

**DESIGN OF AN ELECTRONIC RAILWAY TICKET RESERVATION SYSTEM
FOR RIFT VALLEY RAILWAYS**

**A CASE STUDY: KIBULI RAILWAY
STATION KAMPALA**

BY:

**MUGIRA RICHARD
REG NO: BIT/38051/123/DU
mugirarichard2012@gmail.com**

AND

**OKIROR DANIEL
REG NO: BIT/37171/123/DU
okimalinga@gmail.com**

SUPERVISOR: MR. WANDERA JOSHUA


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DECLARATION

Richard Mugira and Daniel Okiror declare this Project report original. It has not been published or submitted before for any award to any other University or Institution.

Name.....MUGIRA RICHARD.....

Sign.....

Date.....29-09-2015.....

Name.....OKIROR DANIEL.....

Sign.....

Date.....29-09-2015.....

APPROVAL

This work is the students' (Mr. Mugira Richard and Mr. Okiror Daniel) own effort done under my supervision and it is therefore ready for submission to the School of Computing and Information Technology, Kampala international university:

PROJECT SUPERVISOR

Name.....

WANDERA J.

Sign.....



Date.....

20/10/2015

DEDICATION

This Project report is dedicated to our parents; Mzee Stephen Okia, Toto Lucy Okia, Mrs. Katsigazi Rose, Siblings; Mr. Mwine K. Robert, Mr. Mugume K Ronald, Mr. k Dennis, Mr.k David, Mrs Hashaka k. Margi, Mrs. Mbabazi Ruth . k. junior, Eric, Emma, Mike, Bek, friends, relatives and all those who stood for us both physically and spiritually during the whole course, God bless them all!!.

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ABSTRACT

The Electronic Railway Ticket Reservation System for Rift Valley Railways enables a more convenient and quick reservation of railway tickets by passengers electronically, whereby they can do so at their convenience in time and place provided they have access to internet. The need of this system arose because of a remarkable increase in number of train travellers compared to the past where by this type of transport was majorly for cargo. This therefore meant that complex problems especially those related to managing information and manipulating data pertaining ticket bookings were at their peak, considering such a vast system. Advertising and providing Information about the Rift Valley Railways was cumbersome as well.

However, computerization of the system has enabled users overcome many of its previous limitations whereby, it is now more efficient and convenient to learn and use. This has been possible because the system provides users with information about trains and their time schedules, simplifies reserving tickets for the passenger, is fast in executing data at the point of need, has an element of error validation, capturing information about passengers, as well as providing attractive interfaces with easy navigation throughout the system, which are all accomplished by just a click of a button at the users' convenience in time and place.

Using methods such as observation, interviewing and sampling as means of collecting data, the researchers were able to critically analyse the previous system, and site out the major problem. The user requirements were relied upon for the new system design.

In order to fulfill those above requirements, the researchers developed an Electronic Railway Ticket Reservation System to ease data access and retrieval for instant report production after the administrator's authority to access the system.

A code was therefore written using Mysql for the Database, PHP and JavaScript for process queries and connectivity to the database, CSS for styling the web pages and HTML for designing user platforms.

ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line
CS3	Creative Suite
DBMS	Database Management System
DFD	Data Flow Diagram
ERD	Entity Relationship Diagrams
FTP	File Transfer Protocol
GUI	Graphic User Interface
HTML	Hyper-Text Mark-up Language
HTTP	Hyper-Text Transfer Protocol
IIS	Internet Information Services
KRC	Kenya Railway Corporations
MHz	Mega Hertz
PHP	Hypertext Pre-Processor
RTR	Railway Ticket Reservation
RVR	Rift Valley Railways
SDLC	System Development Life Cycle
TCN	Ticket Code Number
URC	Uganda Railway Corporation
WWW	World Wide Web
WYSIWYG	What you see is what you get

CHAPTER ONE

INTRODUCTION

1.0. General Introduction

This chapter addresses the background of the study, problem statement, both general and specific objectives of the study, scope of the study, significance of the study and the limitations of the study.

1.1. Background of the Study.

Considering East African Colonial History, according to the Nairobi Chronicle (nairobiChronicle, 2008), “The Kenya – Uganda Railway was built by the Imperial British East Africa company back in the 1890s. Construction of the line began at the Kilindini Harbour in Mombasa in 1895. Around 1900, the line arrived at the present site of the city of Nairobi. Indeed, Nairobi owes its existence to railway engineers who drained a vast swamp, thus enabling the construction of permanent buildings. Indian labourers began commercial activities to cater for railway crews and colonial administrators. The railway arrived at Port Florence (Kisumu) around 1901.”

This implies the railway in east Africa began as Uganda railways, dating back to as early as 1896 when the first railway line was laid down in Mombasa. Undertaken by the British colonial government, the construction of the railway line started in 1896 and was completed in 1926. In 1927, the name changed from Uganda Railways to Kenya-Uganda Railways and “Harbours”. From 1st November 2006 to date, the Rift Valley Railways (RVR) took over the operations of the Kenya and Uganda railways; was established on October 14th 2005. Today, this type of transport is to a greater extent used by travellers other than just for cargo transportation, and that is why projects such as this one are put forward in an attempt to develop a better system that can accommodate overwhelming economical, social and political demands to keep pace with the developed world standards. This is a reason behind the Uganda’s government great improvement in allocation of Funds to the Railway Corporation Sector, in course to meet the community demands as far as developing the transport sector is concerned. The May 2014 Budget approvals by the Ugandan Government are evidential to an increase in funding towards the transport sector probably for a major interest in railway transport.

Having analyzed the environment surrounding the Rift Valley Railways together with the research above, the System developers ought it more relevant to come up with a new reliable Electronic Railway Ticket Reservation System as a means of outweighing current challenges such as the delays and other problems related to the Ticket booking process, Data redundancy, Difficulty in accessing the data and unsatisfactory security measures, which have been solved by the newly designed system electronically, easing ticket bookings, data and information management plus use of password to access information.

1.2. Problem Statement

The existing ticket reservation system required queuing at the ticket selling points, this is tiresome, time consuming and leads to congestion at the ticket selling points. The existing system is also associated with difficulty in managing, extracting and reporting of data and information pertaining ticket reservations. However other related challenges included difficulty in gathering community views, inadequate technology and human error, inconsistent advertisements and market search, among others. This therefore meant that there are many shortcomings associated with such systems especially concerning convenience and cost in managing data and information pertaining bookings, since the existing system did not have an efficient and effective online booking system which allows ticket reservation at one's convenience in place and time.

To our expectations rather, such a system was meant to clearly provide real time details of trains' arrival, departure, their route schedules and cost of each journey. Therefore, it was necessary to come up and implement a better Electronic Railway Ticket Reservation System for the Rift Valley Railways.

1.3. Main Objective

To develop An Electronic Railway Ticket Reservation System for the Rift Valley Railways

Specific Objectives

- i. To study and analyse the current system and other related systems.
- ii. To come up with appropriate requirement specifications of the new system.
- iii. To design and implement the new Electronic Railway Ticket Reservation system.

- iv. To test and validate the newly designed Railway Ticket Reservation system.

1.4. Research Questions

These were the research questions that partly guided us during analysis.

- i. Can an improved system be developed to ease operations of Uganda Railways Sector, that fulfils all desired standards as far as providing quality services to the community is concerned?
- ii. What measures can be put in place in order to sensitize and encourage the community to rely on Railway transport in preference to others?
- iii. What are the challenges and costs to be met in the course of developing and implementing such a system?
- iv. What is the Government's point of view as far as developing this sector is concerned?

1.5. Scope of Study

The geographical scope was limited to Uganda as a country although to a smaller extent, the concern spanned to the neighbouring countries as well due to the recent unification of East African Community. Specifically, the areas covered were those that are responsible for Railway operations in Uganda, some of which include; Kampala-Kibuli Railway Station, Jinja Railway station, Kasese, Tororo, Apach among others and Relevant Government offices such as those in the ministry of transport and communication.

Technologically, researchers employed basic knowledge and skills on Website Development and database management to design an Electronic system. However, all the above mentioned scopes depended on financial and time scope, according to the researchers' ability.

The project covered a period of about eight months, beginning from 23rd Feb 2015 to 26th Sept 2015.

The proposed cost of the project was \$ 910.

Significance of the study

To the customer, it enables ticket reservations electronically via internet thus increasing convenience and speed on reservation process, given that the proposed system is automated.

The designed system also provides users with updates online for uptime and downtime trains, waiting, journey cost, their time schedules and space for any cargo.

To the administrator, given that the Designed system is automated, it reduces manual operations by enabling direct capturing of data from passengers, easy and convenient updates for information about passengers, trains, routes, fees and their time schedules. Updating online for uptime and downtime trains, waiting, advertising and marketing railway transport over other types, are some of the benefits. These functionalities reduce on need for more manpower, paper work and on queuing of passengers.

1.6. Significance of the project

Accomplishment of this project has enabled the railway transport sector in Uganda attain a considerable level of development because the major requirements for railway operations have been met. This therefore means that:

- i. Information about the route, reservation of tickets, journey time schedules, number of trains available and other information as such, are all in place.
- ii. Storage and retrieval of information about the various transactions related to Rail travel are accomplished.
- iii. Keeping track of all passengers and thus scheduling their journeys can be done accordingly.
- iv. The system can maintain records of passengers travelling in different trains on different dates and time to different destinations.
- v. User friendly interface to administrator and customer.
- vi. Advertising and marketing goals are achieved.

In such a time that the Ugandan Government is in need to develop the railway transport sector, there is no doubt that this system is of great relevance in order to meet the needs and standards of the developed world.

Meeting these standards meant that the design of the whole system had to base largely in knowledge and skills pertaining computerized system development from other related literature and regular consultations with experts in project management and development.

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

In this chapter, the researcher endeavours to cite out, explore and analyse the existing knowledge related to the subject of inquiry. It also sells the relationship of the report for purposes of good representation and critical review of the existing literature. Information in this chapter is vital since it concerns the basics for information management system development as far as the Railway Ticket Reservation system is concerned.

2.1. Railway Transport

This is a type of transport, and just as any other, it has of recent become the major means most especially in developed countries as an indication to the developing countries as a way forward towards a modern world.

A railway has two major components; the rolling stock (The locomotive passenger coaches, freight or cargo trains, and others) and the infrastructure (the permanent way, tracks and stations, freight facilities, viaducts, and tunnels, and others).

2.1.1. Rift Valley Railways

According to nairobiChronicle (2008), “The Kenya – Uganda Railway was built by the Imperial British East Africa Company back in the 1890s. Construction of the line began at the Kilindini Harbour in Mombasa in 1895. Around 1900, the line arrived at the present site of the city of Nairobi. Indeed, Nairobi owes its existence to railway engineers who drained a vast swamp, thus enabling the construction of permanent buildings. Indian labourers began commercial activities to cater for railway crews and colonial administrators”. By nairobiChronicle, (2008) Still, The Name Rift Valley Railways resulted because of railways being built along the rift valley connecting to the East African Countries.

2.1.2. Types of Rail systems

Most rail systems serve a number of functions on the same track, carrying local, long distance and commuter passenger trains, and freight trains. The emphasis of each varies by country. Some of the important systems are summarised below.

- i. Urban rail transit, rapid transit and light rail systems which are isolated from the national system in the cities they serve.
- ii. We also have Industrial railways and Freight lines which are usually owned by companies are specialized railway system used inside factories or mines.
- iii. Steep grade railways which are usually isolated with special safety system.

2.1.3. Railway Ticketing Systems

According to CMC Ltd, (2013), the Researchers got ideas that there are generally two ways of validating tickets such Manual or Offline Reservation Systems and Electronic or online ticket Reservation Systems.

Manual or an Offline Reservation Systems

Here, passengers validate tickets by themselves in the stations or authorized payment premises and later before or during the journey are randomly checked either by:

A Ticket controller; this method is sometimes referred to as proof-of-payment and this is used extensively on one man operation rail and bus lines. Or; a conductor may check all persons in the train for valid tickets and advertising them, so that they cannot be used again. Some passenger cars especially in long distance, speed trains have restaurants or bars. These need to be catered for.

Electronic or Online Train Ticket reservation Systems

From CRIS Projects (2013), These are systems that bring ticket reservation services closer to the customers in that such services can be accessed any were by anybody at any Time. (Grenbergen, 2000), Also stated that through developing the total lifetime value of customer, Customer Complains raised the true economic worth of a business. Moreover successful strategies promoted customers to purchase more products stay loyal for longer periods and were in touch effectively with a company.

2.2. Information Management Systems

There are quite a number of Information Management Systems that offer online rail ticket booking and verification, including train scheduling, availability of tickets such as those created

by CRIS. These systems comprise of websites with efficient and effective database management qualities which are ideas used to develop this system.

Laudon, (2006) defines information system as a set of interrelated components that collect, process, store and distribute information to support decision making and control in an organization.

The use of World Wide Web (www) or computer system could enhance organizations to improve on their communication and therefore effectiveness in service delivery. Therefore, there was need for web-based computer system that could provide easy access of information online and also provide accessibility to information from anywhere, anytime Harpreet, (2002). This necessitated Management to have a centralized database system. Hence an Electronic System that can Reserve and issue or generate ticket electronically anywhere and at any time of customer's convenience

2.3. Websites

According to Ervin J. (2000), a website is a set of related web pages typically served from a single web domain. A website is hosted on at least one web server accessible via a network such as internet or private local area network through an internet address known as a Uniform Resource Locator. All public accessible websites collectively constitute the W.W.W

A web page is a document typically written in a plain text interspersed formatting instructions of HTML or XHTML. A web page may incorporate elements from other websites with suitable mark-up anchors, and it is accessed and transported by the HTTP which may optionally employ Encryption to provide security and privacy for the user.

2.3.1. Designing a Website

If one actually just want to design a website for another company to host (the preferred solution in most cases), then the recommended solution is to learn HTML. The middle solution with the least learning curve is to use software such as dream weaver (with costs a fair bit). If you don't know HTML, go for WYSIWYG editors. For image editing, gimp is good, gimp plus an Inks cape is better, or if you have lots of money to throw at a problem, then Photoshop CS3 is the

best. Some of the other tools on that page might be useful especially FTP, clients which will transmit the files to your hosting server.

2.3.2. Hosting a Website

According to Han, I; Park, Hong - Shik; Jeong, Youn - Kwea, Park, Kwang – Roh (2006), “Web Hosting is the service providing space on the Internet for websites. When you make a website and want other people to see it, you will need to publish (or upload) it with a web hosting service”.

Web hosting services work by storing your website files in high-powered computers (web servers) connected to a very fast network. When someone types in your web address (such as www.midphase.com), the Internet connects to the web server holding your website files and then transfers your website information back to their computer. From there they can surf and view the pages of your website.

To do this, one needs a computer (specs should be higher than 800 MHz, 256 Mega Ram, as a disk space as your site needs plus about 10gig), with either windows, or preferably a UNIX Variant (e.g Ubuntu). That computer will need to be connected to the internet connected with a fixed IP address. If possible, it should be directly connected to internet (e.g with an internal ADSL modem) or if it has to use a router, one will need to set up port forwarding on the router to send requests on port 80 straight to your new server.

Other software includes either Apache (free, best used with Linux and UNIX) or Internet Information Services (IIS) (freely available with most Microsoft window versions). “These actually perform the task of listening on port 80, waiting for a request for a web page, finding the page people want and sending it out”, by (Buyya, R; Yeo, Chee Shin; Venugopal, S., 2008)

2.4. Databases (and SQL Server 2008)

Data base is a structured set of data held in a computer or an organized collection of data, of which data is typically organized to model aspects of reality in a way that supports processes requiring information, for example; modeling availability of tickets to be reserved, in the way that supports finding trains with vacant passenger space.

Database Management systems are computer software applications that interact with the user or application and the database itself, to capture and analyze data. A general purpose database management system is designed to allow the definition, creation, querying, updating and administration of database management systems.

A database system must provide the following features:

- i. A variety of user interfaces
- ii. Physical & Logical data independence
- iii. Query optimization
- iv. Data integrity
- v. Concurrency control
- vi. Backup and recovery
- vii. Security and authorization

SQL Server is a Relational Database Management System. The SQL Server relational language is called Transact-SQL. SQL is asset-oriented language. This means that SQL can query many rows from one or more tables using just one statement. This feature allows the use of this language at a logically higher level than procedural languages. Another important property of SQL is its non-procedurally. SQL contains two sub languages DDL and DML.

A structure of a database is determined by the data model used. There are two types of data models namely Entity relational model (That consists of entities as basic objects and the relationship of these objects) and a Rational Model (That uses a collection of tables to represent both data and relationships among those data). Other models can be object oriented.

2.4.1. Database Languages

i) Data Definition Language; this expresses how to specify a data definition schema. For example, the following statement in SQL defines the accounts table. Create table accounts (account number char(10) balance int())

ii) Data Manipulation language; manipulation for example retrieval, insertion, deletion, modification, among others. DML enables to do the above.

According to (Garci-Molina, Ullman and Widom, 2000), there are two major types of DMLs namely; **Procedural** (which require a user to specify what data are needed and how to get those

data) and **Declarative/non procedural** (which require user to specify what data are needed without specifying how to get those data)

2.4.2. Database Management Systems

According to Silberchatz, Korth and Sudarshan (2002) a database management system is a collection of interrelated data and a set of programs to access those data. A collection of data often called a database contains information relevant to an enterprise. The primary call of a DBMS is to provide a way to store and retrieve database information that is both convenient and efficient. Examples of database system applications include Banking, Airlines, universities, credit card transactions among others.

CHAPTER THREE: METHODOLOGY

3.0. Introduction

This chapter enables one to understand in details step-by-step description of selected methods used by the researcher to achieve desired objectives. This includes the tools, instruments, approaches, processes and techniques, and methods that were employed in the data collection, analysis, design and implementation of the new system.

The following were the steps that were deployed to fully understand the current system that was being used. These include; Problem identification, Feasibility Study, Requirement and Design Specification, development, Implementation, Testing and Debugging, Evaluation and maintenance as shown below.

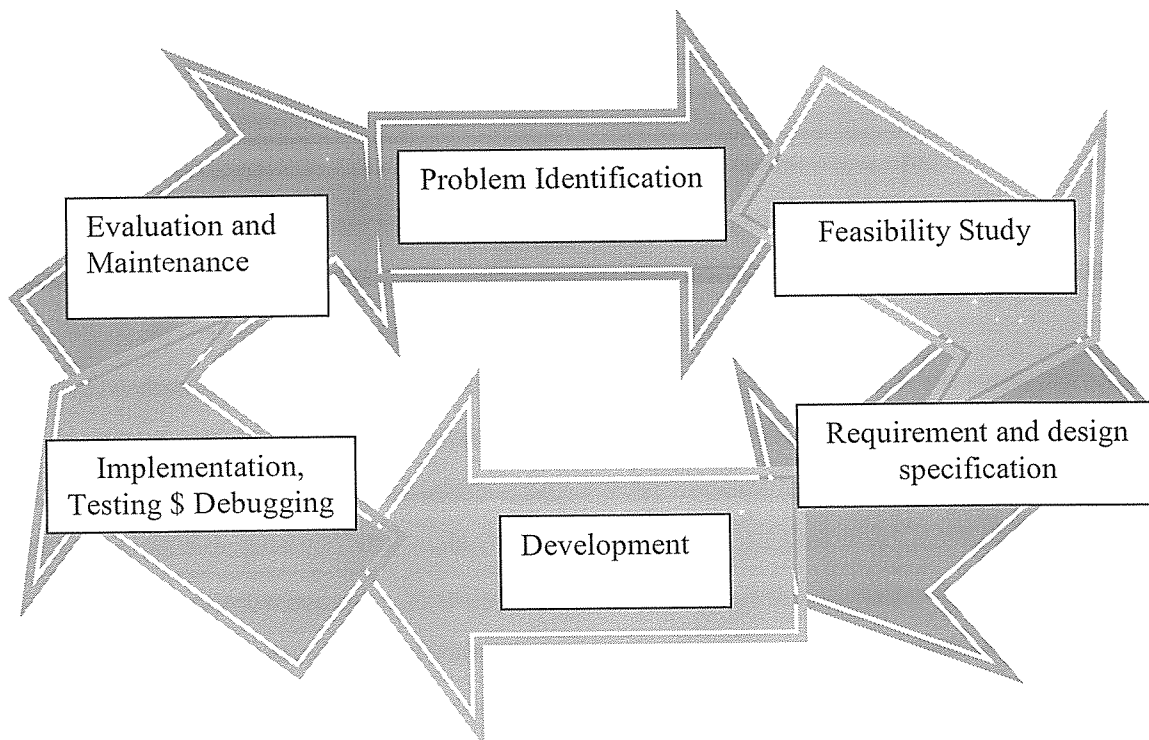


Figure 3:1 Steps for System development

3.1. Requirement Identification

This enabled the researcher with easy identification of the requirements, it is important to collect enough information surrounding the area of interest as well as carrying out analysis and a feasibility study on the gathered data. This therefore implies there are various methods and tools to be employed during this phase and for this case, our interest lies in those discussed below as applied to this project.

3.1.1. Data Collection Methods and Tools

A. Methods for Data Collection

In order to understand the current system, the following fact-finding methods were used to establish the requirements of the proposed system.

i) Interviews

Interviews were conducted with responsible personnel of the System Administration Offices so as to obtain information about the strengths and weaknesses in the current system and what the possible solution would be. However, knowledgeable people in the community were targeted as well, in order to find out their basic demands and expectations from the Uganda Railway Corporation services.

ii) Observation

Non-participant observation was used to complement our understanding of how the current system works.

iii) Sampling

Sampling is a general method that was employed to find out possible outcomes from a vast population since all of it cannot be dealt with. For the case of this project, the developer cited out a hundred people, they comprised both the customers and the administrators of Kampala-kibuli railway station. The researcher was to know their feeling pertaining the current system, whether it worth being in place or innovate another one. Two said nothing, eight rejected on basis of being computer illiterates, whereas the rest sounded yes; they need a new better computerised system. The percentages were calculated as below:

Those who objected the new idea = $8/100 \times 100\%$

=8%

Those who said nothing about the new idea = $2/100 \times 100\%$

=2%

Those who endorsed the new idea = $90/100 \times 100\%$

=90%

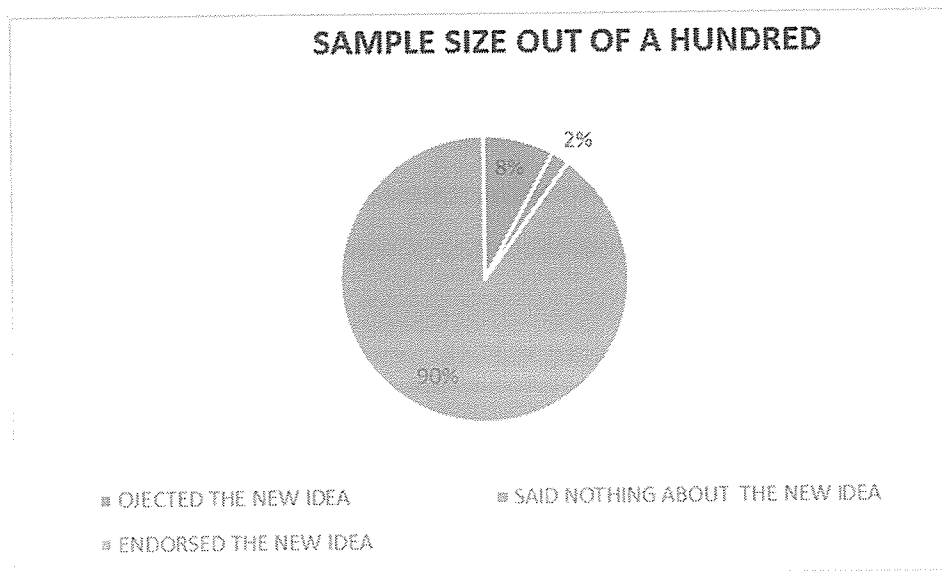


Figure 3.2: A graph showing sampling size percentages

B. Tools for Data Collection

i) A questionnaire

During this method, it is very important to have a questionnaire as a tool in order for the interviewer to be précised. This helped the researcher in gathering information from a far distance such as Jinja, Kasese and other stations with in and this helped the researcher to know how they communicate managing Routes using the current system.

3.1.2. System Requirements

- i. Windows2000 or later operating system.
- ii. 2.4 GHZ processor
- iii. 128 MB RAM (256 MB Recommended)

- iv. Disk space of 80 GB (including 20GB for database Management system)
- v. Display of 800 x 600 colors (1024 x 768 High color- 16 bit Recommended)
- vi. Internet (e.g. with an internal ADSL modem).

3.1.3. Requirement Specification

This category contains two types of requirements: .

The first type comprises Functional requirements; these are statements of services the system should provide or is expected to provide.

- i. Register all information in different stations.
- ii. Assist in keeping track of each client's details.
- iii. Keep track of operational records from different station offices.
- iv. Keep on track of financial and economical records

Secondly, Non-functional requirements; these are constraints on the services or functions offered by the system. Therefore, while executing a search, the system must be able to notify the user of the search success.

- i. The system shall also notify users on wrong inputs and suggest the required inputs
- ii. The system has an online help that assist users on how to operate the system
- iii. User's authentication shall be via valid username and password.

3.2. System Design

3.2.1. Database Design.

A Relational Database Management System was used to design the database. This design system is an excellent tool for organizing large amount of data and defining the relationship between the datasets in a consistent and understandable way. A RDBMS provides a structure which is flexible enough to accommodate almost any kind of data. Relationships between the tables were defined by creating special columns (keys), which contained the same set of values in each table. The tables can then be joined in different combinations to extract the needed data. A RDBMS also offers flexibility that enables to redesign and regenerate reports from the database without need to re-enter the data.

Data dictionaries were used to provide definitions of the data to be used; these included the final data structures for the various tables and their corresponding data fields, description and sizes. The user application programs and interface is developed using PHP, CSS, HTML, and Java Script with support of structured query language (SQL) and MYSQL.

3.2.2. Procedure for Ticket Booking

Customers register online with the system to book tickets. Registration is free, but before registration, customer should go through the “Terms and conditions” which are available at the homepage.

Customers are to register only one user ID with correct details such as name, mobile number, among others.

Tickets including Deluxe tickets and Air Con tickets for senior and non senior citizens at concessional rate can then be booked.

Electronic tickets can be booked for journey between any two stations on the route of the train including originating station and destination.

- i. When ticket is successfully booked, a ticket is generated and a customer can print it out.
- ii. After half or full payment for the fare is made via mobile money to the provided number, a Ticket Code Number and other details are sent to the customer via an SMS. The Code must be shown at the station before boarding for verification purposes.
- iii. During boarding, a passenger may present any of the requirements mentioned below in original as proof of identity (It should be the very identity card used during booking).
 - a. A valid National or Student Identity Card with photograph issued by a recognized school or college identity card.
 - b. Passport,
 - c. Driving License or permit,
 - d. Credit Card issued by Bank with laminated photograph.

Here, the passengers responsibility of carrying any one proof of identifications mentioned above is that; the other passengers booked on the e-tickets are bonfire passengers and are not travelling on someone else's name. If none of the passengers is carrying any proof of Identity as mentioned above, all the passengers are treated as travelling without tickets and are charged accordingly, if the passengers fail to carry the Electronic Ticket Reservation Slip containing journey details from the RTR system including a TCN, an appropriate penalty is imposed by the Administration.

3.2.3. Payment for Online Booking:

Payment is made via Mobile Money in any telephone network. At least a half of the journey fare is required. A mobile money phone number is provided to every customer on the home page of which having submitted the money plus the ID details, a unique Ticket Code Number is sent via an SMS.

However, Precautions while buying the tickets is a must by making sure that one is logged onto the right system.

In order to facilitate availability of system to users, if for any reason, the final output of the booking is not played in the screen; customer should check in the menu "History of tickets booked" in the home page before attempting again. Should the demands go more than the prescribed service charge, one is able to access the help line or an email.

3.2.4. Cancellation of Tickets

A ticket can be cancelled before full or partial payment is made within allotted time; it cannot be cancelled after sending money.

Administrators can as well cancel the ticket before preparation of reservation logging in their Admin ID and password. Reservation Charts are normally prepared 6 hours before departure of the train from Train originating station.

3.3. System Implementation plan

This describes the tools used during implementation of the graphical user interface and the database. MySQL was used to create and connect relational tables to the database. HTML was used to develop the GUI. PHP was used to process queries and request flash to integrate sounds and interfaces was done to develop the model that meets all the requirements of the new system.

3.4. Systems Testing

Testing was done in two ways, that is to say; implementation and Unit testing which was carried out on individual modules of the designed system to ensure that, they were fully functional units.

Researchers did this by examining each unit to ensure that it functions as required and that it adds client data and other details, as well as ensuring that client's data is sent to the database. The success of each individual unit gave the developers a go ahead to carryout integration testing where by all identified errors were dealt with.

The Researcher also carried out integration and system testing after different modules had been put together to make a complete system. The purpose of integration was to ensure that modules are compatible and they can be integrated to form a complete working system.

As one of the final specific objectives of this study, validation of the system was very important. It was done by comparing it to the questions asked by the users.

CHAPTER FOUR

SYSTEM ANALYSIS AND DESIGN

This chapter explores some of the weakness and strengths of the current systems, analysis and detailed design, design requirements and system functionalities are all discussed (different components that make up the System, thus giving a clear architectural diagram).

Therefore, the researcher was able to obtain an understanding on the functionalities of different components and how they communicate with each other in relation to the system.

4.0. Conceptual System Interface

The system is developed to implement in three-tier architecture. It provides the application logic layer in three-tier architecture, enabling client components to interact with data resources and legacy applications. The first tier represents the company and customer with production unit access. The second tier is the application server which receives the queries. The third tier is the data base server from which information are fetched and served for requests. Collectively, three-tier architectures are programming models that enable the distribution of application functionality across three independent systems, typically:

- i. Client components running on local workstations (tier one)
 - ii. Processes running on remote servers (tier two)
 - iii. A discrete database, resource managers, and mainframe applications (tier three)
- rational

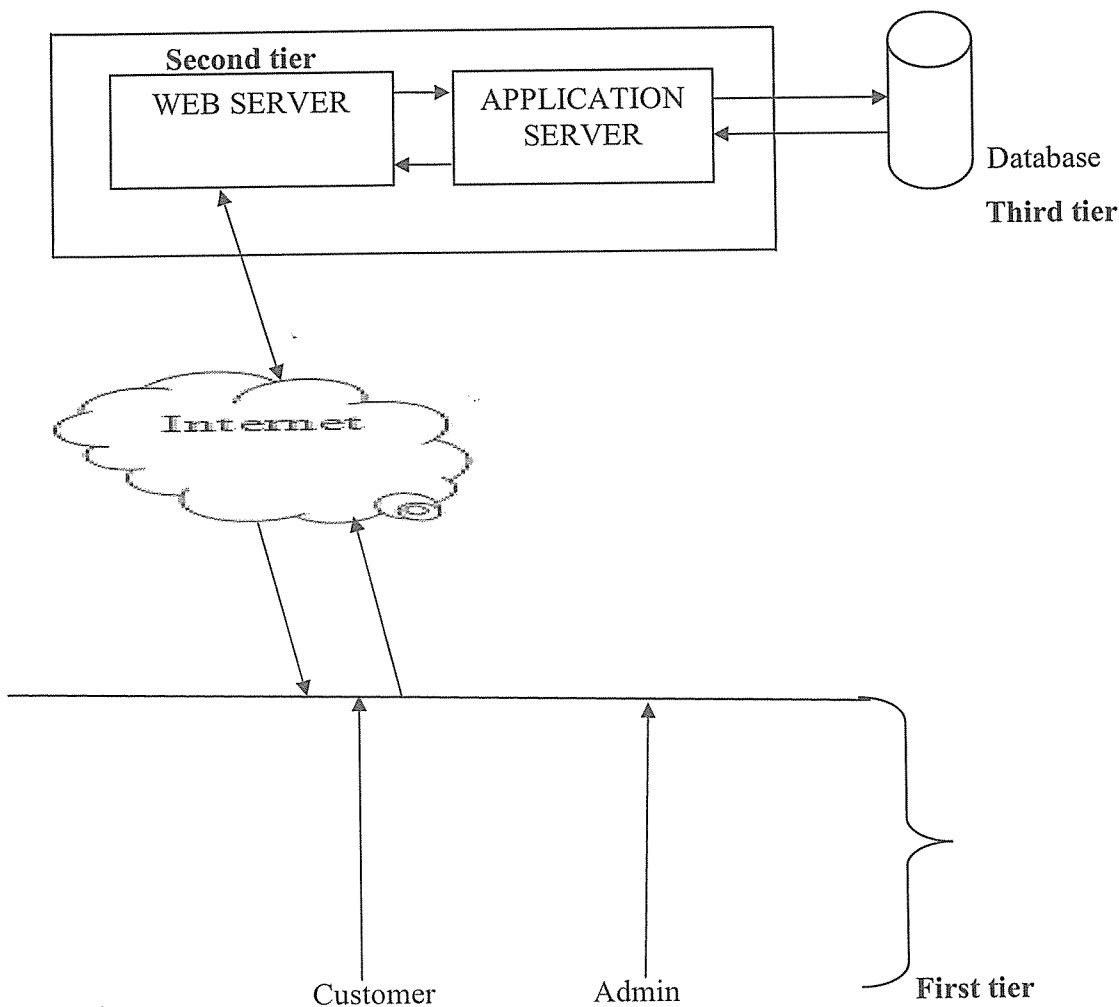


Figure 4.1: System Interface

4.1. Weakness and Strength of the current Systems used to reserve ticket (ticket booking)

4.1.1. Weakness

The following are the limitations of the Existing system; Data redundancy which means that same data fields appear in many different files and often in different formats due to paper or manual system, it poses quite a big problem because data has to be maintained in large volumes but in the designed system, this problem can be overcome by providing the condition that if the data entered is duplicate, it will not be entered, otherwise updating will take place.

Difficulty in accessing the data: The current system, searching information is time consuming as compared to designed system where any information can be accessed by providing the primary key.

Unsatisfactory security measures: The current system has poor security measures since it only uses paper work where as in the designed system, password security has been provided. The person can access the system as an Administrator by providing the correct password otherwise he is denied the access

Ticket generation: the current system, ticket are issued manually to the passenger as compared to the designed system which gives you a right to print your ticket after it has been generated

4.1.2. Strength

The fact remains that we cannot hide the advantages about that the current system ticket reservation which was manual and friendly meaning it favoured all the classes of people unlike the deigned which favours the Educated and easy to managed with little skills of computing among others.

4.2. System Study and Analysis

The researchers studied the existing system so as to identify its strength and weaknesses. The basis of the design for the new system was derived from knowledge and information that was acquired from analysis carried out by employing a number of techniques and tools such as observation and interview guides. An interview guide with open ended questions was prepared and administered to the respondents so as to enable them give their views freely. This was a better technique since it helped the researchers to get full range and depth of information. Observation was also used to gather accurate information about how the system actually operates, particularly about processes.

The method was time consuming nevertheless, it gave more detailed and context related information.

The researchers realized that the existing system is manual implying each staff on duty obtains a printed report so as to follow for daily bookings at the RVR station offices. The existing system is associated with risks such as delays due to the slow booking process and duplication of records. This has created a need for an ERTR System for the RVRs, that will allow travelers carry out bookings easily anywhere at any time, generate tickets, provide security by authentication and also reduce redundancy to the administrators.

4.3. Requirements Analysis, identification and Specification

The requirement analysis stage of a software engineering involves obtaining, collecting and analyzing information that is used to identify the users' requirement for the new system

Requirement Identification is very important as a system with incomplete functionality may lead to denial.

Requirement specification gives an actual view of vital components as well as their order of arrangement.

A description of the aim of the project is given below along with the details of the functional and non-functional requirements for the system.

A. User Requirements

These included user interface requirements such as screen navigation, look and feel, interaction requirements, colours and accessibility requirements

B. Functional requirements

These are statements of services the system should provide or is expected to provide.

- i. Register all information in different stations.
- ii. Assist in keeping track of each client's details.
- iii. Keep track of operational records from different station offices.
- iv. Keep on track of financial and economical records

C. Non-functional requirements

These are constraints on the services or functions offered by the system. Therefore, while executing a search, the system was able to notify the user of the search success.

- i. The system should also notify users on wrong inputs and suggest the required inputs
- ii. The system has an online help that assist users on how to operate the system
- iii. User's authentication is via valid username and password.

D. Hardware and Software Requirements For system development

A well installed laptop with

- i. Windows2000 or later operating system.
- ii. Processor 2.4 GHZ processor
- iii. Memory of 128 MB RAM (256 MB Recommended)
- iv. Disk space of 80 GB (including 20GB for database Management system)
- v. Display of 800 x 600 colors (1024 x 768 High color- 16 bit Recommended)
- vi. Internet (e.g. with an internal ADSL modem).
- vii. Software's like Dreamweaver 8 for web design
- viii. Mysql for database design
- ix. Php connectivity to database
- x. The server: 256Mb of RAM but 512Mb recommended
- xi. WampServer

E. Environmental Requirements

- i. Before use, there should be a staff capacity development to enable users adopt to the new system and learn its PROS and CONS and whatever they were required to do at whatever stage in processing information.
- ii. Some Computer table and good chairs.
- iii. A dust free environment and burglarproofed rooms for safety.
- iv. Power outlet sockets in the rooms.
- v. Computer network set up all in place
- vi. A Server as a backup for the system.

4.4. Structured Requirements Analysis

This section describes the flow of data or information between entities and the processes involved before the information reaches the destination which can be a data store or an entity. Context diagrams and DFDs were used to achieve this. There are mainly four components of a data flow diagram and are represented by the symbols as discussed below.

4.4.1. System Data Flow Diagrams

The data flow diagram is a graphical representation that depicts information flow and the transforms that are applied as data moves from input to output. The DFD may be used to represent a system or software at any level of abstraction. In fact DFD may be partitioned into levels that represent increasing information flow and functional detail.

PROCESS

Process shows the work of the system. Each process has one or more data inputs and produce one or more data outputs. Processes are represented by rounded rectangles or ovals in Data Flow Diagram. Each process has a unique name and number. This name and number appears inside the rectangle that represents the process in a Data Flow Diagram.



The process symbol represents the activity that transforms the data

DATA FLOW

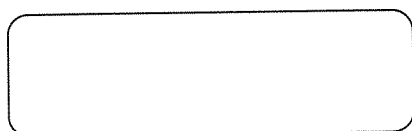
Data flows show the passage of data in the system and are represented by lines joining system components. An arrow indicates the direction of flow and the line is labeled by name of the data flow.



The data flow symbol represents movement of data.

4.2. EXTERNAL ENTITY

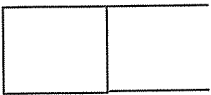
External entities are outside the system but they either supply input data into the system or use other systems output. They are entities on which the designer has control. They may be an organizations customer or other bodies with which the system interacts. External entities that supply data into the system are sometimes called source. External entities that use the system data are sometimes called sinks. These are represented by rectangles in the Data flow Diagram.



The external entity symbol represents sources of data to the system or the destination of data from the system.

DATA STORE

A data store is a repository of data. Processes can enter data, into a store or retrieve the data from the data store. Each data has a unique name.



The data store symbol represents data that is not moving or delayed data at rest.

4.3 Context Diagram

The level 0 DFD or a context model represents the entire software element as a single bubble with input and output data indicated by incoming and outgoing arrows, respectively.

In level 0 diagram shown below, the passenger fills either the reservation or cancellation form as input. He gets the ticket as the output and the report is sent to the administration.

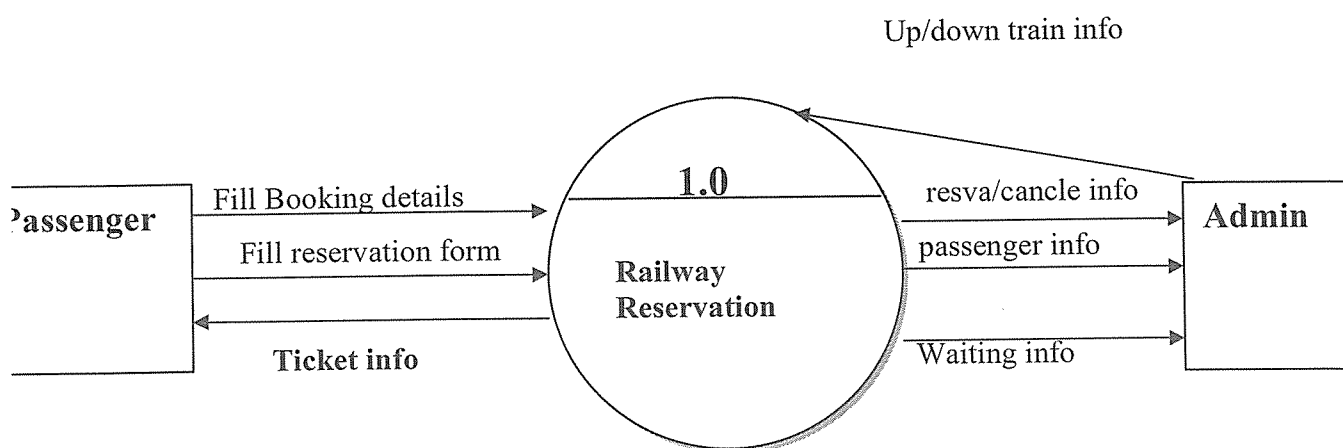


Figure 4.2: Context Diagram Level 0 DFD

Level – 1 data flow diagram

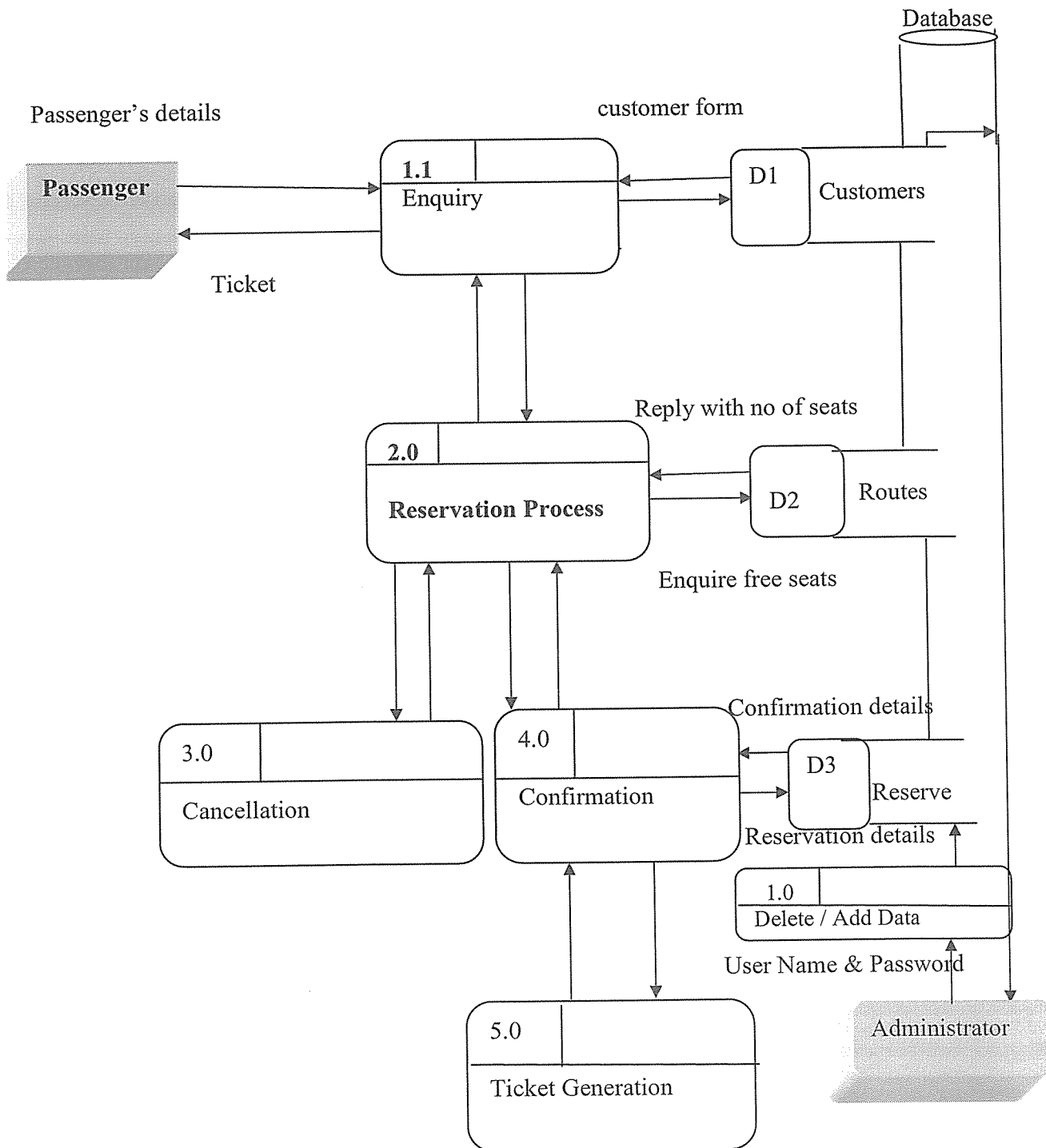


Figure 4.3: Level 1 Diagram System

A level 1 DFD is the further refinement of level 0 DFD showing greater details and functionalities. In this, the single bubble of level 0 DFD is refined further. Each of the processes depicted at level 1 is a subfunction of the overall system depicted in the context model. As shown in the DFD above, the passenger either enquires about the trains or goes directly for the reservation or the cancellation processes as a result of which he gets the ticket generated. The reports are then sent to the administration

Level 2 DFD

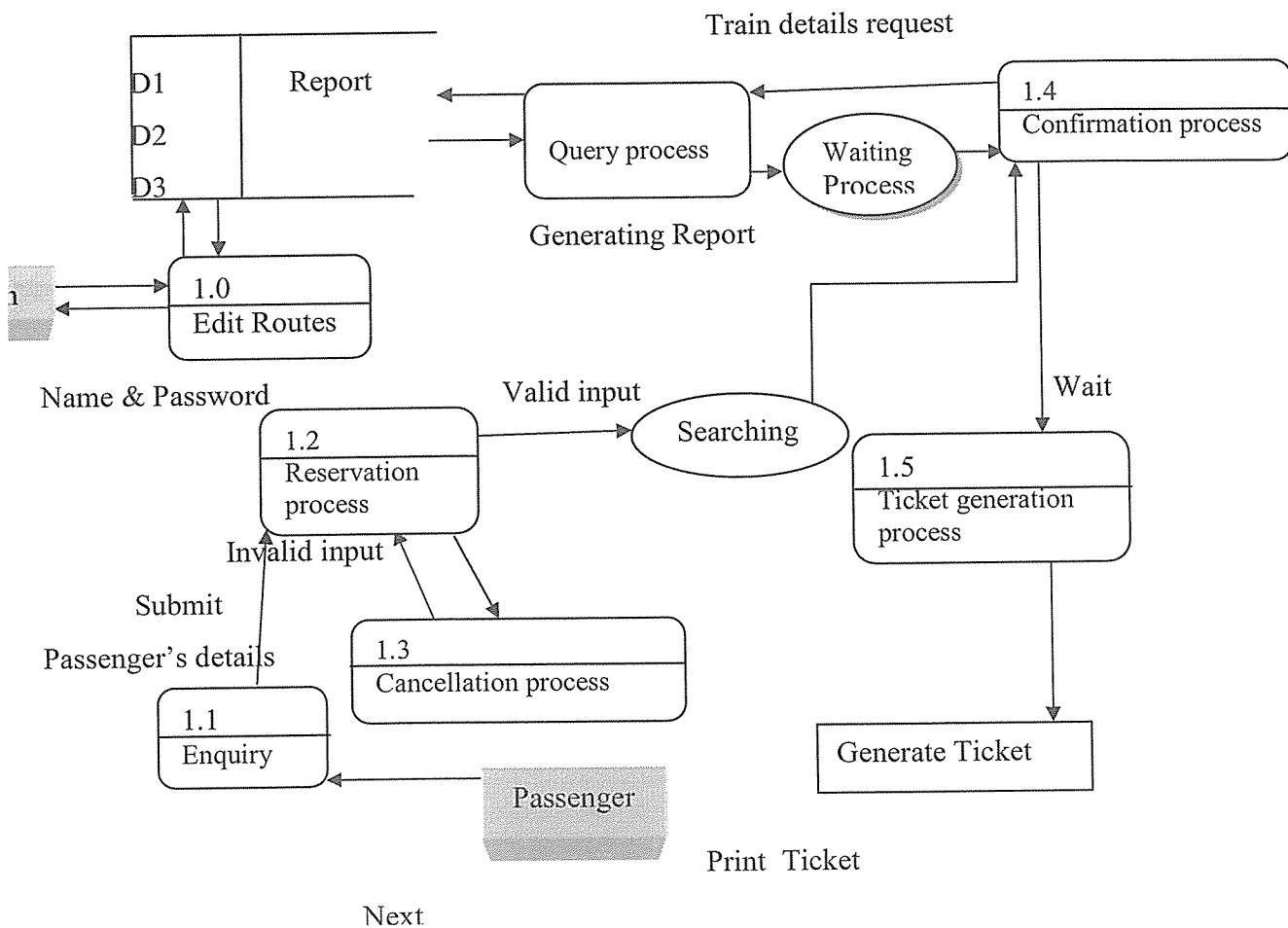


Figure 4.4: Level 2 Diagram System

The level 2 DFD is the further refinement of the level 1 DFD. As shown in the DFD above, the passenger has many options like he can directly go to the reservation counter or can first inquire and then go to the reservation counter or he can just inquire and return back. If the passenger wants reservation then the seats are checked for availability and if the seats are available the confirmation ticket is generated otherwise he is asked for waiting and waiting ticket is generated if he wants. If the user wants tickets to be cancelled he is given the cancellation ticket and the reports of all the transactions are sent to the administrator.

4.4.2. DESCRIPTION OF FLOW CHART

The program flowchart shows how the system proceeds from the input form to the output form of the system. It explains how the system is actually processed step by step .It represents the flow of control as the system is processed.

Here Researchers considered the three types of program flow chart:

1. Input flow chart: This flowchart depicts the basic input operations in the system. In railway reservation system, first of all the password is checked then if the password is valid then we process the input form if the data is valid then the entries are updated in the data base otherwise the form is refilled.
2. Output flow chart: This flowchart depicts the basic output operations in the system. The user is required to enter the criteria for output. If it is for the reservation then the availability if seats is checked, If the seats are available then the confirmed ticket is generated otherwise the user is asked for waiting and if he wants then waiting ticket is generated. The information about all the above transactions is then transferred to the related databases.
3. Report flow chart: This flowchart depicts the basic operations for the generation of reports. If the entries from the processed database are valid the concerned reports are generated otherwise the process will have to be repeated.

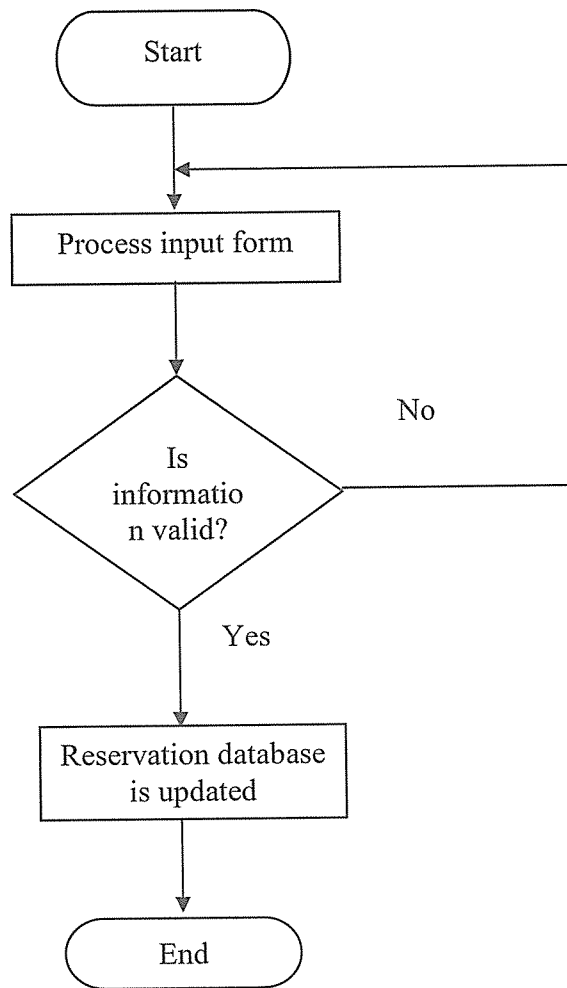


Figure 4.5: Input Data Flow Chart

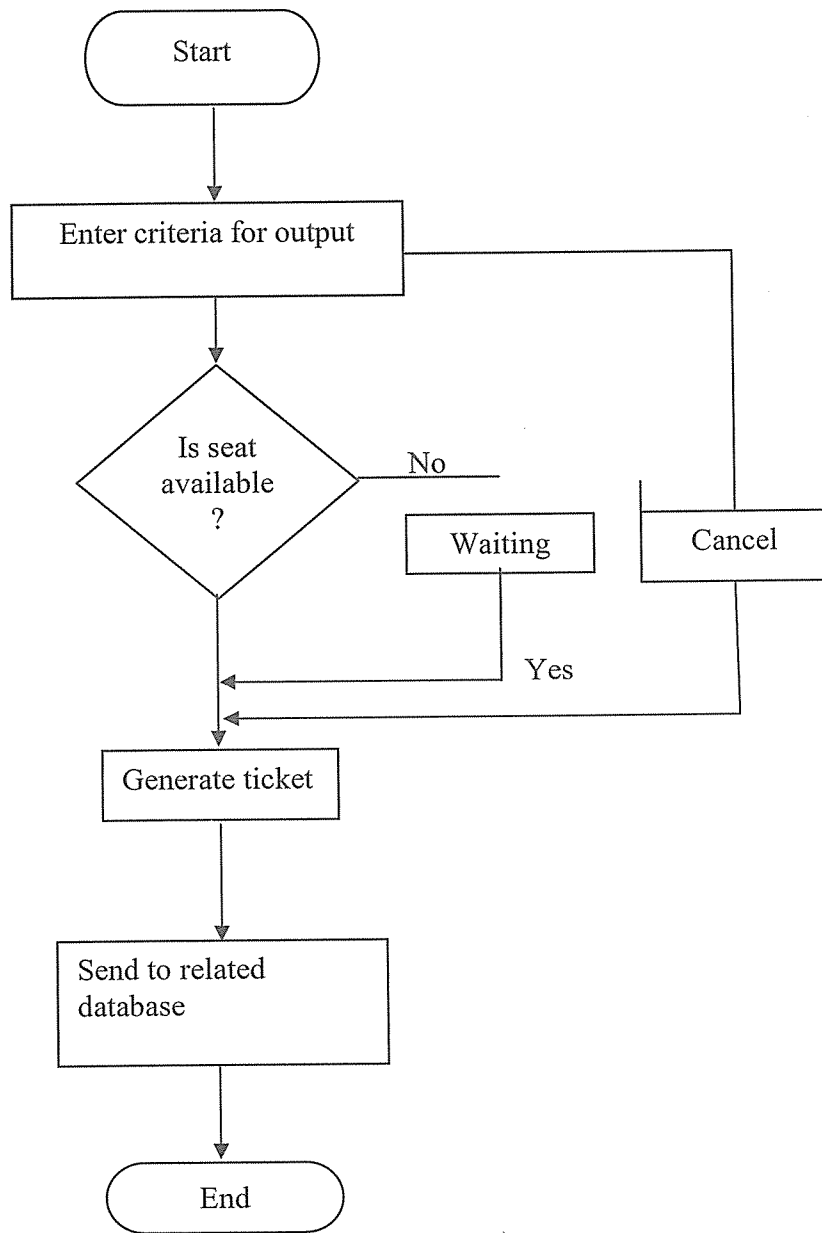


Figure 4.6: Output Data Flow Chart

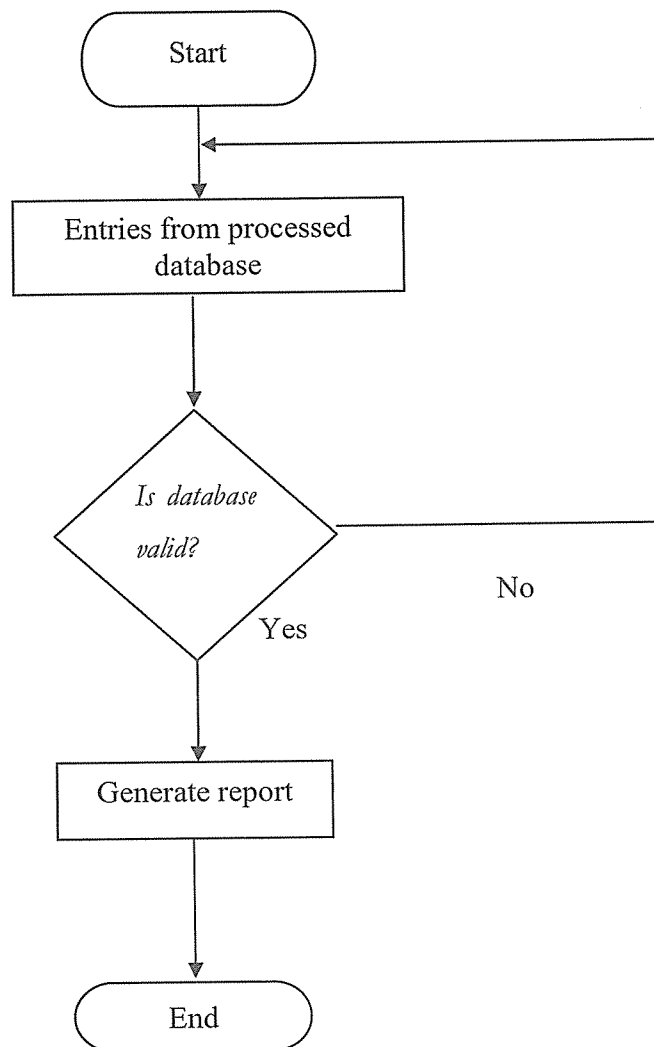


Figure 4.7: Report Data Flow Chart

Entity Relationship Diagram (ERD) for Ticket Reservation System

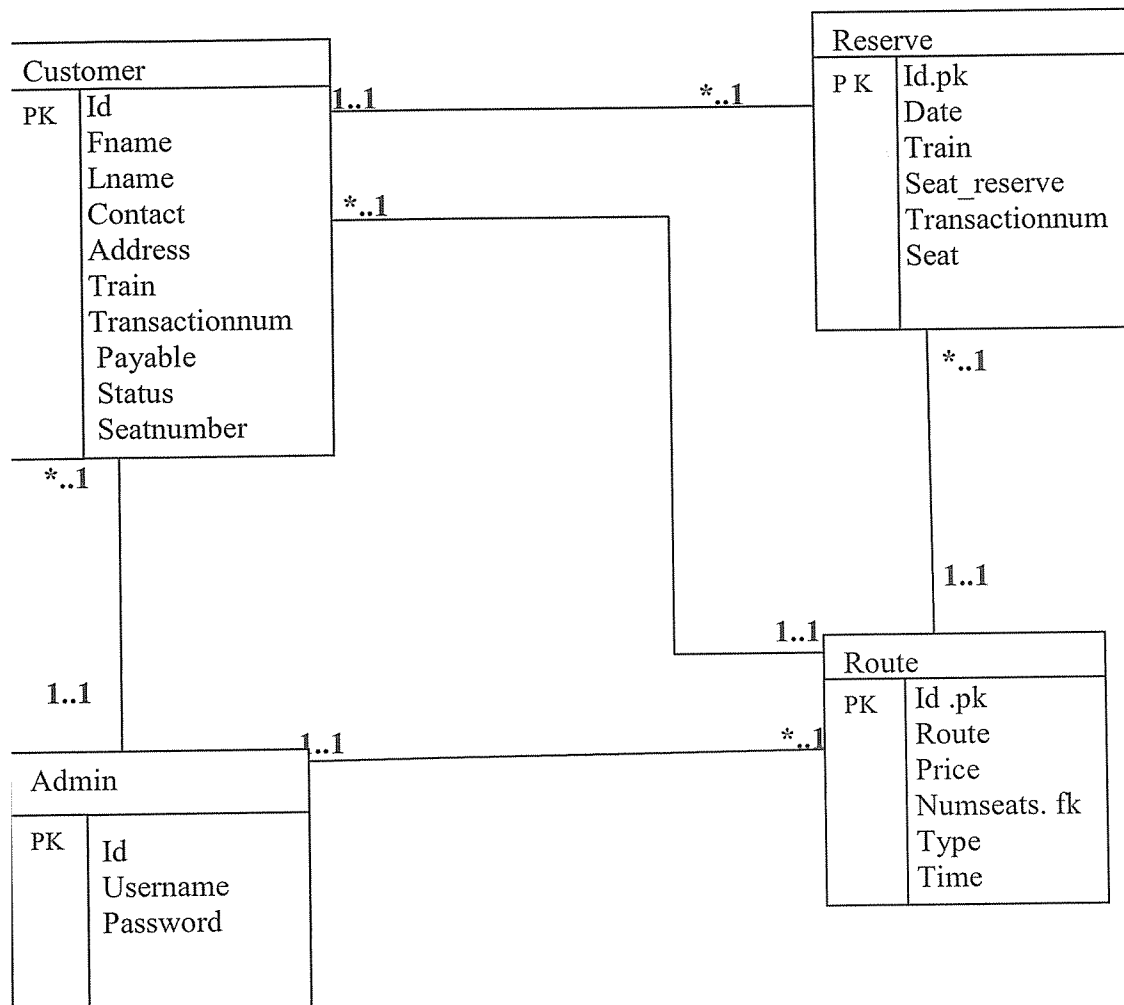
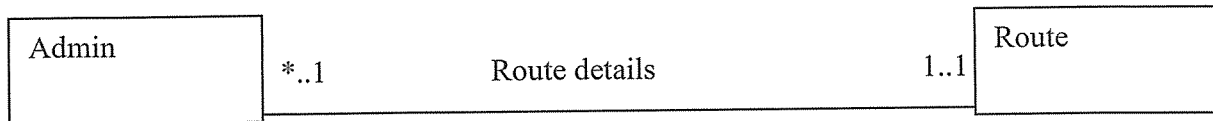


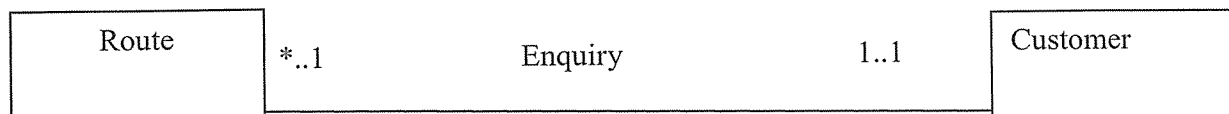
Figure 4.8: Entity Relationship Diagram (ERD)

4:4.3 Mapping of ERD to Relational Model

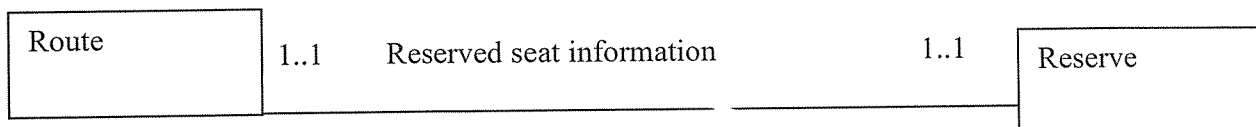
Two forms of relationships were identified that is, one to one and one to many relationships. A one to one relationship represents a single Association between a sole entity occurrence and a single entity occurrence as shown below.



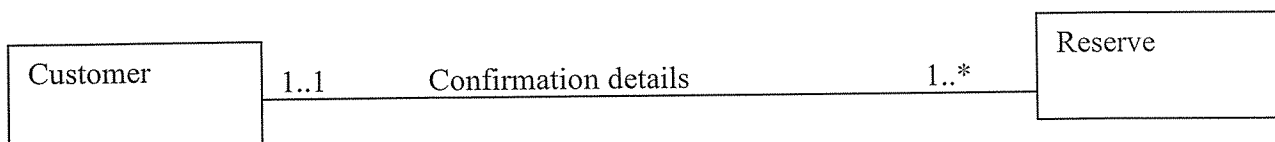
The relationship *..1 means that many Route details can be accessed by one Admin and 1..1 means one System Admin can access many Route details.



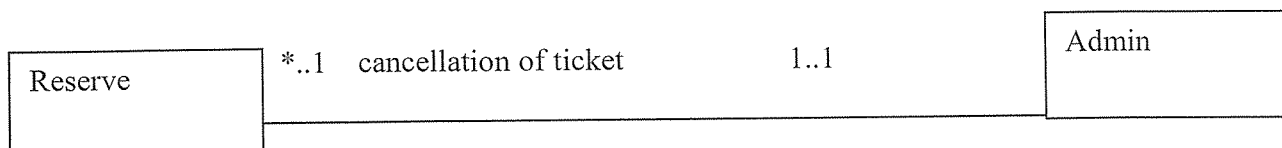
The relationship *..1 means that many Customers can Enquire for one Route and 1..1 means one Route can be Enquired by many Customers of the System at a given time.



The relationship 1..1 means that one Reserve contains Reserved seat information of one Route and 1..1 means that one Route contains one Reservation seat at a time



The Relationship 1..1 means one Confirmation details can be accessed by many Customers and 1..* means many Customers can access one Confirmation details



The Relationship 1..1 means one Admin can do Cancellation of ticket of many Reserves and *..1 means many Reserves can be cancelled by one Admin at a given time.

Tables of Entities and their Attributes

This attributed to how the data types will be coded and appended to the entities in the Database. The structure of relations constructed in the database. This section presents the structure of the relations to be constructed in the database during implementation. The tables show the field name, data type and constraints of attributes of the different entities.

Admin

Field	Data type	constraint
Id	Int (11)	Not null, primary key, auto_increment.
Username	Varchar (30)	Not null
Password	Varchar (30)	Not null

Table 4.1: Admin details

Customer

Field	Data type	constraint
Id	Int (11)	Not null, primary key, auto_increment.
Fname	Varchar (30)	Not null
Lname	Varchar (30)	Not null
Contact	int (20)	Not null

Address	Varchar (300)	Not null
Train	int (30)	Not null
Transactionnum	Varchar (10)	Not null
Payable	Varchar (11)	Not null
Statns	Varchat (100)	Not null
Setnumber	Varchar (100)	Not null

Table 4.1: Customer Details

Reserve

Field	Data type	constraint
Id	Int(11)	Not null, primary key, auto_increment.
Date	Varchar (11)	Not null
Train	int (11)	Not null
Seat reserve	int (11)	Not null
Transactionnum	Varchar (10)	Not null
Setnumber	int (100)	Not null

Table 4.2: Reservation Details

Routes

Field	Data type	constraint
Id	Int (11)	Not null, primary key, auto_increment
Route	Varchar (300)	Not null
Price	Varchar (30)	Not null
Num_seats	Int (30)	Not null
Type	Varchar (300)	Not null
Time	timestamp (100)	Not null

Table 4.3: Route Details

CHAPTER FIVE

SYSTEM IMPLEMENTATION

This chapter includes well explained figures with various screen shorts for major data input, system reports, database tables with some data, and error conditions among others. Each screenshot describes briefly, how they use it and what they use it for. Reports comprise information about the database and users. Below Researchers endeavour to explore the above contents;

5.1. Data input screens

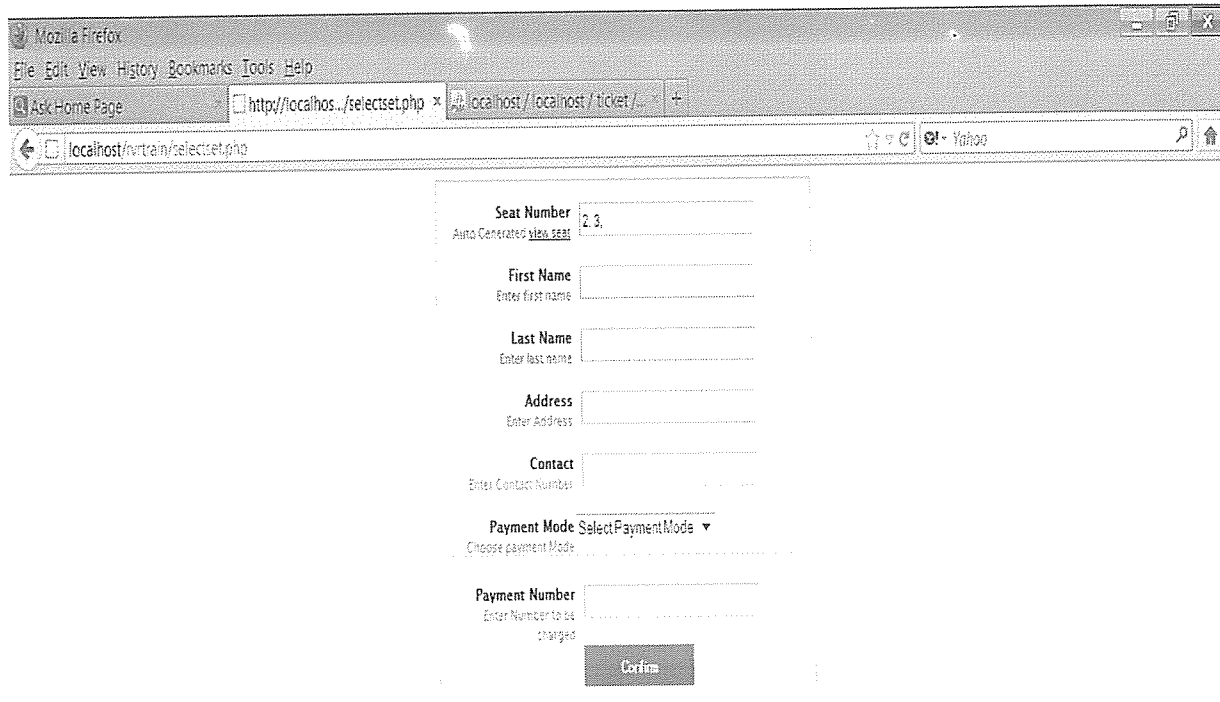
These contain forms used by clients and administrators forward data to the database. The first form is at the home page, of which clicking the “next” button takes you to the passengers’ details form as shown below.

i) Home Page Screen Short



ii) Passengers' Details Screen Short

This is the form delivered as the next phase of booking by the passengers and after the passengers has entered his or her details then has to confirm in order to be confirmed by the system.



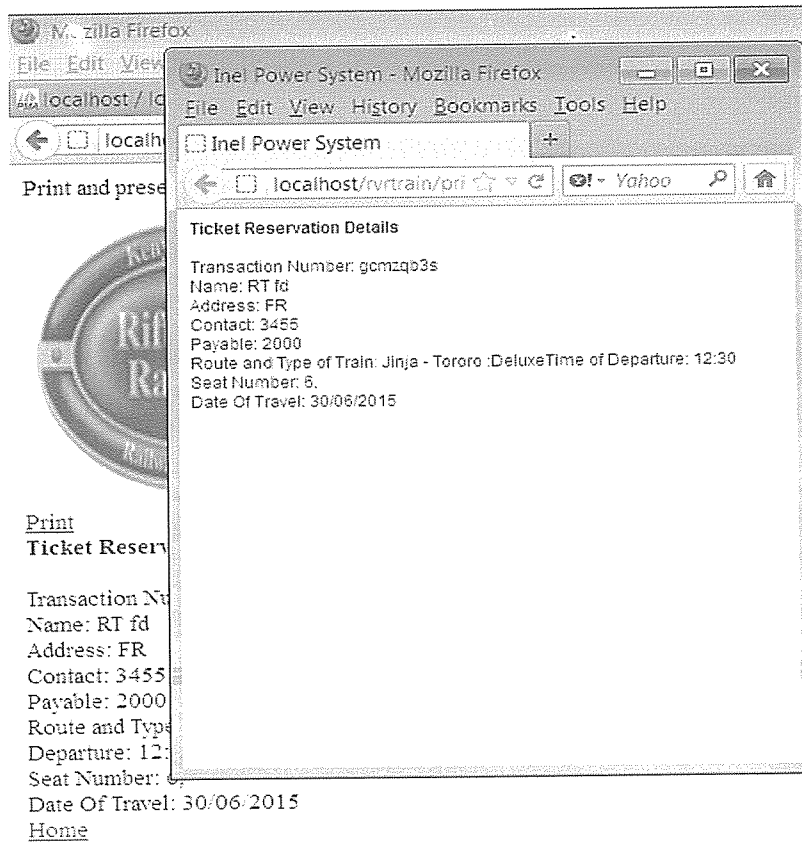
The screenshot shows a Mozilla Firefox browser window with the address bar displaying `http://localhost:8080/selectset.php`. The page content is a form for passenger details. The form includes the following fields and labels:

- Seat Number**: A text input field containing the value "23". Below it, a small text label reads "Auto Generated [view seat](#)".
- First Name**: A text input field with the placeholder text "Enter first name".
- Last Name**: A text input field with the placeholder text "Enter last name".
- Address**: A text input field with the placeholder text "Enter Address".
- Contact**: A text input field with the placeholder text "Enter Contact Number".
- Payment Mode**: A dropdown menu currently showing "SelectPaymentMode". Below it, a small text label reads "Choose payment Mode".
- Payment Number**: A text input field with the placeholder text "Enter Number to be changed".
- Confirm**: A button located at the bottom right of the form.

5.2. Output screen shots

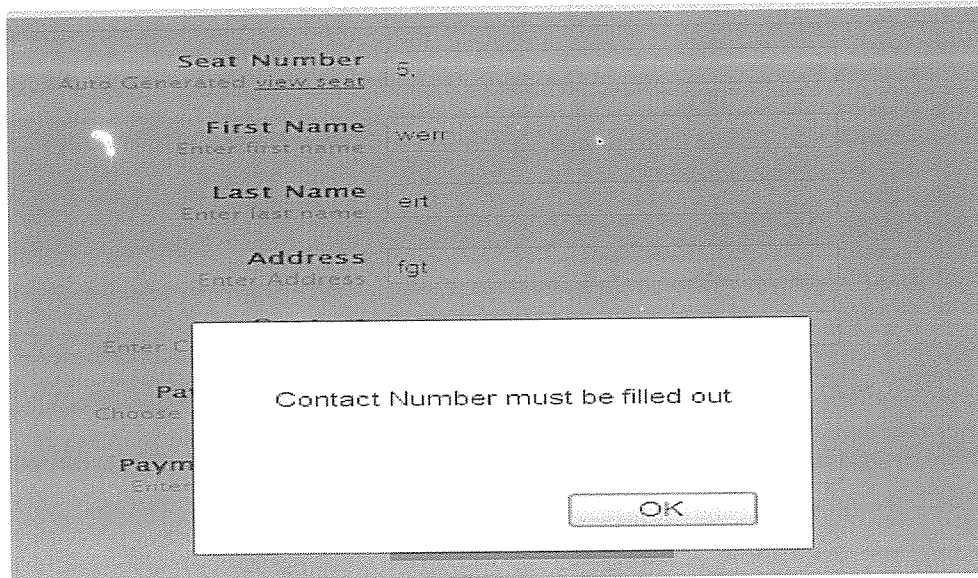
i. Ticket generated

After the passenger has been confirmed by the system and all the details are valid the ticket is delivered to the passengers and when the details are invalid the ticket cannot be generated.



ii. Error reports

This occurs when the passenger has entered invalid details and cannot generate the ticket



The image shows a screenshot of a web form for generating a ticket. The form has several input fields with labels and placeholder text. A modal dialog box is overlaid on the form, displaying an error message. The form fields include:

- Seat Number**: Input field with placeholder "Auto Generated view seat" and value "5".
- First Name**: Input field with placeholder "Enter first name" and value "well".
- Last Name**: Input field with placeholder "Enter last name" and value "ert".
- Address**: Input field with placeholder "Enter Address" and value "fgt".
- Contact Number**: Input field with placeholder "Enter Contact Number" and value "1234567890".
- Payment Method**: Input field with placeholder "Choose Payment Method" and value "Credit Card".
- Payment Amount**: Input field with placeholder "Enter Payment Amount" and value "1000".

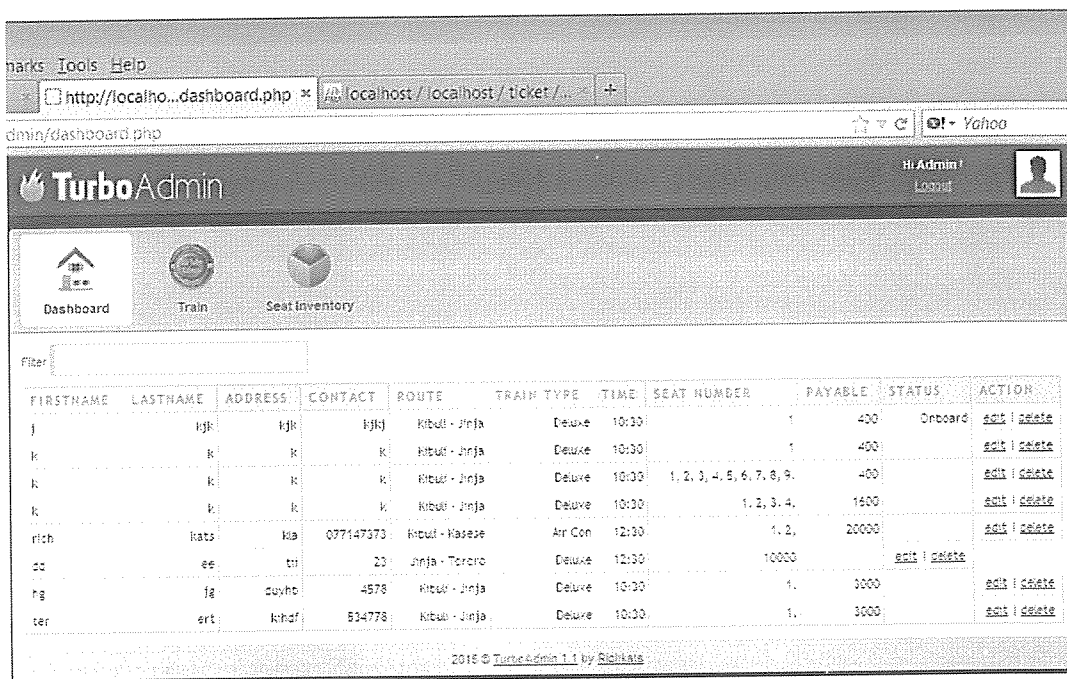
The modal dialog box contains the following text:

Contact Number must be filled out

OK

iii. System reports

This gives a report to the Administrator after logging in as the Admin in the system and details about passengers who have successfully received the ticket and just waiting for their booking time is presented by clicking Dashboard as shown below.



The screenshot shows a web browser window with the address bar displaying 'http://localhost...dashboard.php'. The page title is 'admin/dashboard.php'. The dashboard header includes the 'TurboAdmin' logo, a user profile 'Hi Admin!', and a 'Logout' link. Below the header, there are three main navigation icons: 'Dashboard' (selected), 'Train', and 'Seat Inventory'. A 'Filter' input field is present above the table. The table lists passenger details with columns: FIRSTNAME, LASTNAME, ADDRESS, CONTACT, ROUTE, TRAIN TYPE, TIME, SEAT NUMBER, PAYABLE, STATUS, and ACTION. The table contains 7 rows of data. At the bottom, a footer note reads '2016 © TurboAdmin 1.1 by Richkats'.

FIRSTNAME	LASTNAME	ADDRESS	CONTACT	ROUTE	TRAIN TYPE	TIME	SEAT NUMBER	PAYABLE	STATUS	ACTION
j	kjk	kjk	kjk	Kibuli - Jinja	Deluxe	10:30	1	400	Onboard	edit delete
k	k	k	k	Kibuli - Jinja	Deluxe	10:30	1	400		edit delete
k	k	k	k	Kibuli - Jinja	Deluxe	10:30	1, 2, 3, 4, 5, 6, 7, 8, 9,	400		edit delete
k	k	k	k	Kibuli - Jinja	Deluxe	10:30	1, 2, 3, 4,	1600		edit delete
rich	kats	kla	077147373	Kibuli - Nasele	Air Con	12:30	1, 2,	20000		edit delete
ee	ee	tti	23	Jinja - Tororo	Deluxe	12:30	10000			edit delete
fg	fg	duyho	4578	Kibuli - Jinja	Deluxe	10:30	1,	3000		edit delete
ter	ert	kthdf	534778	Kibuli - Jinja	Deluxe	10:30	1,	3000		edit delete

This gives a report to the Administrator about the routes to be taken by the passengers and here, The Admin can add route as shown below once the Admin logout he or she gets to the home Page.

The screenshot shows the TurboAdmin web application. The top navigation bar includes 'Dashboard', 'Train', and 'Seat Inventory'. Below this is a table of train routes. The table has columns for 'TRAIN TYPE', 'ROUTE', 'SEAT NUMBER', 'PRICE', 'TIME', and 'ACTION'. The data rows are as follows:

TRAIN TYPE	ROUTE	SEAT NUMBER	PRICE	TIME	ACTION
Deluxe	Kibuli - Jinja	5	3000	10:30	edit delete
Air Con	Kibuli - Kasepe	50	10000	12:30	edit delete
Air con	Kibuli - Gulu	6	10000	12:30	edit delete
Deluxe	Jinja - Tororo	10	2000	12:30	edit delete
Air con	Uganda - Tanzania	6	40000	7:40	edit delete
Deluxe	Uganda - Nairobi	5	30000	7:40	edit delete
Air con	Kibuli - Asch	12	2000	6:30	edit delete

At the bottom of the page, the footer reads: 2011-12 © TurboAdmin 1.1 by Rishabh

This gives a report to the Administrator about the train seats remaining and those booked plus the transaction code and once you log out you get to the home page.

The screenshot shows the TurboAdmin web application interface. The top navigation bar includes links for 'marks', 'Tools', and 'Help'. The browser address bar shows the URL 'http://localhost...tinventory.php'. The page title is 'nysetinventory.php'. The main header area displays 'TurboAdmin' and a user profile 'Hi Admin! Logout'. Below the header, there are three tabs: 'Dashboard', 'Train', and 'Seat Inventory'. The 'Seat Inventory' tab is active, showing a table of train transactions. The table has columns for 'DATE', 'TRAIN TYPE', 'ROUTE', 'SEAT NUMBER', 'TRANSACTION CODE', and 'ACTION'. The table lists transactions from 2013-01-01 to 2013-06-29. The 'ACTION' column contains a 'delete' link for each transaction. The footer of the page shows '2011-12 © TurboAdmin 1.1 by Rishika'.

DATE	TRAIN TYPE	ROUTE	SEAT NUMBER	TRANSACTION CODE	ACTION
2013-01-01	Deluxe	Kibuli - Jinja	1	o8ey8p40	delete
2013-01-13	Deluxe	Kibuli - Jinja	1	kc77mzfy	delete
2013-01-15	Deluxe	Kibuli - Jinja	1	n1d3yeyg	delete
2013-01-17	Deluxe	Kibuli - Jinja	1	v53zchwk	delete
2013-01-16	Deluxe	Kibuli - Jinja	1, 2, 3, 4, 5, 6, 7, 8, 9	s4xf7qlq	delete
2013-01-21	Deluxe	Kibuli - Jinja	1, 2, 3, 4	fhk7qarc	delete
23/06/2015	Air Con	Kibuli - Kapese	1, 2	en3c5efs	delete
28/06/2015	Deluxe	Kibuli - Jinja	1	euknyv13	delete
29/06/2015	Deluxe	Kibuli - Jinja	1	anspuap3	delete

CHAPTER SIX

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This chapter gives a summary of a system on how it works, what it does and what the system is all about, the challenges faced during development, accomplishments, major system limitations, recommendation (for future work) and conclusion .

6.1. Discussion about what the system can do

The designed Electronic Railway ticket Reservation system, Can providing users with information about trains, and their time schedules, Reserving and cancelling seats for the passenger and space for any cargo, capturing information about passengers, portraying details pertaining reservation fees, any concessions, enabling users make entries for reservation, waiting, cancelled tickets, updating for uptime and downtime trains, advertising and marketing railway transport over other types, generating tickets to the passenger. This observation is in support with CMC Ltd, (2013) and CRIS Projects, (2013) who assert that Train Ticket reservation Systems are systems that bring ticket reservation services closer to the customers in that such services can be accessed any were by anybody at any Time. There are quite a number of Information Management Systems that offer online rail ticket booking and verification records management is paramount in bringing efficiency in any system.

The literature still by CMC Ltd, (2013), highlighted the fact that there are two ways of validating tickets, including traditional (manual) systems or offline system. Here, passengers validate tickets by themselves in the stations or authorized payment premises and later before or during the journey are randomly checked either by:

A Ticket controller; this method is sometimes referred to as proof-of-payment and this is used extensively on one man operation rail lines.

Online Train Ticket reservation Systems: These are systems that bring ticket reservation services closer to the customers in that such services can be accessed any were by anybody at any Time.

Which the Rift Valley Railways lacked, and therefore they were unable to provide tickets online. In the designed system, the software development approach was completely adhered to and software engineering principles were strictly followed making the software highly user friendly.

The home page consists of links to the pages such a Contact Us, Location, Routes, History and Gallery for proper guidance .to User (Passengers). And two areas for entities that is Ticket Booking for passengers and Admin Login for the Administrators. Admin Login requires a Password to access information about the prisoner reports, edit forms, and delete the necessary information all necessary for updating the information.

The logout menu exits the system. The login page / Home is fully functional and only permits the system user to access the administrator page where administrative tasks are performed; it requires entering a valid username and password. The developed system module was implemented HTML, CSS, MySql, JavaScript and PHP. The system can be availed online by hosting it on a network server like on a LAN (Local Area Network) or internet. This will require it to be installed on a server platform running MYSQL server software and connected on an internet or LAN network.

6.2. Challenges faced during development

Like any other developer, I respect the fact that I faced a challenge in requirement specification, coding, during Data collection methods, machine failure among others and this was executed with the guidance of our Supervisor.

Major system limitations

The Designers limited the designed system on generating tickets to specific ones who paid for the service, Logging in as an Administrator, system editing and data altering when you do not have permission to do so. The system can be accessed via only and only internet.

6.3. Recommendations

The findings of during research recommended adoption and usage of the newly developed Electronic Railway Ticket Reservation System For The Rift Valley Railways, in order to

simplify the ticket booking process as well as managing information related to it. The new system could improve on the security of the information, centralize access at the head offices and also ease update of information, reduce on time of identification of particular information as well as minimizing repair and maintenance costs. For enhancement of an organized, maintainable and robust system, the following are recommended:

The system administrator should be properly trained on how to use the system and also recommended to privately keep their authentication (the user name and password) well so to avoid intrusion into the system.

Talking still about security, the backup module should also be incorporated so as to ensure that the information that is kept is safe and to ensure that there is ready backup information in case the original information gets corrupted or lost.

The Rift Valley Railways' departments could make an effort to secure some computers with windows XP and above, connect them to the internet and provide computer-training sessions to the intended users of the system such that they become acquainted with the developed system since it is internet based.

In order for the information stored in the system to be secured accordingly, mechanisms enabling updates to the system would also be put in place, since there might be a need to improve on the enhancement of the system, for example integrating it with the biometric system.

Furthermore, the designed system should be integrated with mobile applications that can run on cell phones in order to extend more the booking process right at the users' palms.

Lastly, it would be helpful if the developed system component can have the capability to be used in different languages. Further improvement is recommended so that it can be capable of being used in other languages most especially Kiswahili and other locals for the East African region.

Conclusion

Practical Training is a very important part of the curriculum as it strengthens the concepts and enhances knowledge about the practical implementation of all the theory concepts, we have learnt so far in different subjects.

This training helped us learn a lot. In this training we did the project on Electronic Railway Ticket Reservation System for Rift Valley Railways, This project is used to keep a track on Providing users with information about trains, and their time schedules, Reserving and cancelling seats for the passenger and space for any cargo, Capturing information about passengers, Portraying details pertaining reservation fees, any concessions, Enabling users make entries for reservation, waiting, cancelled tickets, Updating for uptime and downtime trains, Advertising and marketing railway transport over other types, Generating ticket to the passenger. Which help's in managing the system very efficiently and conveniently.

Finally, this gives us a lot of mental satisfaction that the project we have worked upon is a real time project, which will be installed at the customer site after some more session of regress testing.

Although the project work has been done in a complete and detailed manner but due to the constraint of time, we could not include some more features we wanted to. We left these features as a part of the future development. As soon as we'll get time we'll try to add them to the project.

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APPENDIX

PROJECT ACTIVITIES

A Gantt chart will be supplementary to the above table, since it maps all the activities to their respective accomplishment time; this can be viewed later in the appendix

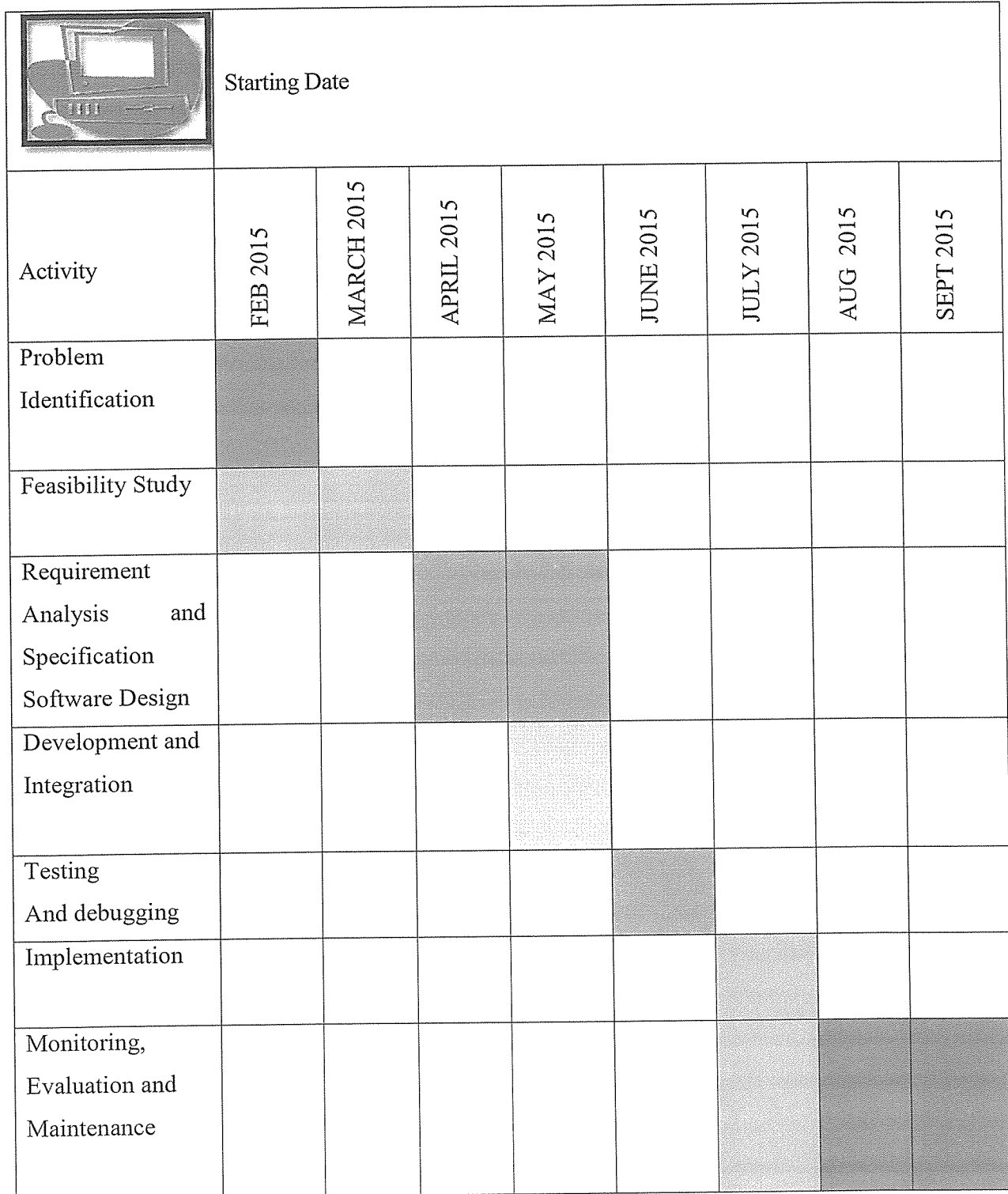
4.2 Constraints and Risks

Development, implementation, and end outcomes of this project could be affected by presence or absence of resources. Great results can be achieved through expertise in project management, which means; means experience, knowledge, skill sets in budgeting and managing resource such as time and human resource, dealing with competitive environment, and existing investments. Short of the above exposes the project to failure risks. Natural calamities or happenings could as well affect the final outcome.

4.3 Contingency Plan

In case of unsuccessful outcomes, reconsidering a fresh feasibility study will be one of the best contingency plans. This is because there is a possibility that the relevance of the project is not accommodated by the resources.

APPENDIX: GANTT CHART



QUESTIONNAIRE USED DURING ANALYSIS

A. To the Administration

1) How the functionalities of the railway transport are today, in comparison to the past?

1. Fair 2. Good 3. Better 4. None of the above

2) What is the current way and challenge in advertising and marketing the railway transport in Uganda and East Africa as a whole?

.....
.....

3) Bearing the fact that railway transport today is not only for cargo transportation but for passengers as well, can the current system effectively and efficiently handle bookings and reservations?

.....
.....

4) How is the information about the route, cancellation of tickets, departure time, arrival time, number of trains available and other such information, managed and stored?

.....
.....

5) How do we rate the current system in terms of keeping track of all passengers as a way of scheduling their journeys accordingly? Are their challenges?

.....
.....

6) What is the extent of relationship between administrators and customers?

.....
.....

7) What possible ideas would you consider to meet the above challenges?

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

B. To the customers or clients

- 1) What does railway transport mean to you in comparison with other types of transport?
.....
.....
- 2) By which means and how often does the community receive information and updates pertaining the railway transport?
.....
.....
- 3) How often is this type of transport used and what challenges are faced when travelling by train is the option?
.....
.....
- 4) What is the extent of relationship between administrators and customers?
.....
.....
- 5) What possible ideas would you consider to meet the above challenges?
.....
.....
.....

THE BUDGET THAT WAS USED

Particulars	Cost (\$)
Computer Hardware and Software Equipment	650
Stationery	35
Consultation Fees	40
Implementation and Maintenance costs	100
Sensitisation and User Training costs	50
Transport costs	35
Total	910