

AN INFORMATION SYSTEM FOR A CREDIT REFERENCE BUREAU

CASE STUDY: COMPUSCAN CREDIT REFERENCE BUREAU

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**A RESEARCH REPORT SUBMITTED TO THE SCHOOL OF COMPUTER
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DECLARATION

“We **Ashaba Ainea Michael** and **Noura Ibrahim Mohamed** hereby declare to the best of our knowledge that the work embodied in this research report is our original work arrived at through reading, research and consultation.

We further confirm that it has not been published or submitted to any university or any other institution of higher learning for any academic award.”

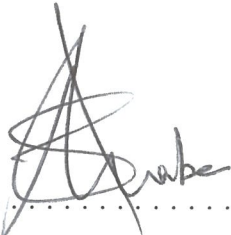
The literature and citation from other scholars’ work has been fully referenced and acknowledged in the text, footnotes and bibliography.

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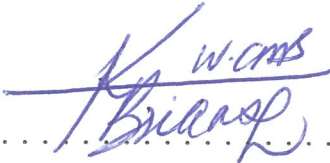
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APPROVAL

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DEDICATION

I **Noura Ibrahim Mohamed** dedicate this research work to my father Ibrahim Mohamed and my mother Hibo Jama, my brothers and sisters and our supervisor Mr. Komakech Brains for their love and support, May ALLAH bless them all.

I **Ashaba Ainea Michael** dedicate this research work to my wife Mary and my sons Arthur and Anderson, my parents and our supervisor Mr. Komakech Brians. May God bless them all abundantly and mercifully.

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LIST OF ABBREVIATIONS

CRB	CREDIT REFERENCE BUREAU
CCRB	COMPUSCAN CREDIT REFERENCE
BOU	BANK OF UGANDA
IT	INFORMATION TECHNOLOGY
CD	COMPACT DISK
UBA	UNITED BANK OF AFRICA
ICT	INFORMATION COMMUNICATION TECHNOLOGY
MIS	MANAGEMENT INFORMATION SYSTEM
DBMS	DATABASE MANAGEMENT SYSTEM
KBS	KNOWLEDGE BASED SYSTEMS
MDI	MULTIPLE DOCUMENT INTERFACE
ADO	ACTIVE X DATA OBJECTS

ABSTRACT

The process of loan acquisition in Uganda has been very tedious with long lists of forms to be filled, checks to pass, vast security requirements and very high interest rates involved.

Compuscan Credit Reference Bureau (U) Ltd is a south African-based private company that was licensed in 2006 by Bank of Uganda to collect financial information about individual borrowers and companies. This information is then analyzed and presented to banks and other legal lending institutions for them to make decisions depending on credit worthiness of the borrower.

This research aims at creating an information system that will be able to collect, analyze and interpret data from borrowers and avail it to the participating banks for them to make decisions on whether to lend or not. Registered members will be issued with a financial card which will contain all their details on credit worthiness.

This will be taken as a single requirement for loan acquisition in Uganda and shall in the long run reduce the interest rates on loans.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

In the post-industrial, information age, the focus of companies has shifted from being product oriented to knowledge oriented, in a sense that market operators today compete on process and innovation rather than product: the emphasis has shifted from the quality and quantity of production to the production process itself, and the services that accompany the production process.

The biggest asset of companies today is their information, represented in people, experience, know – how, innovations (patents, copyrights, trade secrets), and for a market operator to be able to compete, he/she must have a strong information infrastructure, at the heart of which lies the information technology infrastructure.

Information system is all about the development, use and management of organization's IT infrastructure.

1.2 Background of the Study

South African-based Compuscan Credit Reference Bureau is a private organization that collects information about individuals and companies and then presents that information to banks and other financial institutions. Compuscan is located on commercial plaza, 4th floor, and plot 45 Kampala road. The company employs 28 employees, 17 male and 11 female. There are three main departments that is Administration, Data and IT section and Finance department. The company with its headquarter in South Africa, Cape Town; has won a tender to set up the first Credit Reference Bureau in Uganda in 2006 and has started its operations in 2008.

This organization has an exclusive license to operate for three years, in this license it has got several things to do as a CRB, it is supposed to provide an identification system in the financial sector, they are to gather process and keep financial information about credit worthiness of borrowers. They are also responsible for reporting all information collected to Bank of Uganda (BOU). Every institution

gives them information (on obtaining consent from borrowers) and it can then judge the capacity of an individual to pay depending on their credit history.

They collect both positive and negative information about a borrower. Where consent was obtained they will publish it in the CRB, where it wasn't obtained, they will still collect 100% of the information and report only to BOU because they are also an agent for the central bank. Therefore, this system will help them to give the report to BOU and also to register the borrower's information so that in turn they give borrower's information to the issued bank.

1.3 Scope of the Study

1.3.1 Geographical scope

The geographical coverage of the research includes the four branches of the CRB that is head office Kampala rd, Entebbe branch, Jinja branch and Mbrara branch.

This study particularly focused on the Data and ICT departments of the CRB.

1.3.2 Scope of the System

This study concentrated on the automation of a database system for Compuscan Credit Reference Bureau (u) ltd, which is a private organization that deals with collecting and selling information about the creditworthiness or the ability to meet debt obligations of individuals or companies.

The execution of this project was limited to planning, analysis, design and implementation of a database system for Compuscan Credit Reference Bureau. This system contains the organization's data with different forms as interfaces for different aspects of the business.

1.4 Statement of the Problem

Compuscan Credit Reference Bureau offers creditworthiness information to banks and other financial institutions intending to offer credit facilities to individuals and companies. Since the company has been launched currently and it also collects a large amount of information about the borrowers; a manual system can not cope up the companies activities therefore, a computerized system can help them to store the information needed of a borrower.

In addition to that, the lending decision making process takes long that is between two days and two weeks since the bank collects the information about the borrower directly; but the use of this system, the bank will submit borrowers details to Compuscan Credit Reference Bureau and then

Compuscan will check if the borrower is already a member, if the borrower is a member his/her information will be submitted to the bank, otherwise, the borrower is registered so if he/she requests other loans his/her details will be given to the bank.

1.5 Objectives

1.5.1 Main Objectives

The main objective of this project was to develop an information system which, stores information about borrowers that can be submitted to the banks that the borrower has requested from a loan, and also to design an interactive interfaces that allow the users of the system to access information concerning borrowers, which was stored in the database with high reliability, responsiveness and quality content as well as strict security Procedures.

1.5.2 Specific Objectives

- I. To investigate the business and user requirements of the Credit Reference Bureau so as to specify the problem domain in detail.
- Ii. To design the system specifically its architecture, user interface and data management.
- Iii. To test the system to ensure that the systems architecture, user interface, data management and the problem domain meet the original requirements and work correctly
- Iv. To document the deliverables from the system development life cycle phases of the project and compile the project report.

1.7 Conceptual Framework

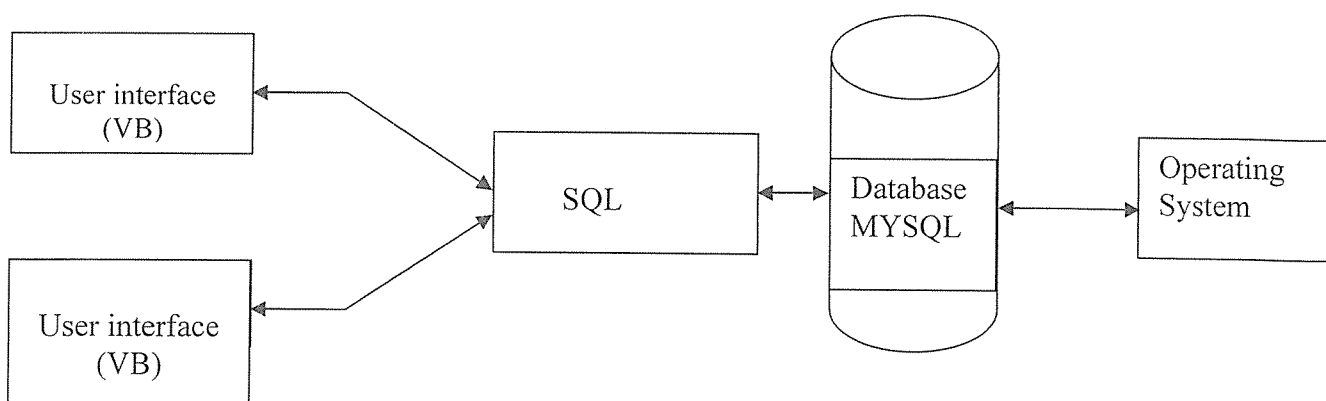
The concept of this study was to design an information system for Compuscan Credit Reference Bureau. This system contains the organization's data – that is the data about the borrowers – with different forms as interfaces for different aspects of the business; the information of this system can only be given to the banks and other financial institutions; it is not possible to access it without authority.

In order to implement the above mentioned system, a database of the clients' information and an administration interfaces were designed and implemented.

The interfaces were designed by using Microsoft Visual Basic software. They are used for viewing, adding and deleting of the clients' data in the database.

The database was designed in MYSQL software. The system runs on Windows operating System.

Figure 1.0: Simplified Structure of the System



1.8 Significance of the Study

Through providing timely and accurate information on borrower's debt profile and repayment history experience has revealed that when financial institutions compete with each other for customers, multiple borrowing and over-indebtedness increases loan default unless the financial institutions have access to a database that captures relevant aspects of client's borrowing behavior.

This system helps Compuscan Credit Bureau to contribute significantly the reduction in the access of screening loan applications by enabling the lender to sort out prospective borrowers who have defaulted with other lenders, therefore, improving lender's ability to predict default.

This study helped the researchers to clearly understand the transactions that take place in the banking institutions and the importance of information systems to business organizations. This project also helped the researchers to partially finish their under graduate course.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This literature review confines itself to what authors published about database and database management system, the benefits and functions of the database and database management system, information system and management information system.

It compares and contrasts different views of different authors towards the above mentioned sectors.

2.2 Knowledge Based Systems

Knowledge-Based Systems focuses on systems that use knowledge-based techniques to support human decision-making, learning and action. Such systems are capable of cooperating with human users and so the quality of support given and the manner of its presentation are important issues. The emphasis is on the practical significance of such systems in modern computer development and usage.

knowledge-based systems covers the design process, the matching of requirements and needs to deliver systems and the organizational implications of introducing such technology into the workplace and public life, expert systems, application of knowledge-based methods, integration with conventional technologies, software tools for Knowledge Based System construction, decision-support mechanisms, user interactions, organizational issues, knowledge acquisition, knowledge representation, languages and programming environments, knowledge-based implementation techniques and system architectures

2.3 Database and Database System

A database is a collection of persistent data that is used by the application systems of some given enterprise. (DATE, 2000)

It is customary to refer to the database as “persistent” (though it might not actually persist for very long). By persistence, we mean intuitively, that database data differs in kind from other more

ephemeral data, such as input data, output data, control statement and more generally any data that is transistent in nature.

As noted by (Thomas Connolly, Carolyn Begg, Anne Strachan, 1997 database is a shared collection of logically related data (and a description of this data), designed to meet the information needs of an organization.

A collection of data designed to be used by different programs is called a database. We can also define it as a collection of interrelated data stored together with controlled redundancy to sure one or more applications in an optimal fashion.

A database system is a computerized record keeping system, that is, a system whose overall purpose is to store information and to allow users to retrieve and update that information on demand DATE (2000).

The information in question can be any thing that is of significance to the individual or organization concerned any thing in other words that is needed to assist in the general process of running the business of that individual or organization.

As Silberschatz, Korth, Sudarshan (2002) noted database systems are designed to manage large bodies of information management of data involves both defining structures for storage of information and providing mechanisms for the manipulation of information.

In addition the database system must ensure safety of information stored, despite system crashes or attempts at unauthorized access. If data are to be shared among several users, the system must avoid possible anomalous results.

2.4 Database Management System

A database management system (DBMS) is a collection of interrelated data and a set of programs to access those data.

“The primary goal of a DBMS is to provide a way to store and retrieve database information that is both convenient and efficient “(Silberschatz et al, 2002).

A database management system is software that defines a database, stores the data, supports a query language, produces reports and creates data entry screens.

It's designed to assist in maintaining and utilizing large collections of data, and the need for such systems, as well as their use, is growing rapidly.

The alternative to using a DBMS is to use ad hoc approaches that do not carry over from one application to another.

2.5 Benefits of a Database and Database Management System

The benefits of a database and database management system include;

Control of data redundancy:

With the use of database management system, a single database file is created and it can be shared by many users and this reduces data redundancy.

Provision of data abstraction:

Data in the database can be accessed but with the DBMS hiding the actual way in which it's stored. E.g. the user can interact with the database, when he does not know the physical location of it or different users can access the same data but in different views.

It gives support for multiple users:

Different users can access the same database at the same time without creating conflicts.

Provision of multiple ways of interfacing the system:

The database management system makes the database accessible programming languages; i.e. it ensures that the variety of front end tools use the database in the back end.

It restricts unauthorized access to the database:

By use of user authentication; i.e. use of username and password, unauthorized users are denied access to the database.

Enforcing integrity constraints:

The database management system gives mechanism of enforcing rules to check the validity of data values during data input.

Back up and recovery:

The database management system has provision of back up and recovery mechanism. Back up is the copy of the original document to be resorted to, incase of any corruption to the original to bring the system back to normal.

2.6 Functions of Database and Database management System

- Data storage, retrieval and update:

This is the fundamental function of the DBMS which furnish users with the ability to store, retrieve and update data in the database.

- A user-accessible catalog:

A database management system must furnish a catalog in which, description of data items are stored and which is accessible to users and the DBMS, typically the system catalog stores, names, types and sizes of data items; names of relationships, names of unauthorized users, who have access to the data; meaning of the data can be defined.

- Transaction support:

A transaction is a series of actions carried out by a single user or application programmer, which accesses or changes the contents of the database. For example, to delete member of customer from the database and reassign the properties he/she managed to another member of the customers. If the transaction fails doing execution perhaps because of a computer crash the database will be in an inconsistent state.

2.7 Information System

An information system is an organized set of components for collecting, transmitting, storing and processing data in order to deliver information for action. (Zwass, 1998)

An information system can be defined technically as a set of interrelated components that collect (or retrieve), process, store and distribute information to support decision making, coordination and control in an organization. Kenneth and Jane (2003).

In addition to supporting decision making, coordination and control, information systems may also help managers and workers analyze problems, visualize complex subjects and create new products.

Information systems contain information about significant people, places and things within the organization or in the environment surrounding it Zwass (1998).

Most information systems in today's organizations are built around the information technologies of computers and telecommunications- they are computer-based information systems.

“Information system management focuses on any organized combination of people, hardware, software, communication networks and data resources that collects or transform and disseminates information in an organization in the verge to achieve its future goals”.

2.8 Management Information System

In the 1970s, managers realized that they could use computer-based information systems for planning, control, decision making, and problem solving; rather than just for reporting transactions. These new types of information systems came to be known as management information systems. (Effy Oz, 2002)

Management information systems are systems designed to provide past, present and future routine information appropriate for planning, organizing and controlling the operations of functional areas in an organization. (Turban, Mclean and Wetherbe, 2002)

Computerized management information systems generate information for monitoring performance, maintaining, coordination and providing background information about the organization's operation. Users include both managers and the employees who receive feedback about performance indicators such as productivity.

A management information system (MIS) provides information for managing an organization.

2.9 Conclusion

This literature review has looked at what other authors have written on the database and database systems. It has also looked at the management information system and information systems and their importance for the business organizations.

The available literature on a database and database management system is enough and reliable but the knowledge based system's literature has limited scope and availability.

There are no many researchers involved in this area and therefore not so much published information was available at our disposal.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter covered the method that the researchers used during the system development process.

3.2 Organization unit to be studied

The organization that was studied is Compuscan Credit Reference Bureau; which is a private organization that collects information about individuals and companies and then presents that information to banks and other financial institutions. The researchers chose this organization since it was planning to automate its information system. As the researchers have computer science knowledge, it is upon that knowledge acquired which helpful to design this system and assist Compuscan Credit Reference Bureau to automate its database system.

3.3 Risk Assessment

This identifies various risks, assesses their probabilities and impact and then suggests how to mitigate them. Such risks and how to mitigate them are as follows:

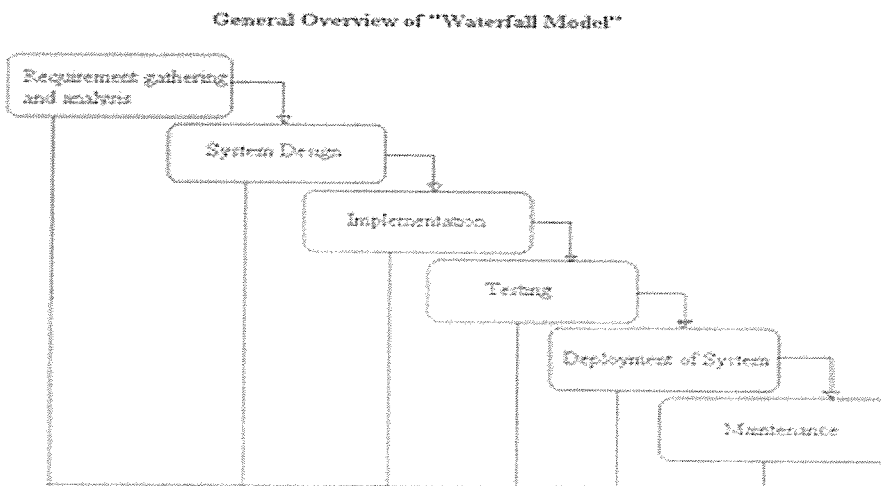
- Lack of familiarity with development tools can lead to delays in completing programming tasks. There is need to upfront training in these tools.
- Lack of knowledge about the application area can lead to delays in completing the project. There is need to read and understand the application area from relevant sources.
- Designing good questionnaires and interview questions can not be under estimated. Extensive time needs to be allocated to this activity.

3.5 Systems development methodology

Waterfall model

The water fall model was used during systems development process. Waterfall model has got different phases; and they are: Requirement analysis and definition, system and software design, implementation and unit testing, integration and system testing, operations and maintenance.

Fig 3.1 waterfall model diagram



3.5.1 Requirements gathering and Analysis

Requirements are set of functionalities and constraints that the end-user (who is the user of the system) expects from the system.

All possible requirements of the system were captured in this phase from the different concerning individuals through given questionnaires and face to face interviews. How these requirements were analyzed is shown in chapter 4.

3.5.2 System & Software Design

System and Software design helps in specifying hardware and system requirements and also helps in defining overall system architecture. The system design specifications serve as input for the next phase of the model.

3.5.3 Implementation and unit testing

During implementation the system was first developed in small programs called units, which were then integrated in the next phase (integration and system testing). Each unit was developed and tested for its functionality; this is referred to as Unit Testing. Unit testing mainly verifies if the modules/units meet their specifications

3.5.4 Integration & System Testing

As specified above, the system was divided in units which were developed and tested for their functionalities. These units were integrated into a complete system during Integration phase and then tested to check if all modules/units coordinate between each other and the system as a whole behaves as per the specifications. After successfully testing the software, it was delivered to the customer.

3.5.5 Operations & Maintenance

This phase of "The Waterfall Model" is virtually never ending phase (Very long). Generally, problems with the system developed (which were not found during the development life cycle) after its practical use starts, so the issues related to the system were solved after deployment of the system. Not all the problems come in picture directly but they arise time to time and needs to be solved; hence this process is referred as Maintenance.

3.6 Conclusion

This chapter has covered the various phases of waterfall method that the researchers will use to carry out this project. It has also looked at the organization unit to be studied, the target population, selecting a sample by using an appropriate sampling technique.

CHAPTER FOUR

SYSTEMS ANALYSIS AND DESIGN

4.0 Introduction

This chapter comprises systems analysis, system requirements and systems design as well.

4.1 System Analysis

System analysis is a problem solving technique that decomposes a system into component pieces for the purpose of studying how well those component parts work and interact to accomplish their purpose.

System analysis involves analyzing data that has been collected in the case study and analyzing it with an aim of validating the method of choice for solution development and implementation.

4.1.1 Procedure of the Study

Before the study, a letter was submitted to Compuscan Credit Reference Bureau seeking permission to carry out the study attached by another letter from the school of computer studies to testify that the researchers are students from school of computer studies. This was done in order to establish a good relationship with the company in addition of showing the importance of the study.

After that the researchers have come up with the questionnaire and a time table which is guiding how to carry out the interviews, when and where to meet with the interviewees, who to give the questionnaire for filling and when. A date convenient for both the researchers and the target members was agreed upon.

4.1.2 Target Population

The target population was senior, middle and lower managers in Compuscan Credit Reference Bureau. The Managing Director was interviewed from the senior group, both Financial Controller and ICT manager were interviewed from the middle level and two data entrants and two loan assessors were also interviewed from the junior group. This group was selected because it was representative of the organization and the selected people were able to give complete and clear information that was used to determine requirements for the system under investigation. The research also targeted people from banking institutions in order to compliment and argument the information gathered from the target company.

4.1.3 Sample Selection

The researchers used purposeful techniques and methods to select respondents who were able to give reliable and accurate information due to their position of authority and expertise.

Thus senior managers gave information concerning the objectives policies, organizational structure, human resource requirements and other information relevant to the research under their jurisdiction. The operational staff also gave information concerning customer care and motivation, routine tasks they perform, and relevant information under their authority.

For banking institutions, the fact finding techniques targeted people who actually interact and carry out transactions with members of the target company and other kinds of people whose work needs the utilization of the information.

Through out the process of gathering data, emphasis was given on confidentiality as a top priority in order to elicit the support and co-operation of the respondents

4.1.4 Data Collection Tools

The process of data collection was done with the approval of the company's management in order to come up with an appropriate schedule so that not normal flow of their businesses was not disturbed. In completion of data collection process a proper sampling method was used to determine system's requirements.

The tools or instruments used to collect data were largely determined by the objectives of the project and the nature of the research undertaken. Consequently in order to capture appropriately the requirements, various techniques in data collection were used based on the traditional (interviews, questionnaires, observations and document analysis) approaches.

The interview and questionnaire schedules composed of open-ended and closed-ended questions, structured and semi-structured questions and multiple choice questions.

Open-ended, structured and semi-structured questions allowed respondents to give different views and opinions while the closed-ended and multiple choice questions allowed them to give specific responses.

Observation schedule was used to compliment the other schedules and helped the researchers cross-validate the findings that have been solicited through interview and questionnaire schedules.

4.1.5 Analysis from the Study

4.1.5.1 Introduction

In this section, we present the findings from the study. In the study we used mainly questionnaires which were also supplemented by interviews. The study was carried out in Compuscan and other banks which are in cooperation with Compuscan Credit reference Bureau that is Barclays Bank, United Bank of Africa, Standard Chartered bank and Stanbic Bank. Some respondents were also customers in the banks.

4.1.5.2 Population of the Respondents

We interviewed 15 respondents in total, 5 of which were from CRB and the rest were from the participating banks as shown in the table below.

Table: 4.1 Respondents details

NO.	NAME	COMPANY	AGE GROUP	LEVEL	SEX	SALARY RANGE(\$)
1	FRANKLYN. N	CRB	30-35	OTHER	FEMALE	100-200
2	LUGOLOBI. I	CRB	35-40	JUNIOR	MALE	200-300
3	MALAN. M	CRB	40-50	TOP	MALE	400>
4	KALUNGI. P	CRB	20-30	SENIOR	FEMALE	400>
5	ANDREAS. B	CRB	30-40	TOP	FEMALE	400>
6	LUTAYA. D	BARCLAYS	20-25	OTHER	MALE	200-300
7	KATONGOLE. C	STANBIC	40-50	SENIOR	MALE	400>
8	SHETTY. P	UBA	20-30	JUNIOR	FEMALE	300-400
9	WALTER. R	STANCHART	40-50	TOP	MALE	400>
10	MOHAMMED. I	SOCIAL WORKER	40-50	SENIOR	MALE	400>
11	FUAD SAIDI	AID AGENCY	20-30	JUNIOR	FEMALE	200-300
12	TUMWINE. B	URC	30-40	SENIOR	MALE	400>
13	ROHRER. G	RCL	50>	TOP	MALE	400>
14	LAMBANI	ROOFINGS	50>	SENIOR	MALE	400>
15	ALELUYA	RETIRED	50>	N/A	MALE	400>

4.1.5.3 Analysis of the Respondents Age and Gender.

The respondents were both male and female. They were falling in various age groups as shown in the table below.

Table 4.2: Age.

NO.	AGE GROUP	FREQUENCY	PERCENTAGE	REMARKS
1	20-30	4	27%	
2	30-40	4	26.60%	
3	40-50	4	26.60%	
4	50>	3	20.00%	
	TOTAL	15	100%	

Table 4.3: Gender

NO.	SEX	FREQUENCY	PERCENTAGE	REMARKS
1	MALE	10	67%	
2	FEMALE	5	33%	
	TOTAL	15	100%	

Majority of the respondents were male that is 67% and the female respondents were only 33%. The researchers were not selective in the gender of the respondents. The respondents were largely between the ages of 20 – 50. Only three out of fifteen respondents were above the age of 50. The respondents' age reflected their seniority thus their ability to interpret and comprehend the questions and the subject matter. This guaranteed accurate response and reaction from the respondents.

4.1.5.4 Level of the respondents.

Table 4.4: level of respondents

No.	Level	frequency	Percentage
1	Other	3	20
2	Junior	3	20
3	Senior	5	33
4	Top	4	27
	Total	15	100

The majority of the respondents were senior members of their respective organizations. 33% and 27% were from senior and top management of their respective organizations. This there means that 50% of the respondents were in decision making positions which means they gave reliable information as far as the questionnaire was concerned.

4.1.5.5 Response on loan taking Procedure:

It was discovered that most of the respondents' banks had almost the same loan taking procedures and requirements list which involved the following common requirements.

- Collect and fill a loan application form.
- Submit your valid identification document that is ID, Passport, and valid Driving Permit.
- If salary loan then one must secure a letter of undertaking from the employer.
- Must have an account with the bank.
- If secured loan then the applicant must have collateral that is worth the loan amount applied for.

4.1.5.6 Response on whether respondents had a Computerized Loan System.

Table 4.5: Response

No.	Bank	Yes/No	Speed	Remarks
1	Barclays	Yes	>30msec	
2	Stanbic	Yes	30sec	
3	UBA	No	—	Manual System
4	Stanchart	Yes	30msec	

It was discovered that 90% percent of the participating Banking institutions had operational computerized loan taking procedures.

The banks operated different loan systems but they were all able to calculate loan interests, remaining balances, amount of time remaining, loan defectors, calculate loan deserved visa-vie the salary scale or the value of the security. The systems for Barclays Bank and Standard chartered bank were found to be fast in processing speed (Less than 1 sec) as compared to Stanbic Bank whose system took at most 30 seconds to process a single instruction.

4.1.5.7 Response on the Efficiency of the System

Table 4.6: Efficiency of the system

No.	Bank	Rating		Remarks
		Employee	Customer	
1	Barclays	Good	Good	
2	Stanbic	Fair	Average	
3	UBA	poor	poor	
4	Stanchart	Excellent	Good	

Both the bank employees and the customers of UBA expressed dissatisfaction with the bank loan system that was being used at the time. The system is inefficient meaning that computerization has to be done to quickly improve service provision. The systems of Barclays bank and Standard Chartered bank were both approved by the employees and the customers who were served with questionnaires. It was noted that the systems incorporate all the information required and can also be relied on to compute loan interest and also make monthly deductions accurately.

4.1.5.8 Response on whether the banks are in Partnership with CRB

Table 4.7: Banks in partnership

No.	Bank	Participating	Remarks
1	Barclays	yes	
2	Stanbic	yes	
3	UBA	yes	
4	Stanchart	yes	

All the banks involved in the research were all in partnership with the CRB. This there means that the new proposed system will be relevant to the banks since they are already involved with the CRB. A segment of the banks network will be linked to the database of the Credit Reference Bureau which will then avail them with the previous data of the borrowers through the Financial card which will enable them make decisions.

4.1.5.9 Response on whether the CRB is going to improve the loan acquisition procedure.

Table 4.8: Response on improvement

No.	Name	Relevance		Remarks
		Banks	Borrowers	
1	FRANKLYN. N		TRUE	
2	LUGOLOBI. I		TRUE	
3	MALAN. M		TRUE	
4	KALUNGI. P		TRUE	
5	ANDREAS. B		TRUE	
6	LUTAYA. D	TRUE	TRUE	
7	KATONGOLE. C	TRUE	TRUE	
8	SHETTY.P	TRUE	TRUE	
9	WALTER.R	TRUE	Don't know	
10	MOHAMMED.I		TRUE	
11	FUAD SAIDI		TRUE	
12	TUMWINE.B		TRUE	
13	ROHRER.G		TRUE	
14	LAMBANI		TRUE	
15	ALELUYA		TRUE	

All the respondents save for Walter Robinson agreed that the proposed system for the Credit Reference Bureau will improve the loan taking procedures and ease access to loans by the borrowers and also enable the Banking institutions make the right decisions on the credit worthiness of the borrowers hence make the right decisions. It will create a database of borrowers and their borrowing behavior which will be very helpful to the banks.

4.1.6 Feasibility Analysis

Feasibility analysis is an activity that was carried out to show whether we could build the new system technically and economically within an organized manner using the available resources.

After carrying out the feasibility study, the following were the recommendations:

- **Technical feasibility**

It was carried out to determine whether the hardware and software requirements were available and if they could be used to develop the system. The researchers also wanted to check their technical abilities such as their knowledge of application area and development tools.

- **Economic feasibility**

This was to compare the proposed expenses to the project benefits. This was usually aimed at having benefits not exceeding expenses.

Since the current system is computerized many obstacles were overcome and hence an increase in both reliability and efficiency of the organization's work.

- **Operational feasibility**

In this feasibility study, we intended to determine whether there were enough trained and experienced personnel to build and install the new system as well as maintain it.

4.1.7 System Specifications

4.1.7.1 Systems Requirements

The requirements for a system are the descriptions of the services provided by the system and its operational constraints.

These requirements reflect the needs of customers for a system that helps solve some problems such as facilitating getting loans, quick decision making, placing an order, finding information or reducing the paper work.

Systems requirements are outlined into two; Functional and Non functional Requirements.

4.1.7.2 Functional Requirements:

Functional requirements are a description of activities and services a system must provide. Functional requirements are frequently identified in terms of inputs, outputs, processes and stored data that are needed to satisfy the system improvement objectives and they are as follows;

- **Input Requirements**

The input data of the system comes from the bank of the borrower. The borrower fills a form at the bank and the bank sends the information concerning the borrower to Compuscan Credit Reference Bureau and the borrower's data is inserted into the system. The system will keep the information and if the borrower wishes to take another loan, his/her information (loan history) will be given to the Bank by CCRB.

- **Output Requirements**

The output requirements depend on the type of the input entered into the system because it is the one which is processed for output. In this system the output we expect is a report that is provided to the bank which the borrower has issued to a loan request. On the other hand the system should also be able to show the financial information of the borrowers.

A financial card given to the borrower is also one of the outputs of the system.

- **Procedural Requirements**

Procedural requirements describe the way in which to get the way round the system. The procedure of accessing the system is; the user first logs in the system by the use of a username and a password and then the parent form is loaded which is the a multiple document interface that allows the user to open and use more than one form.

4.1.7.3 Non-Functional Requirements

Non-functional requirement is a description of other features, characteristics and constraints that define a satisfactory system. Constraints are input/output capacity systems representations. Non-functional requirements are more critical than functional requirements and if not met properly the system may be useless.

Non-functional requirements include;

Speed; the system should be able to solve the delay of loan taking decision in minimal possible time so that to be able to service clients well.

Ease of Use; the system should be ease of use so that the training of the users to be fast.

Size; the storage space should be enough for the purpose of keeping all borrowers information.

Reliability; the system should be reliable and available all the time.

Documentation of the new system should be available according to the specifications of the new system. These documentations includes: user manuals of the system and well commented soft copy of the source code for easy readability.

4.1.8 Hardware and Software Requirements

Hardware

1. A Personal Computer with a Pentium processor with a minimum of 795 MB, 256 MB, and a hard disk space minimum of 20GB.
2. CD-Writer for data binding.
3. Flash disk for data traveling
4. Printer for data output.
5. CD-ROM for data back up.

Software

1. Microsoft Windows Operating System; Win 2000/Xp
2. MYSQL
3. Programming Language; Microsoft Visual Studio 6.0
4. MYSQL ODBC 3.5.1 driver
5. Microsoft Office 2003; Ms Word

4.2 Systems design

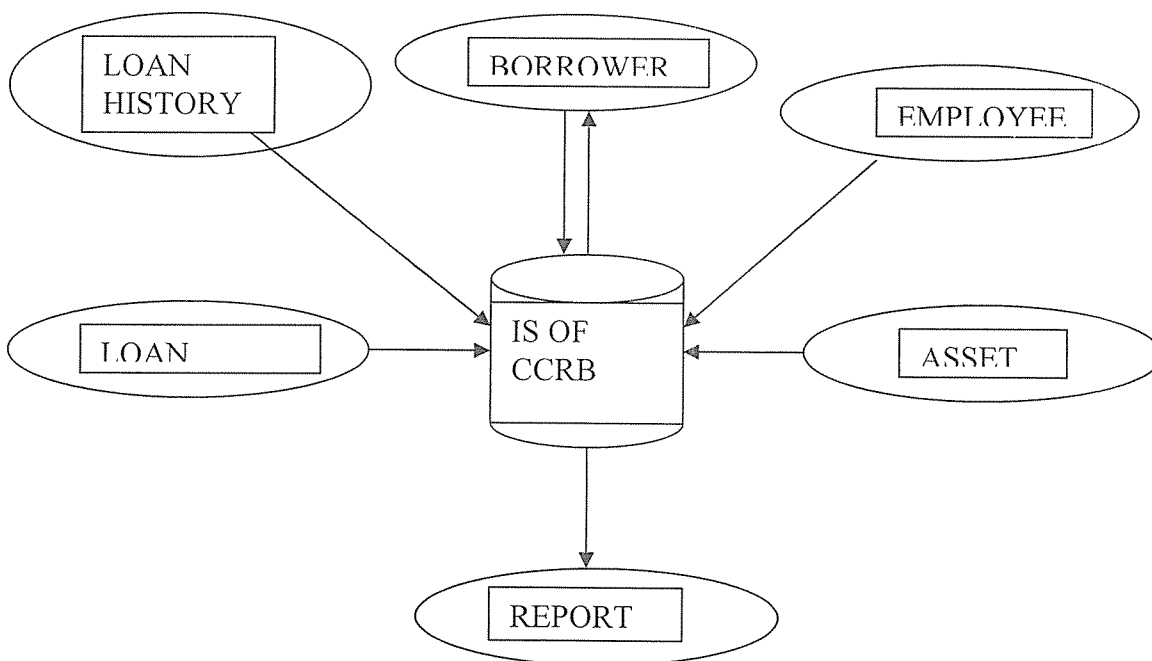
Systems design is defined as those tasks that focus on the specification of a detailed computer-based solution. Thus whereas systems analysis emphasized the business problem, systems design focused on the technical concerns of the system.

4.2.1 Context Level diagram of the new system

Context level diagram describes the interaction within the system and its boundaries and also the external data stores.

As shown by the below diagram, this information system for Compuscan contains a database in the background which stores the information that the system contains and user interfaces on the foreground which allow users to interact with the database in the background also the system as well.

Fig 4.1 context level diagram



4.2.2 Class Diagram representing the new system

Every class diagram contains class name which is the heading, the class attributes and the methods which are the functions of the class.

The figure (4.2) below is a simple class diagram which shows the components of the system. The diagram makes the following business assertions; we need to store data about borrowers, loan, asset, loan history, processing and employees.

The value of borrower ID uniquely identifies one and only one customer. The value of loan number uniquely identifies one and only one loan. The value of asset number uniquely identifies one and only one asset. And the value of loan history number uniquely identifies one and only one loan-history of a specific borrower.

For Borrower we need to know the borrower name, borrower address, occupation, his/her banker, employer, and account number.

For Loan we need to know loan amount, loan duration, loan interest, total number of installment, and amount of installment.

For Asset we need to know asset's name, value, type and quantity.

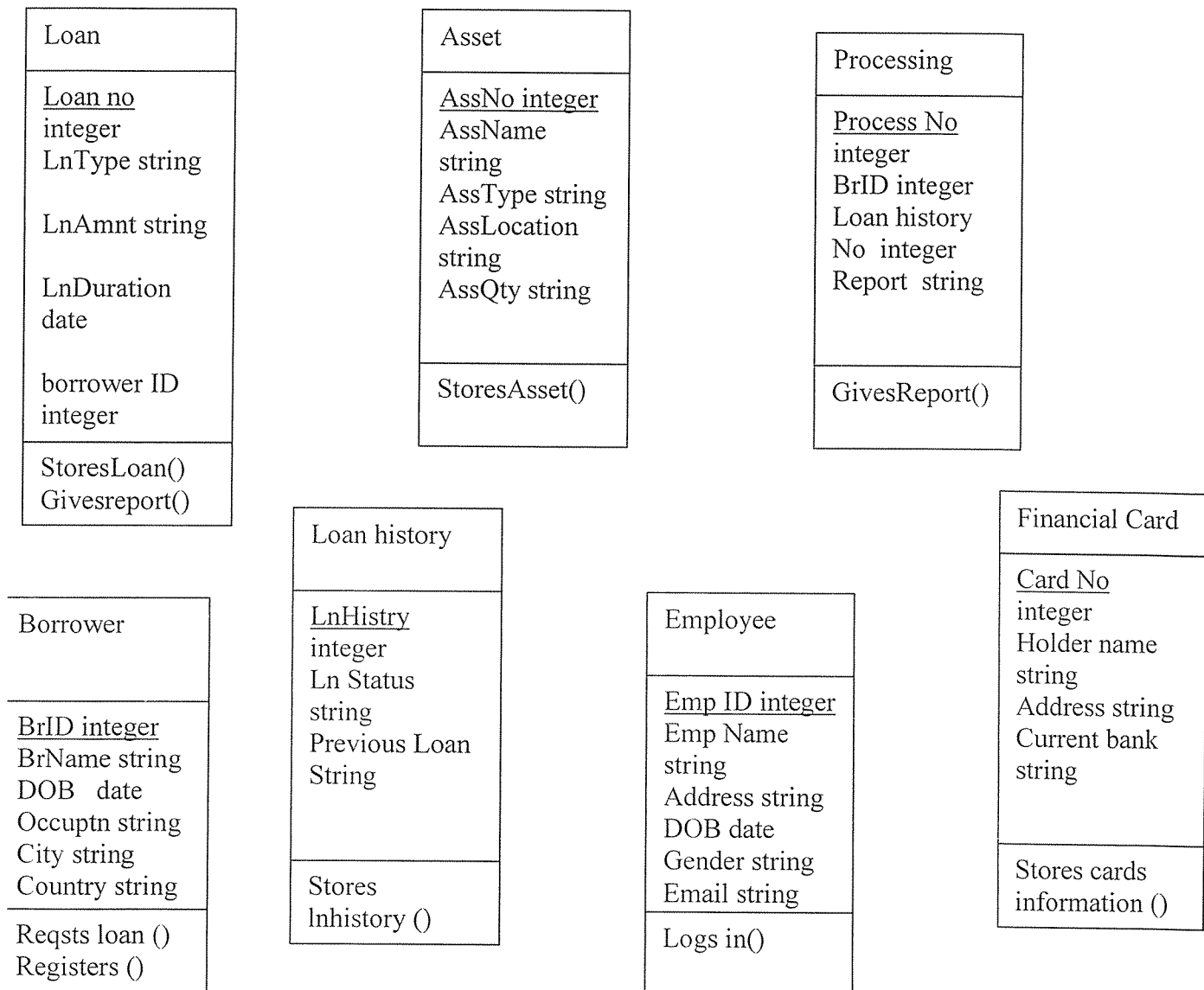
For loan-history we need to know previous loans, status of previous loan and amount of loans.

For employee we need to know employee identification, employee name, date of birth, gender, position, salary, etc.

A borrower places request for one or more different loans. A loan is requested by exactly one borrower. The value of borrower ID (as recorded in loans) identifies that borrower.

For each loan request we need to know the loan history and the asset of the borrower. A loan decision requires checking loan history and asset of the borrower, if the borrower has defaulted to other banks before or if he had cleared former debts; we also check his consistency in paying up.

Fig 4.2: UML class diagram that displays the different objects of the system.

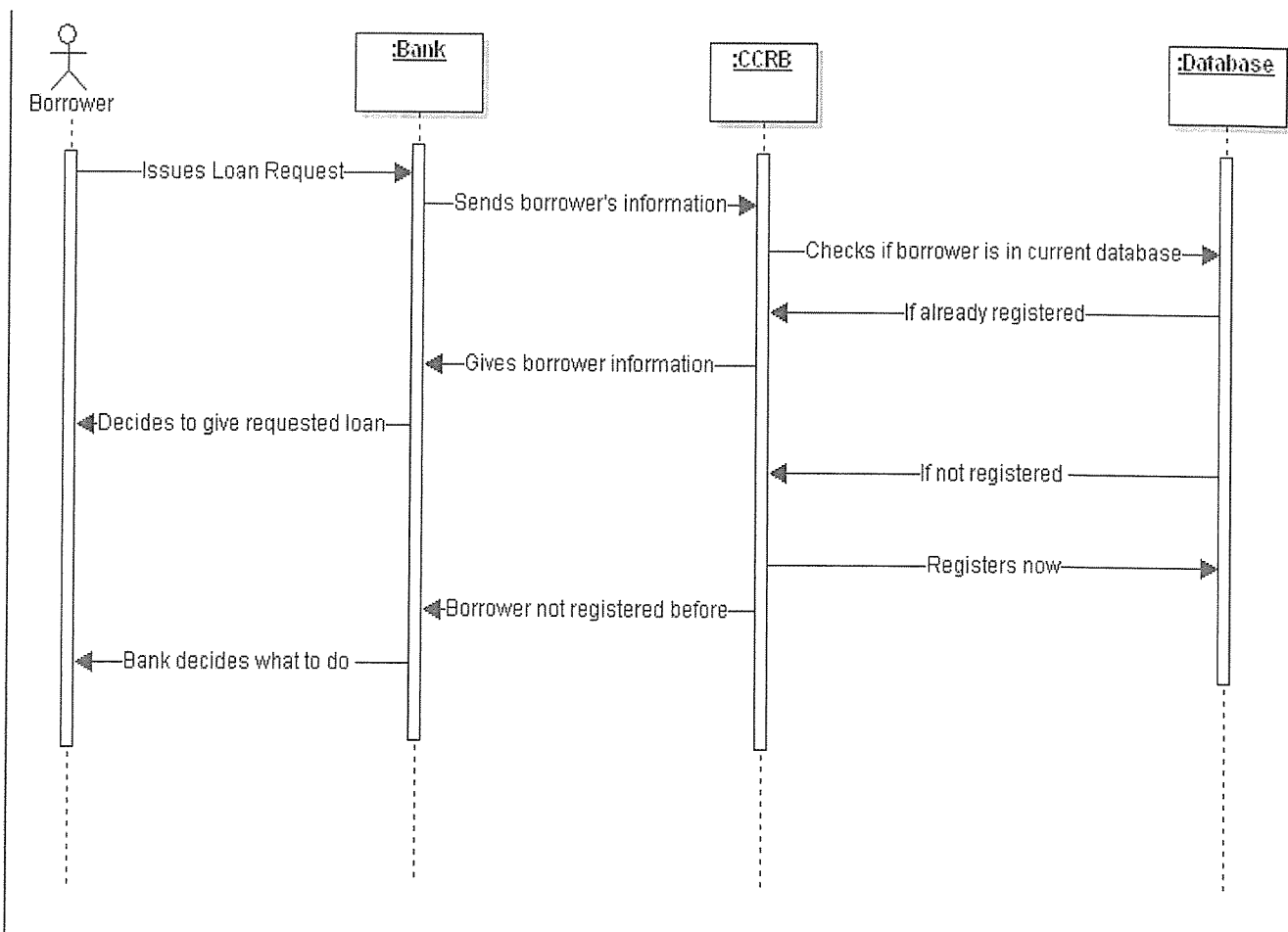


4.2.3 Sequence Diagram

The sequence diagram below explains the interaction between the borrower, the bank that the user issued to the request and the system in the Compuscan Credit Reference Bureau.

First of all the borrower sends his/her request to the bank and then the bank submits borrower's information to Compuscan to check if his/her information is already on the system or in other words if the borrower is a registered member; then Compuscan checks borrower's membership; if he/she is a member then the information is submitted to the bank and then the bank decides to give the loan to the borrower, other wise if the borrower is not a member he/she is registered and then the bank uses the old means to give the loans to the borrower.

Fig 4.3 Sequence Diagram for the interaction between the system and the other different actors;



4.2.4 Database Design

The physical representation of the system shows the kind of data used with their data types and this helped the developer's estimate the size of the memory that the whole database would occupy.

Below are the physical designs for the system developed by using MYSQL for the organization.

Table 4.9: Borrower's table

FIELD NAME	DATA TYPE	SIZE	REQUIREMENT	DESCRIPTION
BrID	Int	11	Required	Borrower Identification
BrName	varchar	35	Required	Borrower name
DOB	Date		Required	Date of Birth of the borrower
Telephone	Varchar	25	Required	Borrower's tel no
Occupation	Varchar	35	Required	Borrower's occupation
City	Varchar	35	Required	Location of the borrower
Country	Varchar	35	Required	Borrower's location
Banker	Varchar	30	Required	The bank of the borrower
AccNo	Varchar	20	Optional	account

Table 4.10: Asset's table

FIELD NAME	DATA TYPE	SIZE	REQUIREMENT	DESCRIPTION
AssNo	Int	11	Required	Asset number
AssName	Varchar	35	Required	Asset name
AssValue	Bigint	35	Required	Asset value
BrID	Int	11	required	Borrower's ID
AssLocation	Varchar	30	required	Current location

				of the asset
AssType	Varchar	40	Required	Asset type
AssQty	Int	11	Required	Asset quantity
LoanAttached	Varchar	25	Required	Loan attached

Table 4.11: Loan's table

FIELD NAME	DATA TYPE	SIZE	REQUIREMENT	DESCRIPTION
LoanNo	Int	11	Required	Loan number
Loan_Type	Varchar	30	Required	Loan type
Loan_amount	Varchar	30	Required	Loan amount
Loan_duration	Varchar	15	Required	Loan duration
Loan_interest	Varchar	30	Required	Loan interest
Total_no_intallment	Varchar	35	Required	Total number of installment
Amount_of_installment	Varchar	35	Required	Amount of installment
Nitialdate	datetime		Required	Initial date
BrID	Int	11	Required	Borrower ID

Table 4.12: Loan history table

FIELD NAME	DATA TYPE	SIZE	REQUIREMENT	DESCRIPTION
Loan_historyNo	Int	11	Required	Loan history no
LoanNo	Int	11	Required	Loan number
BrID	Int	11	Required	Borrower ID
Loan_status	Varchar	20	Required	Loan status
Loanin_institution	Varchar	35	Required	Loaning institution
Previous_loans	Varchar	35	Required	Previous loans

Table 4.13: process table

FIELD NAME	DATA TYPE	SIZE	REQUIREMENT	DESCRIPTION
ProcessNo	Int	11	Required	Process number
BrID	Int	11	Required	Borrower ID
Banker	Varchar	35	Required	Bank of the borrower
Loan_historyNo	Int	11	Required	Loan history no
Report	Varchar	100	Required	Borrower's information report

Table 4.14: Employee's table

FIELD NAME	DATA TYPE	SIZE	REQUIREMENT	DESCRIPTION
EmpID	Int	11	Required	Employee ID
EmpName	Varchar	35	Required	Employee name
Address	Varchar	25	Required	Employee address
DOB	Date		Required	Employee date of birth
Gender	Varchar	8	Required	Employee sex
Email	Varchar	30	Required	Employee email
Date_of_employment	Datetime		Required	Date of employment of the employee
Employer	Varchar	35	Required	Employer of the employee

Table 4.15: financial card table

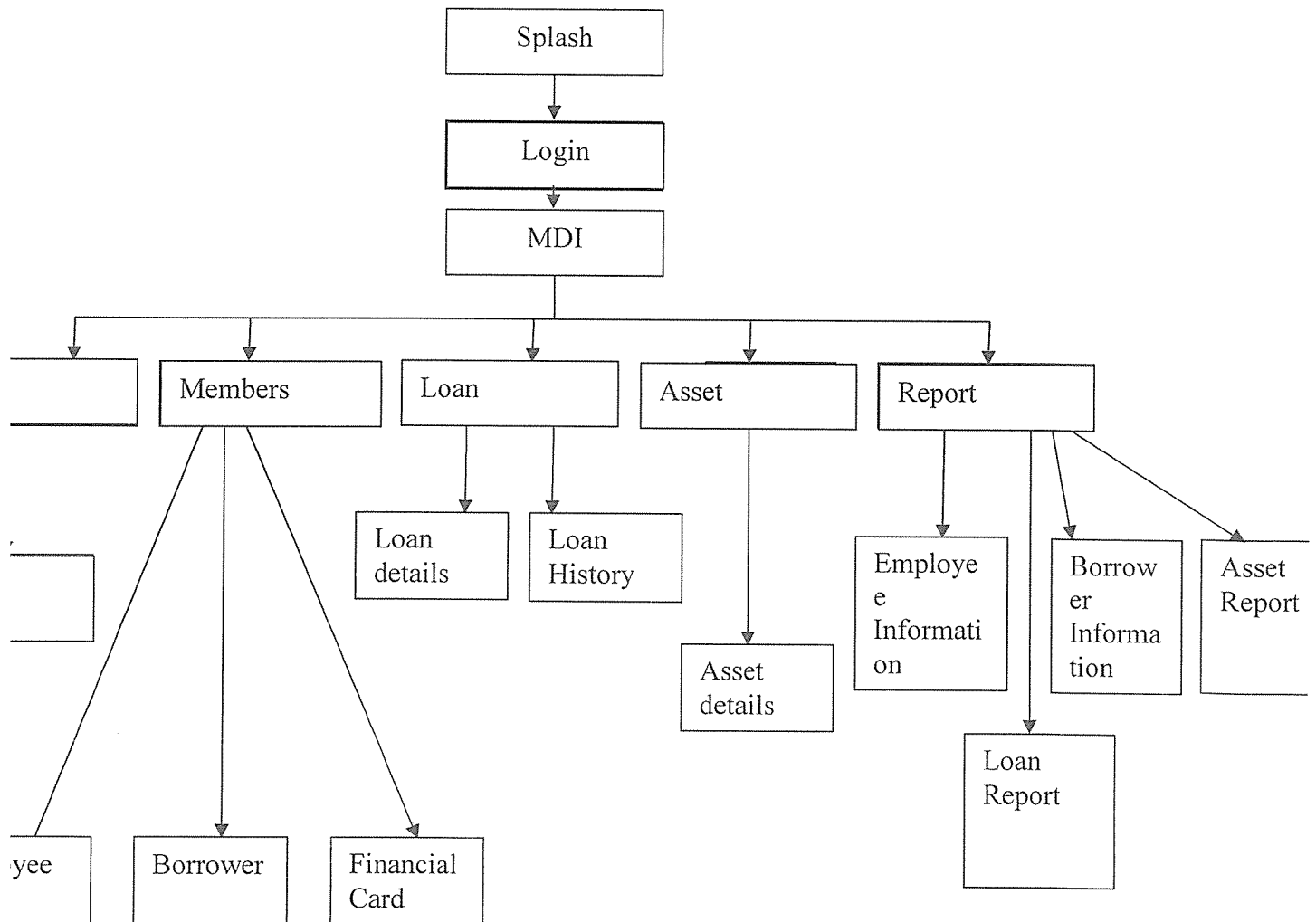
FIELD NAME	DATA TYPE	SIZE	REQUIREMENT	DESCRIPTION
CardNo	Int	11	Required	Card number
Holder_Name	Varchar	35	Required	Holder's name
Address	Varchar	35	Required	Holder's address
BrID	Int	11	Required	Borrower's ID
Current_bank	Varchar	35	Required	Current bank of the borrower
Occupation	Varchar	30	Optional	Holder's occupation
LoanNo	Int	11	Required	Loan No

4.2.5 Structure of the Information System for Compuscan Credit Reference Bureau

The below diagram shows the structure of the system; As we can see, it contains splash form which displays information about the software and the company when the system is loading, the login for preventing unauthorized users to access the system, the MDI form which is the connection that links the different units of the system.

Under the MDI there are main menus which call the different interfaces that the software contains and the different reports that are extracted from the different forms.

Fig 4.4 structure of the system



4.3 Conclusion

The chapter explained important phases of the development process such as system analysis and systems design.

CHAPTER FIVE

SYSTEM IMPLEMENTATION AND UNIT TESTING

5.0 Introduction

The chapter contains systems implementation and testing phases of the software development process.

5.1 System implementation

This involves turning the requirements into technological terms. Implementation includes coding individual components of the system and finally integrating them together in order for the system to perform the expected task.

During implementation the systems interfaces were designed into units, coded by using visual basic programming language, tested and later connected to the database by the use of MSQL ODBC driver.

The interfaces were developed by Visual Basic programming language 6.0 while the database was designed by MYSQL. The components of the system were integrated together and tested the whole system if the system can meet its specifications.

In order to perfect the functionality of the system, the developers ensured every department and the process flow of business has its own entity and a corresponding user-friendly interface.

5.2 System coding

Coding the new system into computer program is an important stage where the defined procedures are transformed into control specifications by the help of a computer language.

In the coding phase, the whole system was converted into computer understandable program by using a visual basic programming language. Visual basic was used to design the forms which are the interfaces between the user and the database and then coded the different controllers of the interfaces so that the interfaces do their intended functions on the system.

The database which was designed by using MYSQL database management system contains 8 entities; each entity contains several related attributes. Structured Query Language was used to define and manipulate the database and its tables which are stored in mysql. MYSQL allows the

accessibility of data and the retrieval of data easily. It allows the elimination of duplicated of data and also security of the database is possible.

5.3 Testing

Testing is checking whether the system is doing the right work expected by the users and It also involves putting the system into operations.

It was done by use of test data collected from Compuscan Credit Reference Bureau.

A test run of the system was done removing all the bugs, if any. After the designing the whole the system, a test plan was developed and ran on a given set of test data. The output of the test run was matched the expected results.

5.3.1 Unit Testing

This is the first stage of testing; this is done by using written test planning and prepared test data. The path consists of a number of test runs such as valid paths through the codes. For each test run, there is a list of condition tested, the test data used and expected results. All the forms that are on the system were tested against the test plan and conditions.

5.3.2 Integration testing

This is the integrating of the components of the entire system so that all can work together to produce required results. Each module is linked to other therefore allowing them to interact. The whole process must be in a specific sequence and within specified response time. The integration between the component and sub-components created in visual basic 6.0 and the database created in MYSQL was fully tested to ensure that they are effectively linked.

5.3.3 System Testing

This tests the whole system after linking together all the subsystems. Bugs were identified and categorized in order of priority and were fixed as those with less priority can be addressed in the follow-up releases in the process of evolution. The following activities were also carried out.

Performance testing to validate the response times or transaction periods specified in the functional specifications. It involved timing how long the system takes to respond to a user's request, timing normal operations and also exception cases.

Regression test ensured that the correction during the system test have not introduced new bugs and tests the key functions.

Acceptance testing was approved by the client, that the system, meets the business requirement agreed upon, in the functional specification. The tested data was replaced with live data provided by the client. The client recorded all errors and other aspects. They were discussed with the developers, whereby, the errors were corrected by the developers and the changes were implemented at the expenses of the client.

5.4 User interfaces

Graphical interface is the part of the program that the user interacts with. Graphical interface contains the following;

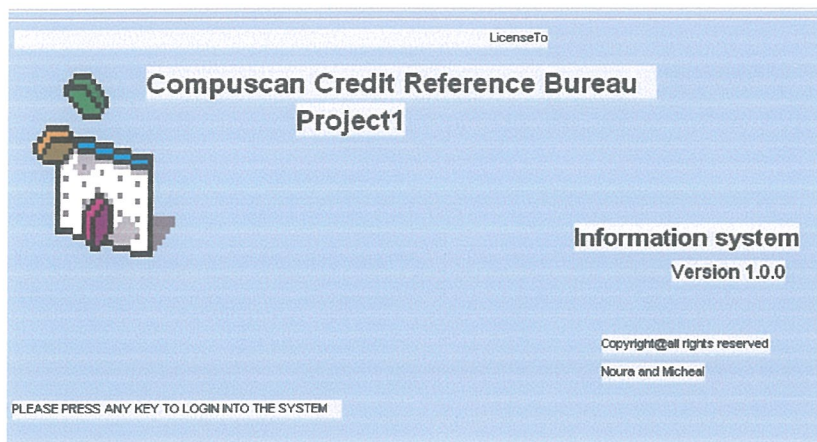
A pointing device, typically a mouse, on screen pull-down menus that can appear or disappear under the control of the pointing device, window that graphically display what the computer is doing, icons, which are graphical images that represent certain items such as files and directories.

The following images show the graphical user interfaces of this information system;

Splash form

Splash form is the first user interface of the information system that is seen the first time the system is loaded; it contains the heading information of the software, the company, the version and other instruction that guides the user what to do next.

Fig 5.1 Splash form

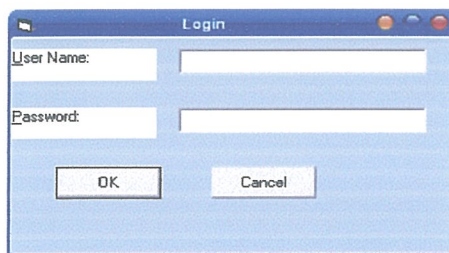


The Login form

The login form allows authorized users to login into the system. When the application loads, the login form appears where the user is prompted to enter username and password.

The system checks in the database and looks for the username and password provided by the user, if they do not match with what is in the database, it will deny access. User rights have been assigned to every user who logs into the system. To guarantee this a button for add user has been included which will allow the application to authenticate the user.

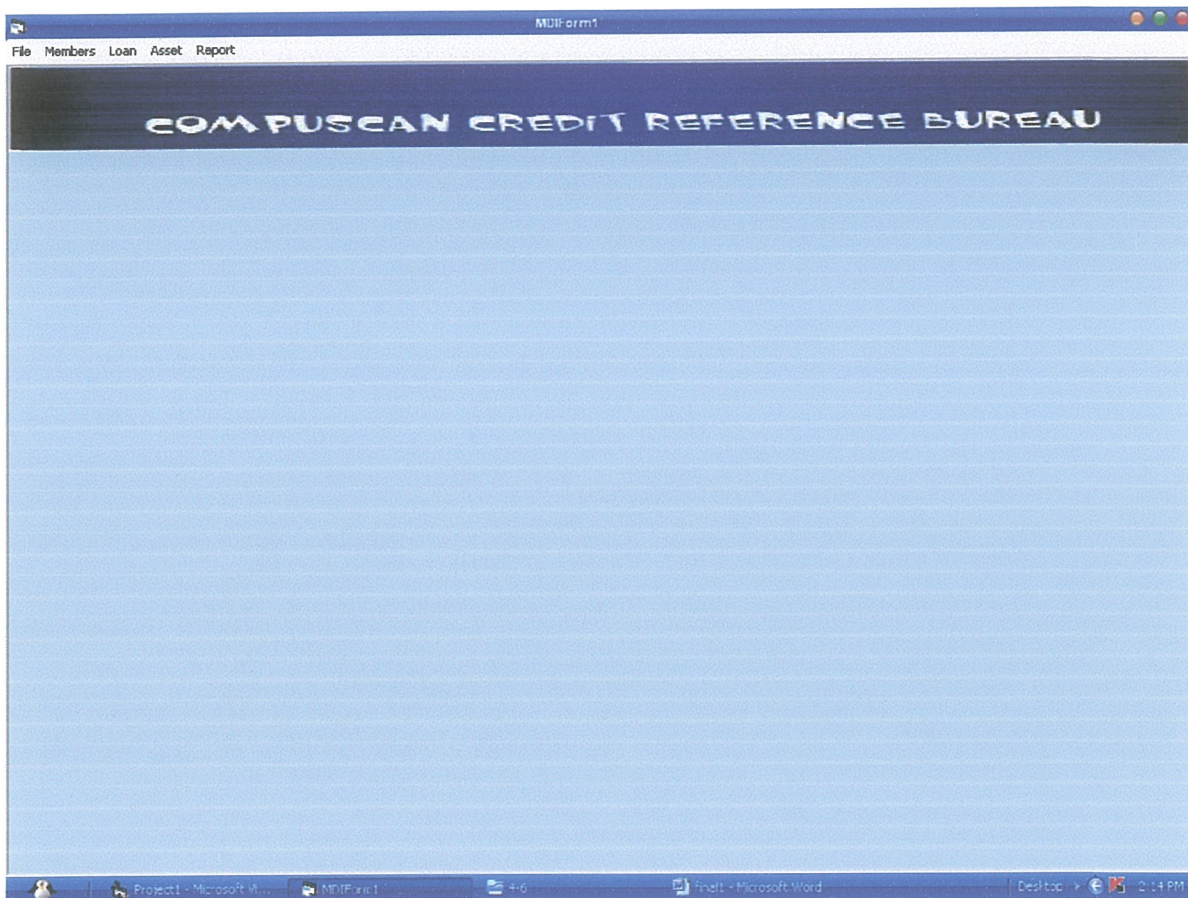
Fig 5.2 Login form



The MDI form

The MDI form is the main form/ page leading into the system. Trough the MDI form you can be able to browse trough the entire system. It is the gateway to the entire Compuscan credit bureau information system. All the other forms are linked to the MDI or the main menu and the user accesses them by use of menus which are located at the top of the interface.

Fig 5.3 MDI form



Employee Information Form

This is the Employee information form which is used to capture information about the employee that is full names, address, and employer among others.

Fig 5.4 Employee form

The screenshot displays a software window titled "MDIForm1" with a menu bar (File, Members, Loan, Asset, Report) and a header "COMPUSCAN CREDIT REFERENCE BUREAU". Inside, a sub-window titled "EMPLOYEE FORM" contains the "EMPLOYEE INFORMATION" form. The form has two columns of input fields: the left column includes EMPID, EMP NAME, ADDRESS, DOB, and GENDER; the right column includes EMAIL, DATE_OF_EMP, and EMPLOYER. To the right of these fields are four navigation buttons: Next, Previous, First, and Last. At the bottom of the form are five action buttons: Add, Save, Delete, Cancel, and Search. The Windows taskbar at the bottom shows several open applications, including "Project1 - Microsoft...", "MDIForm1", "EMPLOYEE", "4-g", "Email - Microsoft Word", and "Desktop", with the system clock showing 2:10 PM.

Borrower Information Form

This form captures information of the borrower that is details of the bank number of loans taken among other details.

Fig 5.5 Borrower form

The screenshot displays a software window titled "MDIForm1" with a menu bar (File, Members, Loan, Asset, Report). The main area has a dark blue header with the text "COMPUSCAN CREDIT REFERENCE BUREAU". Below this is a sub-window titled "borrower" which contains a form titled "BORROWER FORM".

The "BORROWER FORM" has a sub-header "BORROWER'S INFORMATION". It contains two columns of input fields:

Field Name	Field Type
BR ID	Text Input
BR NAME	Text Input
DOB	Text Input
OCCUPATION	Text Input
CITY	Text Input
COUNTRY	Text Input
GENDER	Text Input
EMPLOYER	Text Input
BANK	Text Input
ACCOUNT NUMBER	Text Input

To the right of these fields are four buttons: "Next", "Previous", "First", and "Last". At the bottom of the form are five buttons: "Add", "Save", "Delete", "Cancel", and "Search".

The Windows taskbar at the bottom shows several open applications: "Project1 - Microsoft...", "MDIForm1", "borrower", "New Folder", "Finals - Microsoft Word", and "Desktop". The system clock indicates "2:18 PM".

Loan Information Form

The loan information form captures details of loans taken by an individual. It shows the installments paid, remaining balance, and the number of loans taken at a time.

Fig 5.6 loan form

The screenshot displays a Windows-style application window titled "MDIForm1". The menu bar includes "File", "Members", "Loan", "Asset", and "Report". The main window has a dark header with the text "COMPUSCAN CREDIT REFERENCE BUREAU". Inside, a sub-window titled "Form4" contains the "LOAN FORM". The form is titled "LOAN INFORMATION" and features two columns of input fields. The left column includes "LOAN NO", "LOAN TYPE", "LOAN AMOUNT", "LOAN DURATION", and "LOAN INTEREST". The right column includes "TOTL NO INSTALLMENT", "AMOUNT OF INSTALLMENT", "INITIAL DATE", and "BROWER ID". To the right of these fields are four buttons: "Next", "Previous", "First", and "Last". At the bottom of the form are five buttons: "Add", "Save", "Delete", "Cancel", and "Search". The Windows taskbar at the bottom shows several open applications, including "Project1 - Microsoft...", "MDIForm1", "Form4", "New Folder", "Fruit - Microsoft Word", and "Desktop", with the system clock showing 2:19 PM.

LOAN INFORMATION				
LOAN NO	<input type="text"/>	TOTL NO INSTALLMENT	<input type="text"/>	Next Previous First Last
LOAN TYPE	<input type="text"/>	AMOUNT OF INSTALLMENT	<input type="text"/>	
LOAN AMOUNT	<input type="text"/>	INITIAL DATE	<input type="text"/>	
LOAN DURATION	<input type="text"/>	BROWER ID	<input type="text"/>	
LOAN INTEREST	<input type="text"/>			
Add Save Delete Cancel Search				

Loan History Information Form

The loan history form contains loan history number, loan number which is an attribute from the loan form, borrower identification, which is an attribute from the borrower form, loan status, loaning institution and previous loans.

Fig 5.7 loan history form

The screenshot shows a web application window titled "MDIForm1" with a menu bar containing "File", "Members", "Loan", "Asset", and "Report". The main content area has a dark blue header with the text "COMPUSCAN CREDIT REFERENCE BUREAU". Below this, there is a sub-window titled "LOAN HISTORY" with a tab labeled "LOAN HISTORY FORM". The form itself is titled "LOAN HISTORY INFORMATION" and contains several input fields and buttons.

Field Label	Field Type
LN HISTORY NO	Text Input
LOAN NO	Text Input
BR_ID	Text Input
LOAN STATUS	Text Input
PREVIOUS LOAN	Text Input
LOANING INSTITUTION	Text Input

Navigation buttons: Next, Previous, First, Last.

Action buttons: Add, Save, Delete, Cancel, Search.

Asset Information Form

The asset information form captures the information about the assets of the borrowers. It shows the location of the asset, current value, number of loans attached and depreciation rate among others. It helps decision makers to decide about credit worthiness of the borrowers.

Fig 5.8 Asset form

The screenshot displays a software window titled "MDIForm1" with a menu bar containing "File", "Members", "Loan", "Asset", and "Report". The main area features a header "COMPUSCAN CREDIT REFERENCE BUREAU" and a sub-window titled "ASSET FORM". Inside the "ASSET FORM", there is a section titled "ASSET INFORMATION" with two columns of input fields. The left column contains fields for "ASS NO", "ASS NAME", "ASS VALUE", "ASS LOCATION", and "ASS QTY". The right column contains fields for "Br ID", "ASS TYPE", "OWNER", and "LOAN ATTACH". To the right of these fields are four buttons: "Next", "Previous", "First", and "Last". At the bottom of the form are five buttons: "Add", "Save", "Delete", "Cancel", and "Search". The Windows taskbar at the bottom shows several open applications, including "Project1 - Microsoft...", "MDIForm1", "ASSET", "New Folder", "Final1 - Microsoft Word", and "Desktop", with the system clock showing "2:23 PM".

ASSET INFORMATION	
ASS NO	<input type="text"/>
ASS NAME	<input type="text"/>
ASS VALUE	<input type="text"/>
ASS LOCATION	<input type="text"/>
ASS QTY	<input type="text"/>
Br ID	<input type="text"/>
ASS TYPE	<input type="text"/>
OWNER	<input type="text"/>
LOAN ATTACH	<input type="text"/>

Next
Previous
First
Last

Add Save Delete Cancel Search

Financial Card Information Form

The financial card is issued to all registered members of the CRB and can be used to access several services in partnership banks. It is issued after all the information about the borrower has been captured. It shows the credit worthiness of the holder.

Fig 5.10 financial card information form

The screenshot displays a web-based application window titled "COMPUSCAN CREDIT REFERENCE BUREAU". Inside the window, there is a sub-form titled "FINANCIAL CARD FORM" with the heading "FINANCIAL CARD INFORMATION". The form contains two columns of input fields. The left column includes fields for "CARD NO", "ACC_NO", "HOLDER_NAME", "ADDRESS", and "BR_ID". The right column includes fields for "CURRENT_BAN", "OCCUPATION", and "LOAN NO". To the right of these input fields are four buttons: "Next", "Previous", "First", and "Last". At the bottom of the form, there are five buttons: "Add", "Save", "Delete", "Cancel", and "Search". The application window has a menu bar with "File", "Members", "Loan", "Asset", and "Report". The taskbar at the bottom shows several open applications, including "Project1 - Microsoft...", "MDIForm1", "FINANCIAL_CARD", "New Folder", "Email - Microsoft Word", and "Desktop". The system clock in the bottom right corner indicates "2:25 PM".

Processing Information Form

The processing information form is the form that is used to show whether the borrower is successful or not. It is the last stage of the system before issuance of the financial card.

Fig 5.9 processing form

The screenshot shows a web application window titled "PROCESSING FORM". Inside the window, there is a header section with the text "PROCESSING INFORMATION". Below this, the form is organized into two main columns. The left column contains five input fields, each with a label to its left: "PROCESS NO", "BROWER ID", "BANKER", "LOAN HISTOFY NO", and "REPORT". The right column contains four buttons stacked vertically: "Next", "Previous", "First", and "Last". At the bottom of the form, there is a horizontal row of five buttons: "Add", "Save", "Delete", "Cancel", and "Search". The "Add" button is highlighted with a dashed border.

5.5 Sample data input

The system handles data from the organization as it is expected to generally run the organization's business; the data includes data from borrowers, employees, loans records and asset's records. Employee's records include employee ID, employee names, date of birth, address, loans information include; installments paid, remaining balance, number of loans taken at a time , while the assets information includes asset number, asset type, asset value, asset location, asset quantity and the owner of the asset.

Table 5.1: Asset information

AssNo	AssName	AssValue	BrID	AssLocation	AssType	AssQty	LoanAttached	Owner
1	mercedes benz soloon C200	15	0	Kampala industrial area	Motor Vehicle	1	3,000,000	Mugandazi Baker
2	Mailo undeveloped land	9	1	Mityana District	Land	1	none	Kaamila Bakshi
3	Marc two	300000	1	hargeisa	ma gurto	3	100	Fardus Ibrahim
222	sss	0	0			0		

Table 5.2: Borrower information

rows: 4

BrID	brname	DOB	occupation	city_address	country	gender	employer	bank	acc_no
1	alikira richard	1986-01-14	student	kampala	uganda	male	basaja	centenary	2122222
7	Fuad Ibrahim	2009-04-15	Student	hargeisa	somaliland	female	Naasir	bank of somaliand	0254

Table 5.3: Employee information

EmpID	EmpName	Address	DOB	Gender	Email	Date_of_Employment	Employer
4	Jibril Ibrahim	hargeisa,somiland	1994-02-05 00:00:00	male	jibrill@hotmail.com	2009-03-05 00:00:00	Richard

Table 5.4: Loan information

LoanNo	Loan_Type	Loan_Amount	Loan_duration	Loan_interest	total_no_installment	amount_of_installment	initialedate	BrID
0	morgage	10,000,000	4 years	2% per month	48	25000	2009-02-05 14:52:49	0
1	long term	15,000,000	5 years	2% per month	62	260000	2009-02-05 14:56:48	1

Table 5.5: Loan history information

Loan_historyNo	LoanNo	BrID	Loan_status	Previous_loans	loanin_institution
0	0	0	on going	3,000,000 4,000,000	Uganda microfinance institution
1	1	1	complete	2500,000	barclays bank

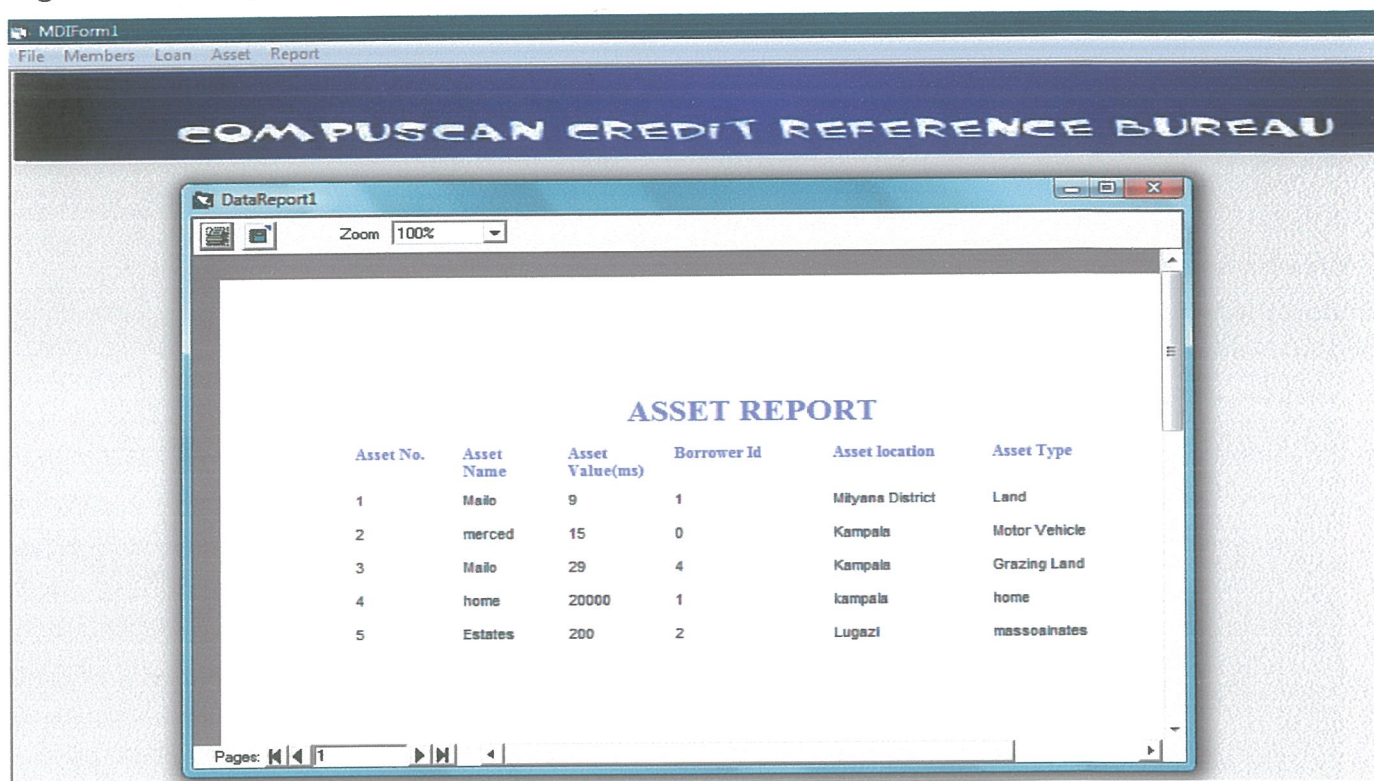
5.6 Sample Data Output

The output expected from the system depends entirely on the kind of input keyed in. This also is determined by the declaration done for each variable used in the system that the input should correspond with data type declared.

Assets Report

The image displays a report on assets details recorded. This output helps the management keep records of all the assets of the borrowers.

Fig 5.10 Asset Report



Asset No.	Asset Name	Asset Value(ms)	Borrower Id	Asset location	Asset Type
1	Mailo	9	1	Mityans District	Land
2	merced	15	0	Kampala	Motor Vehicle
3	Mailo	29	4	Kampala	Grazing Land
4	home	20000	1	kampala	home
5	Estates	200	2	Lugazi	massoainates

Loan Report

The image displays a report on loan details recorded. This output helps the management keep records of all the loans of the borrowers.

Fig 5.11 Loans Report

MDIForm1

File Members Loan Asset Report

COMPUSCAN CREDIT REFERENCE BUREAU

DataReport4

Zoom 100%

LOAN

L NO.	Loan Type	Loan Amount	Loan Duration	Loan Interest	Total No. Interest
0	morgage	10,000,000	4 years	2% per month	48
1	long term	15,000,000	5 years	2% per month	62
3	Salary Loan	12,000,000	4 years	2.5% per month	36
4	School Fees	2,000,000	12 months	2% per month	12
5	Salary Loan	7,000,000	5 years	3% per month	60

Pages: 1

Borrower Report

The image displays a report on borrower details recorded. This output helps the management keep records of all the borrowers.

Fig 5.12 Borrower Report

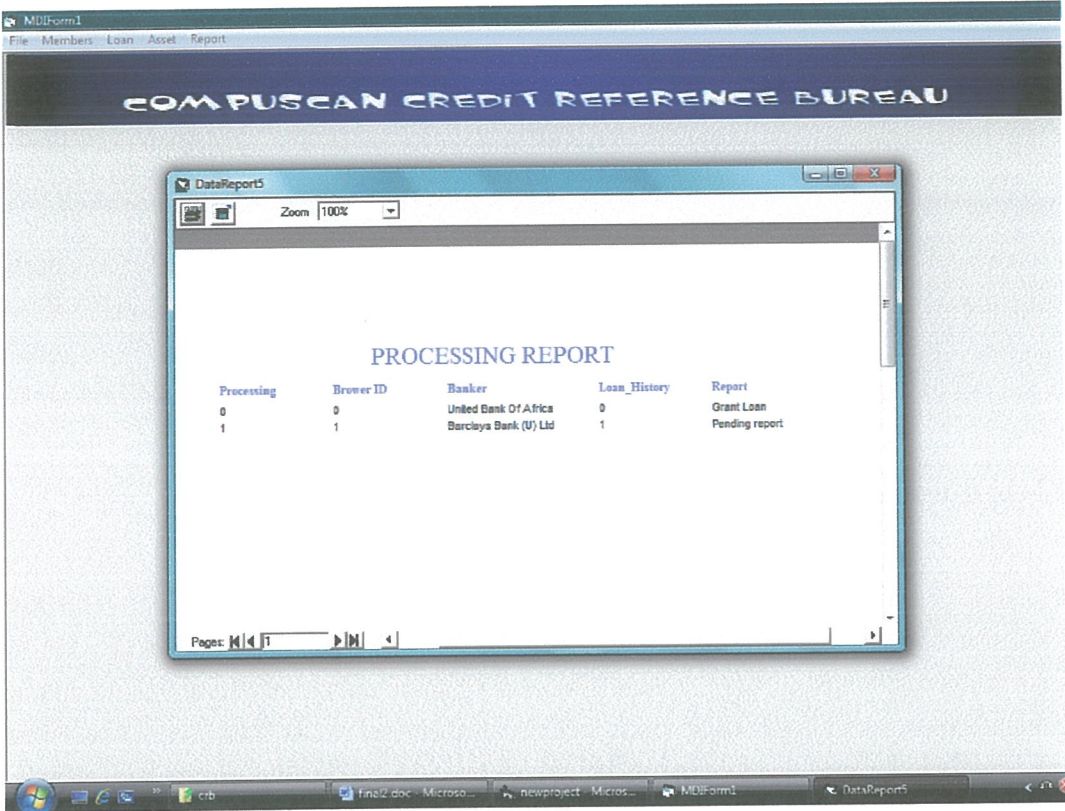
BORROWER REPROT

BORROWER ID	BORROWER NAME	DOB	TELEPHON	OCCUPATIO
0	Nansubuga Anna	08/02/1983	+256 782	Civil Servant
1	Tumushabe Cathy	09/02/1973	+256 701	Private sector
2	Kyeyne Apollo	12/09/1967	+25479309309	cashier
3	Rosemary Seninde	12/07/1963	+25671200987	Member of
4	Ashton Kaganzi	12/03/1977	+25677209080	accountant
5	Nasir Ibrahim	08/06/1970	+25225678964	Manager

Processing Report

The image displays a report on processing details recorded. This output helps the management keep records of all the processed data of the borrowers.

Fig 5.13 Processing Report



5.7 User training

After having the user's acceptance of the new system developed; implementation is the stage of a project during which theory is turned into practice. During this implementation all the programs of the system were loaded onto the Compuscan computers. After loading the system, training of the users started; the main topics of required type of training were:

- ❖ How to enter the data
- ❖ How to process the data (processing details)
- ❖ How to take out the reports

5.6 Conclusion

The chapter explained important phases of the development process such as system analysis and systems design.

CHAPTER SIX RECOMMENDATIONS, DISCUSSIONS AND CONCLUSIONS

6.0 Introduction

The chapter contains the recommendations which the researchers think should be put in place for effective use of the system and general running of the organization business. It also discusses about the general benefits or the strengths of the system once installed in the organization and lastly it has the conclusion of the entire project

6.1 Recommendation

It is recommended that Compuscan Credit Reference Bureau should take over this system for efficient running of their operations. This is because in the current age of technology where every activity in any organization should be computerized. At the moment the company has no computerized system because it's been just launched recently.

For enhancement purpose the system can be redeveloped using other programming tools such as java that would be in position to enhance more functionality and improve operations.

For security reasons, the editing and deleting modules should be secured by use of passwords, this has been realized by use of giving most users less privileges which involves changing data in anyway and instead administrator privileges given to the right person. In other words means access to the database should be in such a way that each person should be availed only the section that he/she is concerned with, not the entire database. This can be achieved by the use of several password protected forms covering the various sections instead of a general password. These passwords should be set to expire after a given duration for them to be renewed, this will help enforcing security.

The data in the system is very vulnerable and can be lost in any time, it can happen intentionally or unintentionally and therefore we recommend backing up of the data regularly, this means making a duplicate copy of entire database in a different locations. Using data recovery software is also highly recommended.

6.2 Discussion

The functionality strength of the system is mainly on its individual components which handle the various units of the organization. The major components of the system have records on borrowers, employees, Borrowers' assets, loans, loan history details and processing.

Each of the components capture the required data for the organization, processes it and produces clear output.

The system records borrower details, asset details, loan details, loan history details and processing information. This information is accurately captured bearing in mind that this part is the core of credit reference. This therefore calls for accurate tracking of each borrower and their information to avoid loss to the company due to exposure of members' information and ensure reliable services to the customers.

The system also captures all the details of the employees and helps the organization manage its employee's records accurately.

For proper functioning of the system, repair and maintenance of the system should be observed. This should be done after critical evaluation of the system. In addition user training is essential for proper use of the system. The system developed handles almost all data belonging to the organization since it deals information management.

The system produces periodical reports for each event taking place in the organization for assessment by the management. The following are the benefits of the new system.

Through providing timely and accurate information on borrower's debt profile and repayment history experience has revealed that when financial institutions compete with each other for customers, multiple borrowing and over-indebtedness increases loan default unless the financial institutions have access to a database that captures relevant aspects of client's borrowing behavior.

This system helps Compuscan Credit Bureau to contribute significantly the reduction in the access of screening loan applications by enabling the lender to sort out prospective borrowers who have defaulted with other lenders, therefore, improving lender's ability to predict default.

On the other hand, the system helps the company to manage its staff and ensure their efficiency . The system developed should monitor the remuneration of the staff and manage their records for effective running of the organization. The new system provides functionality that is responsible for the maintenance of the business records and general operations of the organization.

6.3 conclusions

The research has been successfully completed with the support provided by all the concerned people. The system developed if implemented will help the organization improve its services. This is because the system will make CCRB reliable in terms of efficiency and information management given that the system produces reports when required for decision making and easy running of the company.

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APPENDICES

Appendix A: Time Frame

No	Activity	Event	Time
1	Requirement gathering and Analysis	<ul style="list-style-type: none"> - Feasibility Analysis - Data Collection - Data Analysis -System requirements -Current-system analysis - Risk Assessment 	3 weeks
2	System & Software Design	<ul style="list-style-type: none"> -Logical design -Physical design -Data structures -coding and testing 	4 ½ weeks
3	Implementation and unit testing	<ul style="list-style-type: none"> -Data conversion -System conversion -User training -testing 	6 weeks
4	Integration & System Testing	-software deliverance	5 weeks
5	Operations & Maintenance	- solving problems related with system development.	Up to the expiration of the system.

Appendix B: Sample Codes

```
Private Sub mnborower_Click()
```

```
brower.Show
```

```
End Sub
```

```
Private Sub mneassetdetails_Click(Index As Integer)
```

```
ASST.Show
```

```
End Sub
```

```
Private Sub mnefinancard_Click(Index As Integer)
```

```
FINANCRD.Show
```

```
End Sub
```

```
Private Sub mnloan_Click(Index As Integer)
```

```
LN.Show
```

```
End Sub
```

```
Private Sub mnloanhistory_Click(Index As Integer)
```

```
LNHISTORY.Show
```

```
End Sub
```

```
Private Sub mnuempinfo_Click(Index As Integer)
```

```
EMP.Show
```

```
End Sub
```

```
Private Sub mnuexit_Click(Index As Integer)
```

```
Unload Me
```

```
End Sub
```

Option Explicit

Public LoginSucceeded As Boolean

Private Sub cmdcancel_Click()

 LoginSucceeded = False

 Me.Hide

End Sub

Private Sub cmdOK_Click()

 If txtPassword = "nuura" Then 'check for correct password

 LoginSucceeded = True

 Me.Hide

 MDIForm1.Show

 Else

 MsgBox "Invalid Password, try again!", , "Login"

 txtPassword.SetFocus

 SendKeys "{Home}+{End}"

 End If

End Sub

Private Sub cmdadd_Click()

 crb.Recordset.AddNew

 cmdsave.Enabled = True

 cmdadd.Enabled = True

End Sub

```
Private Sub cmdcancel_Click(Index As Integer)
```

```
Unload Me
```

```
End Sub
```

```
Private Sub cmddelete_Click(Index As Integer)
```

```
Dim Del As Integer
```

```
Del = MsgBox("are you sure you want delete?", vbYesNo, "confirm delete")
```

```
If Del = vbYes Then
```

```
crb.Recordset.Delete
```

```
Else
```

```
MsgBox ("record not deleted")
```

```
End If
```

```
End Sub
```

```
Private Sub cmdfirst_Click(Index As Integer)
```

```
On Error Resume Next
```

```
crb.Recordset.MoveFirst
```

```
End Sub
```

```
Private Sub cmdlast_Click(Index As Integer)
```

```
On Error Resume Next
```

```
crb.Recordset.MoveLast
```

```
End Sub
```

```
Private Sub cmdnext_Click(Index As Integer)

On Error Resume Next

With crb.Recordset

.MoveNext

If .EOF Then

.MoveFirst

End If

End With

End Sub

Private Sub cmdprevious_Click(Index As Integer)

On Error Resume Next

With crb.Recordset

.MovePrevious

If .BOF Then

.MoveLast

End If

End With

End Sub

Private Sub cmdsave_Click()

crb.Recordset.Update

Form_Load

End Sub
```

```
Private Sub Form_Load()
```

```
cmdsave.Enabled = False
```

```
End Sub
```

```
Private Sub cmdsearch_Click(Index As Integer)
```

```
Dim stsearch As String
```

```
stsearch = InputBox("enter the asset no")
```

```
crb.Recordset.MoveFirst
```

```
While Not crb.Recordset.EOF
```

```
If stsearch = crb.Recordset.Fields(0) Then
```

```
MsgBox ("search successful")
```

```
Exit Sub
```

```
Else
```

```
crb.Recordset.MoveNext
```

```
End If
```

```
Wend
```

```
MsgBox ("Record doesn't exist")
```

```
End Sub
```

Appendix C: MYSQL Database codes

-- Database: `ccrb`

Table structure for table `asset`

```
CREATE TABLE `asset` (  
  `AssNo` int(11) NOT NULL auto_increment,  
  `AssName` varchar(35) NOT NULL,  
  `AssValue` bigint(35) NOT NULL,  
  `BrID` int(11) NOT NULL,  
  `AssLocation` varchar(30) NOT NULL,  
  `AssType` varchar(40) NOT NULL,  
  `AssQty` int(11) NOT NULL,  
  `LoanAtatched` varchar(25) NOT NULL,  
  `Owner` varchar(35) NOT NULL,  
  PRIMARY KEY (`AssNo`)  
) ENGINE=InnoDB DEFAULT CHARSET=latin1 AUTO_INCREMENT=223 ;
```

-- Dumping data for table `asset`

```
INSERT INTO `asset` (`AssNo`, `AssName`, `AssValue`, `BrID`, `AssLocation`, `AssType`,  
`AssQty`, `LoanAtatched`, `Owner`) VALUES  
(1, 'mercedes benz soloon C200', 15, 0, 'Kampala industrial area', 'Motor Vehicle', 1, '3,000,000',  
'Mugandazi Baker'),  
(2, 'Mailo undeveloped land', 9, 1, 'Mityana District', 'Land', 1, 'none', 'Kaamila Bakshi'),  
(3, 'Marc two', 300000, 1, 'hargeisa', 'ma gurrto', 3, '100', 'Fardus Ibrahim'),  
(222, 'sss', 0, 0, "", "", 0, "", "");
```

-- Table structure for table `borower`

```
CREATE TABLE `borower` (  
  `BrID` int(11) NOT NULL,  
  `brname` varchar(35) NOT NULL,  
  `DOB` date NOT NULL,  
  `occupation` varchar(25) NOT NULL,  
  `city_address` varchar(20) NOT NULL,  
  `country` varchar(20) NOT NULL,  
  `gender` varchar(20) NOT NULL,  
  `employer` varchar(35) NOT NULL,  
  `bank` varchar(20) NOT NULL,  
  `acc_no` varchar(20) NOT NULL,  
  PRIMARY KEY (`BrID`)  
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

-- Dumping data for table `borower`


```
INSERT INTO `borower` (`BrID`, `brname`, `DOB`, `occupation`, `city_address`, `country`,
`gender`, `employer`, `bank`, `acc_no`) VALUES
(1, 'alikiria richard', '1986-01-14', 'student', 'kampala', 'uganda', 'male', 'basaja', 'centenary',
'2122222');
```

```
-----
-- Table structure for table `employee`
CREATE TABLE `employee` (
  `EmpID` int(11) NOT NULL,
  `EmpName` varchar(35) NOT NULL,
  `Address` varchar(25) NOT NULL,
  `DOB` datetime NOT NULL,
  `Gender` varchar(8) NOT NULL,
  `Email` varchar(30) NOT NULL,
  `Date_of_Employment` datetime NOT NULL,
  `Employer` varchar(35) NOT NULL,
  PRIMARY KEY (`EmpID`),
  UNIQUE KEY `EmpID` (`EmpID`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

```
INSERT INTO `employee` (`EmpID`, `EmpName`, `Address`, `DOB`, `Gender`, `Email`,
`Date_of_Employment`, `Employer`) VALUES
(4, 'Jibril Ibrahim', 'hargeisa,somliland', '1994-02-05 00:00:00', 'male', 'jibrill@hotmail.com', '2009-
03-05 00:00:00', 'Richard');
```

```
-----
-- Table structure for table `financial_card`
CREATE TABLE `financial_card` (
  `CardNo` int(11) NOT NULL,
  `AccNo` varchar(25) NOT NULL,
  `holder_Name` varchar(35) NOT NULL,
  `Address` varchar(35) NOT NULL,
  `BrID` int(11) NOT NULL,
  `Current_bank` varchar(35) NOT NULL,
  `Occupation` varchar(30) NOT NULL,
  `LoanNo` int(11) NOT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

Dumping data for table `financial_card`

```
INSERT INTO `financial_card` (`CardNo`, `AccNo`, `holder_Name`, `Address`, `BrID`,
`Current_bank`, `Occupation`, `LoanNo`) VALUES
(0, '0098756b', 'Tumushabe Cathy ', '712 kampala.', 1, 'Barclays Bank (u) Ltd', 'Employee', 0),
(1, '0884568', 'Nansubuga Anna', '1245 jinja rd, kampala', 0, 'United Bank of Africa', 'Cival servant',
1);
```

```

-----
-- Table structure for table `loan`
CREATE TABLE `loan` (
  `LoanNo` int(11) NOT NULL,
  `Loan_Type` varchar(30) NOT NULL,
  `Loan_Amount` varchar(30) NOT NULL,
  `Loan_duration` varchar(15) NOT NULL,
  `Loan_interest` varchar(30) NOT NULL,
  `total_no_installment` varchar(35) NOT NULL,
  `amount_of_installment` varchar(35) NOT NULL,
  `nitialdate` datetime NOT NULL,
  `BrID` int(11) NOT NULL,
  PRIMARY KEY (`LoanNo`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

-- Dumping data for table `loan`

INSERT INTO `loan` (`LoanNo`, `Loan_Type`, `Loan_Amount`, `Loan_duration`, `Loan_interest`,
`total_no_installment`, `amount_of_installment`, `nitialdate`, `BrID`) VALUES
(0, 'mortgage', '10,000,000', '4 years', '2% per month', '48', '25000', '2009-02-05 14:52:49', 0),
(1, 'long term', '15,000,000', '5 years', '2% per month', '62', '260000', '2009-02-05 14:56:48', 1);

-----
-- Table structure for table `loan_history`
CREATE TABLE `loan_history` (
  `Loan_historyNo` int(11) NOT NULL,
  `LoanNo` int(11) NOT NULL,
  `BrID` int(11) NOT NULL,
  `Loan_status` varchar(20) NOT NULL,
  `Previus_loans` varchar(20) NOT NULL,
  `loanin_institution` varchar(35) NOT NULL,
  PRIMARY KEY (`Loan_historyNo`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

-- Dumping data for table `loan_history`
INSERT INTO `loan_history` (`Loan_historyNo`, `LoanNo`, `BrID`, `Loan_status`,
`Previus_loans`, `loanin_institution`) VALUES
(0, 0, 0, 'on going', '3,000,000 4,000,000', 'Uganda micrifinace institution'),
(1, 1, 1, 'complete', '2500,000', 'barclays bank');

-----
-- Table structure for table `login`
CREATE TABLE `login` (
  `LoginID` int(10) NOT NULL auto_increment,
  `UserName` varchar(30) NOT NULL,
  `Password` varchar(25) NOT NULL,

```

```
PRIMARY KEY (`LoginID`)  
) ENGINE=InnoDB DEFAULT CHARSET=latin1 AUTO_INCREMENT=2 ;
```

```
-- Dumping data for table `login`  
INSERT INTO `login` (`LoginID`, `UserName`, `Password`) VALUES  
(1, 'Noura Ibrahim', '123456');
```

```
-----  
-- Table structure for table `processing`  
CREATE TABLE `processing` (  
  `processNo` int(11) NOT NULL,  
  `BrID` int(11) NOT NULL,  
  `Banker` varchar(35) NOT NULL,  
  `Loan_historyNo` int(11) NOT NULL,  
  `Report` varchar(100) NOT NULL  
) ENGINE=InnoDB DEFAULT CHARSET=latin1;
```

```
-- Dumping data for table `processing`  
INSERT INTO `processing` (`processNo`, `BrID`, `Banker`, `Loan_historyNo`, `Report`)  
VALUES  
(1, 0, 'united bank of africa', 1, 'very good man and paid his default loans');
```

Appendix D: Questionnaire

1. what are your Names

.....

2. Please select your age bracket.

- 18 – 23
- 23 –30
- 30 –40
- 40 >

3. What is your sex? (tick)

- Male
- Female

4. Are you here as a customer or an employee?(tick)

- Customer
- Employee

5. If you are customer, please skip to question 17 and if you are an employee
Please continue with question 6.

6. What is your position in the organization?

- Top management
- Senior management
- Junior management
- Other

7. Please tick your salary range.

- <100\$
- 100\$ -- 200\$
- 200\$ -- 300\$
- 300\$ -- 400\$
- 400\$>

8. Which department do you work for?

.....

9. What is the loan taking procedure?

.....
.....
.....
.....

10. What are the requirements for taking a loan?

.....
.....
.....
.....

11. What loan system does your organization use?

.....

12. Is the loan system computerized? (Tick)

- Yes
- No

13. If yes what is the processing time of the system?

- 30 micro seconds
- >30 micro seconds but less than 30 seconds
- 30 seconds
- >30seconds

14. Is the system efficient and complete and does it incorporate all the information?

- Yes
- No

15. Can the system be relied on to compute interest accurately?

.....

16. Grade the system. (Tick)

- Poor
- Average
- Fairly good
- Good
- Excellent

17. Is the bank in partnership with the Credit Reference Bureau?

- yes
- No

18. If there were any changes to be made, what would you recommend?

.....
.....
.....

19. Have you ever taken a bank loan before?(tick)

- Yes
- No

20. If yes what was the procedure for acquiring the loan?

.....
.....
.....

21. Was the system computerized?

- True

- False

22. If yes what was the processing time of the system?(Tick)

- 30 micro seconds
- >30 micro seconds but less than 30 seconds
- 30 seconds
- >30seconds

23. Are you satisfied with the procedures?(Tick)

- Yes.
- No.

24. How much time did it take for you to get the loan?

.....

25. Was your loan premium and interest computed accurately?

- Yes
- No

26. Were you required to deal with the credit reference bureau?

27. How relevant do think the CRB is the borrowers and Banks and do you think it is going to improve on the loan acquisition Procedures.

28. If you were required to make changes to the system, what would be your Recommendations?

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