Implementation of Virtual Banking System

By

Adil Muslim Malik

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ABSTRACT

Over the last few years, e-commerce transactions have seen explosive growth. Already, the e-commerce world has produced undisputed success. Entirely new Internet-focused business to existing business has extended their organization to take advantage of the Internet. Online shopping centers, book sales are examples of a market that's well over $1 billion per year in combined sales. Realizing the number of people involved in this communication media indicates the scope of capital circulation for many progressive minded organizations. Banks that are actively involved in this circulation of money need to focus on automating and changing existing customer services. A key requirement is the ability to provide basic banking facilities with minimum procedural complexities.

Virtual Bank is a key concept to opening up multi-channel access and communication method to allow both the account holders and banks to communicate using the most convenient and easily accessible channel. This concept enables banks to increase profitability, account holder satisfaction and round the clock access to most banking facilities. The current work is an attempt to demonstrate the usefulness and flexibility of its use in the ever-expanding e-commerce market.

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CHAPTER 1

INTRODUCTION TO BANKING

1.1 INTRODUCTION

Banking in fact is as primitive as human society. Ever since man came to realize the importance of money as a medium of exchange, the necessity of controlling or regulating agency or institution was naturally felt. Like any other basic sphere of modern socio-industrial activity, banking too, is a potent and purposeful monetary-based media that nurses and nourishes the socio-economic growth of all the countries. As such, the role it plays in the present day commerce, trade and industry undoubtedly constitutes an integral organ of over all development.

1.2 BANKING ENVIRONMENTS

Banks are the backbone of economy of any country. The circulation of capital determines the ranking of a stable country. Bank plays pivotal role in circulating this capital. The vital components of a bank are its account holder, business community, companies, industrial infrastructure, importers, exporters and any trading party local or international. Bank provides not only security to the amount deposited by the account holder but facilitates its client in different ways by extending help in providing required amount for the development of the newly established business or trading structures.

1.2.1 Account.

An account is a means of accumulating in one place all the information about the account holder, In case of deposit the amount added becomes the liability to the bank and is bank is bound to return

1.2.2 Account holder

The person maintaining an account in the bank or registered with the bank to use the facilities,

which are offered, by the bank. He operates the account under certain rules so that he makes use of the bank in managing his money according to his will. The person maintaining an account in the bank or registered with the bank to use the facilities, which are offered, by the bank. He operates the account under certain rules so that he makes use of the bank in managing his money according to his will.

1.2.3 Manager

The person, who is in charge of the bank, responsible for maintaining correct accounts and efficient functioning of the bank. He validates any document prepared by the assistant manager of the bank like pay order and pay draft etc. He entertains complaints if any, by the account holder.

1.2.4 Assistant Manager

The person assisting the manager in fulfilling his responsibilities. He takes over the role of manager in his absence. Any document coming to him from the cashier is verified and validated by him. He maintains a record of all account in a book known as Account Ledger. He is responsible for correct and update record of accounts. Any amount deposited and withdrawal by the cashier is counter signed by the assistant manager.

1.2.5 Cashier

The person who gives away and collect the hard cash against a cheque, utility bill etc. An account holder interacts initially with the cashier for any deposit and withdrawal of amount. He maintains a record book known as Cash Book .He endorses necessary details in the

cashbook prepares required document and sends it to the assistant manager for the counter signature.

1.2.6 Transaction

A document, which possesses detail information of any involvement of amount. It contains date, account title, amount, signature and its unique identification number. In case of amount deposit it is prepared by the cashier and sent to the assistant manager for counter signed. In case of pay order and pay draft it is prepared by the assistant manager and validated by the manager. This document acts as a record for the transfer of amount and deposit of it. The details are endorsed in the Cash Book as well as Account Ledger.

1.2.7 Services

Beside providing security to the money deposited bank provides various facilities to its customers to make use of business opportunities like giving loans and profit on the basis of balance available in the account. There is continuous increase in offering better facilities and services to the customers or account holders to improve the relationship, which is key factor of any bank’s success.

1.3 EXISTING BANKING SYSTEM:

An account, account holder, cashier, assistant manager, manager, transaction, cashbook and ledger account are basic elements functions of a bank. An account holder comes to the bank or designates some one on his behalf to withdraw or deposit the amount. The transaction, a document carrying details of the account and account holder, plays the vital role of shifting amount and is later on kept as record of this account. For deposit of cash the deposit slip is issued and for withdrawal a cheque is required. More over pay order for local payment and draft for non-local city is another mode of payment. The cashier records the entire amount

in cash going in or out of the bank and later on the endorsement is done by the assistant manager in the ledger account record that is a major document as far as operating accounts is concerned.

After closing of bank the cashbook and the Ledger account entries of the day are cross checked. The amount coming to the bank as deposit is called “Liability” i.e. it is to be kept as an amount, which is to be repaid. Certain amount that a bank owns is called “Assets”. Loans are provided from assets. The entry in the documents of bank is done in either case that is debit and credit. For example an account holder draws an amount, this is debited to bank and credit to the account holder. This is called “Double Entry System”. This system helps in cross checking of day-to-day amount circulation in the bank. The loan facility is provided by the bank on different criteria i.e. a salaried person can get a loan equal to its six months pay, where as a business man can get loan on the basis of average balance present in account. Similarly the Letter of credit required by the importer is opened when requested by the account holder (importer). The individual pays the amount through the bank. Bank helps him/her in providing assistance and guarantee in the business deal. The Importer gets delivery of goods when the exporter, after getting amount from the bank, delivers the required document through the bank to the importer for the release of goods. All these bank activities are carried through by the transaction documented by different staff at different levels.

1.3.1 Opening of a New Account

A new account is opened asking the individual to provide a copy of National Identity Card and filling in details in the application duly signed by the two old account holders. Cheque

book is issued after one week. The two old account holders take the responsibility of his fair deals with the bank.

1.3.2 Cash Deposit

A person comes and hand over cash amount to Cashier along with the deposit slip containing details of account i.e. Account Number, Date, Amount and signature by the depositor. Cashier accepts it and appends signature on the deposit slip and returns the counter foil to the customer..

1.3.3 Cash Withdrawal By Cheque

There are different means of withdrawing money from the bank. Most commonly used are cheque,

pay order and pay draft. A cheque when made available to the cashier by the account holder is initially received by the cashier who takes not of cheque,amount and other authentication and steps then issues a token to the customer after endorsing details for identifying the respective owner of the cheque. The cheque is then comes to the assistant manager who verify and validates the account holder signature and his account number and his balance in the account. He enters the details in the ledger account and updates the status of his account record. Then the cheque is handed over to cashier for the disburse the hard cash to the account holder on the production of token. When a person designated by the actual account holder submit the cheque to the cashier on the behalf of actual account holder. The cashier hands over him the token endorsing the cheque number and token number with amount details. The assistant manager verifies the cheque and account balance is verifyied.after validation the cheque counter signed by the assistant manager is handed over to the cashier to give away the amount to the person after getting his signature.

1.3.4 Preparing Pay Order

This is the documents prepared by the bank to guarantee the payment of amount on demand, to the person /organization shown on the pay order. Only the individual possessing required amount in account or cash may apply for pay order. The cashier gets amount and records it in separate book along with the cashbook and issues pay order. The transfer of amount through pay order is valid within a city only. The pay order once issued by the bank is only cancelled when the beneficent party cancels it as the bank has honored its validity.

1.3.5 Preparing Draft

This is the document prepared by the bank to guarantee the payment of amount on demand to the person. This involves amount transfer to another city. The procedures are same as pay order .It is prepared by he assistant manager and counter signed for validation by the manager. The amount is submitted to he bank and the document is obtained. It is only cancelled by the beneficent party like pay order.

1.3.6 Payment of Utility Bills

Routine utility bills are submitted to the banks at different branches. The cashier collects amount of bills for a particular utility from the user and entries are maintained. A counter foil is issued to the customer. At the end of the day working separate transaction slip are prepared to keep record of the daily bills paid. The bank under separate head maintains them creditable to the government.

1.3.7 Loan Request

Loan financing is a facility by the bank to its account holders. The banking authority lays down criteria. For salary person it is normally restricted to amount equivalent to six months salary. For businessmen normally it is based on their last three months account status. The

manager of the bank approves the application duly signed by the department of the applicant in case of salary person. In case of businessman the manager of the bank sanctions the loan and certain documents are kept as guarantee to cater for any mishap.

1.3.8 Letter of Credit

This is a facility rendered by the bank to the exporter and the importer. Banks coordinate the activity between them. The importer requests the bank to open a letter of credit of certain amount indicating the details. The bank asks the exporter to fulfill certain documentary requirements to ensure delivery of goods to the importer. The exporter when hands over the shipping documents asked by the bank, he gets the amount from bank. The importer gets the documents for release of the goods when he submits the total amount to the bank.

1.4 PROBLEMS OF EXISTING BANKING SYSTEM:

There are number of problems observed in existing banking system being dependent on manual functioning of human beings which are discussed a follows:

1.4.1 Human Error

Present system is totally dependent on working staff, which is prone to human error especially when over burden and under tension. Security is key feature, which can be over looked. Any human error of one digit can cause embarrassment to the client as well as bank.

1.4.2 Staff Resources

Limited number of staff is possible to employ but still it is not possible to pay individual attention every member, which his basic right of every customer.

1.4.3 Time Constraint

Usual banking hours are in the morning. Any customer requiring bank services in later hours is not entertained. Example of submitting utility bills making long queues and causing discomfort to the old and infirm persons is a point to think.

1.4.4 Fast Growing Economy

It is becoming comparatively difficult to keep pace with the rapid growing economy of the world. Now the strength of a country lies in its economy. With its relation with e-commerce it cannot be overlooked.

1.4.5 Update Information

With the advent of Internet world has become a global village and there is an explosion of knowledge and info taking place. Real update of account, information is becoming impossible manually.

1.4.6 Remote Sites

Distances involved between a client and bank is a major consideration in choosing a bank to avail the banking facility. An account holder has to go physically to the bank office even to know the minor information since on telephone the identity of the person cannot be ascertained.

1.4.7 Latest Economy Trends

Every day we see a new package of investment being announced with lucrative benefits. The economy and its relation with the e-commerce need not to be over emphasized. There

is global competition of economy and hence every country irrespective of its boundary size is excelling for better economy for its survival.

1.5 ELECTRONIC COMMERCE AND BANKING

1.5.1 Electronic Transaction

E-commerce encompasses all economic transactions that are facilitated by digital technology i.e. the exchange of goods and services for value on the Internet, which is a most cost-effective and powerful way to do business.

1.5.2 Virtual Bank or Online Bank

Online systems allow customers to plug into a host of banking services from a personal computer by connecting with the bank's computers over telephone lines. The benefits can be enormous. Not only traveling time is reduced, but effort of going to ATM machines, is eliminated for most of services, by using virtual bank Technology continues to make online banking, once attempted only by computer enthusiasts, easier for the average consumer. Even that may not be easy enough, though. Many systems that offer greater financial control also require more work. These systems offer certain advantages over traditional banking methods.

1.5.3 Importance and Usage of Online Banking

The development of the Digital Economy will have a great impact on the structures and processes of economic systems. Over the last few years e-commerce transactions have seen explosive growth. Already, the e-commerce world has produced many undisputed successes, from entirely new Internet-focused companies to existing companies that have extended their organizations to take advantage of the inter net.

Online banking system is a key concept to opening up multi-channel access and communication method to allow between customers and suppliers to communicate using the most convenient and easily accessible channel. Online banking enables the organizations to increase profitability, customer satisfaction and retention.

1.5.4 Online Banking and E-commerce

As it is becoming increasingly popular, the web is rapidly changing. Just a few years ago, it was enough for a business to put up a site that had a modest amount of information on its products or services with a phone number to contact if the visitor wanted to order something or ask questions. This static “brochure ware” content treated the web as a kind of online Yellow Pages, where the main idea was to make sure people were properly listed. Things have really changed. Now, the Web has become an intensively interactive medium, an extension of the business itself. Companies use the Web to buy, sell, recruit staff, solicit bids and make referrals.

Online banking is simply electronic bank. It is simply the integration of people, processes and technology to conduct business and provide real time banking facilities. Technology allows banks to automate their processes. This can lead to improvements in the way banks do business. There are many metrics available to measure the process improvements. It provides opportunities for giving customer facilities in a new and different ways. For example, self-services are a way for a holder to place an order or check account status without actually speaking to person. This is only possible with recent technological innovations such as the Internet. Although banking fundamentals still exist and apply, customers that choose to change their banks to utilize these new technologies should be prepared for the fact that they will be judged and measured under a whole new set of rules.

With technology and electronic transactions comes an expectation of immediate fulfillment. Managers, account holders and other customers believe that “all the information is in the computer” and will expect immediate reports, reconciliation, etc. The electronic environment is real-time. Time frames to produce and measure the success or failure of a virtual or online bank initiative are much shorter. Virtual banking, by nature, is not entirely business as usual. Many people equate virtual banking to the Internet. This is not necessarily accurate he opportunity to conduct virtual bank has become more accessible utilizing the Internet as the transmission mechanism. It provides the link between banks and their customers, importers, exporters and branches.

1.6 COMMON ACRONYMS USED IN THE E-BANK ARENA:

1.6.1 Bank to Account Holder:

It is automating the relation between a bank and account holder. In bank-to-account holder dealing banks handle the account holder in a more personalized, dynamic environment. Bank-to-account holder will increasingly include the handling of digital transactions-software, electronic media and information. Account holders will look more frequently to the Internet for the delivery of services, including first hand information of accounts, transfer of amounts, and other financial services.

1.6.2 Bank to Bank:

Bank to bank is merely automating a transaction between two banks. Bank-to-bank relation includes online major transactions, where banks interchange amount and services to other banks on the Web. In internet-based account handling, whole account handling merges into system where individual account holder draws and transfers amount. With internet-based

transactions, banks work closely together via the Internet to automate and streamline the handling and maturing of procedures involved.

1.6.3 Electronic Data Interchange:

EDI is a set of standard record formats for electronic transactions. For example, a transaction would have some mandatory fields:

Account number, Account Title, Amount and date.

1.7 CONCLUSION

Virtual Banking requires more than simply moving existing practices to the internet, Banking Issues and Technology Considerations associated with creating effective E-solutions must be understood. The virtual bank offers:

- Reduced Administration Costs.
- First hand account information.
- Universal access to individual.
- Real Time transactions.
- Immediate clearance of Utility bills.
- Fundamental support of E-economy with fast developing electronic culture.

CHAPTER 2

BANKING SYSTEM

2.1 INTRODUCTION

System Analysis is the part of the systems development life cycle in which functionality of the current banking system is determined. An assessment has been as to how potential account holders would like to see the system. These three sub phases were conducted in analysis:

- Requirements Determination
- Requirements Structuring
- Proposal Preparation

2.2 REQUIREMENTS DETERMINATION

During requirements determination, information was gathered, on what the system should do from as many banks as possible: from account holder of the current banks, from observing banks, and from reports, forms and procedures. Following methods were used for collecting

2.2.1 System Requirements:

Comprehensive interviewing sessions were conducted with various banks working in the Rawalpindi/Islamabad region. We individually interviewed bank staff informed about the operation and issues of the current working of banks and the need for systems in future organizational activities. We observed workers/operators at selected time to observe how data are handled and what information they need to do their jobs.

Moreover a study of business documents to discover reported issues, policies rules, and directions as well as concrete examples of the use of data and information in the bank.

2.3 REQUIREMENTS STRUCTURING

During requirements structuring, information gathered from the previous stage was organized into a meaningful representation of the information system that exists and of the requirements desired in a replacement system.

2.3.1 Modeling the Context of the System

In the UML, the context of the system is modeled with use case diagrams emphasizing the actors that surround the system. To model the context) of the system, we identified the actors that surround the system, organized actors in a generalization/specialization hierarchy. The context diagram Fig 2.1.

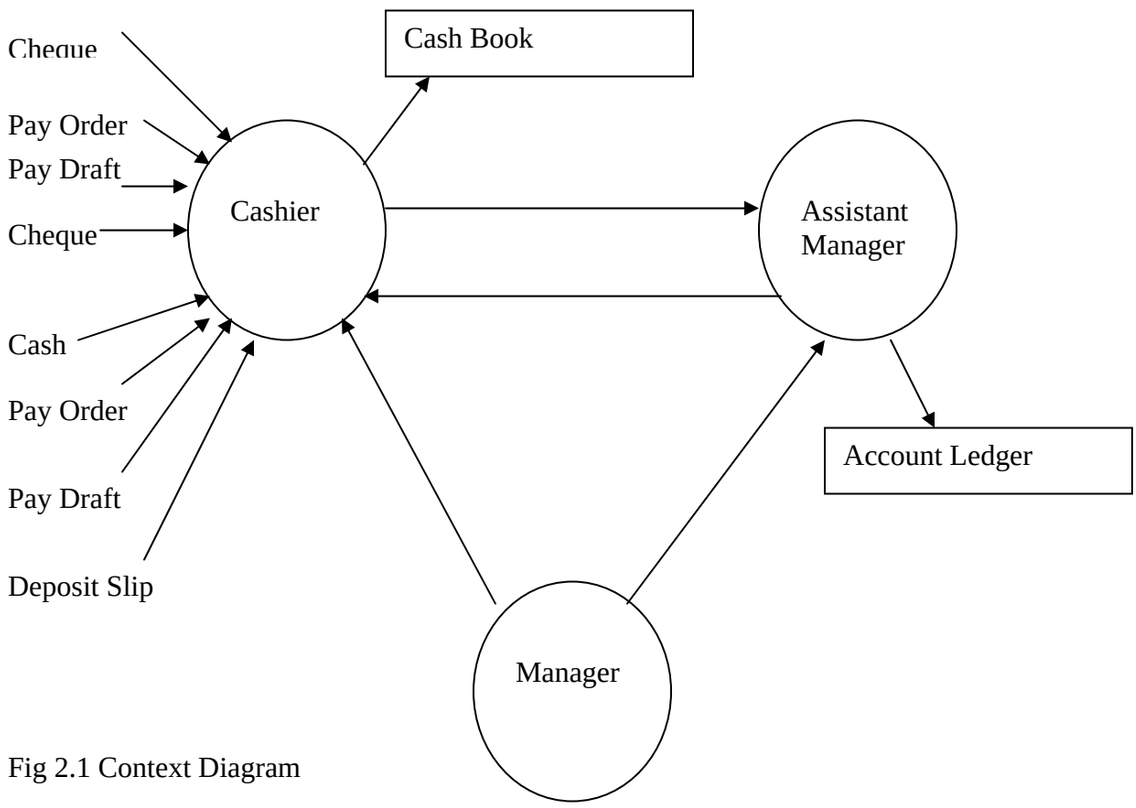


Fig 2.1 Context Diagram

2.3.2 Modeling the Requirements of the System

By stating systems requirements we assert a contract, established between those things that lay outside the system, and the system itself, which declares what we expect that system to do. Requirements can be established in various forms, from unstructured text to expressions in a formal language, and everything in between. We modeled the requirements expressed as Use cases; these diagrams to be followed.

2.4 PROJECT OVERVIEW:

2.4.1 Project Deliverables

- The Virtual Bank will support three user types:
- Account Holders, Manager.
- The users should be able to access the Virtual Bank over a web-based client.
- The Virtual bank SUPPORT analysis capability to and Manager user type.
- The virtual bank will provide a ledger module to manage the transaction portfolio of the bank.
- The Virtual Bank will provide a suitable interface for entering and tracking transactions by all user types.
- The Virtual Bank will define an interface to credit checking application.
- The Virtual bank will define interface to engineering, provisioning and billing systems.
- The Virtual Bank will incorporate necessary security features.

2.4.2 PROJECT DELIVERABLES

2.4.2.1 In House User:

The in house users include the Account Holder and Manager. Following brief description of their usage of system.

- Account Holder: Customer management and e-mail facility.
- Manager: Account Management, Account holder Management.

2.4.2.2 External User:

The external user category would encompass anybody interested in using the Virtual Bank services. The external users would get online transitioning and its tracking facilities.

2.5 PROJECT ORGANIZATION:

2.5.1 Process Model:

Due to the evolutionary nature of spiral process model or risk based software process model was the most suitable for our system. It couples the iterative nature of prototyping with the controlled and systematic aspects of the Linear Sequential model. Work flow diagram Fig2.2

2.5.2 Project Overview:

2.5.2.1 Planning:

Planning for:

- Purpose
- Audience
- Load
- Resources
- Schedule
- Look ad feel

- Security
- Partnerships
- Long Term Goals

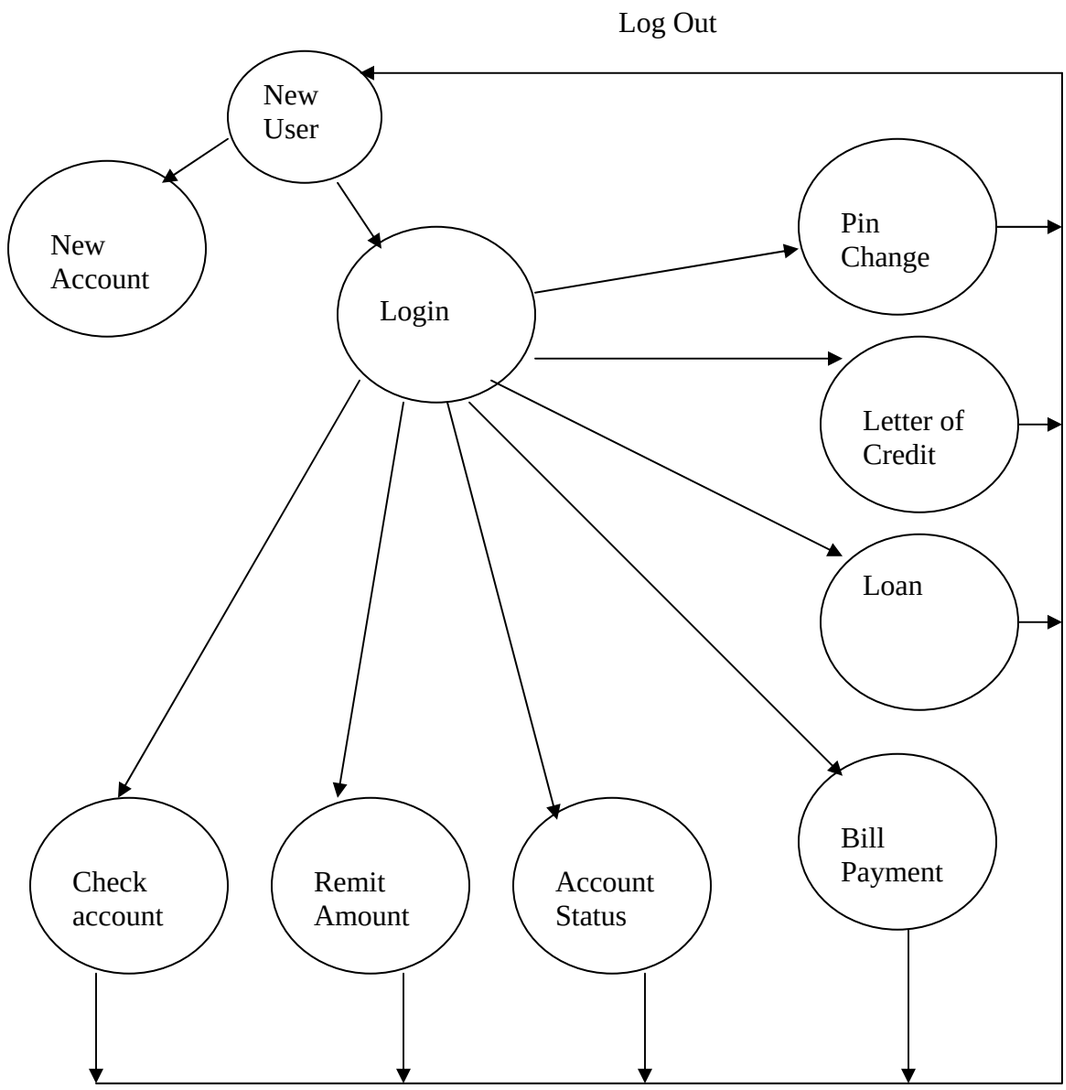


Fig2.2 Work Flow Diagram

2.5.2.2 Development:

Development Tasks:

- Outlining
- Site Preparation
- Web Page Design and Development
- Database Design and Development
- Banking Integration
- Data Input
- Third Party Software Integration
- Managing the Process
- Interim Testing

2.5.2.3 Testing and Troubleshooting:

- Developing Beta test shoppers
- Conducting the Test
- Fixing the Problem
- Deployment
- Watch for Problems
- Customer service

2.5.2.4 Maintenance:

- Keeping Tabs
- Minding the site
- Making Improvements
- Customer Service

2.6 FEASIBILITY REPORT:

In this report following is included:

- Economic Analysis
- Implementation Environment
- Constraints
- Technical analysis
- Development Risk
- Technology to be used

2.6.1 Economic Analysis:

This application will be general-purpose software and can be applicable any where for online banking. As this project is a research project so the exact economic analysis at this stage is not possible. But the following expected economic advantages of our application are as follows:

2.6.2 Development Cost is reduced:

Applications for online banks are developed for specific systems by very experienced developers, which are domain experts so the development cost is very high. But by using this software a bank wishing to e-Business can employee a technical person (with management know-how), who do not have any programming experience but knows this subject can develop his or her own banking system with minor training. So no experienced developer is needed thus it costs very less.

2.6.3 Maintenance cost is reduced:

Professional developers also do the maintenance & up gradation of applications. It is a time consuming process so it is also very expensive. But by using this software, management

personnel can do it by themselves so maintenance cost is reduced.If the system is imported or ready-made software packages are used then there are following disadvantages:

- Loss of foreign exchange
- For upgrades and maintenance one have to pay heavy extra cost.

2.7 Implementation Environment:

This application can be use in any environment where online bank is need.

2.7.1 Constraints:

Following are some constraints (DAV94) for this project:

2.7.2 Response Time:

As this application will be used in a real time environment so the time constraints are of vital importance. Obviously, the longer customers must wait to access a site, the more impatient they become. Impatience leads to frustration, which leads to a negative view of the business. Response time, therefore, is a critical measure for the success of an E-commerce site.

2.7.3 Regulatory Policies:

We have to adopt special techniques for having project development in check with the proposed timeline.

2.7.4 Hardware Limitations:

None

2.7.5 Interfaces to other Applications:

This applications needs to be interfaced with the Engineering or Provisioning and the Billing Divisions/Departments of the Target Environment.

2.7.6 Assumptions and Dependencies:

This reliability and criticality considerations for this application require special Monitoring and Access Management Facilities. The points of failure and possible solutions are listed below: (An assumption is being made that these will never occur)

Problem: Server Failure – The server becomes unavailable due to a hardware or Operating system failure.

Solution: Using two or more servers, with automatically routing to any server that Fails or becomes unavailable. By proactively monitoring servers, failures can be kept transparent to customers. Then, once the server responds properly again, it is added back into the server farm automatically.

Problem: Software failure – Individual applications may hang up or stop responding.

Even though other applications are healthy.

Solution: Detecting the failure, and sends requests to another server that has that Service running properly. Determining that applications are returning the “right content” to customers.

Problem: Content failure – The server and application may be working properly, but are responding to customer requests with a “404 Object not Found” error message.

Solution: Actively querying individual servers at the application level and, if an application is not returning the right content, redirecting requests to applications that are responding properly.

Problem: Network unavailable – The link between the server and the outside world is lost making the server unreachable.

Solution: Using some mechanism businesses must provide high a availability and load balancing over geographically distributed sites.

2.7.7 Technical Analysis:

What makes for the complexity in these systems? The fact that they must tie together information and applications from many business systems and processes in a consistent fashion, quickly and in real time, for many concurrent users. Let's consider how such a system serves its clients Ultimately e-commerce applications result in a stream of HTML being delivered to a clients Web browser. The challenge is in how that delivery takes place. Here's a nutshell overview of the operations and technologies involved:

- Modern e-commerce sites generate many of their pages dynamically, using content assembled from a variety of sources. For example, a retail site page might present product descriptions and images from one or more databases, pricing calculated by business applications, and availability and shipping information from back-end business systems.
- To generate its dynamic content, the servlet must either access data directly out of a database or delegate these responsibilities to an application component creation.
- Pulling data out of the database involves querying, transporting the result set into the object would across a ODBC interface and doing the O/R (object to relational) mapping necessary t populate the needed objects.
- Depending on the application, it might be necessary to retrieve data from one or more legacy systems – each represented y a separate interface requiring more

component creation. The hit might result in the need to commit data into the database. If several backend data sources are involved, this would incur the extra overhead of a distributed two-phase commit

- Finally, methods in the objects are exercised to produce the HTML stream in the servlet that must then be routed back through the Web server and across the network to the client.

2.7.8 Environmental Resources:

There is no special requirement for Software Engineering Environment (SEE), moreover no access to specialized hardware or software elements is needed.

2.7.9 Technology to be used:

This includes:

- Development Approach
- Development Tool
- Operating System

2.7.10 Development Tool:

The tool for the development will be Active Server Pages(ASP) as it is a recommended Integrated Development Environment tool for large web based application development. It provides full facilities for web application development that brings together various technologies to work toward a common goal of building robust and dynamic applications for the web. ASP enables the developer to build dynamic web pages through the use of client and server side script. Database integration is vital to any application. ASP provides a rich and robust set of visual database tools to immediately enhance the productivity. It

supports the major object based technologies that exist for developing Web-based applications, including ActiveX controls and Java applets.

2.7.11 Database Development

The Database Development would be done in Microsoft Access 2000 as it is the strongest database tool for windows platform. This would be integrated with our application using ADO 2.5 to perform various database operations.

2.7.12 Web Server:

When one is dealing with web based applications the choice of a web server is a major decision. The web server is responsible for hosting the whole web application and provides the connectivity to the web users to the site content. In or case the web server would be Internet Information Server (IIS). The choice of IIS as our web server was based on following grounds:

2.7.13 Tightly Integrated with Windows NT Platform:

IIS is a web server of choice for Windows NT platform. It provides easy integration for windows application with itself through Internet Server Application Programming Interface (ISAPI).

2.7.14 Scalable

IIS scales well. It is ideal for medium to large sized we applications. IIS integrates with Microsoft Transaction Server to provide scalable solution for enterprises.

2.7.15 Secure

IIS employs three different levels o security

- Windows NT security
- IIS security

- Network Security

Each of these security levels adds up to provide a secure environment for internet or intranet web application.

Processing: It verifies that the new password entered is valid i.e. it is not more then eight characters long.

CHAPTER 3

SOFTWARE DESIGN AND IMPLEMENTATION

3.1 INTRODUCTION

The Analysis gives the baseline project specifications on the basis of which the project design is built and later implemented. The design phase was divided into two sub phases:

- Logical Design
- Physical Design

3.2 LOGICAL DESIGN:

Logical Design is the phase of systems development cycle in which a concrete under standing of how the system will work is developed. In this phase we have described the “look and feel” of all system inputs, outputs, and interfaces and dialogs. It includes the following steps:

- Designing forms, which describe how data will appear to user in the system inputs and out puts.
- Designing interfaces and dialogues, which describe the pattern of inter action between system users and software.

System inputs and outputs-forms and reports were identified during requirements structuring. The kinds of forms and reports the system will handle were established as part of the design strategy formed at the end of the analysis phase of the systems development process. A form (in this context) is a bank document containing some pre-defined data and often includes some areas where additional data are to be filled in.

Designing forms is a user-focused activity that typically follows a prototypical approach. First an understanding of the intended user and task objectives by collecting initial requirements during requirements determination was gained. During this phase, several questions must be answered. These questions attempt to answer the “who, what, when, where and how related to the creation of any form. The focus of this phase is on the design-content and layout. How specific forms are implemented is left to the later stage. Detailed use case analysis was performed at this stage. What is a Use Case?

A use case is a sequence of transactions performed by a system in response to a triggering event intimated by an actor to the system. A full use case should provide a measure value to an actor when he actor is performing a certain task. A use case contains all the events that can occur between an actor-use case pair, not necessarily the ones that will occur in any particular scenario. A use case contains a set of scenarios that explain various sequences of interaction with the transactions. Use case can also describe the behavior of a objects, such an organization.

Use cases were used to define the operations that can be performed by different actors on the system. These scenarios help in developing the software and creating its interface. An actor in scenario may be a person, an institution or an event etc. For example a timer is also an event that starts some event after the specified period of time.

The first section of the specification provides a narrative overview the containing the information relevant to developing and using the forms within the context of the system. The second section contains the Preconditions and Post conditions of the use case, followed by initiation. Then follows navigation maps (state diagram of page transitions). Then for

each page a screen shot, initial condition, a tabular description of detail of control, notes if needed, and exceptions if any.

3.2.1 UC1-User Views Main Page

- Overview

  This use case allows the user to view the main page.

- Preconditions

  None

- Post conditions

  None

- Initiation

  This use case is initiated when the user accesses the bank's web site.

- Initiation

  There is only one page in this use case

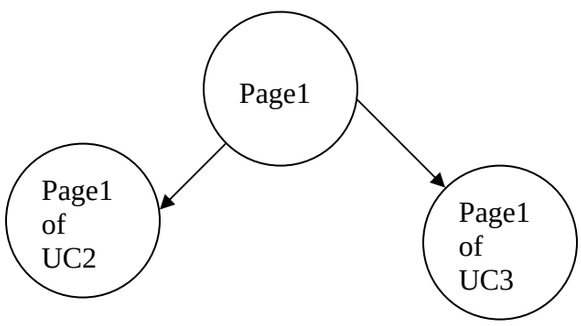
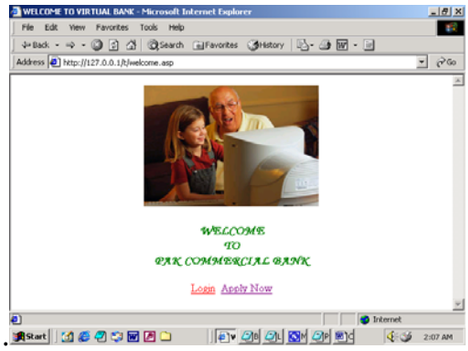


Figure 3.1 INITIATION

This page is the opening main page for many of the cases to follow. It contains a brief synopsis bank and its working



Exception 3.1 MAIN PAGE

3.2.2 UC 2 User Apply for New account

- Overview

This use case allows the user to view the application form for opening an account.

- Preconditions

None

- Post conditions

None

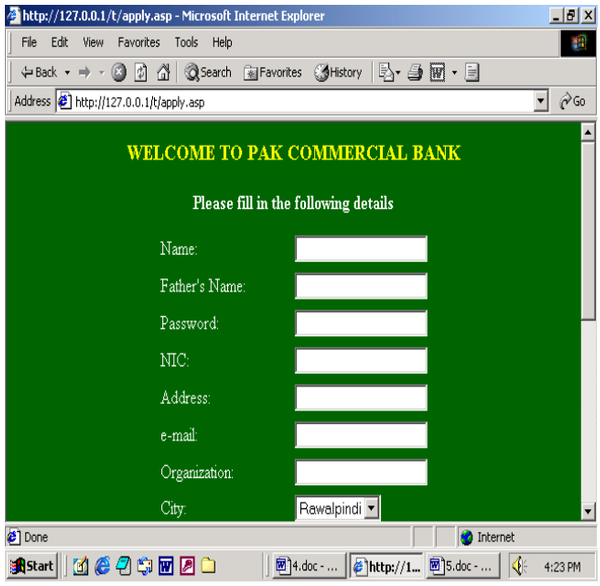
- Initiation

This use case is initiated when the user accesses the bank's web site and clicks <APPLY NOW>.

- Initiation

There is only one page in this use case.

- Page 2



Exception 3.2 APPLY FOR NEW ACCOUNT

- Initial State

This page contains input text boxes meant for the user (customer),who clicked<APPLY NOW>in the Page 1 of UC 1.

- Notes

The input for field<name> must be maximum 30 characters. Valid input consists of all keyboard characters. Password needs to be unique while login must be unique.

3.2.3 UC 3-User Logs into Account

- Overview

This use case allows the user to view a previously created account.

- Preconditions

The database is accessible

The account holder is logged in.

- Post conditions

None

- Initiation

This use 2 pages in this case. State transition diagram for the pages in this use case is shown below. Pages are switched when the commands links are clicked. This diagram shows the normal transition without showing exceptions.

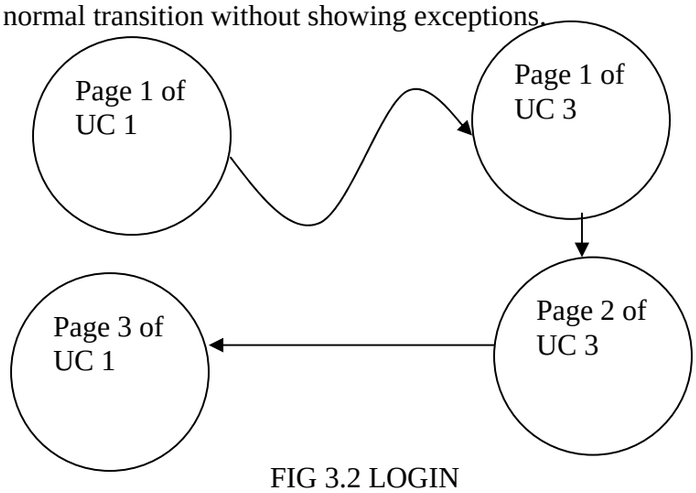
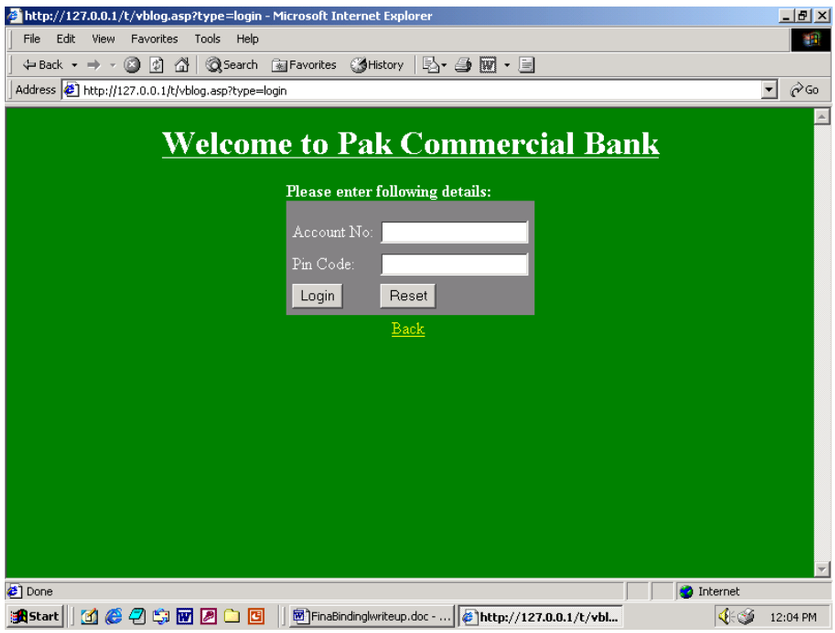


FIG 3.2 LOGIN

This page asks an old Account Holder for password for access to his account.



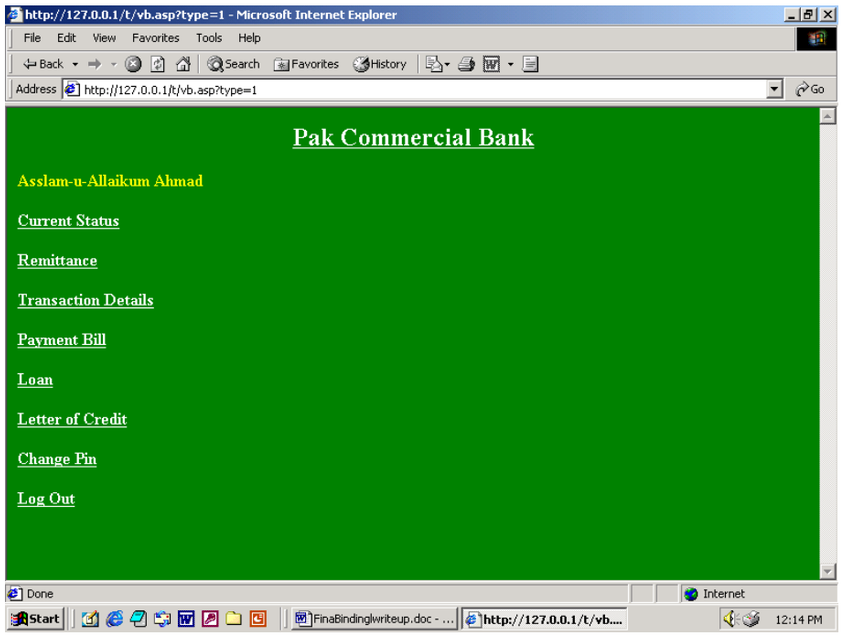
- Exception 3.3 PIN CODE

Table 3.1 PIN CODE

Control Name	Control Type	Data Type	Boundary Condition	Action	Software Action
Log Out	Link	N/A	N/A	Click	Page 1of UC 1

- Page 2

This page displays the option of the account option available to the account holder by the bank.



Exception 3.4 HOME PAGE

- Initial State

User logs in successfully

Table 3.2 OPTION PAGE

Control	Control	Data Type	Boundary	Action	Software

Name	Type		Condition		Action
Current Status	Link	N/A	N/A	Click	Page 5 UC1 is invoked
Remittance	Link	N/A	N/A	Click	Page 1 of UC 5
Transaction Details	Link	N/A	N/A	Click	Page 1 of UC6
Bill Payment	Link	N/A	N/A	Click	Page1 of UC7
Loan	Link	N/A	N/A	Click	Page 1 of UC 8
LC	Link	N/A	N/A	Click	Page 1 of UC 9
Change Pin	Link	N/A	N/A	Click	Page 1 of UC 10

3.2.4 UC4 User Checks Status of Account

This use case allows the account holder to view his Latest Balance, Latest Credit transaction, Latest Debit Transaction in his account.

- Preconditions

The account holder is logged in.

The user must have logged in his/her account.

- Post Conditions

None

- Initiation

This case is initiated when link <CURRENT STATUS> is clicked in the page of UC 3.

- Navigation

There is only one page in this use case. State transition diagram for the page is shown.

Page switch when command link is clicked.

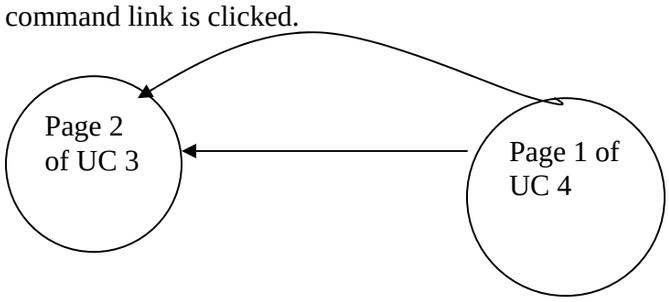


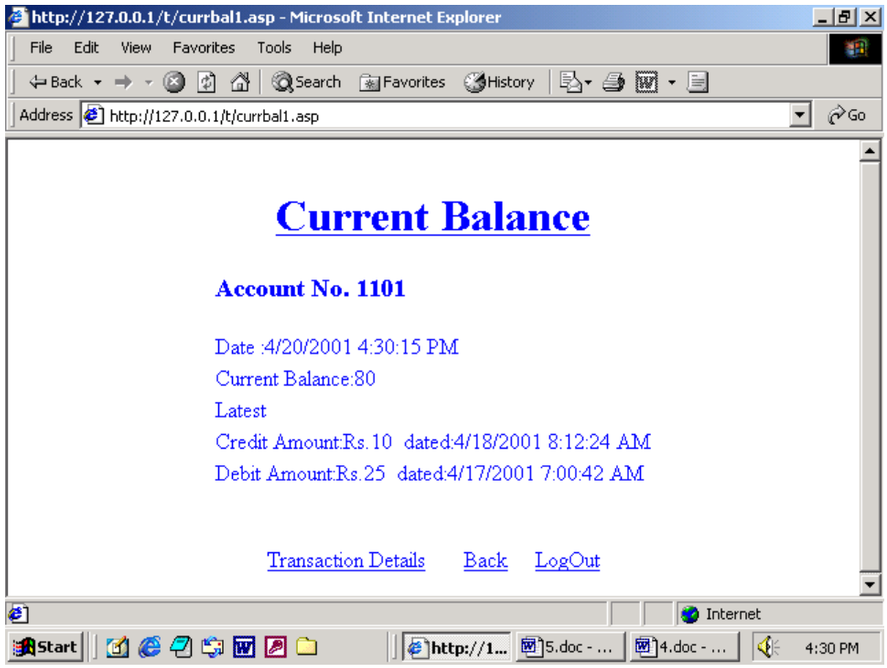
Figure 3.3 CHECK ACCOUNT

Table3.3 CHECK STATUS

Control Name	Control Type	Data Type	Boundary Action	Action	Software Action
Transaction Details	Link	N/A		Click	Page 1of UC8
Back	Link	N/A		Click	Page 2 of UC 3
LogOut	Link	N/A		Click	Page 1 of UC 1

- Page 1

Allows account holder to view his Account details.



Exception3.5 CURRENT BALANCE

3.2.5 UC5 User Remit Amount

- Overview

This use case allows the user to remit amount from his account.

- Preconditions

The database is accessible

The user is logged in.

- Post conditions

None

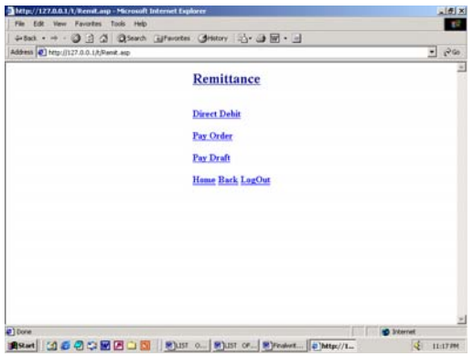
- Initiation

This use 6 pages in this case. State transition diagram for the pages in this use case is shown below. Pages are switched when the commands links are clicked. This diagram shows the normal transition without showing exceptions.

- Navigation

This has 6 Pages. State transition diagram for the pages is shown below. Pages are changed when commands links are clicked.

- Page 1 of UC 5Allows to view option for remitting amount.



Exception 3.6 REMITTANCE

- Note

If the Pay Order is prepared for then on local account message will display to advise to use draft facility.

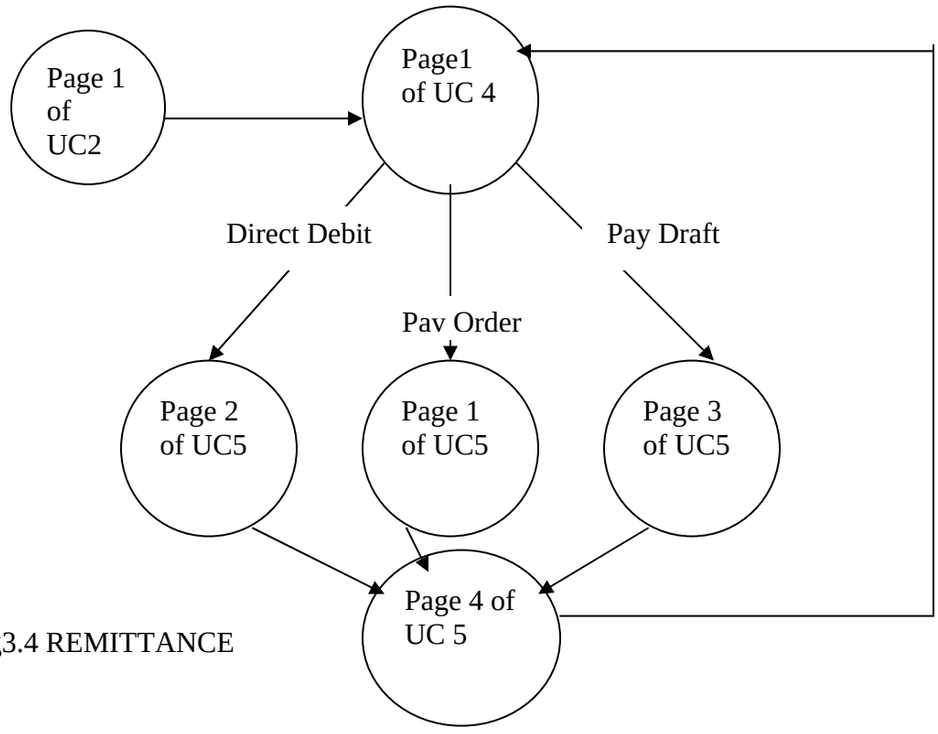


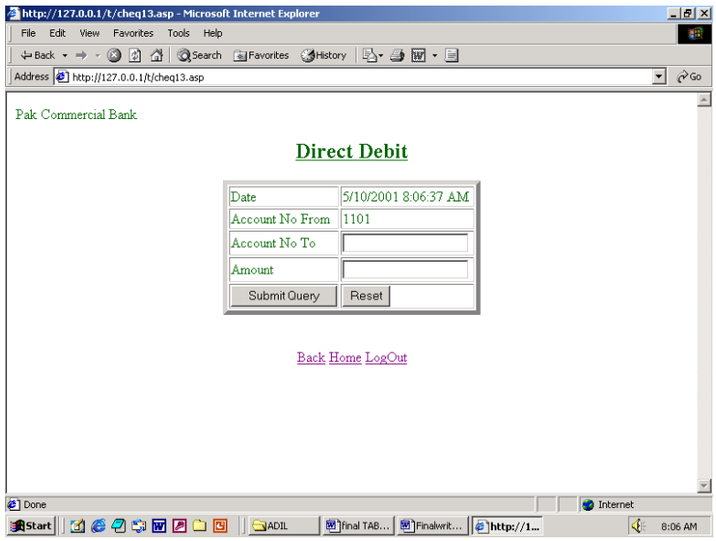
Fig3.4 REMITTANCE

Table3.4 REMITTANCE

Control Name	Control Type	Data Type	Boundary Condition	Action	Software Action
Back	Link	N/A	N/A	Click	Page 1 of UC4
Home	Link	N/A	N/A	Click	Page 2 of UC3
Log out	Link	N/A	N/A	Click	Page1 ofUC1

- Page 2 of UC5

Allows the old account holder to transfer amount through a cheque.



Exception 3.7 PAY CHEQUE

- Initial State

The account holder wants to remit amount.

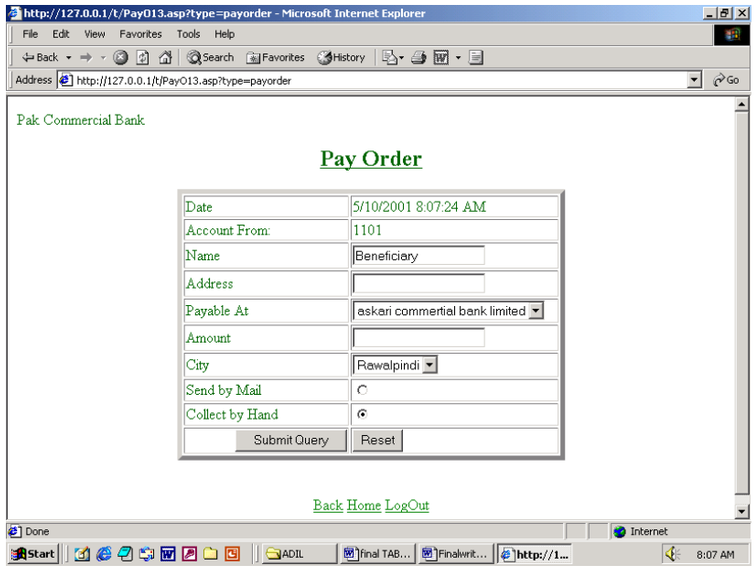
- Detail of Control

Table 3.5 PAY CHEQUE

Control name	Control Type	Data Type	Boundary Condition	Action	Software Action
Back	Link	N/A	N/A	Click	Page 1 of UC5
Home	Link	N/A	N/A	Click	Page2 of UC3

- Note If the amount to be transferred is more than currently present in the balance of account than the message will appear to notify. Similar if the amount in account is less than specified amount another message will appear.

- Page 3a



Exception 3.8 PAY ORDER

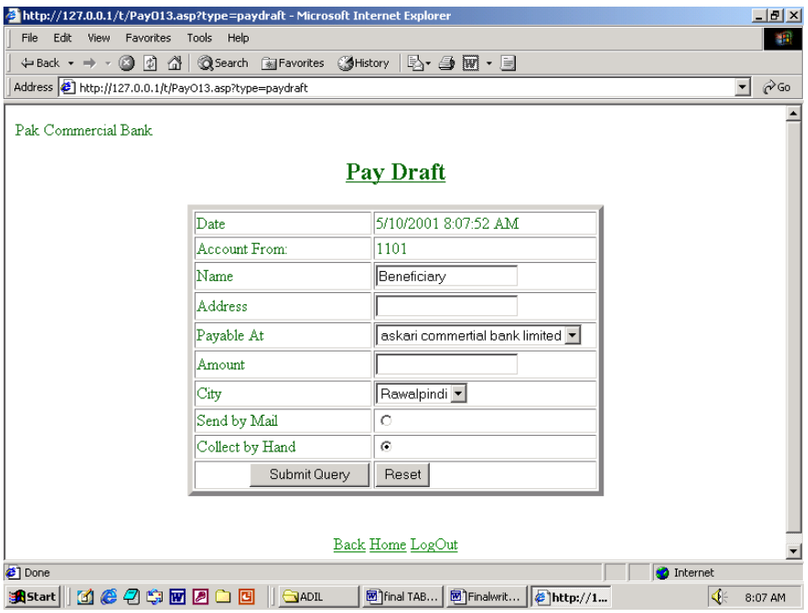
Allows the account holder to transfer amount through Pay Order. The facility to transfer amount in local account.

- Note

It notifies if the accounts involved are from different cities.

- Page 4

This allows to transfer amount through a Pay Draft.



Exception 3.9 PAY DRAFT

- Note

It notifies if the accounts are from same cities.

3.2.6 UC6 User View Previous Transaction

- Overview

This use case allows the user to view previous transaction record of his account.

- Preconditions

The database is accessible

The account holder is logged in.

- Post conditions

None

- Initiation

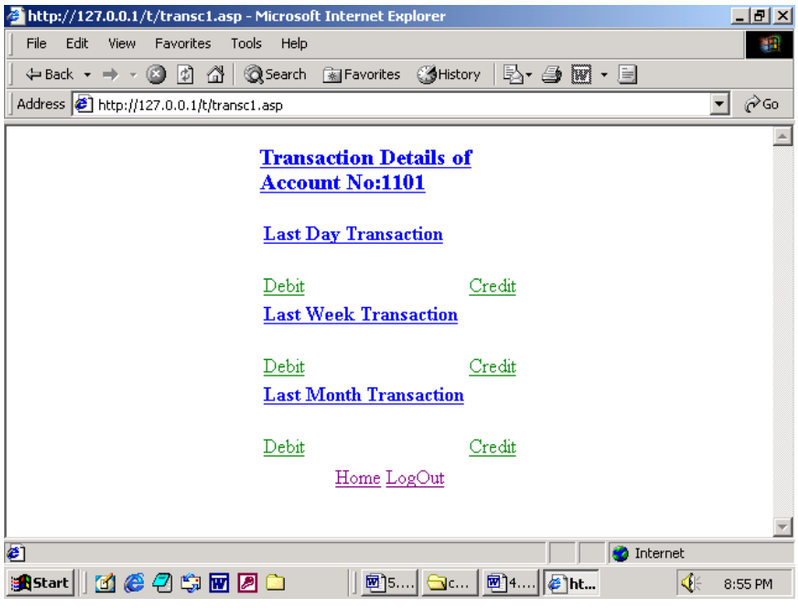
This use 7 pages in this case. State transition diagram for the pages in this use case is shown below. Pages are switched when the commands links are clicked. This diagram shows the normal transition without showing exceptions.

- Navigation

State transition diagram for the pages is shown below.Pages are changed when commands links are clicked.

- Page 1

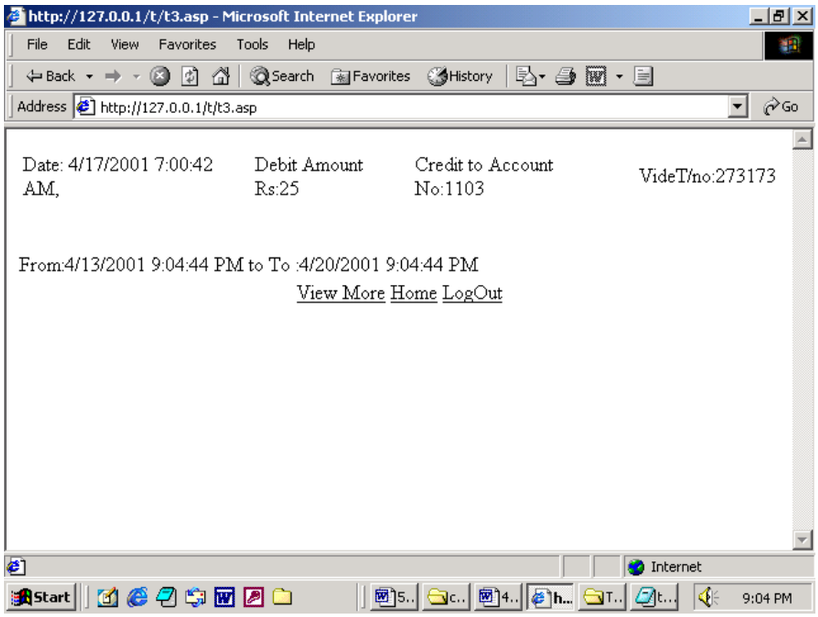
This page displays the query option to the account holder to view previous transactions.



Exception 3.10 TRANSACTION

- Page 2

This page displays the result related to the query



Exception 3.11 QUERY RESULT

- Detail of Control

Table 3.6 VIEW TRANSACTION

Control Name	Control Type	Data Type	Boundary Condition	Action	Software Action
View More	Link	N/A	N/A	Click	Page 1 of UC6
Home	Link	N/A	N/A	Click	Page 2 of UC3
Log Out	Link	N/A	N/A	Click	Page1 of

					UC1

3.2.7User Wants to Pay Utility Bills

- Overview

This use case allows the user to make payment of utility bills from his account.

- Preconditions

The account holder is logged in.

The database is accessible

- Post conditions

None

- Initiation

This use 3 pages in this case. State transition diagram for the pages in this use case is shown below. Pages are switched when the commands links are clicked. This diagram shows the normal transition without showing exceptions.

- Navigation

State transition diagram for the pages is shown below. Pages are changed when commands links are clicked.

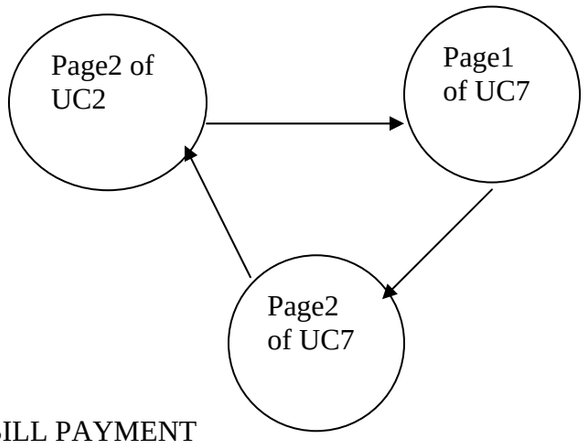
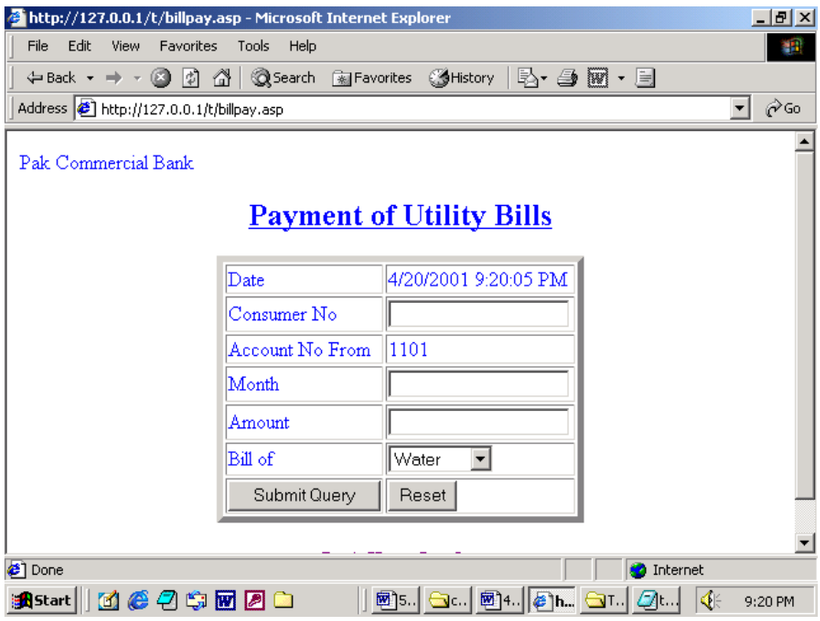


Figure 3.6 BILL PAYMENT

This allows filling in details of the utility bill to be paid.



Exception 3.12 UTILITY BILLS

3.2.8 UC8 User Apply for Loan

This use case allows the account holder to apply for a loan with the option of different installments.

- Overview

This use case allows the user to get loan.

- Preconditions

The account holder is logged in.

The database is accessible

- Post conditions

None

- Initiation

This use 2 pages in this case. State transition diagram for the pages in this use case is shown below. Pages are switched when the commands links are clicked. This diagram shows the normal transition without showing exceptions.

- Navigation

State transition diagram for the pages is shown below. Pages are changed when commands links are clicked.

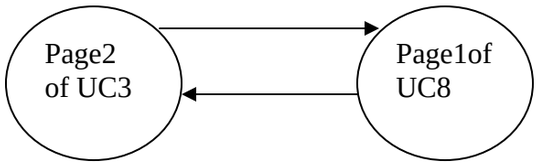
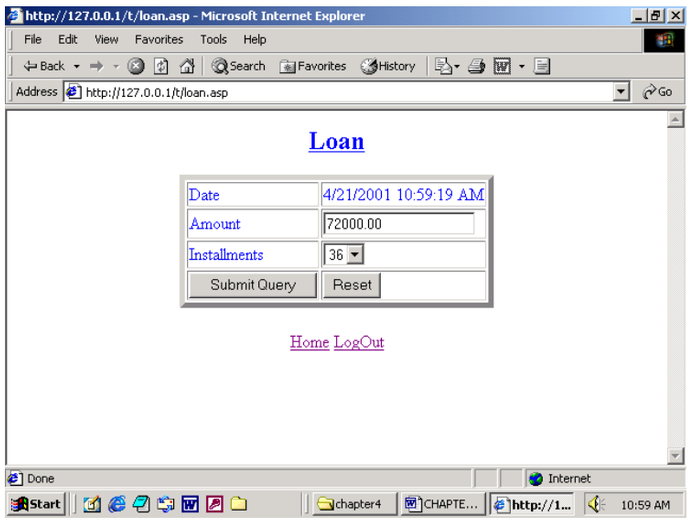


Figure 3.7 LOAN



Exception 3.13 LOAN

3.2.9 UC9 Account Holder Request for LC

- Overview

This use case allows the account holder to open Letter of Credit.

- Preconditions

The database is accessible.

The account holder is logged in

- Post conditions

None

- Initiation

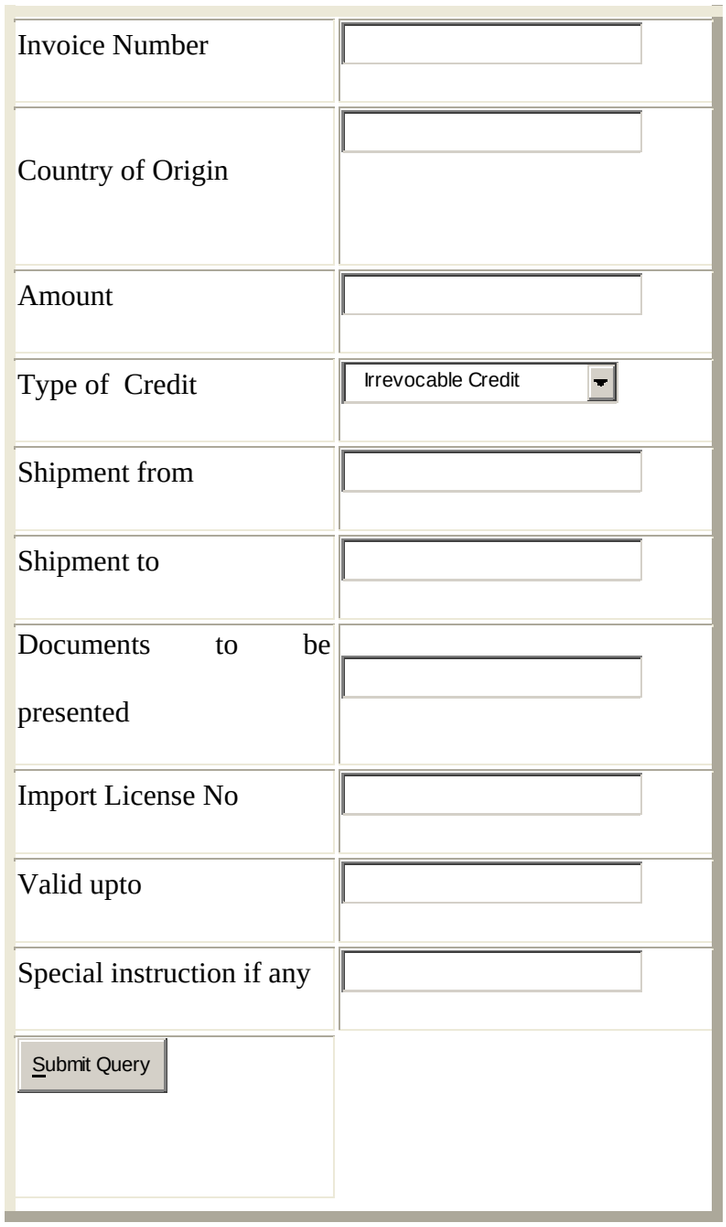
This use one page

- Navigation
- Page 1

This page allows the account holder to apply for the Letter of Credit.

Letter of Credit

Date	4/21/2001 11:07:43 AM
Letter of credit No.	
AccountNo(Opener)	1101
Name of Openers	
Address (Openers)	
Account No (Beneficiary)	
Name of Beneficiary	
Address (Beneficiary)	



Home LogOut

Exception 3.14 LETTER OF CREDIT

3.2.10 UC10 Change of Password

- Overview

This use case allows the user to change his/her password.

- Preconditions

The account holder is logged in.

- Post conditions

None

- Initiation

This command is initiated when the commands links <CHANGE PIN>are clicked. This diagram shows the normal transition without showing exceptions.

- Navigation

State transition diagram for the pages is shown below. Pages are changed when commands links are clicked.

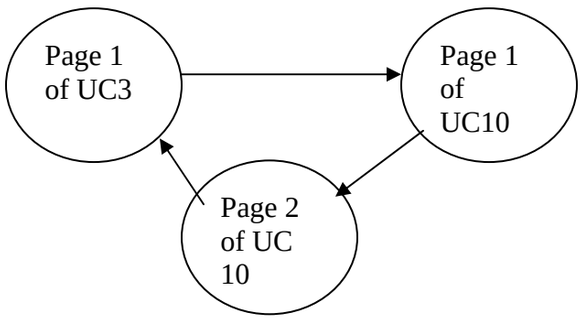
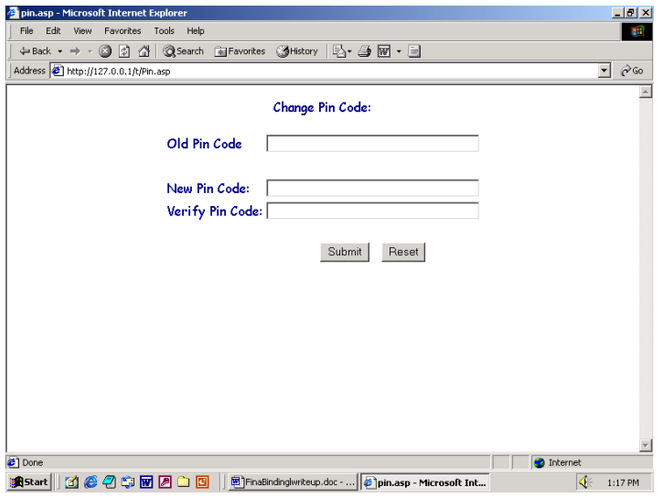


Figure 3.8 CHANGE PIN

This allows account holder to feed in new password.



Exception 3.15 CHANGE PIN

3.2.11 UC11 Administrator

- Overview

This allows the administrator to view and up date the accounts.

- Preconditions

The account holder is logged in as administrator.

- Post conditions

None

- Initiation

When user is login as administrator.

- Navigation

State transition diagram for the pages is shown below. Pages are changed when commands links are clicked.

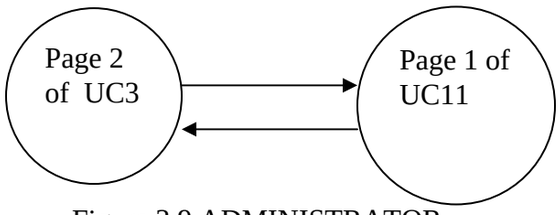
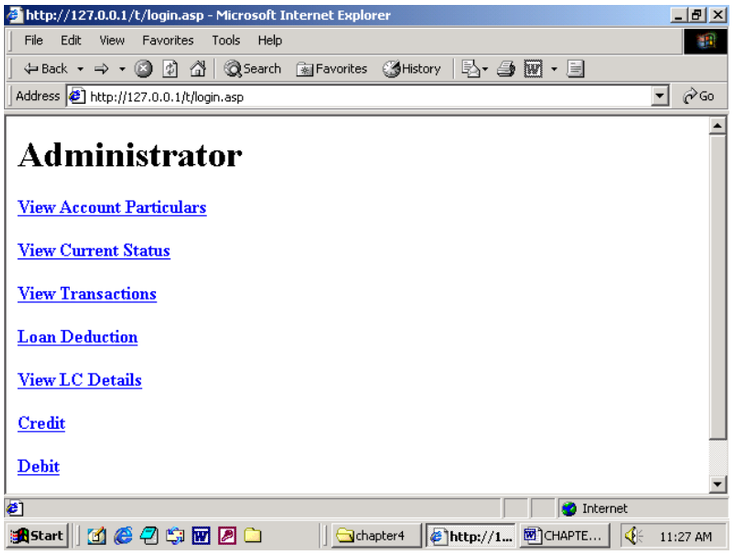


Figure 3.9 ADMINISTRATOR



Exception 3.15 ADMINISTRATOR

Table 3.7 ADMINISTRATOR

Control Name	Control Type	Data Type	Boundary Condition	Action	Software Action
View Account Particulars	Link	N/A	N/A	Click	Page 2 of UC11 is Invoked
View Current Status	Link	N/A	N/A	Click	Page 3 of UC 11 is invoked
View	Link	N/A	N/A	Click	Page 4 of UC11 is

Transaction					invoked
Loan Deduction	Link	N/A	N/A	Click	Page 5 of UC 11 is Invoked
LC details	Link	N/A	N/A	Click	Page 6 of UC 11 is invoked
Credit	Link	N/A	N/A	Click	Page 1 of UC 6 is invoked
Debit	Link	N/A	N/A	Click	Page 1 of UC 6 is invoked

CHAPTER 4

PHYSICAL DESIGN

4.1 INTRODUCTION

The purpose of the physical design [ADA85] is to specify all the technological characteristics of the system so that in the implementation phase, concentration is on building the system and not how to build the system. Whereas prior phase dealt with what the system should do and how the system should look like to the user, physical design specifies the structure for data and programs that make the system work efficiently and securely, including considerations for the location of data and data processing on a computer network. The physical design includes these steps:

4.2 DESIGNING PHYSICAL FILES AND DATABSES

Describes how data will be stored and accessed in secondary computer memory and how the quality of data will be insured. A bottom-up approach [PAG80] to implement physical design was taken, thus initially the design of physical fields for each attribute in the logical data model was addressed. Fields group to form records group to form tables. A detailed data specification follows:

4.3 DATA DICTIONARY

The Data Dictionary of Virtual bank describes the structure of Backend Database used in the application. It describes the Tables used in the Database, the session variables maintained during the HTTP session and application variables maintained during the entire course of application.

4.3.1 Newaccount

Category: Table

Fields:

Field name	Field Type	Description
ACCOUNT	Number	Account Number
NAME	Text	Account Title
FATHERNAME	Text	Name
NIC	Text	National ID Card
ADDRESS	Text	Postal Address
EMAIL	Text	E-Mail
ORGANISATION	Text	Organization
CITY	Select	City
TELO	Number	Telephone (Office)
TELR	Number	Telephone (Residence)
GENDER	Select	Gender
A_TYPE	Select	Saving/Current Account
KNAME	Text	Name of Next of Kin
KREL	Text	Relation with next of kin
KNIC	Text	NIC of next of kin
KADDRESS	Text	Address of next of kin
PASSWORD	Text	Password

4.3.2 Account

Category: Table

Fields:

Field name	Field Type	Description
ACCOUNT	Text	Account Number
CR_DATE	Date/Time	Latest Credit Date
CREDIT	Number	Latest Credit
DB_DATE	Date/Time	Latest debit Date
DEBIT	Number	Latest Debit
BALANCE	Number	Latest Balance

4.3.3 Transaction 1

Category: Table

Fields:

Field name	Field Type	Description
ACCOUNT	Text	Account Number
DATE	Date/Time	Date/Time
CREDIT	Number	Credit Amount
DEBIT	Number	Debit Amount

4.3.4 Transaction 2

Category: Table

Fields:

Field name	Field Type	Description
ACCOUNT FROM	Text	Account Number From
ACCOUNT TO	Text	Account Number To
DATE	Date/Time	Date/Time
CH_NO	Number	Cheque Number
PAY_NO	Number	Pay Order Number
BILL_NO	Number	Bill Number
DRAFT_NO	Number	Pay Draft Number
LC_NO	Number	Letter of Credit Number
AMOUNT	Number	Amount

4.3.5 Loan

Category: Table

Fields:

Field name	Field Type	Description
ACCOUNT	Text	Account Number
A_DATE	Date/Time	Date/Time
AMOUNT	Number	Applied Loan Amount
INSTAL	Number	Number of Installment
PAID	Number	Loan Paid
LEFT OVER AMOUNT	Number	Loan Left Over

4.3.6 Letter of Credit

Category: Table

Fields:

Field name	Field Type	Description
ACCOUNT	Text	Account Number
LC_NO	Number	Letter of Credit Number
DATE	Date/Time	Date/Time
BENEFICIARY	Text	Name
INVOICE_NO	Number	Invoice Number
COUNTRY	Text	Country of Origin
AMOUNT	Number	Amount
C_TYPE	Text	Type of Credit
SHIP FROM	Text	Shipment From
SHIP TO	Text	Shipment To
DOCUMENTS	Text	Documents To
LICENSE_NO	Text	License Number
VALID UPTO	Date/Time	Date
SPEC_INSTR	Text	Instructions(If any)

4.4 PROCESS SPECIFICATION

4.4.1 Account

Category: Session Variable

Description: It is used to store account Number of the account holder during each HTTP session.

4.4.2 Name

Category: application Variable

Description: It is used to store Name of account holder.

4.4.3 Father Name

Category: Application variable

Description: Name of Father of account holder.

4.4.4 NIC

Category: Application variable.

Description: National Identity Card Number

4.4.5 Address

Category: Application variable.

Description: Address of account holder

4.4.6 E-Mail

Category: Application variable.

Description: E-mail address of account holder.

4.4.7 Organization

Category: Application variable.

Description: Name of organization.

4.4.8 City

Category: Application variable.

Description: Name of city of applicant.

4.4.9 Telo

Category: Application variable.

Description: Telephone number of office.

4.4.10 Telr

Category: Application variable.

Description: Telephone number of residence.

4.4.11 Gender

Category: Application variable.

Description: Type of gender.

4.4.12 A_Type

Category: Application variable.

Description: Account Type.

4.4.13 Kname

Category: Application variable.

Description: Name of next of kin.

4.4.14 Krel

Category: Application variable.

Description: Relation with next of kin.

4.4.15 Knic

Category: Application variable.

Description: National ID Card number.

4.4.16 Kaddress

Category: Application variable.

Description: Address of next of kin.

4.4.17 Password

Category: session variable.

Description: It is used to store password of account holder.

4.4.18 Credit

Category: Application variable.

Description: Credit of amount.

4.4.19 Cr_date

Category: Application variable.

Description: Credit date.

4.4.20 Debit

Category: Application variable.

Description: It is used to store debit amount.

4.4.21 Db_date

Category: Application variable.

Description: It is used to store debit date.

4.4.22 Balance

Category: Application variable.

Description: It is used to store balance amount.

4.4.23 Ch_no

Category: Application variable.

Description: It is used to store transaction number of cheque .

4.4.24 Pay_no

Category: Application variable.

Description: It is used store transaction number of pay.

4.4.25 Draft_no

Category: Application variable.

Description: It is used to store transaction number of draft .

4.4.26 Bill_no

Category: Application variable.

Description: It is used to store transaction number of

4.4.27 Lc_no

Category: Application variable.

Description: It is used to store letter of credit transaction number.

4.4.28 Instal

Category: Application variable.

Description: It is used to store the number of installments of loan applied.

4.4.29 Opener

Category: Application variable.

Description: It is used to store the name of account holder requesting for Letter of Credit.

4.4.30 Beneficiary

Category: Application variable.

Description: It is used to store the name of beneficiary.

4.4.31 Invoice_no

Category: Application variable.

Description: It is ued to store the transaction of invoice number.

4.4.31 Country

Category: Application variable.

Description: It is used to store the country of origin.

4.4.32 C_type

Category: Application variable.

Description: It is used to store the type of credit.

4.4.33 Ship from

Category: Application variable.

Description: It is used to store the location of shipment from.

4.4.34 Ship To

Category: Application variable.

Description: It is used to store the location of shipment to.

4.4.35 Document

Category: Application variable.

Description: It is used to store details of documents.

4.4.36 License_no

Category: Application variable.

Description: It is used to store the license number.

4.4.37 Valid upto

Category: Application variable.

Description: It is used to store the date of validity.

4.4.38 Spec_Instr

Category: Application variable.

Description: It is used to store any instruction.

4.5 DESGNING SYSTEM AND PROGRAM STRUCTURES

Describes the various programs and program modules that correspond to various documentations

develop in prior life cycles stages. Once the input, output, interface, dialogue and database for a software system are known, you can design the inside of a system, the part of the system that makes interface operable, generate output, and access and update the organizations database. The various components of the system are:

4.5.1 Welcome.asp

Classification: File

Definition: It is used to display the main page of bank to which the user visits

Responsibilities: It routes the customer to specific user category i.e. Old user or NewUser

Constraints: nil.

Composition: nil.

Uses Interactions: It interacts with the Login.asp and Apply.asp

Resources: nil

Processing: It validates the customer’s login name and password against the database.

4.5.2 Login.asp

Classification: File

Definition: It allows the old user to log in.

Responsibilities: It validates the old user against his account. If successful it takes the user to his account.

Constraints: nil.

Composition: nil.

Uses Interactions: The account detail page uses it

Resources: nil

Processing: nil

4.5.3 Currbal1 .asp

Classification: File

Definition: It displays current status of an account.

Responsibilities: It shows the details of latest transactions of credit and debit with balance amount.

Constraints: A valid customer has logged in the account.

Composition: nil

Uses/Interactions: It uses vb.asp

Resources: It uses Database to retrieve account record.

Processing: It uses the account number of the account to retrieve the details.

4.5.4 Apply. asp

Classification: FILE

Definition: It allows a new customer to create his account

Responsibilities: To create an account of a new user

Constraints: nil

Composition: nil

Uses Interactions: nil

Resources: It updates the database with the new user information.

Processing: It gets the information from the user, validates the info and then updates the database.

4.5.5 Vb.asp

Classification: File

Definition: It displays the portfolio of the bank

Responsibilities: To show the services offered by the virtual bank to the User and allow online transactions.

Constraints: The customer is a valid user.

Composition: nil

Uses Interactions: It uses AccountDetail.asp

Resources: It uses Database to dynamically display the services offered by the company.

Processing: It dynamically retrieves the Product information from the database.

4.5.6 Pg 2.asp

Classification: FILE

Definition: It displays the information entered by the user.

Responsibilities: To display the information entered by the user.

Constraints: The user has entered valid information in the Pg 1.asp file

Composition: nil

Uses Interactions: It uses Pg 1.asp.

Resources: nil

Processing: It displays the user his entered information if it is valid.

4.5.7 Pg3.asp

Classification: FILE

Definition: It tells the user his Login Name and Password and takes the user for Services.

Responsibilities: It tells the user his Login Name and Password and takes the user for Service Purchasing.

Constraints: nil

Composition: nil

Uses Interactions: It uses Pg2. asp.

Resources: nil

Processing: If the info entered by the user was valid, it tells the user his password and login name.

4.5.8 Record set

Classification: Object

Definition: Represents the entire set of records from a base table or the results of an executed command. At any time the Record set object refers to only a single record within the set as the current record.

Responsibilities: You use Record set objects to manipulate data from a Database. When you use ADO, you manipulate data almost entirely using Record set objects. All Record set

objects consists of records (rows) and fields (columns). Depending on the functionality supported by the provider, some Record set methods or properties may not be available.

Constraints: nil

Composition: nil

Uses Interactions: Uses OLE-DB

Resources: nil

Processing: When you ope a Record set, the current record is positioned to the first record (if any) and the BOF and EOF properties are set to False. If there aree no records, the BOF and EOF property settings are True.

You can use the MoveFirst, MoveLast, MoeNext, and MovePRevious methods; the Move method; and the Absolute Position, AbsolutePage , and Filter properties to reposition the current record, assuming the provider supports the relevant functionality. Forward-on Recordset objects support only the MoveNext method. When you use the move methods to visit each record (or enumerae the Recordset), you can use the BOF an EOF properties to determine if you've moved beyond the beginning or end of the Recordset.

Recordset objects can support two types of updating: immediate and batched. In immediate updating, all changes to data are written immediately to the underlying data source once you call the Update method. You can also pass arrays of values as parameters with the Add new and Update methods and simultaneously update several fields in a record.

If a provider supports batch updating, you can have the provider cache changes to more than one record and then transmit them in a single call to the database with the UpdateBatch method this applies to changes made with the AddNew, Update, an Delete methods. After

you call the UpdateBatch Method, you can use the Status property to check for any data conflicts in order to resolve them.

Note: To execute a query without using a Command object, pass a query string to the Open method of a Record set object. However, a Command object is required when you want to persist the command text and re-execute it, or use query parameters.

The Mode property governs access permissions.

The Fields collection is the default member of the Recordset object. As a result, the following two code statements are equivalent.

4.5.9 Command

Classification: Object

Definition: Defines a specific command that you intend to execute against a data source.

Responsibilities: Use a Command object to query a database and return records in a Recordset object, to execute a bulk operation, or to manipulate the structure of a database Depending on the functionality of the provider, some Command collections, methods, or properties may generate an error when referenced.

Composition: nil

Uses Interfaces: Uses OLE-DB

Constraints: nil

Processing: To create a Command object independently of a previously defined Connection object, set its ActiveConnection property to a valid connection string. ADO still creates a Connection object, but it doesn’t assign that object t an object variable However, if you are associating multiple Command objects with the same connection, you should explicitly create and open a Connection object; this assigns the Connection object t an object variable.

If you do not set the Command object's Active Connection property to this object variable, ADO creates a new Connection object for each Command object, even if you use the same connection string.

To execute a Command, simply call it by its Name property on the associated Connection object. The Command must have its ActiveConnection property set to the Connection object. If the Command has parameters, pass their values as arguments to the method.

If two or more Command objects are executed on the same connection and either Command object is a stored procedure with output parameters an error occurs. To execute each Command object, use separate connections or disconnect all other Command objects from the connection.

4.5.10 Connection

Classification: Object

Definition: A Connection object represents a physical connection to a data store.

Responsibilities: A Connection object represents a physical connection to a data store. To create a Connection object, you will supply the name of either an ODBC data store or an OLE DB provider. When you open the Connection object, you attempt to connect to the data store.

Constraints: nil

Composition: nil

Uses Interfaces: Uses OLE-DB

Processing: To use a Connection object, simply specify a connection string, which identifies the data store, and then call the Open method to connect. The easiest way to open a connection is to pass the connection string information to the Open method. To determine

whether the Connection object worked, you can use the State property of the Connection object. State returns adStateOpen if the Connection object is open and adStateClosed if it isn’t.

4.5.11 Chart

Classification: Object

Definition: The Chart component is comparable to a small version of Excel charting, supporting most o the two-dimensional chart types in Excel 2000 as well as a Polar chart type.

Responsibilities: do

Constraints: nil

Compositions: nil

Compositions: nil

Uses Interfaces: Uses Office Web Components

Processin: A chart can be data-bound to an ADO Recordset object. When bound to a data source, a Chart control will e update whenever the source data changes.

4.5.12 Request

Classification: Object

Definition: You use the Request object to retrieve information from or about the current user. The Request object gives you access to all of the information passed in any HTTP request. HTTP requests contain information about the current user, any data they entered prior to making the request, and arguments that tell the Web server how to process and respond to the request.

Responsibilities: do

Constraints: nil

Composition: nil

Uses Interfaces: Uses ASP. Dll

Processing: We use the Request object's associated collections to access information. These collections include:

- QueryString – Retrieves the values of additional arguments in a URL when a request is passed using the GET method. GET is used by the Web server to retrieve objects and, in some cases, to send information form an HTML form.
- Form – Retrieves the value of form elements passed in an HTTP request when the request is passed using the POST method. POST is a method used by the Web browser to send the information from an HTML form.

  Note POST is the more common method used to send form information. You can use the Request object to access any of this data. You should not use the GET method in your HTML template files.
- Cookies – Retrieves the data contained in cookies sent with the form request. Cookies are small parcels of information used to store data about the current user. These can be passed between the browser and the Web server.
- ServerVariables – Retrieves information such as header values, logon name, or server protocols in use.
- ClientCertificate – Retrieves information stored in certificate fields when the browser sending the request supports client certificates. Certificates identify a user to the Web server.

4.5.13 Response

Classification: Object

Definition: The Response object is used to return information to the browser. For example, you might use the object's Respond event to write HTML to the browser

Responsibilities: do

Constraints: nil

Composition: nil

Composition: nil

Uses Interfaces: Uses ASP.dll

Processing: There are several methods you can use with the Response object:

- Use the Write or BinaryWrite method to send information directly to a browser.
- Use the Redirect method to direct the user to a different URL than the one the user requested, such as a different webclass or an external page.
- Use the Cookies collection to set cookie values to return to the browser and store these values for future use. A cookie is a set of information about the user that can be passed between the client and the server, identifying the user to either system.
- Use the Buffer property to postpone a response while the entire page is processed.
- Use the AddHeader method to add http headers to a response.

4.5.14 Session

Classification: Object

Definition: The Session store state information about the users. The Session object can store information about a single user in the current session.

Responsibilities: do

Constraints: nil

Composition: nil

Uses/Interfaces: Uses ASP.dll

Processing: nil

4.5.15 Application

Classification: Object

Definition: The Application objects store state information about the users. The Application object can store information about multiple users.

Responsibilities do

Constraints: nil

Composition: nil

Uses Interfaces: Uses ASP.dll

Processing: nil

4.5.16 Browser Type

Classification: Object

Definition: You use the Browser Type object to determine the capabilities of the user's browser and make processing decisions based on that information.

Responsibilities: do

Constraints: nil

Composition: nil

Composition: nil

Uses Interfaces: Uses ASP.dll

Processing: nil

4.5.17 Server

Classification: Object

Definition: You use the Server object to create objects and determine server specific properties that might influence the web class's processing.

Responsibilities: do

Constraints: nil

Composition: nil

Uses Interfaces: Uses ASP.dll

Processing: nil

4.5.18 Object hierarchy

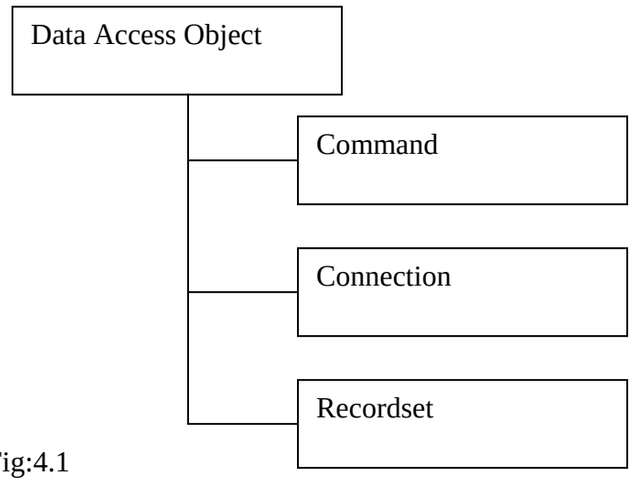


Fig:4.1

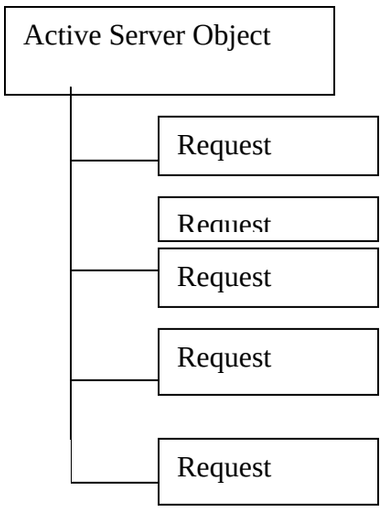


Fig:4.2

CHAPTER 5

SOFTWARE ANALYSIS AND RESULTS

5.1 ACHIEVEMENTS:

5.1.1 DYNAMIC PCM GENERATION

The portfolio to manage the back front end of the bank is dynamically generated from the backend database. This essentially means by merely updating the values in database, store can make transaction. This module has been implemented using Active Server Pages imagination. This module has been implemented using Active Server Pages (ASP) and Active Data Objects (ADO).

5.1.2 ACCOUNT MANAGEMENT

The account management has been followed according to the prevailing norms. Account creation, Online Account Display, Online Transaction entering, Online Account Tracking are some of the facilities available for the customers. The system has been implemented in such a way, there are no cookies. This module has been implemented using HTML, JavaScript, ADO and ASP.

5.1.3 SECURITY FEATURES

A strong emphasis was on Security; Three Layer Deep Security was implemented to keep the system as secure as possible. These layers are

- User Login and Password Security Layer
- Internet Information Server Security Layer
- Windows NT Security Layer

5.2 SYSTEM FEATURES:

- Account Management
- On-Line Transfer of Amount.
- On-Line Account Tracking
- Session Management
- Dynamic PCM Generation
- Web-Based Interface for Remote Management
- Backward compatibility with Existing system
- Security Measures for Client Authentication

5.3 PROBLEMS ENCOUNTERED:

Reluctant behavior of bank staff to spell out exact steps and procedures caused quite a set back during requirements gathering stage. Even specimen documents were difficult to get for the designing requirement. Shifting from Natural Procedural Language paradigm to Object oriented paradigm very little literature was available in the market. Related to Web Technologies Unfamiliarity with UML (Unified Modeling Language) rendered initial progress slow. Unavailability of software needed for development in the market. Such as Web Servers this reduced the available options, and Microsoft Products had to be adopted.

5.4 FUTURE ENHANCEMENTS:

5.4.1 A GIS Based Analysis Facility

A comprehensive GIS based facility that enhances the analysis capability GIS can be implemented as an Active-X control or a Com component, and later incorporated in the

project. GIS can initially be limited in scope to the Capital region as it will be a little easier due to symmetric geographic distribution.

5.4.2 Security Through SSL and Digital Certificates

Digital Certificate can be purchased from the issuing authorities as Version, this will be a must if the system is to be implemented in Real Time Environments as Security and Reliability are the key issues in E-Commerce.

5.4.3 WAP integration

As market focus shifts from E-Commerce to M-Commerce, the challenge is to enable Virtual Bank with Wireless and Mobile communication. This will require integration of a WAP server and shift to WML.

5.5 CONCLUSION

The project undertaken as a master project was a complete success. It helped to learn a lot. The complete software life cycle could not be understood in a better way. Each phase of software development from Project planning, Analysis, Design to Implementation, made its mark enabling me to understand the importance of each phase in true letter and spirit.

It opened new vistas of knowledge regarding domains of Customer Relationship Management, Banking and E-Commerce. The domain study was thought provoking and led to develop and under standing which helped during later stages. The exposure to three-tier architecture and latest technologies regarding Web Development was a real eye opener.

APPEDIX A

6.1 APPLICATION DEPLOYMENT (INSTALLATION) GUIDE:

6.1.1 System Requirements

Following is the list of requirements for this application on Server side

1. Microsoft Windows NT 4.0
2. Microsoft Internet Information System 3.0 or later
3. Microsoft ACCESS
4. Active Data Object 2.0

On client side, you need Internet Explorer 5.0 to run this application.

6.1.2 Set up Procedure

The set up procedure of this sample requires installation at two ends

- Server-side set up
- Client-side set up

6.1.3 Server-side setup

Until we build a set up utility, the following procedure has to be followed if you want to install this application to a server.

Set up at the server side involves

1. Copying the project's web onto the server

2. copying MFC42 DLL in the system 32 directory of server (system directory of Win95 clients)
3. Installation of Project Database
4. Creating a Data Source at server side

6.1.4 Copying the project web

1. The web or this sample i.e. Virtual Bank should be copied onto the server at the following location.
2. \\inetpub\wwwroot\vb

It would be accessed by the browser through the following URL

http://ServerName/vb

You can find default web page a the following location on the Setup CD

\\oms\welcome.asp

Copy the 'TEST' folder on the distribution CD to the following location at your server.

\\inetpub\wwwroot\

2. Copy MFC44.dll and MSVBVM50.DLL in the system32 directory of server from the TEST folder on the CD.
3. Copy the project Database named project1.mdf from the folder "Database" onto the server hard drive.
4. Make an ODBC data source named "project" using MS Access database driver.

6.1.5 Client-side setup

Set up at client side involves:

1. Having Internet Explorer 5.0 on the client side.
2. Copying MFC42.DLL in the 'system' directory of client computer

6.2 DEPLOYMENT PLAN I – SINGLE SERVER

All server applications run on a single machine. This means that same machine has database server and Web server installed.

6.3 DEPLOYMRNT PLAN II – MULTIPLE SERVER

Server applications are hosted on different machines. This means that database server and WEB server is running on different machines. Installation and working of this application should be independent of the deployment.

6.4 CLIENT MACHINE:

The only criterion for client machine is that it should have Internet Explorer 5.0 installed. Other software packages may or may not be installed on this machine and it may be using Windows 95 or Windows NT Operation System.

Verify installation of individual modules as follows.

6.4.1 Database Installation Verification

After following instructions of database installation test the successful installation of the database. To accomplish this follow instructions given below:

1. Create a DSN for the database using ODBC set up utility in control panel.
2. Use any ODBC compliant data viewer to access the database. For this purpose Microsoft Access can be used to link external tables. Otherwise MS Query can also be used.
3. Browser through the database table to make sure that test data is there.

6.4.2 WEB Installation Verification

Follow the instructions for web installation. To verify that all web related content has been successfully installed on the web server use Microsoft Visual InterDev or FrontPage

explorer to confirm the existence of required files. Use IE to access any page in the web to make sure that http service of the web server is running and web content is accessible.

APPENDIX B

7.1 APPLICATION USER GUIDE:

The user guide can be divided into the two sections according to users' type

7.2 External User

The external users are the customers of the Bank. Te user guide for them covers following things.

a) Logging In Account
b) Creating an Account
c) Transferring Amount
d) Checking Account Status
e) Applying Loan
f) Opening LC
g) Change Password

7.2.1. Logging Into Account

In order to log onto our system the user should proceed as follows.

1) Click on the link "Login" on the welcome.asp web page.
2) Enter the login information i.e. the Account and the password.
3) The system would validate the login information and allow the user to login into his account.

7.2.2 Creating an Account

Our customer could create his account by the following procedure.

1) Click on the link “Apply Now” on the welcome.asp web page.
2) Enters account information on the next page.
3) The user must fill the Name, Login and Password fields of the account creation page. Keeping them unfilled or entering invalid entries would generate appropriate errors.
4) After entering the valid information in the fields, the system allocates the user a Login name. His account has been successfully created.

7.2.3 Making a Transaction

If a user holds a valid account with or system, he could make a transaction by the following procedure.

1) Click on the link “Login” on the welcome.asp web page.
2) Enter the login and password on the login.asp web page.
3) If the login passwords are valid the system takes the user into his account information web page.
4) The user could make a remittance by clicking on the button “Remittance”.
5) The system takes the user to amount transfer page, where the various services offered by a bank are listed.
6) The system takes the transaction information from user. If the user wants to add more services in his shopping cart, he could go back to Product information page by clicking on “Continue Shopping” button.
7) On the completion of transaction the details about would be shown to the account holder including transaction number, credit, debit and balance. The system would prompt the sure to enter his credit card information; the system would validate the

information and would inform the user with an order ID with which the customer could track his order.

7.2.4 Change Password

The system allows the user to change his password. This goes as follows.

1) The user must log into his account to change his previous password.
2) When the user successfully logs into his account, he has to click the “Change Pin” button.
3) On pressing this button, the system takes the use to password changing web page.
4) Here the user has to enter his old password and the new password twice.
5) The system validates the passwords, and if successful the system allocates the user new password.

7.2.5 In House Users.

The in house users i.e. administrator and account holder of the bank. The user guide for them covers following things.

a) Logging into account
b) Using e-mail facility

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