

**VEHICLE MANAGEMENT SYSTEM FOR BUS OPERATORS OF  
LUWINZO BUS SERVICE COMPANY**

**By:  
HAMAD SEIF**

**A Project Report Submitted To The College Of Applied Sciences And Technology In  
Partial Fulfillment For The Requirements For The Award Of The Degree Of Bachelor Of  
Computer Science Of Kampala International University**

**February-2013**

**VEHICLE MANAGEMENT SYSTEM FOR BUS OPERATORS OF  
LUWINZO BUS SERVICE COMPANY**

**By:  
HAMAD SEIF  
BCS/41729/91/DF**

**A Project Report Submitted To The College Of Applied Sciences And Technology In  
Partial Fulfillment For The Requirements For The Award Of The Degree Of Bachelor Of  
Computer Science Of Kampala International University**

**February-2013**

### DECLARATION

I do hereby declare with truth that this project report is my original work and has never been presented to any academic institution for any award or certificate whatsoever.

The literature and citations from other people's work have been duly referenced and acknowledged in the text and bibliography.

Signature:



HAMAD SEIF

Date. 16-02-2013

### APPROVAL

This is to certify that this study by **HAMAD SEIF (BCS/41729/91/DF)** has been carried out under the title “Vehicle Management System for Bus operators”  
Using Java and Ms Access Database case study of “Luwinzo Bus Services Company” has been under my supervision and project report is now ready for submission to the university council with my approval.

Signed: .....

**Nabbanja Teddy (PhD)**

**Supervisor**

Date.....

## **DEDICATION**

I dedicate this project to my parents, without whom my education would not have been a success. For all my loved ones and their encouragement, material and moral support, and lastly to my dear brothers and sisters, i love you all.

## **ACKNOWLEDGEMENTS**

First i would like to acknowledge the divine presence of my Almighty God to whom this research study would not have been successful without his guidance, love, care and protection. All the Glory belongs to Him.

I would like to thank every individual who has played a role in one way or the other to the completion and success of this project. Nabbanja Teddy, my sincere appreciation goes to my dear parents for all the support they have shown me through all hardships and struggles till this far. May the Almighty grant you more strength to move on.

To Nabbanja Teddy, the Head of Computer Science Department, College of Applied Science and Technology at Kampala International University. I appreciate your vision in leadership and sustaining an effective and focused academic environment.

## ABBREVIATIONS AND ACRONYMS

DBMS	- Database Management system
DA	- Data Administrator
DBA	- Database Administrator
DFD	- Data Flow Diagram
E-R	- Entity-Relationship Models
ICT	- Information Communication Technology
IT	- Information Technology
DBALC	- Database Application Lifecycle
ISL	- Information System Lifecycle
SQL	- Structured Querying Language
SDLC	- System Development Life Cycle
IDE	- Integrated Development Environment
JDK	- Java Development Kit
JRE	- Java Run Time Environment
XP	- Extreme Programming

**LIST OF TABLES**

Table 1 Users ..... 19

Table 2 Booking..... 19

Table 3 Buses..... 20

Table 4 Employee ..... 20

Table 5 Passenger ..... 21

Table 6 Payment ..... 21

Table 7 Route..... 22

Table 8 Schedules ..... 22

Table 9 Trips ..... 23

Table 10 Validator ..... 23



## LIST OF FIGURES

Figure 1. Conceptual Framework of the System. ....	5
Figure 2. XP Based Methodology .....	14
Figure 3 Login. ....	40
Figure 4 Add new user.....	41
Figure 5 Bus details .....	41
Figure 6 New Bus Details .....	42
Figure 7 Update Bus Details .....	42
Figure 8 Employees Details .....	43
Figure 9 Add New Employee .....	43
Figure 10 Update Employee details .....	44
Figure 11 Route Report .....	44
Figure 12 Add New Route .....	45
Figure 13 Update Route .....	45
Figure 14 Add New Passengers .....	46
Figure 15 Update passenger details .....	46
Figure 16 Scheduling Process.....	47
Figure 17 Payment Process .....	47
Figure 18 Booking Process .....	48
Figure 19 Buses Report .....	49
Figure 20 Employees Report .....	50
Figure 21 Booking Report .....	50

## ABSTRACT

This report is about Vehicle Management System for Luwinzo Bus Service Company located in Kenya. The company's work was dominantly handled using a paper based system to keep records for different transactions made each day whereby all the jobs of the bus routes management were done manually. This is very difficult to the operators who want to handle hundreds of trips and many buses in a day. This study aimed at computerizing the paper based system and automate administration of bus management of Luwinzo Bus Services. The main goal of this project is to create a Vehicle Management System for Bus Operators which can eliminate most of the problems experienced with the current system. The researcher implemented various methods of data collection such as interviews, questionnaires and observations. MS Access was used to develop a back end database application while the front-end interface was developed with JAVA to come up with a system that solved the current problem. Implementation of the system was highly considered when the system was being developed. I recommend the new system to be implemented so that bus management becomes hassle free in terms keeping track of the trips they make per day, keep records about the vehicles (buses) they have, providing easy retrieval of bus, passengers and operators' information in the shortest time possible. All the information about buses and the employees is securely kept.

## TABLE OF CONTENTS

DECLARATION .....	i
APPROVAL .....	ii
DEDICATION .....	iii
ACKNOWLEDGEMENTS .....	iv
ABBREVIATIONS AND ACRONYMS .....	v
LIST OF TABLES .....	vi
LIST OF FIGURES .....	vii
ABSTRACT .....	viii
CHAPTER ONE .....	1
INTRODUCTION .....	1
1.0 Introduction .....	1
1.1 Background Study .....	1
1.2 Problem Statement .....	1
1.3 Objectives .....	2
1.3.1 Main Objective .....	2
1.3.2 Specific Objectives .....	2
1.4 Research Questions .....	2
1.5 Scope .....	3
1.6 Significance of the Study .....	3

1.7 Limitation of the Study .....	4
CHAPTER TWO .....	6
LITERATURE REVIEW .....	6
2.0 Introduction.....	6
2.1 Definition of Terms.....	6
2.2 Systems Development Lifecycle (SDLC).....	8
2.3 Information System Life Cycle (ISL) .....	9
2.4 Database Application Lifecycle (DALC) .....	9
2.5 Database Management System (DBMS) .....	10
2.6 Entity Relationship (E-R) .....	11
CHAPTER THREE .....	12
METHODOLOGY .....	12
3.0 Introduction.....	12
3.1 Research Design.....	12
3.2 Area of Study .....	12
3.3 Data Collection Techniques.....	12
3.4 Data Analysis .....	13
3.5 Development Methodology and Tools.....	14
3.6 Programming Tools .....	15
3.7 Business Needs of the Organization .....	16
3.8 Expected Functionality of the System .....	16

3.9 Expected value of the system.....	16
3.10 Project Plan .....	16
3.11 Analysis Phase .....	17
3.12 Design Phase.....	17
3.13 TABLES USED.....	19
3.14 Implementation Phase.....	24
3.14.1 End user Training:.....	24
3.14.2 Post Implementation Review .....	24
3.15 SOFTWARE TESTING .....	25
 CHAPTER FOUR.....	 26
SYSTEM ANALYSIS .....	26
4.0 Introduction.....	26
4.1 Existing System .....	26
4.2 New System .....	26
4.3 Feasibility study.....	27
4.4 System Requirements.....	28
4.5 SYSTEM IMPLEMENTATION.....	29
 CHAPTER FIVE .....	 35
DISCUSSION, RECOMMENDATION AND CONCLUSION .....	35
5.0 Discussion .....	35

5.1 Limitation.....	35
5.2 Recommendationss .....	35
5.3 Areas of Feature Research .....	36
5.4 Conclusion .....	36
REFERENCES .....	37
APPENDICIES .....	40
Appendix A: FORMS USED.....	40
Appendix B: WORK PLAN AND BUDGET .....	51
Budget of the system.....	52

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.0 Introduction**

This chapter is to provide information about the background of the system and the area or case of study where the system has been designed and implemented for.

#### **1.1 Background Study**

According to Mugisha (2005) on an IT magazine article, Information and Communication Technology (ICT) has proven to be a very important aspect of society today; such that any organization intending to progress cannot ignore it. Increased workload, integration of various activities and economies of scale are some of the key factors that organizations feel the input of ICT is of great importance.

Luwinzo Bus Service is a private bus operator company in Nairobi, Kenya that performs many trips within and across countries. It performs many transactions per days such as route scheduling, Booking management, as well as keeping records about vehicle profiles on a paper based system. This is very difficult to the operators who want to handle hundreds of trips and many buses in a day.

Most of Buses operators are now slowly trying to move away from the paper based way of keeping records, to a go between. This go between would be the use of both paper based and computer based ways of storing information about their daily transactions. This change will be the key to improve the efficiency of records retrieval when needed, which is not time consuming or costly as the paper based system

#### **1.2 Problem Statement**

In the current system, data related to the buses, employees and route are often manually recorded resulting in faults and it is difficult to find back information. Automatically recording the information ensures that data is accurate and easily to track back. The currents system is that an operator wants to keep the physical records of the bus route in his office and a separate record for the passengers' and for the booked seats. In current system there is no way to store the details of the employees' working in the bus.

So many complaints against staff can arise from the passengers' side and there is no proper record of the bus and routes in which they serve. This has made Luwinzo Bus Service Management very difficult to respond to the different complaints from clients and if this is not handled well with a computerized system, the company will drastically phase out of the business.

### **1.3 Objectives**

#### **1.3.1 Main Objective**

The main purpose of this project was to create a java application that will automate all the daily company record keeping activities such as buses management, route management, employee management and passengers management (Booking and payments).

#### **1.3.2 Specific Objectives**

- I. To investigate the existing system which is paper based system.
- II. To analyze the requirements for the new system with regard to the findings of the problems on the existing system.
- III. To develop a database that can capture, store and maintain information about buses available, employees, passengers and routes.
- IV. To develop a user friendly interface and integrate both the database and the user interface to a complete working system.
- V. To test the new system with actual data and implement to the intended environment.

#### **1.0.1 1.4 Research Questions.**

- I. What problems have been discovered with the existing system (the manual system)?
- II. Are the user specifications about the requirements for the new system clear? And can they be implemented?



- III. Is it possible to develop a database that is sufficient and efficient to capture, store and maintain information about buses available, employees, passengers and routes?
- IV. Which programming language can be used to easily develop an interface for user interactivity with the database to manipulate and access information stored?
- V. Does the new system respond correctly with the actual data intended to be stored in the database and can be implemented in the company (the real World scenario) to solve the problems it has been built for?

### **1.5 Scope**

The research took place at Luwinzo Bus Service Company in Nairobi, Kenya only with regard to design and development of a Vehicle Management System to automate the record keeping activities of the company. The study took place between September 2012 and April 2013.

### **1.6 Significance of the Study**

The purpose of the study is to make Luwinzo Bus Service Company understand the problems of having a paper based system for capturing and storing records about the company transactions and understand how can be to the company as a whole by changing to computerized system. The new system is very useful for the operators and passengers. This avoids the overheads for the operators. They can minimize the working stress and can keep essential documents related to the bus and the passengers as a softcopy. The advantage of the new system is the reduction in the cost of the office equipment and the transaction is done quickly. Any operator can answer if any seats for a particular route in a particular day are available or not. The study will also help researchers embark upon a similar study or will serve purpose as source to refer upon. The research is part of a fulfillment for an award of the Bachelor of Computer Science.

### **1.7 Limitation of the Study**

During the course of my study i faced a number of limitations such as shortage of time, cost and software hindrances. Shortage of time, Time limitation was a problem i faced with my study because as researchers i needed more time to extract and analyze adequate material for the study. Costs limitations occurred as would be expected due to materials needed to fulfill the objective, transport costs and other expenditures. Software hindrances occurred because i needed to learn and acquire knowledge of software's that had thus far not yet been used before.

### **1.8 Schema of the System**

This diagram depicts what the proposed system will achieve its goals and objectives, as well as the inputs, processes, and the outputs of the proposed system.

A manager will be be the first user of the system since is the only one provided a deafault login account which has administrator priviledges to create other user account for further users who will be using the system.

Consider the figure below which demonstrate the login and logout processes as well as user priviledges to perform different functions.

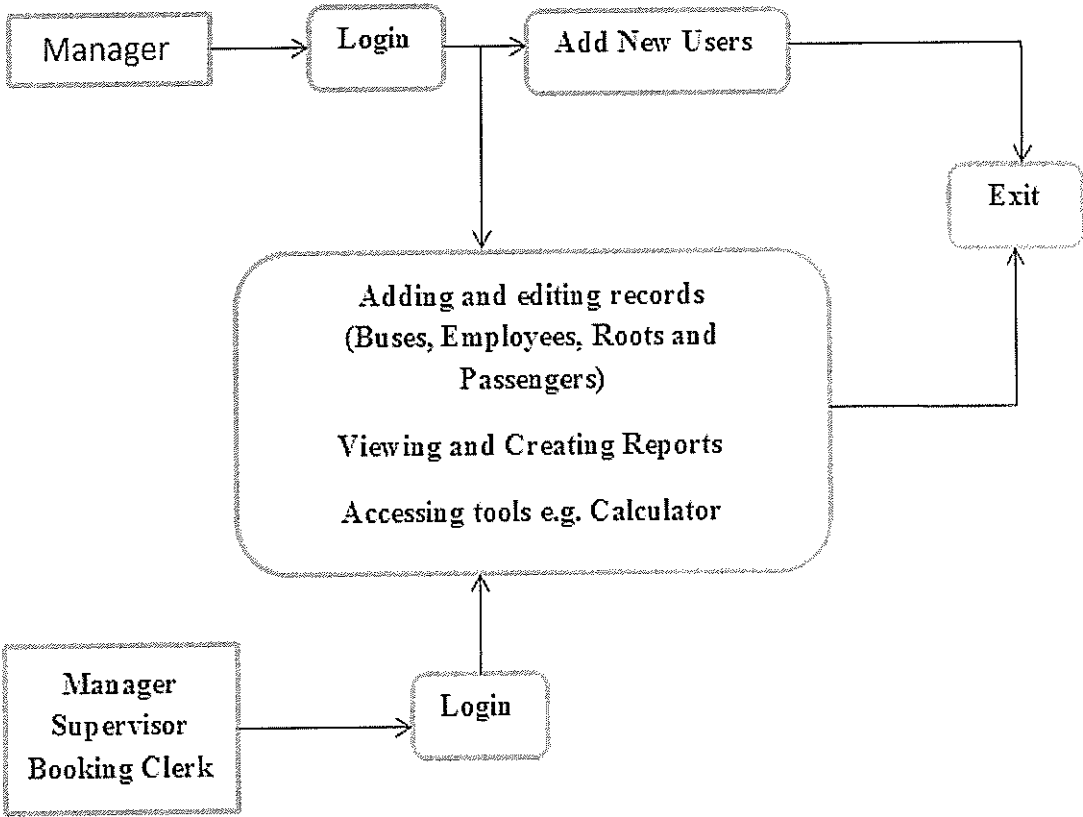


Figure 2. Conceptual Framework of the System.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter will look at the literatures related to the project and review other researchers' work.

#### **2.1 Definition of Terms**

According to ken (2001), an information system is the resources that enable the collection, management, control, and dissemination of information through an organization.

The need for a Vehicle Management System and how it can boost data integrity, disadvantages of paper based records storing and retrieval, development of a security measures and policies to ensure data integrity and protect unauthorized access of data by unauthorized users and testing of the recommended system.

According to Nedap Avi (2012,) Public transport buses can be driven by different drivers depending on their work shift. To keep track of which driver is on which bus is often a manual procedure subject human error. In order to schedule efficient bus services it is important to have real time information on availability of the vehicle and the driver.

According to, Connolly and Begg (2004), software has now surpassed hardware as the key to the success of many computer-based systems, or web-based systems. Unfortunately, the track record at the developing software is not particularly impressive. The last few decades have seen the proliferation of software applications ranging from small, relatively simple applications consisting of a few lines of codes, to large, complex applications consisting of millions of lines of codes. Many of these applications have required constant maintenance. This involve correcting faults that had been detected, implementing new user requirements, and modifying the software to run on new or upgraded platforms. The effort spent on maintenance began to absorb resources at an alarming rate. As a result, many major software projects were late, over budget, unreliable, difficult to maintain, and performed poorly. This led to what has become known as the software crisis.

Although this term was first used in the late 1960s, more than 40 years later the crisis is still with us. As a result, some authors now refer to the software crisis as the software depression. As an indication of the crisis, a study carried out in UK by OASIG, a Special Interest Group concerned with the organizational aspects of IT, reached the following conclusions about software projects (OASIG, 1996).

- 80-90% does not meet their performance goals
- About 80% are delivered late and over budget
- Around 40% fail or are abandoned.
- Fewer than 40% fully address training and skills requirements.
- Less than 25% properly integrate enterprise and technology objectives.
- Just 10-20% meets all their success criteria.
- There are several major reasons for the failure of software projects including:
  - Lack of a complete requirements specification
  - Lack of an appropriate development methodology
  - Poor decomposition of design into manageable components
  - As a solution to these problems a structured approach to the development of software was proposed called the Information Systems Lifecycle or the Software Development Lifecycle.

As a solution to avoid the above problems in my designed system, I had to involve users of the system who contributed to requirements of the designed system and system testing to avoid project failure and abandoned. The collected requirements were specific to the intended objectives and guided system design and development.

## 2.2 Systems Development Lifecycle (SDLC)

Kenneth and Kendall (2005) argue that the systems development life cycle (SDLC) describes a set of steps that produces a new computer information system. The SDLC is a problem-solving process. Each step in the process delineates a number of activities. Performing these activities in the order prescribed by the SDLC will bring about a solution to the business situation.

The SDLC process consists of the following phases:

- Preliminary investigation—the problem is defined and investigated.
- Requirements definition—the specifics of the current system as well as the requirements of the proposed new system are studied and defined.
- Systems design—a general design is developed with the purpose of planning for the construction of the new system.
- Systems development—the new system is created.
- System installation—the current operation is converted to run on the new system.
- Systems evaluation and monitoring—the newly operational system is evaluated and monitored for the purpose of enhancing its performance and adding value to its functions.
- Looping back from a later phase to an earlier one may occur if the need arises.

Each phase has a distinct set of unique development activities. Some of these activities may span more than one phase. The management activity tends to be similar among all phases. The SDLC is not standardized and may be unique to a given organization. In other words, the names and number of phases may differ from one SDLC to the next. However, the SDLC discussed here is, to a large extent, representative of what is typically adopted by organizations.

At each phase certain activities are performed, the results of these activities are documented in a report identified with that phase. Management reviews the results of the phase and determines if the project is to proceed to the next phase.

### **2.3 Information System Life Cycle (ISL)**

According to (Date (2003) it is also known as System Development Lifecycle (SDLC), these are the resources that enable the collection, management, control, and dissemination of information through an organization.

Since the 1970s, database systems have been gradually replacing file-based systems as part of an organization's information systems (IS) infrastructure. At the same time there has been a growing recognition that data is an important corporate resource that should be treated with respect, like all other organizational resources. This resulted in many organizations establishing whole departments or functional areas called data administration (DA) and Database administration (DBA), which are responsible for the management and control of the corporate database, respectively.

The database is a fundamental component of an information system, and its development and usage should be viewed from the perspective of the wider requirements of the organization.

Therefore, the lifecycle of an organization's information system is inherently linked to the life cycle of the database system that supports it.

### **2.4 Database Application Lifecycle (DALC)**

According to (2003) it is also known as System Development Lifecycle (SDLC), these are the resources that enable the collection, management, control, and dissemination of information through an organization.

Since the 1970s, database systems have been gradually replacing file-based systems as part of an organization's information systems (IS) infrastructure. At the same time there has been a growing recognition that data is an important corporate resource that should be treated with respect, like all other organizational resources. This resulted in many organizations establishing whole departments or functional areas called data administration (DA) and Database administration (DBA), which are responsible for the management and control of the corporate database, respectively.

The database is a fundamental component of an information system, and its development and usage should be viewed from the perspective of the wider requirements of the organization.

Therefore, the lifecycle of an organization's information system is inherently linked to the life cycle of the database system that supports it.

## **2.5 Database Management System (DBMS)**

According to Okereke (2009), a DBMS is a complex set of software programs that controls the organization, storage, management and retrieval of data in a database.

According to Malcolm Tatum (2013), as the tool that is employed in the broad practice of managing databases, the DBMS is marketed in many forms. Some of the more popular examples of DBMS solutions include Microsoft Access, FileMaker, DB2, and Oracle. All these products provide for the creation of a series of rights or privileges that can be associated with a specific user. This means that it is possible to designate one or more database administrators who may control each function, as well as provide other users with various levels of administration rights. This flexibility makes the task of using DBMS methods to oversee a system something that can be centrally controlled or allocated to several different people.

There are four essential elements that are found with just about every example of DBMS currently on the market. The first is the implementation of a modeling language that serves to define the language of each database that is hosted via the DBMS. There are several approaches currently in use, with hierarchical, network, relational, and object examples. Essentially, the modeling language ensures the ability of the databases to communicate with the DBMS and thus operate on the system.

Second, data structures also are administered by the DBMS. Examples of data that are organized by this function are individual profiles or records, files, fields and their definitions, and objects such as visual media. Data structures are what allow DBMS to interact with the data without causing damage to the integrity of the data itself.



A third component of DBMS software is the data query language. This element is involved in maintaining the security of the database, by monitoring the use of login data, the assignment of access rights and privileges, and the definition of the criteria that must be employed to add data to the system. The data query language works with the data structures to make sure it is harder to input irrelevant data into any of the databases in use on the system.

Last, a mechanism that allows for transactions is an essential basic for any DBMS. This helps to allow multiple and concurrent access to the database by multiple users, prevents the manipulation of one record by two users at the same time, and preventing the creation of duplicate records.

## **2.6 Entity Relationship (E-R)**

According to Kroenke (1997), one of the most difficult aspects of database design is the fact that designers, programmers, and end-users tend to view data and its use in different ways, unfortunately, unless we give a common understanding that reflects how the enterprise operates, the design we produce will fail to meet the user requirements. To ensure that we get a precise understanding of the enterprise, we need to have a model for communication that is non-technical and free of ambiguities.

The Entity-Relationship (E-R) model is a top-down approach to database design that begins by identifying the important data called entities and relationships between the data that must be represented in the model we then add more details such as the information we want to hold about the entities and relationships called attributes and any constraints on the entities, relationships, and attributes.

So the E-R is a graphical representation of entities and their relationships to each other, typically used in computing in regard to the organization of data within databases or information systems.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 Introduction**

This chapter introduces the methods and techniques that are to be used to develop the system, and techniques to collect and analyze the system's and its user's requirements.

#### **3.1 Research Design**

Data was collected taking into consideration that the researchers used multiple methods of data collection techniques such as questionnaires and interviews.

#### **3.2 Area of Study**

The study took place at Luwinzo Bus Services Company which operates in Kenya.

#### **3.3 Data Collection Techniques**

##### **Interview**

The researchers conducted a number of semi-interviews both with passengers and employees so they could hear directly the concerns of the study; this of course would help the researchers validate the information collected through the Questionnaires.

##### **Questionnaires**

These are special-purpose documents that allow the analyst to collect information and opinions from the respondents. Questionnaires provide a relatively inexpensive means for gathering data from large number of individual. The researcher used questionnaires with both open and closed ended questions. The researchers chose this option because it gave the respondents the chance to answer them in their own time. This offered the respondent greater latitude in the answer. I.e. when a question was asked the respondent recorded the answer in the space provided. Multiple-choice questions were also included in the questionnaire. This allowed a brief free-format response when none of the standard answers applied. This made the results much easier to tabulate. The researchers also used the observation technique to collect data which included a non-participatory method.

By non-participatory method what is meant is that the researcher just observed what was going on within the current system to get more data because some employees consider some information to be privileged so this would assist in getting data that wasn't otherwise attained from the Interviews and Questionnaires.

### **Interview and Questionnaire**

The stakeholders that were interviewed and questioned were all in the same view that they would look forward to the system that save their time when searching for old stored records. They stated that the current system was not working because it is time consuming. The employees on the other hand had a different view, they were also keen to mention that if another system was to be put in place they were ready to adapt to it as long as it is easy to use, access, learn and teach to others and it would have to have a user friendly means to it. They were also able to let us know that this system would work well if put into conjunction with part of the current system still working. The employees on the other hand had a different view. The employees felt that it was true that the system was time consuming but the system they felt that the system worked. They were also keen to mention that if another system was to be put in place they were ready to adapt to it as long as it is easy to use, access, learn and teach to others and it would have to have a user friendly means to it. They were also able to let us know that this system would work well if put into conjunction with part of the current system still working.

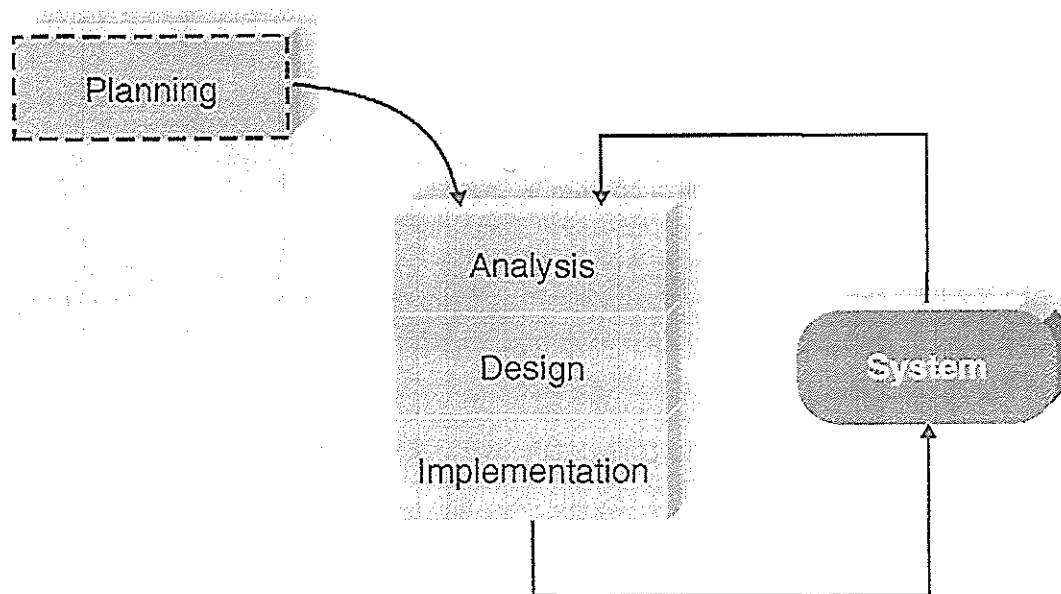
### **1.0.2 3.4 Data Analysis**

During analysis, data collected on the various files, decision points and transactions handled by the present system. The commonly used tools in the system are Data Flow Diagram, interviews, etc. Training, experience and common sense are required for collection of relevant information needed to develop the system. The success of the system depends largely on how clearly the problem is defined, thoroughly investigated and properly carried out through the choice of solution. A good analysis model should provide not only the mechanisms of problem understanding but also the frame work of the solution. Thus it should be studied thoroughly by collecting data about the system. Then the proposed system should be analyzed thoroughly in accordance with the needs.

### 3.5 Development Methodology and Tools.

The development methodology I used on this project is prototyping methodology with an Extreme Programming (XP) approach. After considerations of time and cost were made in respect to this project, XP was thought to be the most convenient.

Extreme Programming (XP) is an agile Development methodology which focuses on streamlining the System Development Life Cycle (SDLC) by eliminating much of the modeling and documentation overhead and the time could be spent on those tasks. Projects emphasize simple, iterative application development. I choose XP since it was founded on four core values which are Communication, Simplicity, Feedback and Courage.



**Figure 2. XP Based Methodology**

An extreme programming based methodology.  
Taken from (Dennis, Wixom, & Roth, 2006, p. 17)

### **3.6 Programming Tools**

#### **Java**

Java is the most powerful programming language which can be used to design just about any kind of application, and more popular for its cross platform feature meaning it's application can run across multiple platforms. This is a big advantage to organizations that plan to migrate to other platforms.

#### **NetBeans**

NetBeans is a Java IDE which is used as an integrated development environment for creating and testing java applications. It's more user Friendly since it has a drag and drop features for creating and adding components to a window or frame to create an Interface, moreover is better for Prototype.

#### **Adobe Photoshop CS6**

Adobe Photoshop CS 6 is a most popular application used for image editing. It has been used to create and edit some images used in the system.

#### **Ms Access 2007 (DBMS)**

This is a Database management system which is most often easy to use due to more user friendly Graphical user interface. It has been used to create a database that has been used in this system.

#### **JAVA JDK 7**

To develop Java applications and applets, you need the JDK (Java Development Kit), which includes the JRE. And in order to use NetBeans Java JDK must be installed on the system for NetBeans to run.

#### **Window 7**

The system was developed using the tools above installed on windows 7 operating system and being tested throughout within the same operating system.

### **3.7 Business Needs of the Organization**

The organization needed not spend much money for the development of the system already available. The only thing is to be done is making an environment for the development with an effective supervision.

### **3.8 Expected Functionality of the System**

The proposed system is expected to add new users who will be using the system as well as editing their details, to provide information about buses, employees, routes assigned to a particular bus and also passengers who have booked seats or done some payments. Also to provide reports about booking, scheduling, buses and employees.

### **3.9 Expected value of the system**

The system is expected to improve efficiency in retrieving information needed so as to save time and money. For instance if a particular information is needed about a certain employee or bus can be obtained easily and faster comparing to the manual or paper based system where it was very difficult to retrieve a record which is say a year old.

### **3.10 Project Plan**

The project plan was based on the four phases of the system development life cycle (SDLC) which includes planning, analysis, design and implementation. During the planning phase the researcher produced a system request report. This is a document produced by the researcher to show the need of a new system for an organization. It includes project name, name of the organization, and the expected functionality of the system. The researcher was also required to carry out a feasibility analysis and come up with a feasibility analysis report. Also the researcher was required to draw up a schedule to show the various tasks and activities against a specified time frame. It was also necessary to carry out a risk assessment and come up with a risk assessment report.

### 3.11 Analysis Phase

During analysis, data collected on the various files, decision points and transactions handled by the present system. The commonly used tools in the system are Data Flow Diagram, interviews, etc. Training, experience and common sense are required for collection of relevant information needed to develop the system. The success of the system depends largely on how clearly the problem is defined, thoroughly investigated and properly carried out through the choice of solution. A good analysis model should provide not only the mechanisms of problem understanding but also the frame work of the solution. Thus it should be studied thoroughly by collecting data about the system. Then the proposed system should be analyzed thoroughly in accordance with the needs.

System analysis can be categorized into four parts.

- ✓ System planning and initial investigation
- ✓ Information Gathering
- ✓ Applying analysis tools for structured analysis
- ✓ Feasibility study
- ✓ Cost/ Benefit analysis

### 1.0.3 3.12 Design Phase

#### Input Design

Input design is the process of converting user-oriented input to a computer based format. Input design is a part of overall system design, which requires very careful attention .Often the collection of input data is the most expensive part of the system. The main objectives of the input design are to produce cost effective method of input, achieve highest possible level of accuracy and to ensure that the input is acceptable and understood by the staff. Input Data, the goal of designing input data is to make entry easy, logical and free from errors as possible. The entering data entry operators need to know the allocated space for each field, field sequence and which must match with that in the source document. Input files can exist in document form before being input to the computer. Input design is rather complex since it involves procedures for capturing data as well as inputting it to the computer.

## **Output Design**

Outputs from computer systems are required primarily to communicate the results of processing to users. They are also used to provide a permanent copy of these result for latter consultation .Computer output is the most important and direct source of information to the users. Designing computer output should proceed in an organized well throughout the manner. The right output must be available for the people who find the system easy to use. The outputs have been defined during the logical design stage. If not, they should defined at the beginning of the output designing terms of types of output connect, format, response etc. Various types of outputs are external outputs, internal outputs, operational outputs, interactive outputs and turn around outputs. All screens are informative and interactive in such a way that the user can fulfill his requirements through asking queries.

## **Database Design**

The general theme behind a database is to handle information as an integrated whole. A database is a collection of interrelated data stored with minimum redundancy to serve many users quickly and effectively. After designing input and output, the analyst must concentrate on database design or how data should be organized around user requirements. The general objective is to make information access, easy quick, inexpensive and flexible for other users. During database design the following objectives are concerned:-

- Controlled Redundancy
- Data independence
- Accurate and integrating
- More information at low cost
- Recovery from failure
- Privacy and security
- Performance
- Ease of learning and use



### 3.13 TABLES USED

**Table 1 Users**

This table shows the fields and their respective data types that have been used in a table called users which stores information about users of the system in the database.

FieldName	DataType	Key
UserID	AutoNumber	Primary
Name	Text	-
Category	Text	-
Username	Text	-
Password	Text	-

**Table 2 Booking**

This table shows the fields and their respective data types that have been used in a table called booking which stores information about who have done booking at a particular day and store this information in a table called BOOKING in the database.

FieldName	DataType	Key
Booking_No	Number	Primary
Pass_No	Text	-
PassName	Text	-
Bus_RegNo	Text	-
SeatNo	Text	-
Date_of_Travel	Text	-
Time_of_Travel	Text	-
Pass_From	Text	-
Destination	Text	-
Amount	Text	-

**Table 3 Buses .**

This table shows the fields and their respective data types that have been used in a table called Buses which stores information about available buses that the company owns and store this information in that table in the database.

FieldName	DataType	Key
Bus_RegNo	Text	Primary
BusNo	Text	-
Model	Text	-
Capacity	Number	-
DateBought	Date/Time	-
Insurance_Status	Text	-
Date_Insured	Date/Time	-
Insurance_Expiry	Date/Time	-

**Table 4 Employee**

This table shows the fields and their respective data types that have been used in a table called Emp which stores information about employees in the company and store this information in that table in the database.

FieldName	DataType	Key
empNo	Text	Primary
Sname	Text	-
Fname	Text	-
Lname	Text	-
Gender	Text	-
DOB	Date/Time	-
Designation	Text	-
Telephone	Number	-
E_Mail	Text	-
Address	Text	-

**Table 5 Passenger**

This table shows the fields and their respective data types that have been used in a table called passenger which stores information about passengers and store this information in that table in the database.

FieldName	DataType	Key
Pass_No	Text	Primary
Pass_Name	Text	-
Address	Text	-
Tel_No	Number	-
Date_of_Travel	Date/Time	-
Depot	Text	-
To	Text	-
Pay_Status	Text	-
Booked_Status	Text	-

**Table 6 Payment**

This table shows the fields and their respective data types that have been used in a table called payment which stores information about passengers who paid for their booking and store this information in that table in the database.

FieldName	DataType	Key
Payment_No	Text	Primary
Pass_No	Text	-
Pass_Name	Text	-
Payment_Mode	Text	-
Date_Payment	Date/Time	-
Amount_Paid	Currency	-
Received_By	Text	-

**Table 7 Route**

This table shows the fields and their respective data types that have been used in a table called route which stores information about available routes for the buses available in the company and store this information in that table in the database.

FieldName	DataType	Key
Route_No	Text	Primary
RouteName	Text	-
Depot	Text	-
Destination	Text	-
Distance	Text	-
Fare_Charged	Number	-

**Table 8 Schedules**

This table shows the fields and their respective data types that have been used in a table called schedules which stores information about which bus takes which route in a particular day and store this information in that table in the database.

FieldName	DataType	Key
Route_Name	Text	-
empNo	Text	-
Driver_Name	Text	-
Trip_No	Number	-
Date_Scheduled	Date/Time	-
Dept_Time	Text	-

**Table 9 Trips**

This table shows the fields and their respective data types that have been used in a table called trips which stores information about trips made by each bus for each route in a particular day and store this information in that table in the database.

FieldName	Data Type	Key
Trip_No	Text	Primary
Bus_RegNo	Text	-
Route_No	Text	-
S_Date	Text	-

**Table 10 Validator**

This table shows the fields and their respective data types that have been used in a table called validator which stores information about the confirmed schedules that is routes and trips and store this information in that table in the database.

FieldName	Data Type	Key
Bus_No	Text	-
DriverNo	Text	-
RouteNo	Text	-
Date_Schedule	Text	-
Trip_No	Text	-

### **3.14 Implementation Phase**

Implementation is the stage in the project where the theoretical design is turned into a working system. The implementation phase constructs, installs and operates the new system. The most crucial stage in achieving a new successful system is that it will work efficiently and effectively. There are several activities involved while implementing a new project. They are end-user training, end-user education, training on the application software, parallel run and to new system and post implementation review.

#### **3.14.1 End user Training:**

The successful implementation of the new system will purely upon the involvement of the officers working in that department. The officers will be imparted the necessary training on the new technology. The education of the end user start after the implementation and testing is over. When the system is found to be more difficult to understand and complex, more effort is put to educate the end used to make them aware of the system, giving them lectures about the new system and providing them necessary documents and materials about how the system can do this.

After providing the necessary basic training on the computer awareness, the users will have to be trained upon the new system such as the screen flows and screen design type of help on the screen, type of errors while entering the data, the corresponding validation check at each entry and the way to correct the data entered. It should then cover information needed by the specific user or group to use the system.

#### **3.14.2 Post Implementation Review**

The department is planning a method to know the states of the past implementation process. For that regular meeting will be arranged by the concerned officers about the implementation problem and success. A method of implementation was selected which is parallel run method where by a new system and an existing system run side by side. To input the same data and perform the same processes, compare their output and prove the reliability of the new system. If the new system is accepted, the existing system will stop running and will be replaced by the new one. They wanted to risk no data that's why they didn't quit the old system before evaluating properly the new one.

I provided the system along with a documentation document which contains Description of the User Interface, Screen Images, Objects and Actions as well as System installation procedures. But it was not that necessary since throughout the process of implementation users have been involved.

### **3.15 SOFTWARE TESTING**

There are different methods which can be used for Software testing such as White Box Testing, Black Box Testing and Grey Box Testing which is the combination of the previous two.

**Black Box Testing**, The technique of testing without having any knowledge of the interior workings of the application is Black Box testing. The tester is oblivious to the system architecture and does not have access to the source code. Typically, when performing a black box test, a tester will interact with the system's user interface by providing inputs and examining outputs without knowing how and where the inputs are worked upon.

**White Box Testing** is the detailed investigation of internal logic and structure of the code. White box testing is also called glass testing or open box testing. In order to perform white box testing on an application, the tester needs to possess knowledge of the internal working of the code.

The tester needs to have a look inside the source code and find out which unit/chunk of the code is behaving inappropriately.

In this project both methods have been used because the first one was used by the users since they had no any knowledge of programming so they just needed to know whether the Interface works properly as intended. And the last method was used mainly by me as the programmer so as to know the codes functionality and troubleshooting.

## **CHAPTER FOUR**

### **SYSTEM ANALYSIS**

#### **4.0 Introduction**

Luwinzo Bus Service is private buses Operator Company in Kenya. In its existing system all the jobs of the bus route management is done manually. This is very difficult to the operators who want to handle hundreds of trips and many buses in a day. The current system is that an operator wants to keep the physical records of the bus route in his office and a separate record for the passengers' and for the booked seats. In current system there is no way to store the details of the employees' working in the bus. So many complaints against staff can arise from the passengers' side. More over there is no detailed record of the bus and routes in which they service.

#### **4.1 Existing System**

In the existing system all the jobs of the bus route management is done manually. This is very difficult to the operators who want to handle hundreds of trips and many buses in a day. The current system is that an operator wants to keep the physical records of the bus route in his office and a separate record for the passengers' and for the booked seats. In current system there is no way to store the details of the employees' working in the bus. So many complaints against staff can arise from the passengers' side. More over there is no detailed record of the bus and routes in which they service

#### **4.2 New System**

The new system is very useful for the operators and passengers. This avoids the overheads for the operators. They can minimize the working stress and can keep essential documents related to the bus and the passengers as a softcopy. The advantage of the proposed system is the reduction in the cost of the office equipment's and the transaction is done quickly. Any operator can answer if any seats for a particular route in a particular day are available or not. Is also helpful for the agents to get details of the route and the details of the bus which have trip to that route more quickly. So in this new system all information about employees, passengers, vehicles as well as routes can be retrieved and or edited more quickly than before when using the manual system.



The new system has several advantages such as organized information storage and restricted access to data, easy access to information using search function and quick transaction processing facilitated with a user friendly interface.

#### **4.3 Feasibility study**

Whatever we think need not be feasible .It is wise to carry out feasibility of any problem to be undertaken. Feasibility is the study of impact, which happens in the organization by the development of a system. The impact can be either positive or negative. When the positives nominate the negatives, then the system is considered feasible. Here the feasibility study can be performed in two ways such as technical feasibility and Economical Feasibility.

##### **Technical Feasibility**

We can strongly say that it is technically feasible, since there will not be much difficulty in getting required resources for the development and maintaining the system as well. All the resources needed for the development of the software as well as the maintenance of the same is available in the organization here we are utilizing the resources which are available already.

##### **Economic Feasibility**

Development of this application is highly economically feasible .The organization needed not spend much m money for the development of the system already available. The only thing is to be done is making an environment for the development with an effective supervision. If we are doing so, we can attain the maximum usability of the corresponding resources. Even after the development, the organization will not be in a condition to invest more in the organization .Therefore, the system is economically feasible.

#### 4.4 System Requirements

##### ➤ Minimum Hardware Requirement

No.	Requirement	Minimum Required
1	Processor	Pentium III 630MHz
2	RAM	128 MB
3	Hard Disk	20GB
4	Monitor	15" Color monitor
5	Key Board	122 Keys

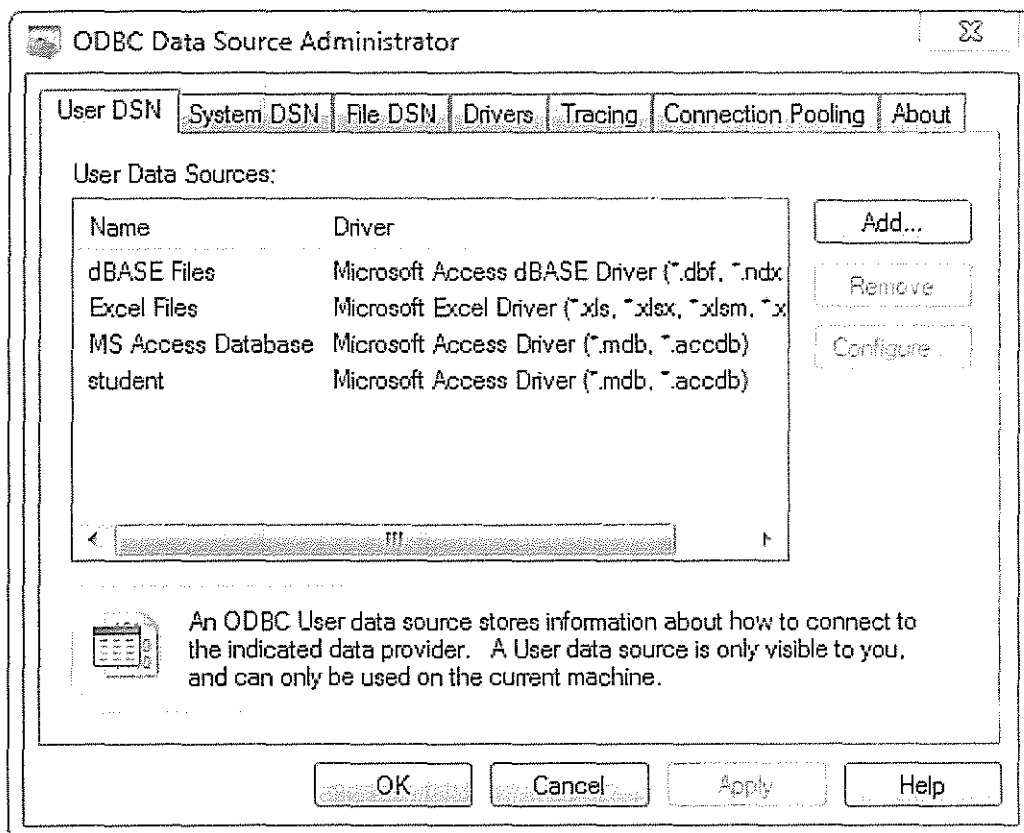
##### ➤ Software Requirement

No.	Category	Minimum Required
1.	Operating System	Windows NT Windows 98 Windows XP Windows 7
2.	Software	Java Runtime Environment 1.7 or above
3.	Database	MS Access2007

## 4.5 SYSTEM IMPLEMENTATION

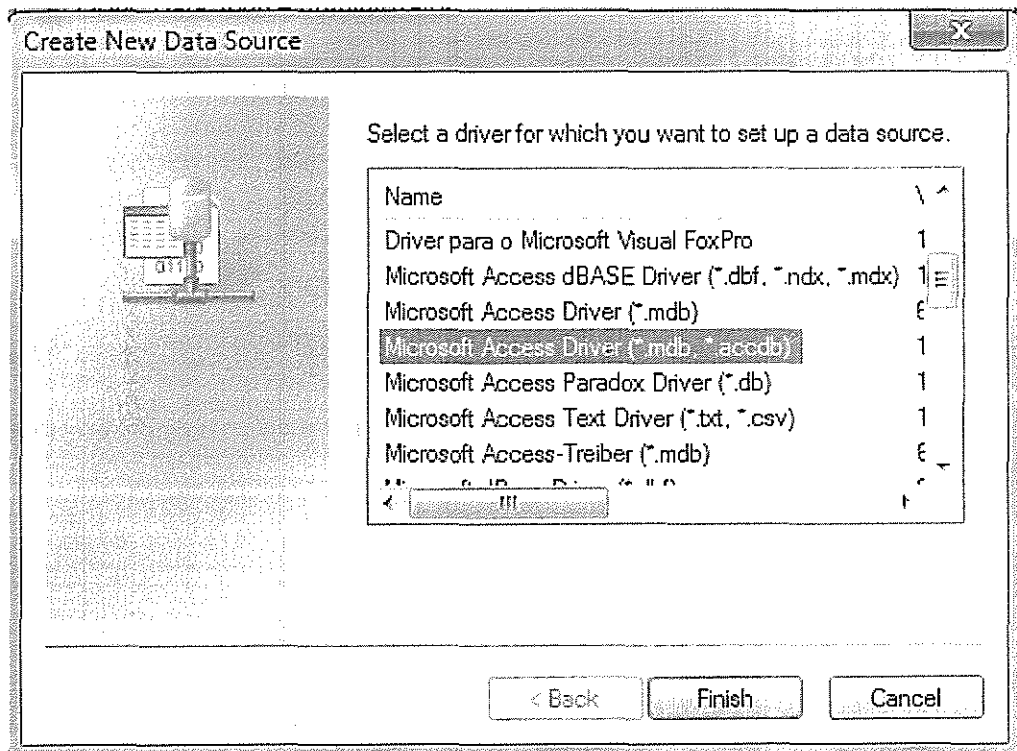
### 4.5.1 HOW TO SET UP THE SYSTEM.

1. Install Java JDK 6 or above and JRE 6 and above
2. Set the ODBC Connection for the database to work with the system by doing the following
  - If you are on Windows 7 Double-Click a file odbcad32.exe which is in the folder c:\windows\sysWOW64 to get the set up windows below.

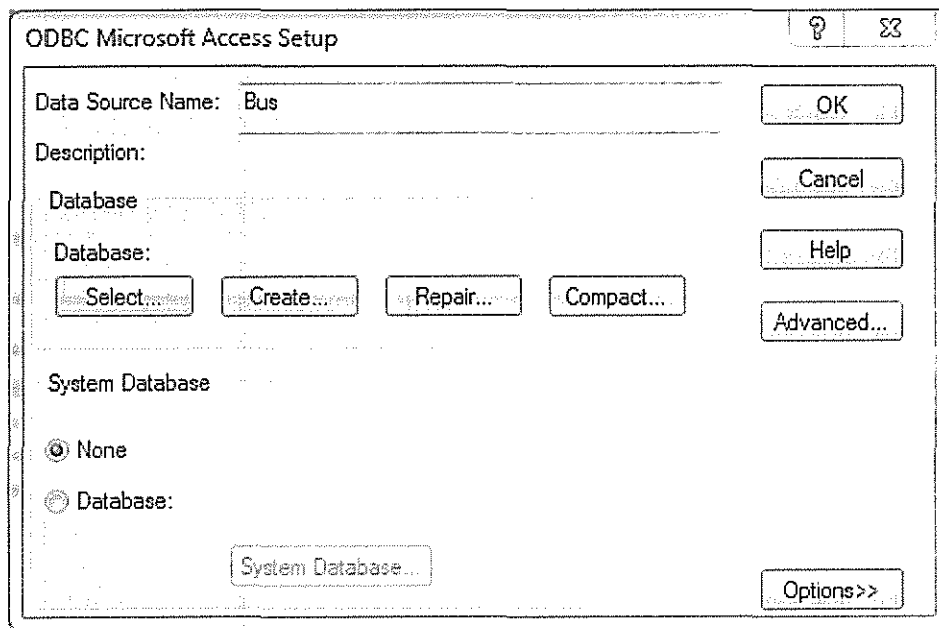


- Or if you are on Windows XP you can go to Start>Settings>Control Panel>Administrative Tools>data Sources (ODBC)
- Then you get 'ODBC Data Source Administrator' window (shown below)  
+Click **Add** Button

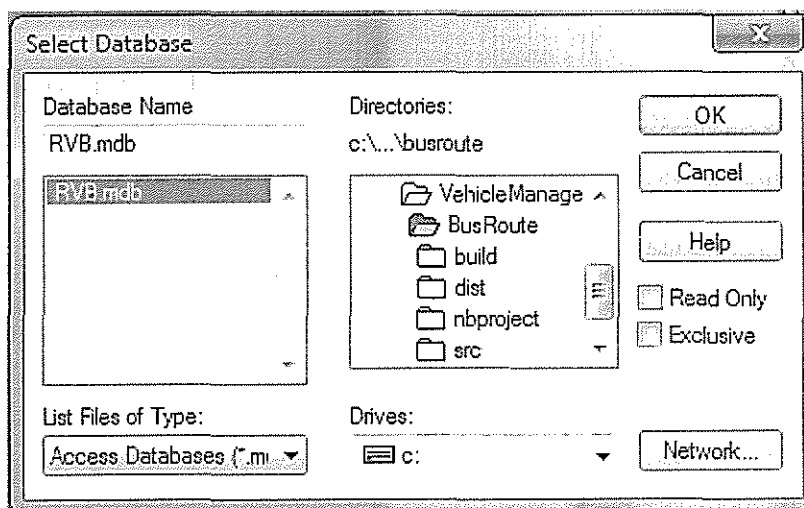
Create New Data Source (shown below) +select **Microsoft Access Driver (\*.mdb,\*.accdb)** + press **Finish** button



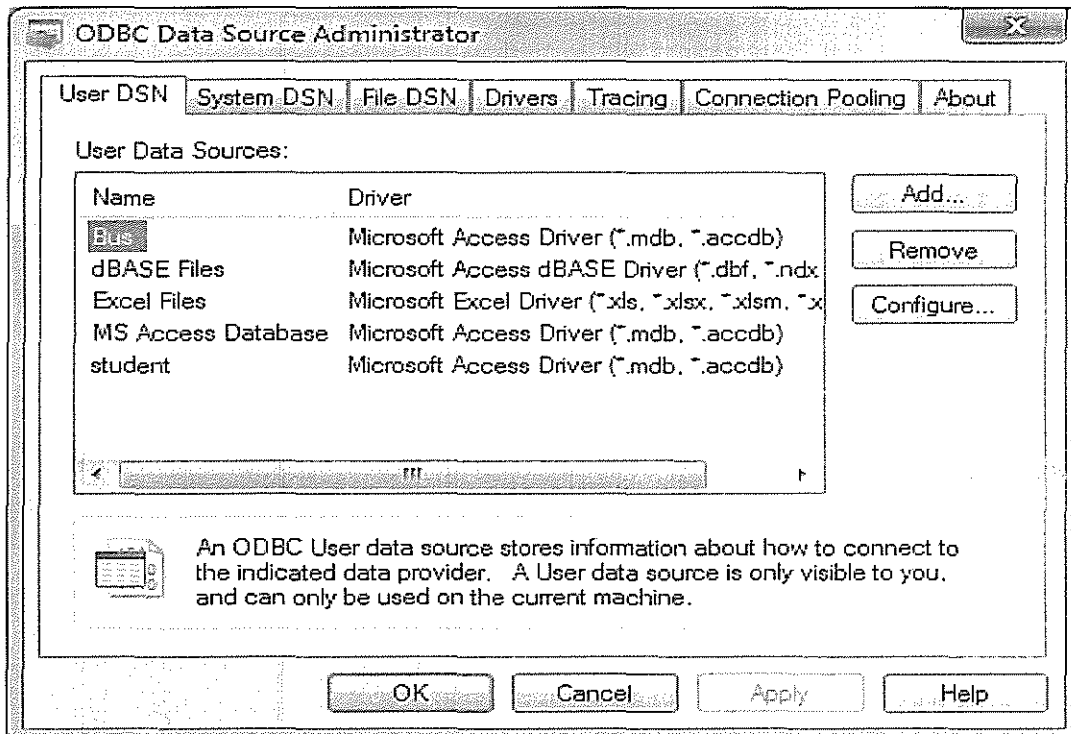
- ODBC Microsoft Access Set up (shown below) + gives **Data Source Name (Bus)**



+select **Database (Press select button)** +select your database (shown below) + Press **Ok** button



- Before you close the window make sure that your DSN name is correct or not (shown below) +Press **Ok** button



Now you got the **DSN name (Bus)** this is the way for connecting ODBC, if you have any doubt please mail me at [madcom5@gmail.com](mailto:madcom5@gmail.com).

3. Now you can Double Click BusRoute.JAR File in the folder **dist** inside the **BusRoute** Folder in the **VehicleManagement** Folder.
4. Or If the file does not start the application then you can open it through NetBeans IDE that is you launch the NetBeans IDE and then you load a project form the folder BusRoute, then you can compile and run it through the IDE.

5. After you successfully run the application A login window below will appear,

**Note:**


**Default User Name : admin**

**Default Password : admin**

**Login as : Manager**

System Login

## VEHICLE MANAGEMENT SYSTEM FOR BUS OPERATORS



*Login*

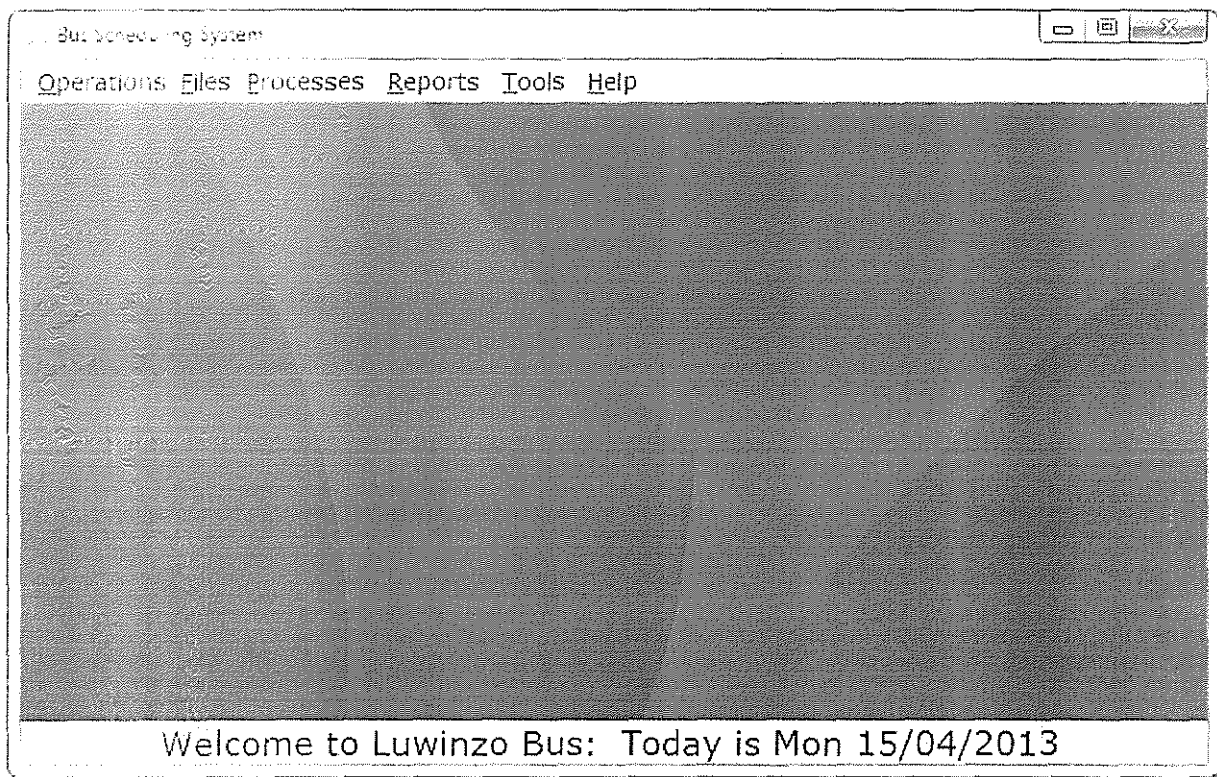
User Name

Password

Login AS

Date: 15/04/2013 Time: 12:04:45 AM

6. After successfully login, the main window or home screen as seen below will appear.



Now from there, different operations can be done from the menu bar since everything can be accessed from there. The interface has no other interactive components on the home screen due to the limit of knowledge I have.

Other screen shots can be seen in the Appendix.



## **CHAPTER FIVE**

### **DISCUSSION, RECOMMENDATION AND CONCLUSION**

#### **5.0 Discussion**

Vehicle Management system has been designed developed and put in place. This is a great achievement as a whole, hence records keeping and quick retrieval problem has been solved to some extent. There is still room for future development of this system to integrate an application as may be required by the Company. The system generally has been complex to my level of knowledge so I tried my best to deliver a better product as needed. The intended system users for this system were cooperative during requirements capture and analysis. This clearly indicated that they were happy too with the idea of adopting a computerized system. Hence the new system will be successful in Luwinzo Bus Services since it is likely not to face user resistance.

#### **5.1 Limitation**

The Organization's board had not yet considered a change of system so this was a big jump for them. It was not in their annual budget or plan, so the decision to take it on was a hard one from the get go. They finally accepted to go along with it after taking a look at the advantages behind it but it took a while to decide. It was observed that some of the employees of the organization were reluctant to give information during the system analysis stage. When asked the problems, their response was more of fear towards job security than to the advantages of having a new system put in place. Questionnaires that were distributed to users were not filled in time and some were not returned at all. Most of the users chose to ignore questions asked about the system. The research was very expensive to carry out and lacked the time as well.

#### **1.0.4 5.2 Recommendations**

Everyday technology changes and user needs change too. Therefore the developed system will need further improvements as time goes by. And also I recommend using NetBeans IDE to come up with the system installer. Other researchers can also study my application version thoroughly and fix were they might observe wrong and carry on further improvements if necessary. Lastly, I recommend to other bus operators to try use this system as it can be of great importance to them too and not only to Luwinzo Bus Service Company.

### **1.0.5 5.3 Areas of Feature Research**

- Improve and add new functionalities that are not supported
- Web based System for Vehicle Management System.
- Mobile Bus Monitoring application.

### **5.4 Conclusion**

My project is only a humble venture to satisfy the needs in a library. Several user friendly coding have also been adopted. This package shall prove to be a powerful package in satisfying all the requirements of the organization.

The system can sufficiently and effectively handle day to day activities of the Luwinzo Bus Services and when proper arrangements are met, the system will overcome all the current problems of the manual system.

The objective of software planning is to provide a frame work that enables the manger to make reasonable estimates made within a limited time frame at the beginning of the software project and should be updated regularly as the project progresses.

## REFERENCES

Connolly, T, & Begg, C. (2004). Database Systems (4<sup>th</sup>ed) London, Person Education Limited

Coy, Wolfgang (June 2004). "Between the disciplines". *ACM SIGCSE Bulletin* 36 (2): 7–10. ISSN 0097-8418. "Computer science may be in the core of these processes. The actual question is not to ignore disciplinary boundaries with its methodological differences but to open the disciplines for collaborative work. We must learn to build bridges, not to start in the gap between disciplines".

C. J. (2003). An Introduction to Database Systems, Fifth Edition , Addison Wesley. ISBN 0-201-51381-1.

Deitel, and Deitel (2005) C++how to program (5<sup>th</sup>ed) New Jersey, Ashoke K, Prentice-Hall of India Private Limited.

Denning, Peter (July 1999). "COMPUTER SCIENCE: THE DISCIPLINE". Encyclopedia of Computer Science (2000 Edition). "The Domain of Computer Science: Even though computer science addresses both human-made and natural information processes, the main effort in the discipline has been directed toward human-made processes, especially information processing systems and machines".

Ellen S. (2006) Principles and Methods of Research; Ariola et al. (eds.)

Galindo, J.; Urrutia, A.; Piattini, M. Fuzzy Databases (2006): Modeling, Design and Implementation (FSQL guide). Idea Group Publishing Hershey, USA.

Galindo, J., Ed (2008). Handbook on Fuzzy Information Processing in Databases. Hershey, PA: Information Science Reference (an imprint of Idea Group Inc.).

Gray, J. and Reuter (1992 1<sup>st</sup>ed), A. Transaction Processing: Concepts and Techniques, Morgan Kaufmann Publishers.

Hoganson, Ken (December 2001). "Alternative curriculum models for integrating computer science and information systems analysis, recommendations, pitfalls, opportunities, accreditations, and trends". Journal of Computing Sciences in Colleges **17** (2): 313–325. ISSN 1937-4771." Information Systems grew out of the need to bridge the gap between business management and computer science ".

Jeffrey B. Layton (2011): "Intro to Nested-RAID: RAID-01 and RAID-10", Linux Magazine, January 6, 2011.

Kenneth, K and Kendall, J (2005). Systems Analysis And Design (6<sup>th</sup>ed)

Kroenke, David M (1997). Database Processing: Fundamentals, Design, and Implementation, Prentice-Hall, Inc., pages 130-144.

Kroenke, David M. and David J. Auer (, 2007, 3rd ed). Database Concepts. New York: Prentice.

Ling Liu and Tamer M. Özsu (Eds.) (2009). "Encyclopedia of Database Systems, 4100 p. 60 illus. ISBN 978-0-387-49616-0. Table of Content available at <http://refworks.springer.com/mrw/index.php?id=1217>

Okereke. G (2009) Database Management System, logos, National Open University of Nigeria [www.nou.edu.ng](http://www.nou.edu.ng)

Parkin, (1987) Systems Analysis (2<sup>nd</sup>ed) Maryland, Edward Arnold, (publishers) Ltd.

University of Florida. (2010). Online Course Registration System (Database Management Systems “COP 5725”). Florida, USA: Nafde.

Walker, E. (2005) Web Technology and DBMS’S Hiram College

Head First Java 2nd Edition

<http://java.sun.com/javase/technologies/desktop/>

<http://www.roseindia.net/jdbc/jdbc-access/CreateTable.shtml>

<http://www.jdbc-tutorial.com/>

Java and Software Design Concepts by A Press

## APPENDICIES

### Appendix A: FORMS USED.

**Figure 3 Login.**

System Login

VEHICLE MANAGEMENT SYSTEM FOR BUS OPERATORS



*Login*

User Name

Password

Login AS

Date: 15/04/2013

Time: 01:57:42 AM

**Figure 4 Add new user.**

**Adding New User**

Name: Hamad

Category: Manager

Username: madcom

Password: \*\*\*\*\*

Re-enter Password: \*\*\*\*\*

Save Cancel

**Figure 5 Bus details**

Bus Scheduling System

Operations Files Processes Reports Tools Help

RegNo	BusNo	Model	Capacity	Date purchased	Insurance Status	Date Insured	Expiry Date
KAS 234P	1000	TATA	100	2007-08-17	Insured	2007-08-17	2007-06-30
KAD 897S	1001	Isuzu	45	2007-08-17	Insured	2007-08-18	2007-11-18
KAX 679K	1003	Isuzu	45	2007-08-17	Insured	2007-08-17	2007-07-29
KAJ 687B	1004	Ite Kali	45	2007-08-17	Insured	2007-08-17	2007-10-18
KAF 122Y	1005	Hummer	45	2007-08-20	Insured	2007-08-20	2007-08-20
KAV 657L	1007	Isuzu	35	2007-08-20	Insured	2007-08-20	2007-08-20
KLL 345P	1008	Nyundo	45	2007-08-21	Insured	2007-08-21	2007-08-21

Add New Update Refresh Print Close

**Figure 6 New Bus Details**

New Bus Entry

Bus Number

1009

Reg Number

Model

Capacity

Date Purchased

2013-04-15

Insurance Status

Date Insured

2013-04-15

Insurance Expiry Date

2013-04-15

Add Record

Cancel

Clear

**Figure 7 Update Bus Details**

Update Bus Details

Bus Number

1000

Reg Number

KAS 234P

Model:

TATA

Capacity

100

Date Purchased

2007-08-17

Insurance Status

Insured

Date Insured

2007-08-17

Insurance Expiry Date

2007-06-30

Update

Cancel

Search

Delete

Clear



**Figure 8 Employees Details**

Bus Scheduling System

Operations Files Processes Reports Tools Help

Driver Number	Surname	FirstName	LastName	Gender	DOB	Designation	Telephone	E-mail	Address
1000	Ogallo	Tobias	Oluoch	Male	2007-04-06	Driver	720233259	tcbl@gmail.co..	5454,Kamoro
1001	Mbira	Michael	Mboya	Male	1987-08-23	Driver	72056787	m@kmail.com	45,Anywhere
1002	Mary	Thomson	Njeri	Male	2003-12-08	Manager	7289596	tm@gmail.com	45,Somewhere
1003	Jane	Huston	Anne	Female	1987-08-23	Driver	72056787	m@kmail.com	45,anywhere
1004	Lady	Monics	Kjumbi	Female	2007-08-04	Booking Clerk	720233456	jj@gmail.com	4567,Kisenan
1005	Gor	Mahia	Sigu	Male	2007-08-08	Driver	45454	sg@yahoo.com	455,Uptown
1006	Ell	Elza	Mawinga	Female	2007-08-08	Booking clerk	5656565	elz@yahoo.com	254,Nairobi W.
1007	Matogo	Becks	Anderson	Male	2007-08-09	Supervisor	2455677	elz@yahoo.com	2435,Downto...
1008	Kolo	Toure	Arsenal	Male	2007-08-09	Clerk	545454	kol@yahoo.com	2345,Ivory
1010	Mr	Ganesh	Kumar	Male	2000-12-24	clerk	2525	ganesh@gma...	TK Street

Add Entry Update Refresh Print Close

**Figure 9 Add New Employee**

Add New Driver

Employee Number 1012

Surname

First Name

Last Name

Gender Male

DOB 2013-04-15

Telephone Number

E-mail Address

Address

Designation

Select pic

Add Record Cancel Clear

**Figure 10 Update Employee details**

**Update Employee's Details.**

Employee Number	10111
Surname	Luwinzo
First Name	Hamad
Last Name	Seif
Gender	Male
DOB	2000-04-15 00:00:00
Telephone Number	784255067
E-mail Address	madcom5@gmail.com
Address	P.O.Box 6222. Morogoro
Designation	Manager

Update Cancel Search Delete Clear

**Figure 11 Route Report**

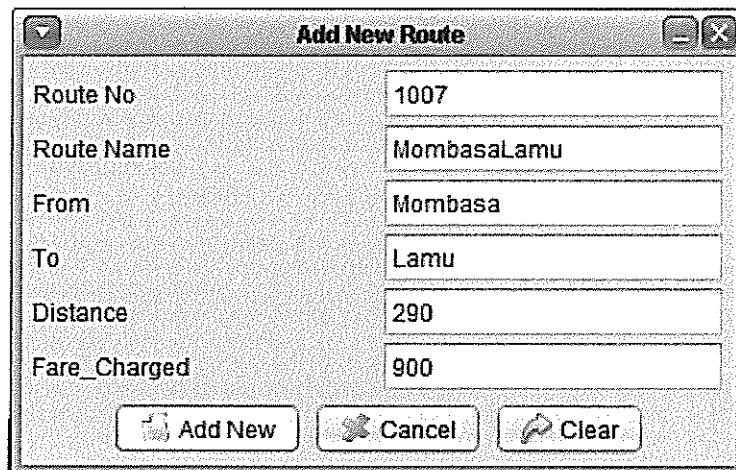
**Bus Scheduling System**

Operations Files Processes Reports Tools Help

RouteNo	Route Name	From	To	Distance	Fare_Charged
1000	Kisumu-Busia	Kisumu	Busia	1200KM	200
1002	Nairobi-Kisumu	Nairobi	Kisumu	400KM	550
1003	Kakamega-Bungoma	Kakamega	Bungoma	127KM	250
1004	Mombasa-Nairobi	Mombasa	Nairobi	457KM	700
1005	Malindi-Busia	Malindi	Busia	450KM	1200
1006	Kitale	Kitale	Bungoma	890KM	200

Add Entry Update Refresh Close

**Figure 12 Add New Route**

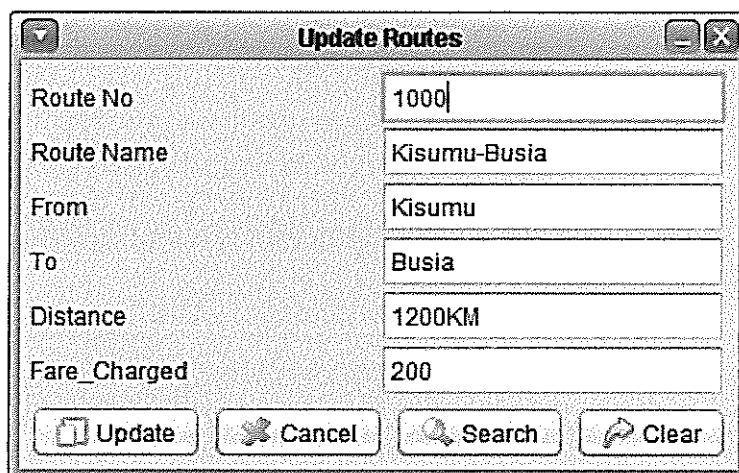


A dialog box titled "Add New Route" with a standard Windows-style title bar (minimize, maximize, close buttons). It contains six text input fields arranged vertically, each with a label to its left. The fields contain the following values: "1007", "MombasaLamu", "Mombasa", "Lamu", "290", and "900". At the bottom of the dialog, there are three buttons: "Add New" (with a plus icon), "Cancel" (with a cross icon), and "Clear" (with a circular arrow icon).

Route No	1007
Route Name	MombasaLamu
From	Mombasa
To	Lamu
Distance	290
Fare_Charged	900

Buttons: Add New, Cancel, Clear

**Figure 13 Update Route**



A dialog box titled "Update Routes" with a standard Windows-style title bar (minimize, maximize, close buttons). It contains six text input fields arranged vertically, each with a label to its left. The fields contain the following values: "1000", "Kisumu-Busia", "Kisumu", "Busia", "1200KM", and "200". At the bottom of the dialog, there are four buttons: "Update" (with a document icon), "Cancel" (with a cross icon), "Search" (with a magnifying glass icon), and "Clear" (with a circular arrow icon).

Route No	1000
Route Name	Kisumu-Busia
From	Kisumu
To	Busia
Distance	1200KM
Fare_Charged	200

Buttons: Update, Cancel, Search, Clear

**Figure 14 Add New Passengers**

Passenger Details

Passenger Number

1009

Passenger Name

Charles Modest

Address

P.O.Box 564, DSM

Telephone Number

Date\_of\_Travel

2013-04-15

From

Kisumu

To

Busia

Add New

Cancel

Clear

**Figure 15 Update passenger details**

Passenger Details

Passenger Number

1000

Passenger Name

Goose Adriano

Address

12 Post

Telephone Number

7498977

Date\_of\_Travel

2007-08-10

From

Kisumu

To

Busia

Update

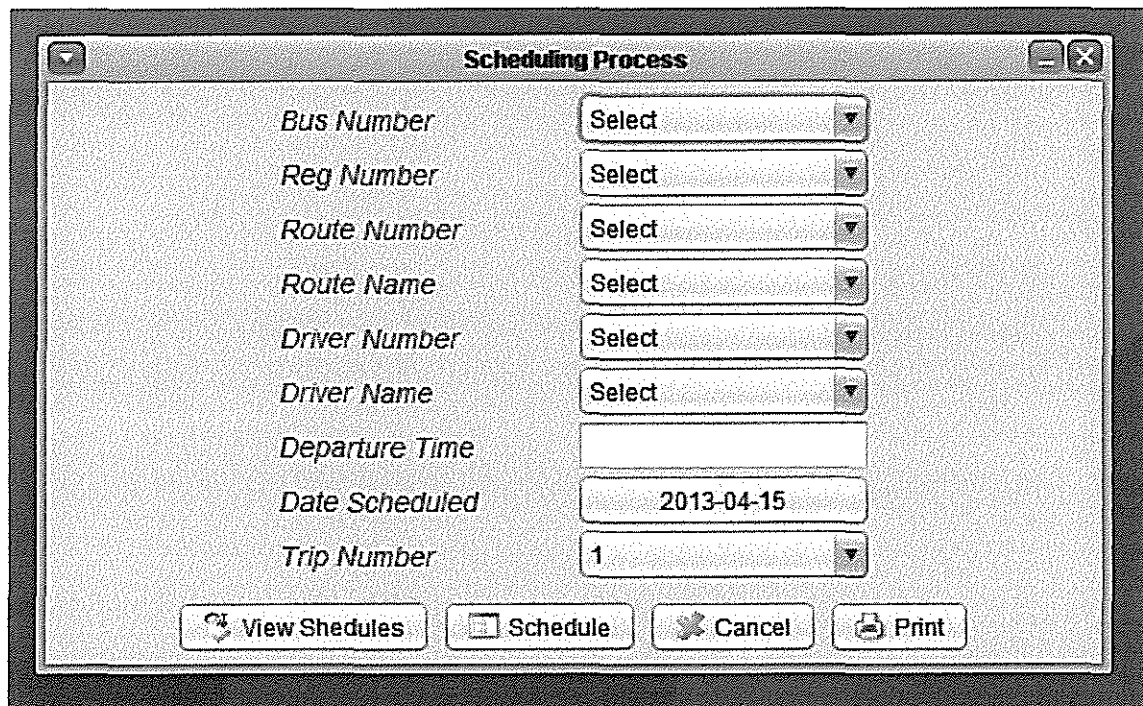
Search

Delete

Clear

Cancel

**Figure 16 Scheduling Process**

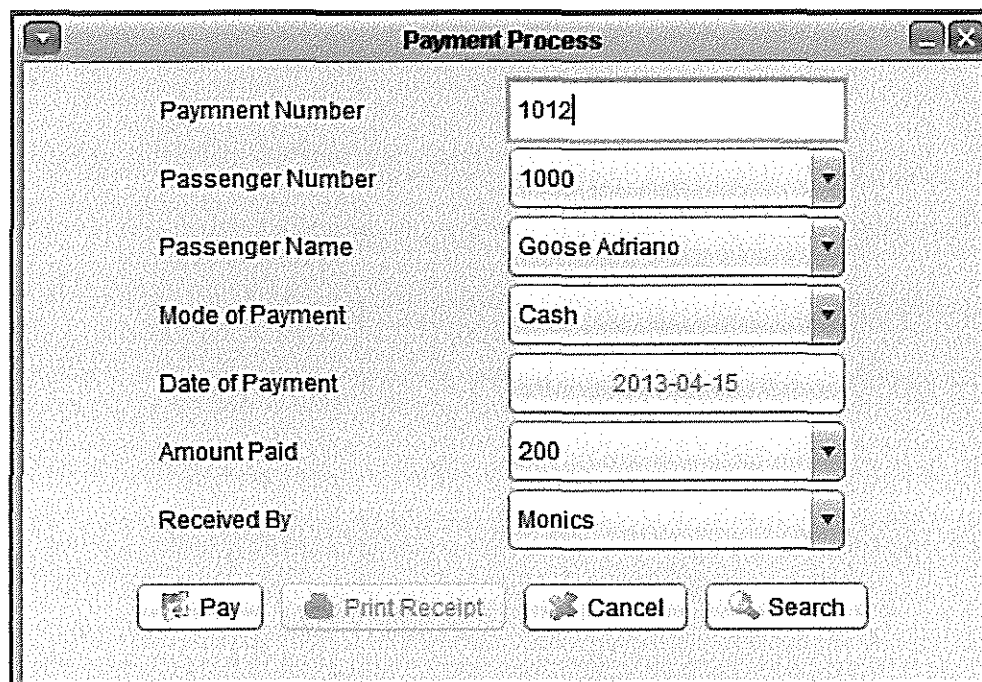


The screenshot shows a window titled "Scheduling Process" with a standard Windows-style title bar. Inside the window, there are several input fields for scheduling a bus trip. The fields are arranged in two columns. The left column contains labels: "Bus Number", "Reg Number", "Route Number", "Route Name", "Driver Number", "Driver Name", "Departure Time", "Date Scheduled", and "Trip Number". The right column contains the corresponding input controls: "Select" (dropdown), "Select" (dropdown), "Select" (dropdown), "Select" (dropdown), "Select" (dropdown), "Select" (dropdown), an empty text box, "2013-04-15" (text box), and "1" (dropdown). At the bottom of the window, there are four buttons: "View Shchedules" (with a magnifying glass icon), "Schedule" (with a calendar icon), "Cancel" (with an 'X' icon), and "Print" (with a printer icon).

Field	Value
Bus Number	Select
Reg Number	Select
Route Number	Select
Route Name	Select
Driver Number	Select
Driver Name	Select
Departure Time	
Date Scheduled	2013-04-15
Trip Number	1

Buttons: View Shchedules, Schedule, Cancel, Print

**Figure 17 Payment Process**



The screenshot shows a window titled "Payment Process" with a standard Windows-style title bar. Inside the window, there are several input fields for processing a payment. The fields are arranged in two columns. The left column contains labels: "Payment Number", "Passenger Number", "Passenger Name", "Mode of Payment", "Date of Payment", "Amount Paid", and "Received By". The right column contains the corresponding input controls: "1012" (text box), "1000" (dropdown), "Goose Adriano" (dropdown), "Cash" (dropdown), "2013-04-15" (text box), "200" (dropdown), and "Monics" (dropdown). At the bottom of the window, there are four buttons: "Pay" (with a credit card icon), "Print Receipt" (with a printer icon), "Cancel" (with an 'X' icon), and "Search" (with a magnifying glass icon).

Field	Value
Payment Number	1012
Passenger Number	1000
Passenger Name	Goose Adriano
Mode of Payment	Cash
Date of Payment	2013-04-15
Amount Paid	200
Received By	Monics

Buttons: Pay, Print Receipt, Cancel, Search

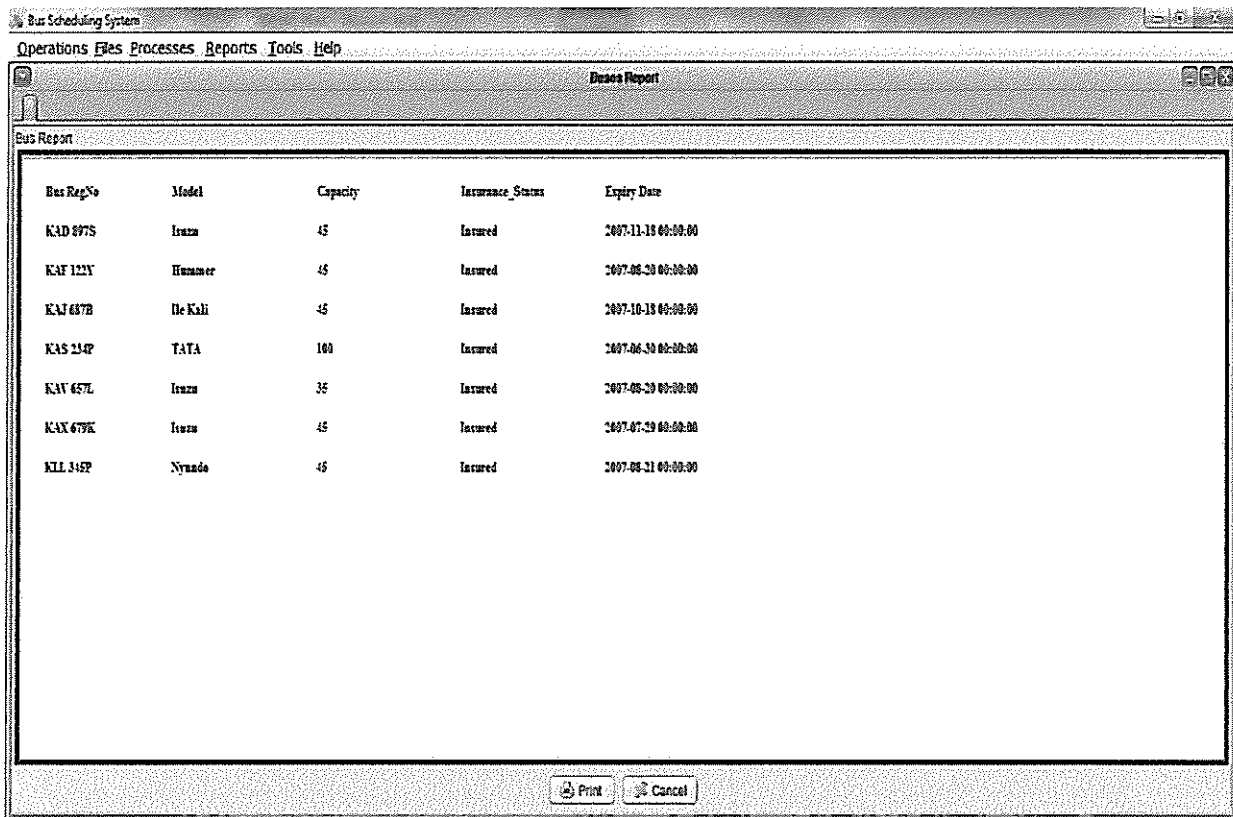
**Figure 18 Booking Process**

The screenshot shows a window titled "Booking Process" with a standard Windows-style title bar. Inside the window, there is a form for booking a bus. At the top, there is a label "Select passenger route" followed by a dropdown menu showing "Kisumu-Busia" and a small "OK" button with a checkmark icon. Below this, there are several input fields, each with a label on the left and a text box on the right. The fields are: "Booking Number" (1002), "Passenger Number" (1002), "Passenger Name" (Monica Bonanza), "Time\_of\_Travel" (empty), "Bus RegNo" (empty), "Seat Number" (1), "Date\_of\_Travel" (2013-04-15), "From" (Kisumu), "Destination" (Busia), and "Amount Paid" (200). At the bottom of the form, there are four buttons: "Add New" (with a plus icon), "Search" (with a magnifying glass icon), "Cancel" (with a close icon), and "Clear" (with a trash icon).

Field	Value
Booking Number	1002
Passenger Number	1002
Passenger Name	Monica Bonanza
Time_of_Travel	
Bus RegNo	
Seat Number	1
Date_of_Travel	2013-04-15
From	Kisumu
Destination	Busia
Amount Paid	200



**Figure 19 Buses Report**



Bus Scheduling System

Operations Files Processes Reports Tools Help

Buses Report

Bus Report

Bus Reg No	Model	Capacity	Insurance Status	Expiry Date
KAD 897S	Isuzu	45	Insured	2007-11-19 00:00:00
KAF 122V	Hummer	45	Insured	2007-08-20 00:00:00
KW 687B	De Kali	45	Insured	2007-10-18 00:00:00
KAS 214P	TATA	100	Insured	2007-06-30 00:00:00
KAV 657L	Isuzu	35	Insured	2007-08-20 00:00:00
KAX 679K	Isuzu	45	Insured	2007-07-29 00:00:00
KLL 345P	Nynado	45	Insured	2007-08-21 00:00:00

Print Cancel

Figure 20 Employees Report

Employee Report						
Emp_No	Sname	Fname	Gender	Designation	Telephone	E-Mail
1000	Opalla	Tobias	Male	Driver	720233289	rob@gmail.com
1001	Mikra	Michael	Male	Driver	72056787	m@gmail.com
1002	Mary	Thamiza	Male	Manager	7209396	tm@gmail.com
1003	Jane	Huston	Female	Driver	72056787	m@gmail.com
1004	Lady	Maulis	Female	Booking Clerk	720233406	jj@gmail.com
1005	Ger	Makla	Male	Driver	45454	rg@yahoo.com
1006	Bill	Elza	Female	Booking clerk	5656545	clz@yahoo.com
1007	Matago	Becks	Male	Supervisor	2105677	clz@yahoo.com
1008	Kale	Toure	Male	Clerk	545454	kai@yahoo.com
1010	Mr	Ganesh	Male	clerk	2525	ganesh@gmail.com
1011	Lawinzo	Hamad	Male	Manager	704255047	madcom5@gmail.com

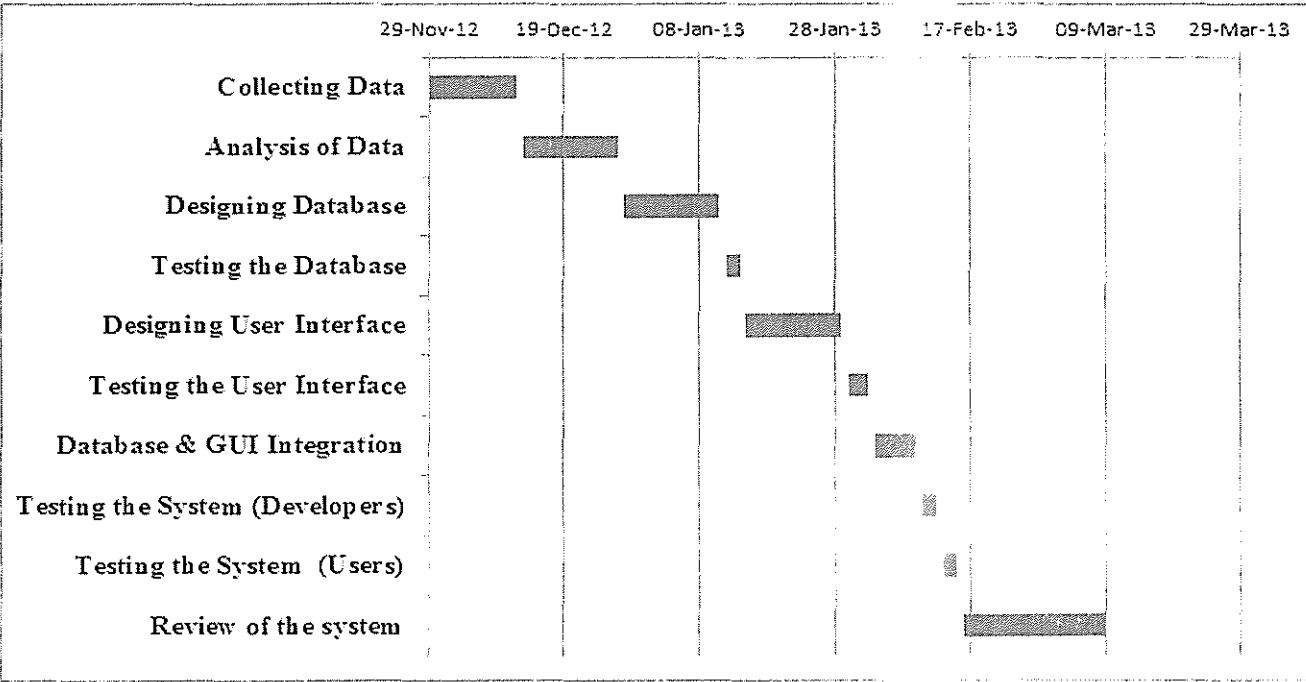
Figure 21 Booking Report

Booking Report Summary					
Booking_No	Passenger_Name	Bus_RegNo	SeatNo	Date_travel	Destination
1000	Goose Adriane	KAS 234P	1	2007-08-28	Busia
1001	Ooka Peterlis	KAS 234P	1	2008-10-12	Busia



Appendix B: WORK PLAN AND BUDGET

Work plan



■ Duration

**Budget of the system**

No	Item	Cost in UGX
1	Transport	100,000 ugx
2	Internet	150,000 ugx
3	Photocopying	30,000 ugx
4	Printing and Binding	60,000 ugx
5	Airtime	30,000 ugx
6	Software and empty CDs	20,000 ugx
<b>Total</b>	6 items	390,000 ugx