the decision. The system will not allow the Branch Manager to grant any leave request if the available expertise of a department becomes less than the minimum expertise required for the smooth operation of that department. If the manager still needs to grant the leave request, s/he should recall an employee who is already on leave so that the available expertise remains adequate. For the other four types of leave the Human Resource Department will make the decision. If the HRD grants any leave request they will have to send a backup officer to the branch with similar expertise.

Furthermore, the proposed system will avail both the Branch Manager and the HRD with instant report generation. So the HRD will be able to see the leave status of a branch whenever they want and thus the proposed system will be helpful to take managerial decisions.

3.3 Structuring the Proposed System: Process Modeling

Process modeling involves geographically representing the functions, or processes, which capture, manipulate, store and distribute data between a system and its environment and between components within a system [1].

3.3.1 What is Context Diagram?

An overview of an organizational system that shows the system boundaries, external entities that interact with the system and the major information flows between the entities and the system [1].

3.3.2 Context Diagram of the Proposed System

The context diagram is given in Appendix C.

3.3.3 What is Data Flow Diagram?

A picture of the movement of data between external entities, the processes and data stores within a system [1].

3.3.4 Data Flow Diagram of the Proposed System

Data flow diagram is provided in Appendix D.

3.3.5 Use Case Diagram of the Proposed System

Use case diagram is provided in Appendix E.

3.4 Design Phase

3.4.1 Designing Database

The Branch Manager provided me with an idea about their expectation from the future system. Their main focus was on:

- Pending leave list
- Leave application form
- Up to date leave status

So, I have decided to design the database containing the tables which will be able to store the inputs for the desired outputs. In addition, the back-end database is created using MySQL. There is no query in the database. Queries are maintained from the front-end.

3.4.1.1 Finalizing the Tables for the Prototype

No matter what information is to be retrieved from the fields of the tables, to me Employee Information and Leave Information are the key tables that should exist in the database. While working with the database I had to change the prototype repeatedly for the desired output. At last I finalized the design after getting the approval of both the company advisor and the academic advisor.

3.4.1.2 Description of Tables

The description of all the tables is provided in appendix A.

3.4.2 Designing the User Interface

While designing the user interface, I have tried to make the interfaces as user-friendly as possible so that from the interface the users easily understand what they are doing and what they should do. Moreover, I have attached quick tips in all the buttons so that they can understand what will happen if they Click it. Again, I have used red stars beside the mandatory fields and at the beginning of the pages where red stars are used; it has been mentioned that the red started fields cannot be blank.

3.4.3 Forms and Validations

I have used PHP and HTML to create the forms that has been used in the prototype. I kept the back ground very simple so that users can find the information easily. For validating the forms, I have provided massages to the users so that they can check and correct their inputted values without difficulty.

3.4.4 An Example of Form's Validation

An example of the validation of a form is provided in appendix B.

3.4.5 Report Generation

In this system I have not used any report generating tool. All the reports (e.g. Pending Leave List, Current Leave Status) have been generated using the SQL queries. These reports are shown on a page by using tables so that the users can view the requested reports.

3.4.6 Logout

Proper logging out is an important issue as it has a relation with the company's privacy and security. A user must logout after s/he has completed his/her task. I have used session for login and logout. Every time a user logins in, a variable will be crated in the session with the same value of the User Id. When the user will log out then the session variable will be destroyed. As a result, no one will be able to use the "Back" option from the tool bar to go back to any pages of the previous user.

3.4.7 Accessibility and Authentication

Every organization has employees with different position and rank. Moreover, different users has different task that they perform and they deals with divergent information. So, it is necessary to ensure that an employee will have accessibility only to those sections of the prototype which really required by them. For an example, an employee will not have the permission to access all the sections that the Branch Manager of the bank can access. So, accessibility of different users means privacy and security of important information of an organization.

To maintain the accessibility I have used different forms for different types of user. When a user logs in, the system will check his/her user type and will present different pages accordingly. So, the Branch Manager will never be able to access the information which are not permitted for him/her but permitted for the System Administrator as they have different user type.
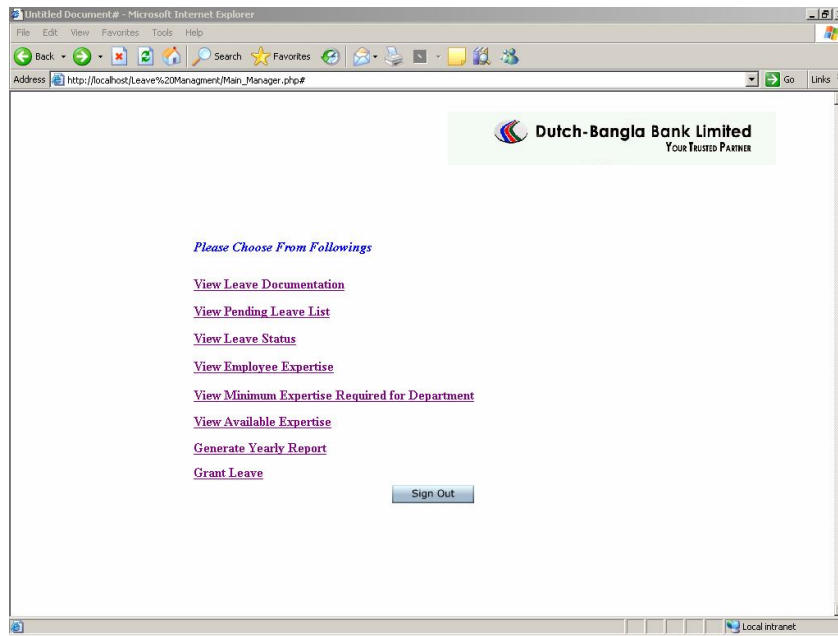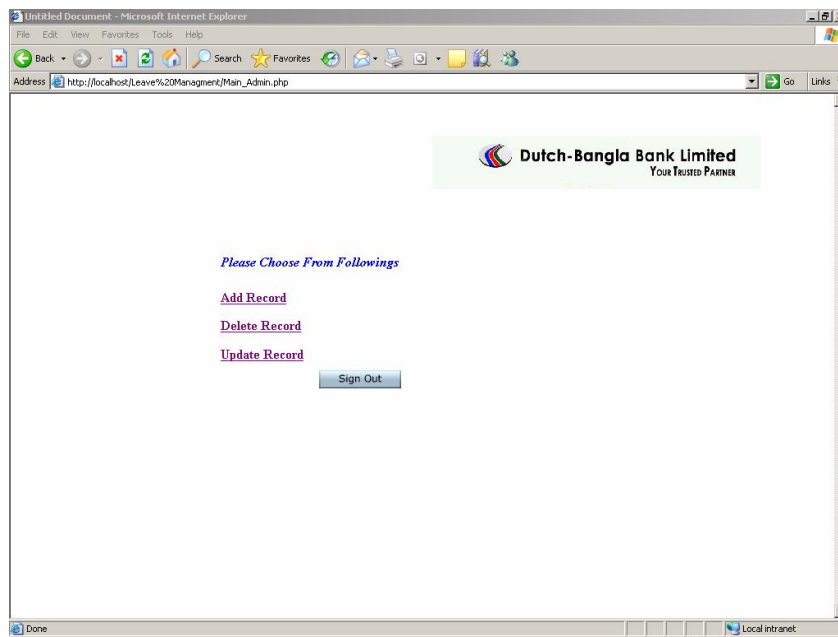
Fig 3.1: Main page for Branch Manager

Fig 3.2: Main page for System Administrator

In this system, all the users have some specific authentication rights and these authentication rights have been categorized on basis of the user type. These are:

Branch Manager:

- View the leave documentation.
- View the pending leave list.
- View the current leave status.
- View the employee expertise list.
- View the minimum expertise required for a particular department.
- View the available departmental expertise.
- Grant the employee's leave (for some particular types of leave).
- Recall the employees from leave.
- View the yearly report.
- Change his/her password.

System Administrator:

- Create new user.
- Delete any user.
- Add the employee information.
- Update the employee information.
- Delete the employee information.
- Change his/her password.

Employees:

- View the leave documentation.
- Apply for leave.
- View the result of his/her leave request.
- Change his/her password.

Human Resource Department Officer:

- View the leave documentation.
- View the pending leave list.
- View the current leave status.
- Assign the employee expertise.
- View the employee expertise.
- Update the employee expertise.
- Assign the minimum expertise required for a particular department.
- View the minimum expertise required for a particular department.
- Update the minimum expertise required for a particular department.
- View the available departmental expertise.
- View the employee information.
- Grant the employee's leave (for some particular types of leave).
- Recall the employees from leave.
- View the yearly report.
- Change his/her password.

3.5 Implementation Phase

3.5.1 Coding and Testing

I have used PHP and HTML for the front end and MySQL for the back end while implementing the system. I have completed almost all the pages except few. I have not completed the rest because of time constrain.

As I am yet to implement the total system, the system has not gone through the testing phase.

3.6 Benefits of the Proposed System

The proposed system will solve most of the problems that the existing system encompasses. This web based system will make the total leave management process faster and it will also save a lot of time and energy. The main benefits are:

1. The employees will not need to wait for a long time to know the decision of the authority as unlike the existing system where they need to submit the leave application one month ahead from the date of commencement of the leave applied for.

2. It will ensure that the most deserving person will get the leave as priority is assigned for each types of leave and for each employee.

3. Unlike the existing system where the leave register only contains the record of the granted leave, the pending leave list of the proposed system will contain the record of all the leave requests which are pending as a result an employee will not need to apply twice for the same leave.

4. Less chance of the manipulation of information as both the Branch Manager and HRD will get information directly from the system.

5. The management will get up-to-date report which will help them in decision making.

4.1 Conclusion

The proposed Leave Management System will make the whole leave management process efficient. Users will be able to access the software from anywhere. The employees may be applying for leave from their home as well. This supporting software will help the management in decision making in case of leave related affairs. Moreover, it will ensure less paper works and as a result the whole process will be swift and reliable.

REFERENCES

Book

[1]   Jeffery A. Hoffer, Joey F. Geroge and Joseph S. Valacich, "Modern System Analysis And Design", Ed. 3rd. India: Pearson Education (Singapore) Pte. Ltd, 2002.

[2]   C.J. Date, "An Introduction to Database System", Ed. 7th. India: Pearson Education Singapore).Pte. Ltd, 2002.

[3]   Craig Larman, "Applying UML And Patterns", Ed. 2nd. India: Pearson Education (Singapore) Pte. Ltd, 2002.

Website

[4]   http://www.dbbl.com.bd/

A. Description of the Tables

Table Name: Employee_Information	
Description: Stores Information about the Employees.	
Primary key: Employee_Id	
Field Name	**Description**
Employee_Id	Id of the employee. It groups all the employees together.
First_Name	First part of name of the employee.
Middle_Name	Middle part of name of the employee.
Last_Name	Last part of name of the employee.
Designation	Designation of the employee in the bank.
E_Priority	Assigned priority of the employee for leave by the bank.
Joining_Date	Joining date of the employee in the bank.
Phone	Employee's residence telephone number.
Mobile	Mobile phone number of the employee.
E_mail	E-mail address of employee to contact through E-mails.

Table Name: Create_User	
Description: Stores Information of the users that are using the system.	
Primary key: User_Id	
Field Name	**Description**
User_Id	Id of the user. It groups all the users together.
Employee_Id	Id of the employee which already exists in the Employee_Information table.
User_Type	Type of the user (e.g. Employee, System Administrator).
Password	Password of the user to login in the system.

Table Name: Employee_Expertise	
Description: Stores Expertise of the Employees in each department.	
Foreign key: Employee_Id	
Field Name	**Description**
Employee_Id	Id of the employee which already exists in the Employee_Information table.
Cash	Expertise of an employee in Cash department.
General_Banking	Expertise of an employee in General Banking department.
Finance_Credit	Expertise of an employee in Finance & Credit department.
Foreign_Trade	Expertise of an employee in Foreign Trade department.

Table Name: Available_Employee_Expertise	
Description: Stores Available Expertise of the Employees in each department. Modification of this table depends on the availability of employees.	
Foreign key: Employee_Id	
Field Name	**Description**
Employee_Id	Id of the employee which already exists in the Employee_Information table.
Cash	Available expertise of an employee in Cash department.
General_Banking	Available expertise of an employee in General Banking.
Finance_Credit	Available expertise of an employee in Finance & Credit.
Foreign_Trade	Available expertise of an employee in Foreign Trade.

Table Name: Leave_Information	
Description: Stores Information about all types of Leave.	
Primary key: Leave_Id	
Field Name	**Description**
Leave_Id	Id of the leave type. It groups all types of leave together.
Leave_Name	Name of the leave.
Min_Days	Minimum days at service required by an employee to be eligible for a particular type of leave.
Max_Time	The maximum number of days that an employee can take leave at a time for a particular type of leave.
Priority	Priority of the type of leave assigned by the bank.

Table Name: Leave_Request	
Description: Stores Information about the requested leave.	
Composite key: Employee_Id, Start_Date	
Field Name	**Description**
Employee_Id	Id of the employee which already exists in the Employee_Information table.
Leave_Id	Id of the leave type which already exists in the Leave_Information table.
Start_Date	Requested starting date of the leave.
End_Date	Requested ending date of the leave.
Request_Date	On which date the leave request was submitted.
Status	Status of the leave request (e.g. pending, granted).
Narration	Added comments regarding the leave request.

Table Name: Min_Dept_Exp	
Description: Stores Minimum Expertise required by each department.	
Primary key: Department_Id	
Field Name	**Description**
Department_Id	Id of the department. It groups all the departments together.
Department_Name	Name of the department.
M_D_Exp	Minimum cumulative employee expertise in a department required for smooth operation of that particular department.

Table Name: Available_Expertise	
Description: Stores Available Expertise in each department. Modification of this table depends on the availability of employees.	
Foreign key: Department_Id	
Field Name	**Description**
Department_Id	Id of the department which already exists in the Min_Dept_Exp table.
Expertise	Available cumulative employee expertise in a department.

Table Name: Granted_Leave	
Description: Stores Information about the granted leave.	
Composite key: Employee_Id, Start_Date	
Field Name	**Description**
Employee_Id	Id of the employee which already exists in the Employee_Information table.
Leave_Id	Id of the leave type which already exists in the Leave_Information table.
Start_Date	Granted starting date of the leave.
End_Date	Granted ending date of the leave.

Table Name: Recalled_Leave	
Description: Stores Information about the recalled leave.	
Composite key: Employee_Id, Recall_Date	
Field Name	**Description**
Employee_Id	Id of the employee which already exists in the Employee_Information table.
Leave_Id	Id of the leave type which already exists in the Leave_Information table.
Recall_Date	Recall activation date.

B. An example of form's validation

For an example, here I am considering the login page. The users will put their specific User Id and Password to login. Every employee will be given a User Id and password by the System Administrator. The user will be able to change the password by clicking "Change Password".
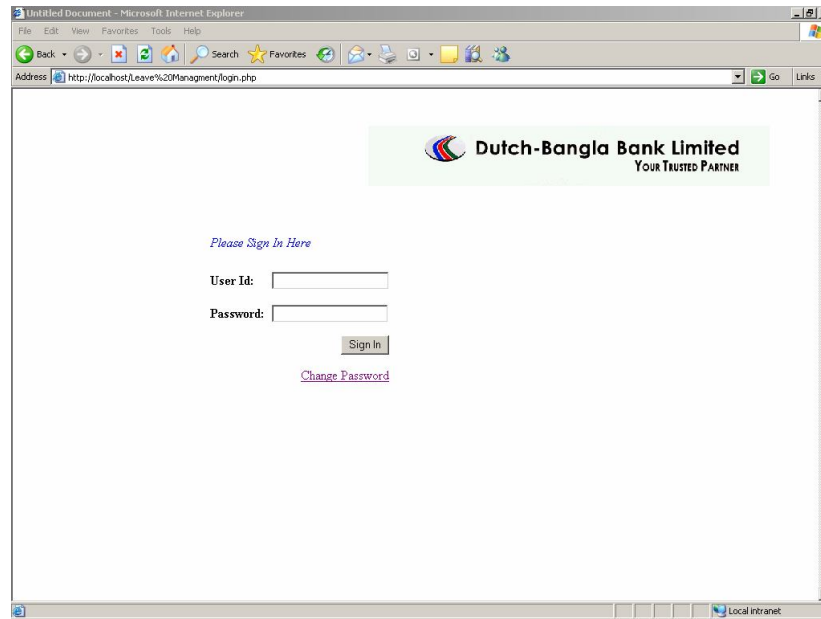
Fig: Login page

I have considered two scenarios for the validations in the login page. These are:

1. The user may miss spell his/her User Id or Password.
2. The user may keep the Password filed blank.

If a user miss spells his/her User Id or Password then an error massage will be shown. Like in the database, there is an employee whose User Id is "u01101042" and Password is "bonny". The user may try to login with a misspelled User Id "u01101024" or with a misspelled Password "boney".
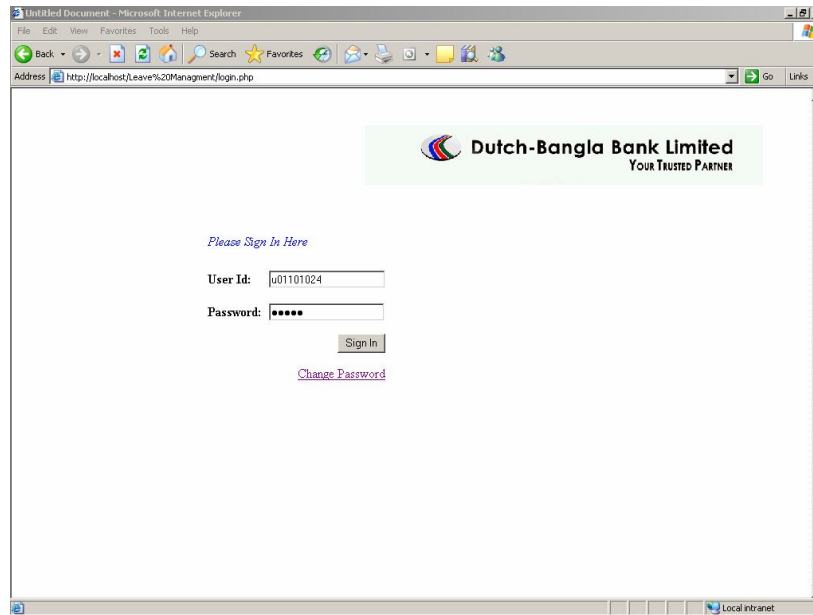
Fig: User misspelled User Id

In this situation in the next page s/he will get a massage, "Invalid User Id or Password".
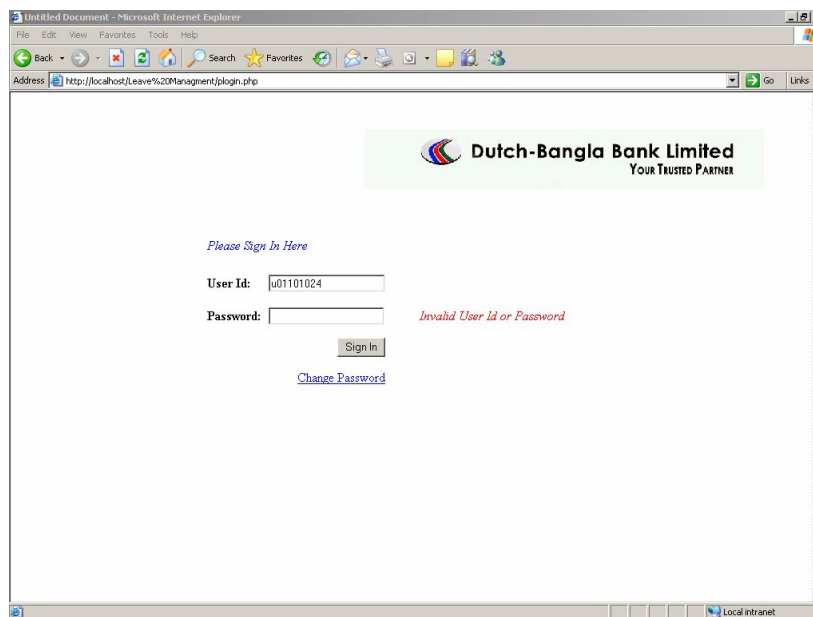

Fig: Error massage for invalid User Id or Password

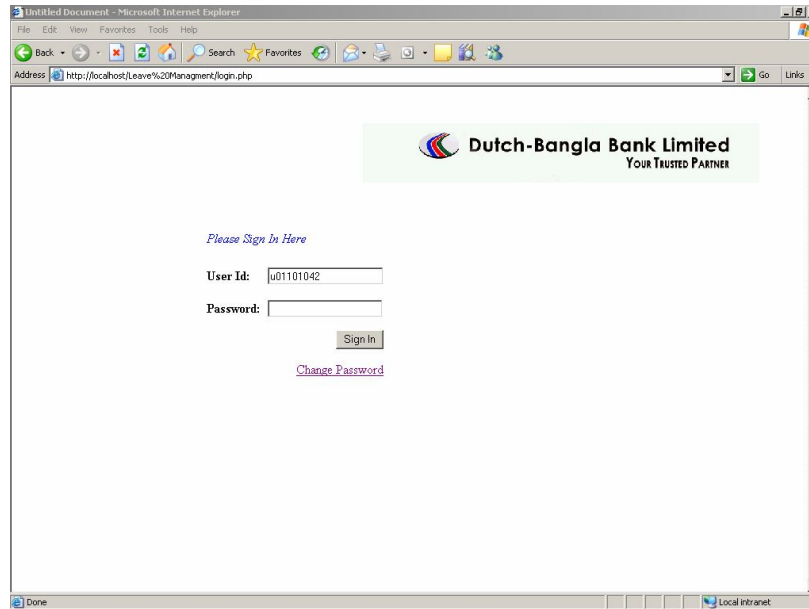If the user keeps the Password blank, then in the next page s/he will get a massage, "Password can not be blank".

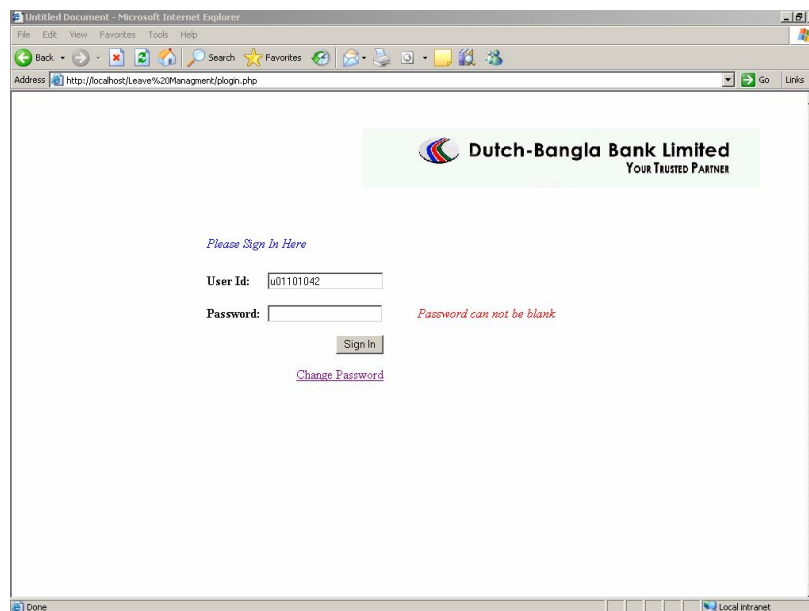
Fig: User keeps the Password blank

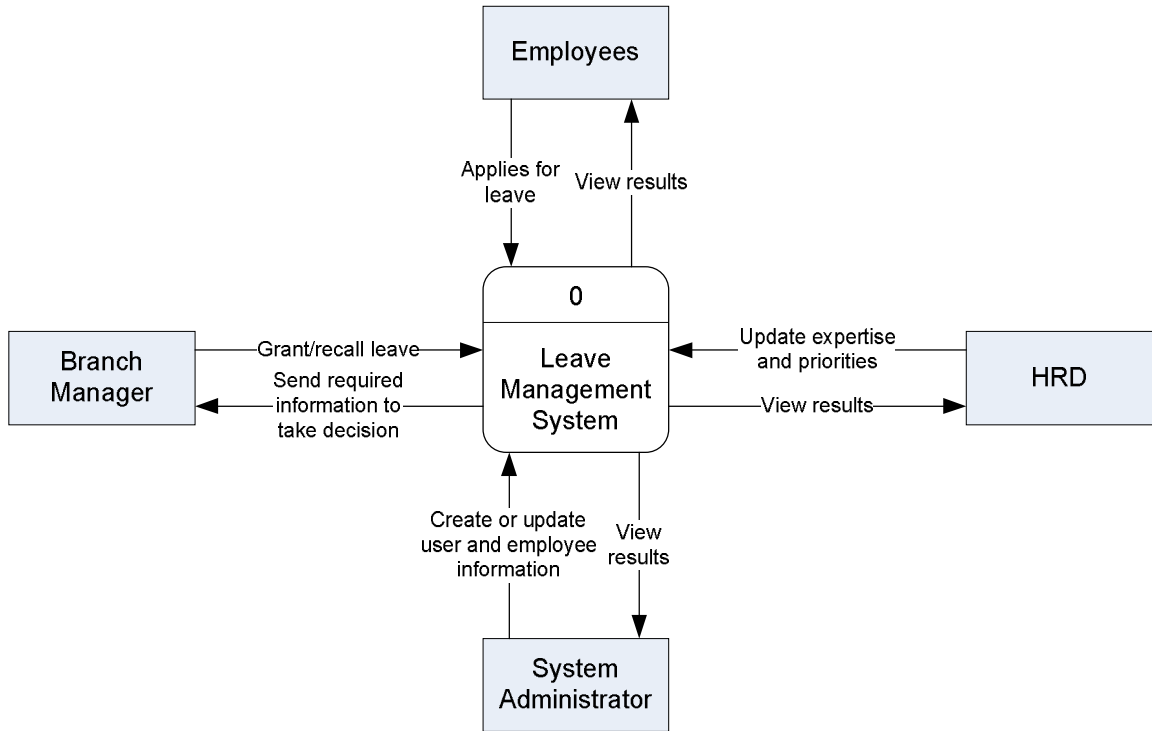Fig: Error massage for blank Password

C. Context diagram of the system

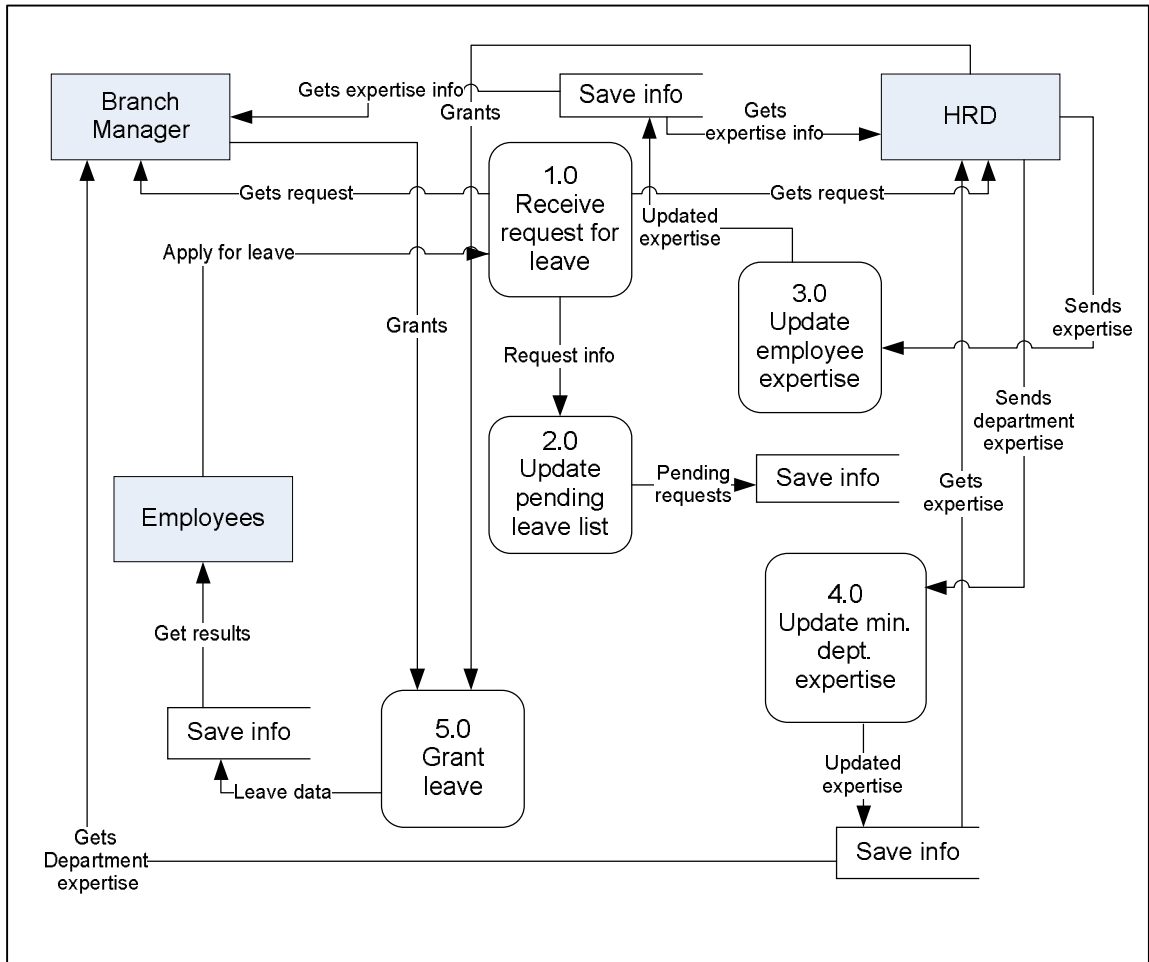Fig: Context diagram

D. Data flow diagram of the system
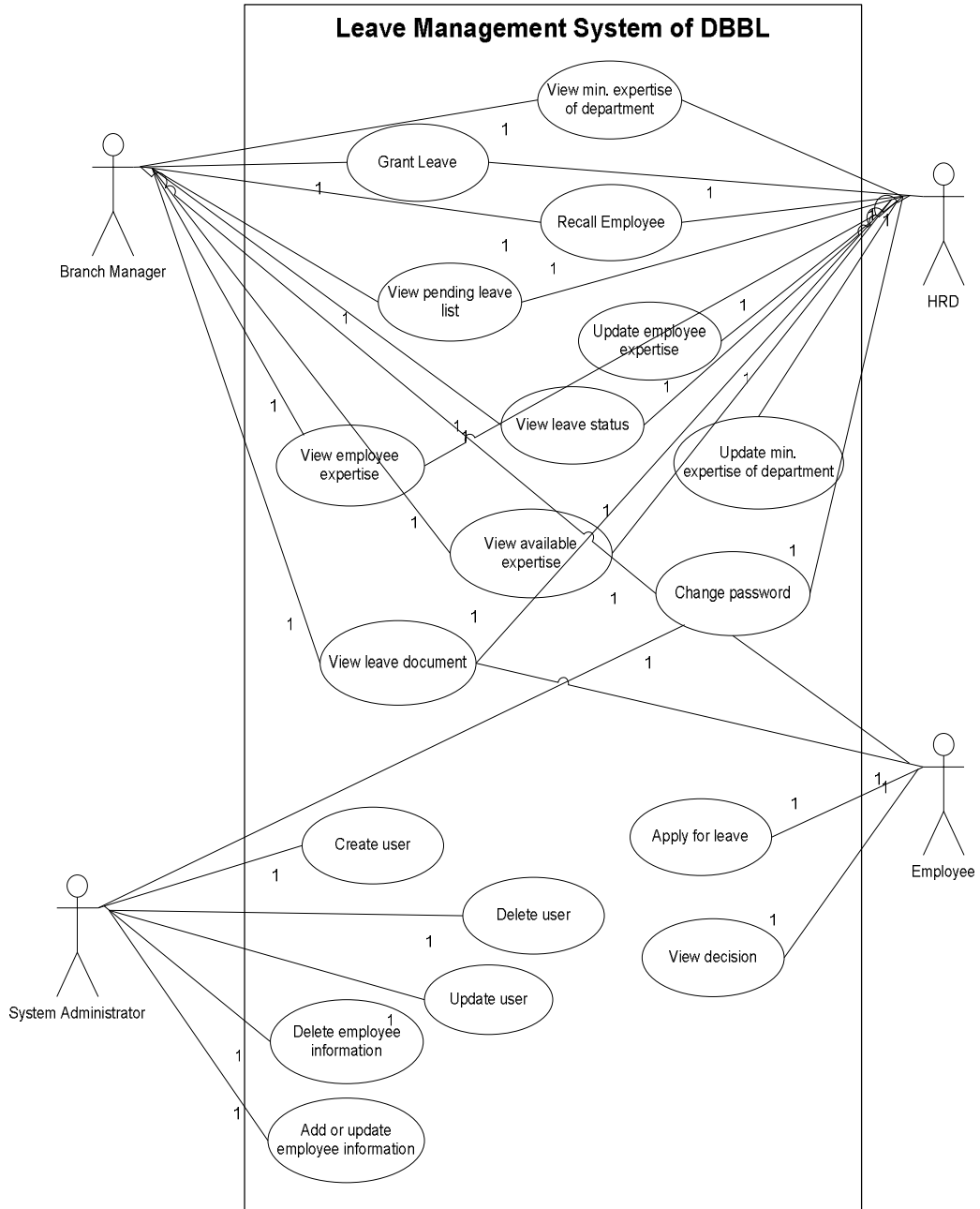

Fig: Level 0 DFD

E. Use case diagram of the system

Fig: Use case diagram