ONLINE TRAIN RESERVATION SYSTEM

BY

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COMPUTER SCIENCE

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DECLARATION

I, Muhammad Sani Musa, hereby declare that this project titled online Train Reservation System has been carried out by me under the supervision of Mal. Muhammad Aminu Umar It has not been presented for award of any degree in any institution. All sources of information are specifically acknowledged by means of reference.

…………………………………….. ……………………….

       Signature   Date

CERTIFICATION

This project entitled "ONLINE TRAIN RESERVATION SYSTEM" by Muhammad Sani Musa meets the requirements governing the award of the degree of Bachelor of Science in computer science and is approved for its contribution to knowledge and literary representation.

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Mal. Muhammad Aminu Umar   Date

Supervisor

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Prof. Babangida Sani   Date

Head of Department

External Examiner

Name: --   ------------------------

Signature: ---   Date

DEDICATION

I dedicated this write up to my religion

ISLAM

ACKNOWLEDGEMENT

ABSTRACT

The utilization of transport voyaging is an expansive developing business in Cities and different nations; the manual utilization of train reservation is instantly extremely strenuous, furthermore devours a considerable measure of time by needing to remain focused in long line. For this reason, a proficient framework is to be proposed in this project to facilitate the issue of transport reservation amongst indigenes inside the nation. The framework is a web –based application that permits guests to check transport accessibility, purchase and pay transport ticket on the web. The proposed train online reservation system was created utilizing Extensible Hypertext Markup Language (XHTML), PHP Hypertext Preprocessor (PHP), Structure Query Language (SQL), Jquery, Ajax, Cascading Style Sheet (CSS), and JavaScript.

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CHAPTER ONE: INTRODUCTION

1.0 Background of The Study

Ever man since came into existence, the thrust for knowledge and invention has been an unquenchable process, thanks to which man has giant leaps in technology which couldn't have been ever thought before. One such contribution is the development of internet. Technological advances has profoundly changed the way consumers buy products and services. Around the globe, the number of Internet users is approximately 655 million in 2002 , 941 million in 2005 and is expected to reach about 2.5billion by the end of 2020 statistically (Ainin & Mohezar, 2008).Transportation industries seems to appreciate such rapid development, The Online Train Ticket Reservation System is an online application that permits guests check transport ticket accessibility, purchase transport ticket and pay the transport ticket on the internet. This system is made for all the home/office clients in the wake of obtaining entrance from the overseer (kumar & A.Gopikrishna, 2015).

Rail transport is a means of conveyance of passengers and goods, by way of wheeled vehicles running on rails (Payton, 2004). It is also commonly referred to as train transport. In contrast to road transport, where vehicles run on a prepared flat surface, rail vehicles are also directionally guided by the tracks on which they run.

An **electronic ticket** (commonly abbreviated as **e-ticket**) is a digital ticket. The term is most commonly associated with airline issued tickets. Electronic ticketing for urban or rail public transport is usually referred to as travel card or transit pass. It is also used in ticketing in the entertainment industry. An electronic ticket system is a more efficient method of ticket entry, processing and marketing for companies in the railways, flight, and other transport, entertainment industries.

The Nigerian Railway traces its history to the year 1898, when the first railroad in Nigeria was constructed by the British colonial government. The Nigerian Railway system officially came into existence in October, 1912 when Frederick Lugard merged the pre-existing Lagos government railway and the Baro-Kano railway to become the 'Nigerian Railway'. The merger further enhanced the desirability of merging the Northern and Southern Nigeria protectorates.

The railway line ran on two principal North and South trunks: one from Lagos to Nguru and Port Harcourt to Maiduguri, both tracts having branch extensions. In the 1950s, partly for economic reasons, the railway system in the country came under the coordination of the Nigerian Railway Corporation (NRC).

The demands for such means of transportation pave a bright innovation into the sector where consumers are increasingly walking there way on board the train system. Technology has found a way for making it easy to the consumers when boarding any means of transportation e.g. Train reservation system, Flight booking system, bus reservation system or the Uber platform (where individual can request for a cab with a fingertip using their phones). Queuing whenever a passenger wants to board a means of transportation is one of the most complain activity in the process especially in African. Purchasing of boarding ticket makes some people loss courage into such system, a long queue at the ticket counter is something regularly experienced by the train commuters railway system. The gravity of this problem is clearly visible. Other than the obvious wastage of time in the queues, the stress and frustration created by this problem on people daily, is another major concern. This brings a lot of inconvenience to the customers. The manual process tends to be time consuming, data duplication, and error exposed. (Athukorale & Dissanayake, 2008).

The Train Ticket Reservation System will enable the customer to buy and pay for train ticket, ask for information online easily and even cancel a reservation. Furthermore, staff can sell ticket

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using Train Ticket Reservation System after checking train ticket availability for the customer and printing the ticket to the customer that queue up in the counter. The method to solve this problem is to create an online train booking ticket system. Customer can buy the bus ticket over the Internet, 24 hours a day, 7 days a week and the train ticket can't be lost, stolen or left behind. In addition, the online system lets the customers check the availability of the train ticket, seat available and route before paying for the ticket. Furthermore, one can pay in cash or pay directly from their bank account using their Atm card details. Therefore, this project covers the design and implementation of an online train reservation system.

1.1 Statement of Problem

One reason for long queues at ticket counters is, in most stations there are not enough ticket counters to handle the peak time crowd. But it is not practicable to increase the number of ticket counters just to serve at peak time. Another reason is the time taken for one passenger to buy a ticket. The person at the counter has to issue the ticket and deal with the "change". This increases the time taken to complete the transaction. The solution to this problem is to automate the system. But we have to consider the Nigerian railway context when deciding how to automate the system. The debit card system is obviously not suited since a significant number of train commuters do not use debit cards. The system we have suggested is an automated pre-paid system. The automated part addresses the problem of long queues. The pre-paid part aims to solve the problem of dealing with actual money. By this way, the time taken in exchanging money and receiving the correct balance will be completely eliminated. (Athukorale & Dissanayake, 2008).

Data redundancy: It means that same data fields appear in many different files and often in different formats. In manual system, it poses quite a big problem because the data has to be maintained in large volumes, no security measures were provided in manual system but in this

system, password security has been provided. The person can access the system by providing the correct password otherwise he is denied the access (Kumar, 2004)

1.2 Aim And Objectives

The main aim of this project is to develop an automated train ticketing system which is cost effective and suits the transport system. The system will effectively reduce the time taken to obtain a ticket at a ticketing counter. The project objectives are as follows

1. To identify the usefulness of a real time web based system on providing information useful to railway commuters and provide compute based system to overcome shortfalls in current manual system.

2. To design and implement an online train reservation information system to facilitate online booking and Train scheduling.

1.3 Motivation

The recent government interest in the railways sector, which is the cheapest means of transport and would convey the bulk or large percentage of the population when fully utilized is the fore motivation of this project and of interest is the urge to solve the problem faced by the process of the system.

1.4 Scope And Limitation

The developed system will facilitate online booking; keep customer records, provides an online menu on train schedules, train destinations, their prices and alternative payment method and will have page dedicated to customer queries and replies. The system excludes reservation cancellation, specific seat reservation, classes and other management issues.

1.5 Methodology

The project methodology used in the development of the system is the System Development Life Cycle (SDLC). SDLC is the process of understanding how an Information System (IS) can support business needs, designing the system, building it and delivering it to users. The SDLC is composing of four phases: Planning, Analysis, Design and Implementation. The SDLC traces the history (life cycle) of a developing information system. Structured design methodology is Waterfall Development. With Waterfall Development, analyst and users proceed in sequence from one phase to the next mapped out and evaluate.

1.6 Project Organization

This report is organized into five chapters. The first chapter takes care of the background of the study, aim and objectives, scope and limitation. Chapter two is the review of literatures related to the topic. In chapter three the project methodology, data collection; the system analysis and design are discussed. In chapter four, the system implementation, testing is carefully done. Finally, chapter five closes up with the summary, recommendations and conclusion of the work.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

In the arena of global competition, organizations all over the world are competing through the use of the most comprehensive and advanced technological features. The most common example of innovation is in the area of information technology and communication. Various industries are using technology and the advancements of software and internet to maintain and monitor their business transactions. In the application of the informative systems, the airline industry, Rail industry and Automobile (i.e. Uber app) are the most commonly used system. This chapter

explores the concept of reservation information system, their history, components, types and their applications in real world situation to solve problems

2.1 Nigerian Railway System

Railways stand for modernity, No competing form of transport, technological innovation or industry has wrought change on the scale brought about by the invention and adoption of the railway. It led to developing timetables in our lives and railway stations were a major attraction around which towns developed. Try to think of a world before the railway and the meaning of distance and impediment it imposed when it took to travel from one place to another, and the means employed to do so, had changed little for two millennia.

Prior to the development of modern highways and airports in Nigeria, railway was the only means to travel efficiently and move goods from one point to another. It also paved the way for the modest development that was witnessed from the colonial times to the early 1970s (Joshua, 2000). The importance of railway is once again becoming glaring and paramount, as the highways are not only getting congested and dangerous but the rising cost of fuel is making it less efficient and uneconomical to move persons and goods.

Railway transport in Nigeria is inefficient and has hardly developed at all over the past 100 years compared to railways in the developed world where policies are lenient and process of boarding or booking/reservation is within a fingertip. Inefficiency of the railway system is due to both maladministration by successive governments and to the lack of a functional transport policy ensuring a constant pattern of railway development. The 100% ownership by the national government has contributed greatly to this neglect (Joshua, 2000). Today, reservation systems have developed into computerized reservation systems (CRS) which are of mission critical to the entire transport industry i.e. airline, railways etc., (Winston, 1995)

2.2. Online Booking/Reservation.

According to (Ainin & Mohezar, 2008), widespread use of Internet has led to the emergence of a variety of electronic services, e-services (e.g. e-ticket, e-payment, e-commerce, e-learning etc.) Electronic ticket, or e-ticket, is an example of such a class of e-services. E-tickets give evidence to their holders to have permission to enter a place of entertainment, use a means of transportation, or have access to some Internet services. Users can get the e-tickets by purchasing them from a web server, or simply receiving from a vendor, or from another user who previously acquired them. E-tickets can be stored in desktop computers, smart phones or personal digital assistants for future use. For some cases, E-tickets are nontransferable example airline e-ticket, it has to be validated to prevent duplication, and ensure authenticity and integrity. A user first has to relay it to server for validation before using an e-ticket

2.3 Reservation Information Systems

The online reservations system was one of the earliest changes to improve efficiency in the transport industry. Transport Reservation System eventually evolved into the computer reservations system (CRS). Train Reservations System (TRS) is a computerized system used to store and retrieve information and conduct transactions related to Rail travel. The systems was originally designed and operated by airlines, but were later extended for the use of other transportation means. (Wikipedia, 2012).

Major online reservation system operations that book and sell tickets for multiple transport industries are known as Global Distribution Systems (GDS). Transportation industry has divested most of their direct holdings to dedicated GDS companies, who make their systems accessible to consumers through Internet gateways. Modern Global Distribution Systems typically allow users to book hotel rooms and rental cars as well as airline tickets (Wardell & David 1991)

Modern Global Distribution Systems typically allow users to book hotel rooms, rental cars, airline tickets as well as train ticket (Wardell, 1991). Global Distribution Systems (GDS) is a worldwide computerized reservation network used as a single point of access for reserving train ticket, airline seats, hotel rooms, rental cars, and other travel related items by travel agents, online reservation sites, and large corporations. The premier global distribution systems are Amadeus, Galileo, Sabre, and World span. They are owned and operated as joint ventures by major rail companies, airlines, car rental companies, and hotel groups.

2.3.1 Components of Reservation Information Systems

These are complete Information Technology subsystems that make the reservation Information System operational; they are compatible in nature and the failure of one component may affect the operation of the others with in the system. They consist of computer resources, data, people, and procedures used in the modern transport companies.

2.3.2 Hardware

This is defines as individual physical devices and material used in information processing. Specifically, it includes not only machines like computers but also data media i.e. all tangible objects on which data are recorded from sheets of paper to magnetic disks. Others include keyboards, mouse, printers, scanners etc. (O"Brien, 2001)

2.3.3 Software

Rochester et al. (1996) assert that software includes all sets of information processing instructions and it comprises of different types of programs that enable the hardware to carryout different tasks. Software is further categorized into system software and Applications software. System software is concerned with keeping the computer system working while Application software is the general purpose or written for a specific task like stock control. It

may be written using a programming language or more general purpose piece of software such as database.

2.3.4 Data

Rochester (1996), defines data as all raw and unprocessed facts that can readily be used. Clearly no database system can exist without data. The basic factor upon an organizations processing and information needs are founded. Data elements and relationships must be precisely defined and the definitions must be accurately recorded in the data dictionary.

2.3.5 People

According to (O‟Brien, 2001), these are required for the operation of all information systems. They include end-users and information system specialists. End-users are people who use an Information System. The reservation information system specialists help in the development and operation of information system. They include system analysts, programmers, computer operators and others. People, are probably the component that most influence the success or failure of information systems

2.3.6 Procedures

These are set of instruction about how to combine the above components in order to process the information and generate the desired output. They consist of the way how to log on to the DBMS, use of different forms and manipulations throughout the project.

2.3.7 Database

Wells (2002) defined Database is a collection of non-redundant data, which can be shared by different application systems. Or database is a collection of data as well as programs required to manage that data. According to Merril Wells the importance of data has been obvious from time immemorial. Before the advent of computers, this was written in books or registers; these could

be considered as manual" databases. Ever since computers were introduced as a means of sorting data, the concept and structure of a database have undergone a sea change. Database creation and maintenance is a gradual and continuous procedure being influenced by system software such as database management systems.

Database users state their requirements to the database using the data definition languages (DDL) and the data manipulation languages (DML) via the database management systems. The database management system surely provides an interface between the users programs and contents of the data base. During the creation and subsequent maintenance of the data base contents, the DDL and the DML are used for the following, add new files, expand the database, delete the absolute records, adjust data, and expand the database capacity, link up the data items and many others.

2.4 Types Of Reservations In Reservation System

> Guaranteed Reservation: This insures that the company will hold an item for the customer until a specific time following the customer's scheduled date. In return, the customer shall guarantee his/her reservation of an item unless reservation is properly canceled. In order to guarantee a reservation, customers might opt for one of the following methods.

- Prepayment guaranteed reservation

- Credit card guaranteed reservation.

- Advance deposit or partial payment

- Travel agent guaranteed reservation

> Non-guaranteed Reservation: Insures that the company agrees to hold an item for the customer until a stated reservation cancellation hour on that day. A reservation agent always makes sure to encourage their customers to guarantee their reservations especially in the high season.

However, the intended system will use the guaranteed Reservation.Where reservations are guaranteed only when a customer make payment on the site or at the train station.

2.5 Types Of Information System

Information System is a combination of people, hardware, software, communication devices, network and data resources that processes (can be storing, retrieving, transforming information) data and information for a specific purpose. The types are;

2.5.1 Transaction Processing System (TPS)

This is a computerized system that performs and records daily routine transactions necessary to the conduct of the business. TPSs are information systems that process data resulting from the occurrence of business transactions. Example: payroll system; production instructions. The system uses the transaction processing method (TPS) and the decision support system (DSS) that involves a centralized database system.
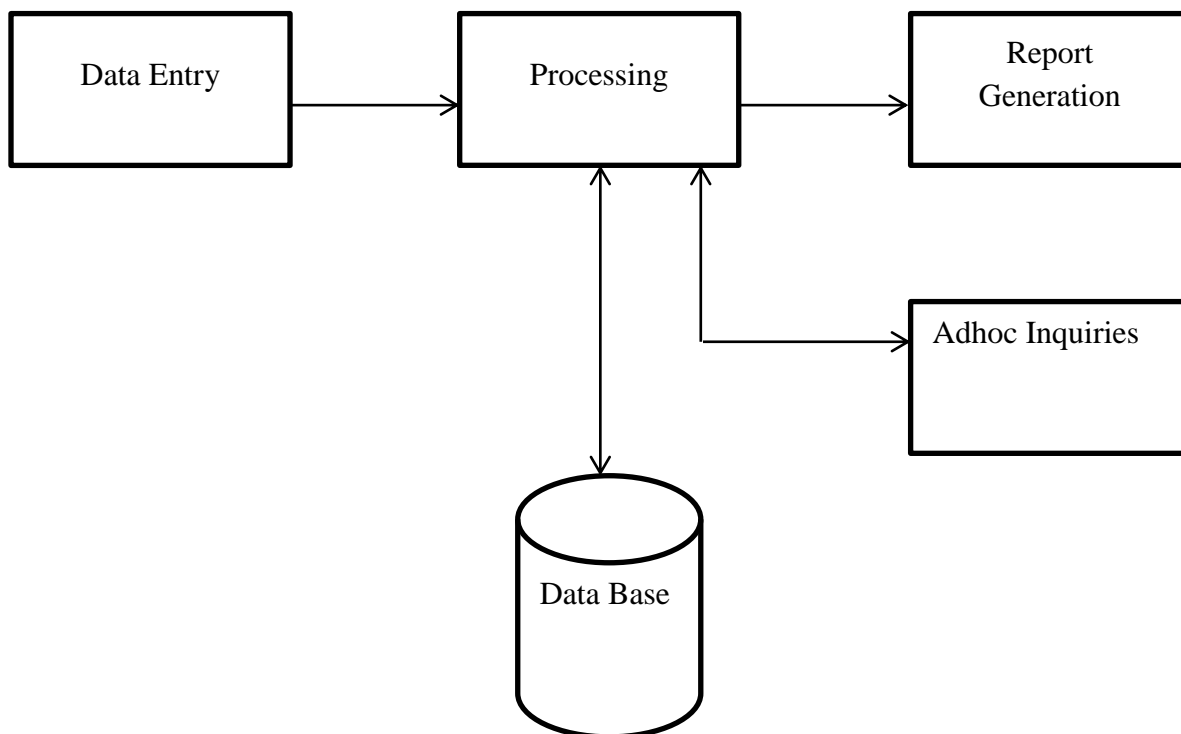

Figure 2.1 Five Stages of Transaction Processing System

2.5.2 Management Information System (MIS)

These are mainly concerned with internal sources of information. MIS usually take data from the transaction processing systems and summaries it into a series of management reports. Hence MIS provides information for managing an organization. Information from MIS helps managers to monitor and direct the organization

2.5.3 Decision-support systems (DSS)

These are specifically designed to help management make decisions in situations where there is uncertainty about the possible outcomes of those decisions. DSS comprise tools and techniques to help gather relevant information and analyze the options and alternatives. DSS often involves use of complex spreadsheet and databases to create "what-if" models (Finley et al. 1994).

2.5.4 Executive Support System (ESS)
This is designed to help senior management make strategic decisions. It gathers analyses and summarizes the key internal and external information used in the business. A good way to think about an ESS is to imagine the senior management team with the instrument panel showing them the status of all the key business activities. ESS typically involves lots of data analysis and modeling tools such as "what-if" analysis to help strategic decision-making (Stair, 1996).

2.6 Application Of Reservation Systems

Computer Reservations Systems (CRSs) are used for hosting rail transport, airline inventory and seat reservation transactions. Originally designed, owned and operated by airlines, the use of CRSs had been extended to travelling means as a distribution tool. Over the years CRSs have evolved into Global Distribution Systems (GDSs) that host inventory of multiple booking systems and other modes of travel and travel related associated services such as room reservation, ticket reservation systems for football games, train reservation for reserving train seats and many more others Nasim (2010).

2.7 Advantages Of Reservation Information Systems

1. Convenience; One advantage of booking a hotel, train, flight or car rental online is the convenience. Being able to make all your travel plans on the Internet means you can do it any time of the day or night at home, or while you are on your lunch break at the office. Customers on the go can even make reservations on their smartphones or tablets. There is no need for lengthy phone calls or visits to a travel agency, with just a few minutes and a click of the mouse, you will have all your plans finalized, Diane, (1993).

2. Changes and Cancelations; it is simple for travelers to change or cancel online reservations. Instead of calling the train station, hotel or airline and waiting for a customer service representative to help you through the process, booking online means you can do it wherever you have Internet access.

3. Customer Reviews; Making a reservation over the phone or at a travel agency does not allow you to check out what past customers have thought of transport agencies (railways, hotel chains or certain airlines). Another benefit of making online reservations is being able to see these customer reviews. Diane, (1993)

2.8 Limitation Of Reservation Information System

The reservation information system has its setbacks but the online system is noticed for the inability to provide live help to customers, when you book online, you usually can't ask a live person questions about hotel rooms, flight routes, railway route, visa requirements or anything else you're concerned about. This has been a hitch in the reservation systems for many decades.

3.0 Methodology

The methodology describes the procedures, tools, techniques that were employed to achieve the specific objectives of the train reservation system. The development of the System was based on the model on Fig. 3.1 known as the waterfall model. It involved requirement determination, requirement analysis, system design, implementation, testing and validation. This approach below describes the sequence of steps involved.
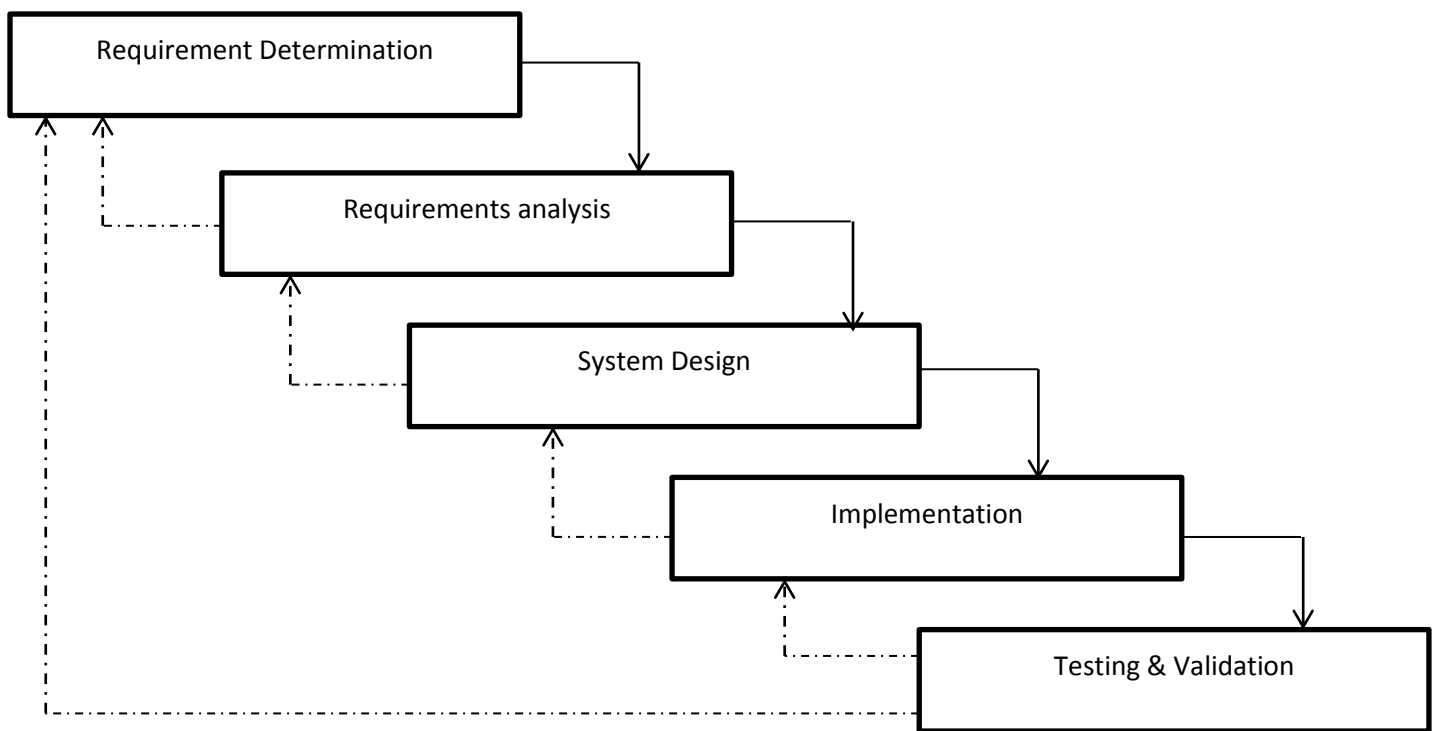

Figure 3.1 The System Study And Design Model

3.1 System Analysis

System analysis can be defined as a process of investigation of a real or planned system to determine the function of the system, identify the problems of the system, analyzing and synthesizing the various factors and determining a satisfactory solution. The purpose of the system analysis is for an analyst to look carefully into the manual system and automate it into

computerized system. This was carried out on the existing system. It helped to show the weaknesses of the existing system. The researcher used various methods to collect information about the current system as shown below.

3.1.1 Oral Interviews

These were carried out on some customers and staff of the Nigerian Railway Corporation (NRC). Who are the users of the current manual system? These were about how customers book/board the train, how customer data and information is stored and how trips are scheduled and management is done.

This method had the following advantages;

i.   The researcher was exposed to firsthand information from the current administrators of the current system; this helped the researcher to get the feel of the current system

ii.   ii. The researcher was able to ask follow up questions and this helped him to gain more insight into the current system

3.1.2.   Study of the Manual system

Existing boarding and booking system formats was studied and some of the important features taken note of and was applied in the implementation of the new system.

3.2 Requirements Analysis

The primary goal of this phase was to create a detailed Functional Specification defining the full set of system capabilities to be implemented, along with accompanying data and process models illustrating the information to be managed and the processes to be supported by the new system

It involved examination of the collected data. Models such as Data Flow Diagrams (DFD) and Entity Relationship Diagrams (ERD"s) were used to model individual processes and data

respectively. Under here requirements were classified as functional and nonfunctional requirements, the determination and analysis of requirements helped the researcher to achieve his second objective.

3.2.1 Functional Requirements

The following requirements were captured for the intended use of the system.

- **User account:** The registered user can directly do the booking of train and if there is a new user he may register or he only sees the train details. But for the reservation of ticket he must register first.

- **Creation of new user account:** When there is a new customer he should fill the form containing field like Username, First name, Last name, phone No and Password.

- **Checking Availability:** To check the available train the user should input the origin city and destination city, date of journey.

- **Reservation of Seat:** After providing all information the system will ask user for confirmation. After confirming the information the seats get reserved.

- **Canceling / Rescheduling of Ticket :** To reschedule reservation the customer should log into his account and can change departure date and time.

3.2.2 Non-functional requirements

The application was designed to fulfill the following non-functional requirements.

- **Performance Requirements**: Performance of the system is dependent on the bandwidth of the internet and also the hardware itself.

- **Security Requirements**: There is only one authorized person who can see the confidential Information. The information of the customer is only available for the administrator.

- **Software Quality Attributes:** The system is very user friendly, interoperable and flexible

3.3 System Design

This showed the application of system theory to product development by defining the architecture, components, modules, interfaces and data for a system to satisfy specified requirements. The goal of design phase was not just to produce a design for the system; instead it was to find the best possible design within the limitations imposed by the requirements and the physical as well as the social development in which the system was to operate (Stair, 1996). The system design process was divided into logical, conceptual and physical design.

In Logical design; the logical model of the system was developed indicating all the vital steps the system development went through. Here, the researcher used case tools like flow charts and data flow diagrams. Conceptual design was a description of the proposed system in terms of a set of integrated ideas and concepts about what it should do, behave, and look like, that was understandable by the users in the manner intended. The Physical design was the physical realization of logical design. Tables, forms and reports were created and relationships defined among these tables and security constrains set during the physical design the researcher translated the expected schemas into actual database structures. In here the researcher achieved his third objective.

3.3.1 Description Of The Current System

The current system is based on manual system .staff at the bus ticket counter is using an internal system to sell ticket at the counter. Customer is unable to buy bus ticket online at this moment and has to go to the counter to buy bus ticket. Sometimes, customer needs to queue up a long queue to buy bus ticket and ask for information. Besides that, customer also not allows buying bus ticket through telephone and Transnational's telephone line is always busy. This brings a lot

of inconvenience to the customers Bus Ticket Reservation System enables the customer to buy bus ticket, and ask for information online easily. Furthermore, staff can sell bus ticket using Bus Ticket Reservation System after check bus ticket availability for the customer and print the bus ticket to the customer that queue up in the counter.

3.4.2 Description Of The Proposed System

The system is very simple in design and to implement. The system requires very low system resources and the system will work in almost all configurations. It has got following features:

• It will ensure data accuracy.

• Records will be efficiently maintained by DBMS.

• Availability of seats can be enquired easily.

• Minimum time needed for the various processing.

• It will provide better Service.

The system design is to create a technical solution that satisfies the functional requirements for the system. At this point in the project life cycle there should be a Functional Specification, written primarily in business terminology, containing a complete description of the operational needs of the various organizational entities that will use the new system. The challenge is to translate all of this information into Technical Specifications that accurately describe the design of the system, and that can be used as input to System Construction.

3.4.2 Architecture Of The Proposed System

This process supports existing infrastructure requirements and provides specific recommendations for hardware and network solutions based on existing and projected user needs. Application requirements, data resources, and people within an organization are all

important in determining the optimum hardware solution. It is represented using a three tier architecture that comprises of user interface, process management and Database Management System (DBMS). It shows the components of the system, the services they provide and the way they communicate to bring about the system functionality.

3.4 Use Case Diagram

Use case diagram visually represents what happens when a user interacts with a system; it captures the functional aspects of a system.

OLINE TRAIN RESERVATION
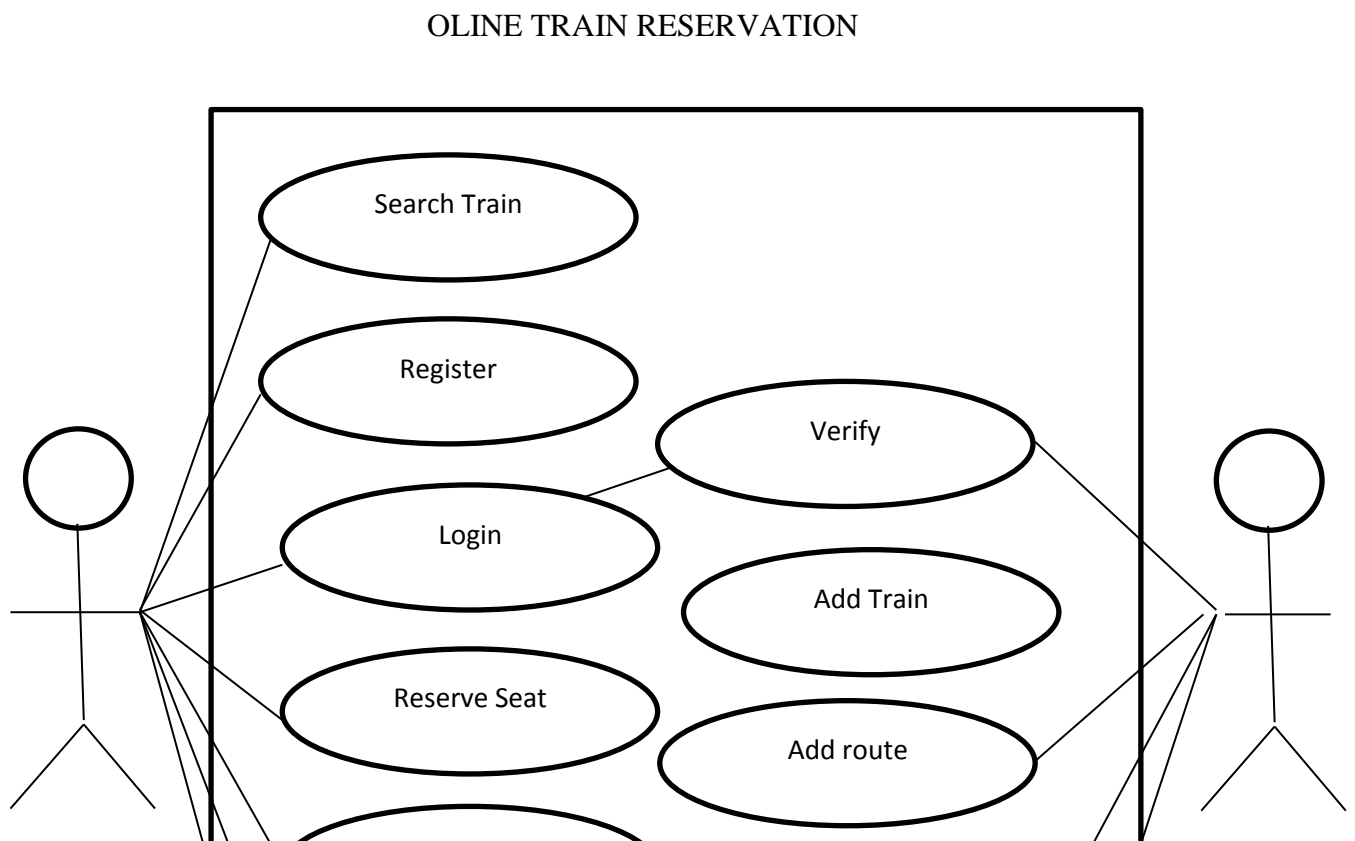
CUSTOMER   ADMIN

3.6 Database Design

Under this section, the various entities, their corresponding attributes and data types, as well as

the relationships among them were defined basing on the user requirements. It also involves the

construction of a suitable data model for the system.

3.6.1 Entities

a. Passenger (customer)

The person who is booking for purposes of travel

b. Railway detail

The train to travel in

c. Journey details

The details of the planned destination

d. Ticket details

The details of the ticket

e. Schedule details

Details of the journey schedule
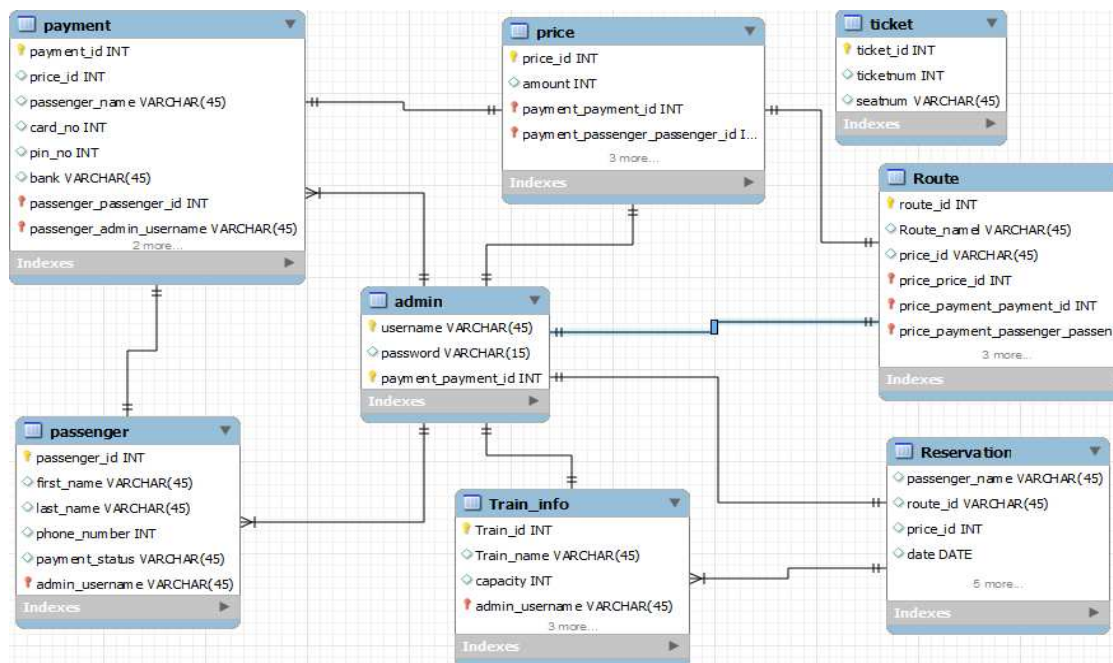
Figure 3.2 showing the data base logical design for a train reservation system

3.6.2 Table Attribute Description (Physical Design)

MySQL Database was used in the design of the new system database. Below are the database structure and specifications

Table 3.1 Customer_Table

Field Name	Type	Size
customer_id	Int	11
First_name	Varchar	45
Last_name	Varchar	45

Phone_Number	Int	11
Username	Varchar	45

Table 3.2 Train_table

Field name	Type	Size
Train_id	Int	11
Name	Varchar	40
Capacity	Int	11
Status	Int	11
Date_added	Timestamp	

Table 3.3 Route_table

Field Name	Type	Size
Route_id	Int	11
Train_id	Int	11
Name	Varchar	45
Price	Double	
Departure_date	Varchar	11
Departure_time	Timestamp	

Table 3.4 Reservation_Table

Field Name	Type	Size
Reservation_id	Int	11
Source	Varchar	25
Destination	Varchar	25

Customer_id	Int	11
Num_of_seat	Int	11
Price	Double	
Tranx_id	Varchar	60
Departure_date	Varchar	50
Departure_time	Varchar	50

Table 3.5 Customer_account_table

Field Name	Type	Size
Cust_acc_id	Int	11
Cust_id	Int	11
Card_type	Varchar	50
Card_pin	Int	11
Balance	Float	
Card_number	Varchar	50

3.7 Choice and Justification of Programming Language Used

So many programming languages were considered in the cause of designing this software. A lot of factors were put into consideration which includes online database access, data transmission via networks, database security, database retrieval online, multi user network access, online data capture, etc.

The choice for PHP- MySQL was made to enable us achieves the above set objectives. Moreover, PHP- MySQL is very user friendly and enables the design of an interface that can be modified programmatically. Also MySQL database is a robust database that can guarantee database integrity, database protection, and accommodate large database.

CHAPTER FOUR: SYSTEM IMPLEMENTATION

4.1 System Design Objectives

The Online Train Reservation System (OTRS) is a software application to assist railways with transactions related to making ticket reservations, which includes, reserving, canceling and rescheduling tickets.

From the viewpoint of the railways the system provides the following

1. The system should minimize repetitive work done by the system administrator and reservation clerks.

2. The system should maintain customer information in case of emergency, e.g. rail cancellation

3. The system should minimize the number of vacant seats on a train and maximize capacity utilization.

4. The system should reduce effort and frustration for travelers in scheduling a trip, especially by reducing the search effort for the train they need to take.

5. The system should make it easy for travelers to check the ticket status or make changes to their trip.

4.2 System Design

This was divided into Logical, conceptual and physical design

4.2.1 Logical design

In this case the logical model of the system was developed indicating all the vital steps the system development went through. In this, the research used case tools like flow charts and data

flow diagrams. These models were vital in the development of the system. This stage included the graphical user interface design, input design in which the user inputs in data, the output design which displays the results of what a user will have entered, and database design where data is stored for easy management. These designs provided the technical blueprint from which the system was built. A combination of layout tools such as hand sketches and CASE tools were used to come up with both input and output designs. Database design was based on the Relational data model and the database management system employed was MySQL.

4.2.2 Conceptual design

This was a description of the proposed system in terms of a set of integrated ideas and concepts about what it should do, behave, and look like, that will be understandable by the users in the manner intended. The process begun with identifying the entities required by the users and then identifying all the important relationships that exist between the entities. The result was the model of the user interface that has been developed.

4.2.3 Physical design

This was the physical realization of logical design. Tables, forms and reports were created and relationships defined among these tables and security constrains set. During the physical design the researcher translated the expected schemas into actual database structures and at this time, he had to map:

i.   Entities to tables

ii.   Relationship to foreign key constraints

iii.   Attributes to columns primary unique identifiers to primary key constraints

iv.   Unique identifiers to unique key constraints

v.   Attributes to columns.

4.5 System Implementation

The Online Train Reservation System (OTRS) provides the following types of easy-to-use, interactive, and intuitive graphical and telephonic interfaces.

1. The OTRS provides an easy-to-use, intuitive Graphical User Interface (GUI) as part of the Administrator's working desktop environment.

2. The OTRS also provide an interactive Graphical User Interface, on the World Wide Web for the general customers.

The system working scenario is as follows:

1. The customer should register himself in order to proceed to book ticket service.

2. The customer needs to input all the required particular details during the registration process.

3. Upon successful login, the customer will be registered officially to the web service and he can login using his username and password.

4. The guest is only permitted to check Rail availability and route.

4.6 System Users

- Administrator

This is the person charged with responsibility of updating system content

- Customer (Registered user)

The person who accesses the system from the user point of view

4.7. Implementation Requirements

The implementation requirements depend on the system specifications. These are the hardware and software requirements that the system runs on. The system supports all Pentium III clients

and above computers, operating systems, Linux, Windows NT, and Mac. The client computer must have internet connectivity to have access to the web server through TCP/IP.

The system should be installed on any server computer running on either Linux or windows architecture. The server should have at least 10 GB of RAM and I Terabyte of storage space and running on processor speed of at least 10 GHz.

4.8 System Execution Sequence

This is divided into two, User's environment and Administrator environment

4.8.1 User's environment

a) Home Page

This appears when the URL of OTRS is typed in any browser. While on this page customers can choose to register and continue to book tickets or view Train schedules, journey details and access the contact us page. However for a user to book a ticket or a Train, he/she must be registered first.
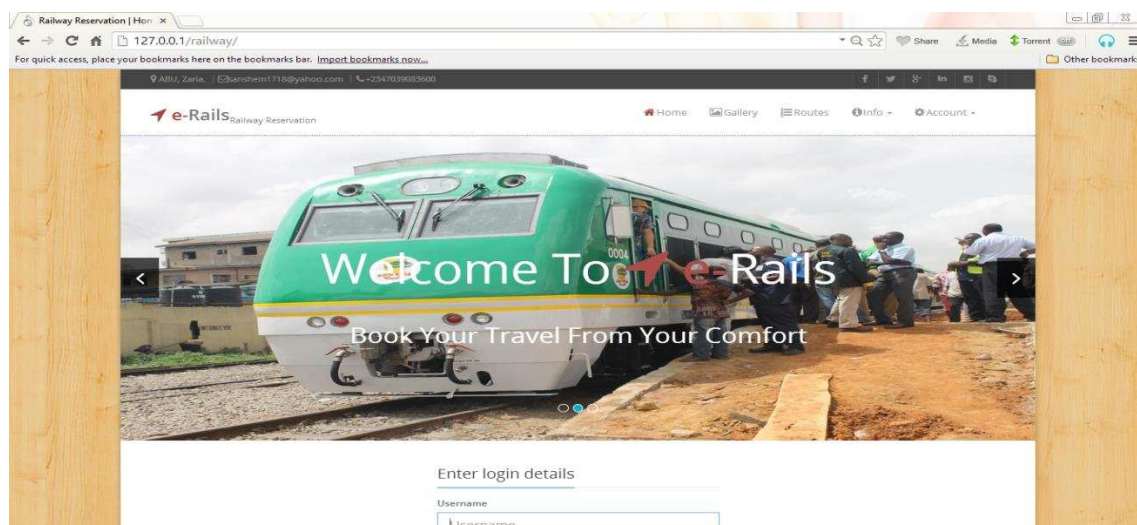
Figure 4.3 Showing the Welcome Interface

b) Registration Form

This form is used by customers (Passengers) to register before booking a Train or ticket. The user must first register. To access this page the customer clicks on the register link on the home page. The customer Id and Customer password fields are mandatory, which means the customer must fill them before adding the record.

Figure 4.4 Showing Customer Registration Form

c) Customer Login Interface

This interface is as a result of a successful Registration. This interface enables a customer to log into his/her account, where they can start making reservation or view previous reservations. This interface is accessed by entering the correct username and password and clicking on find record.
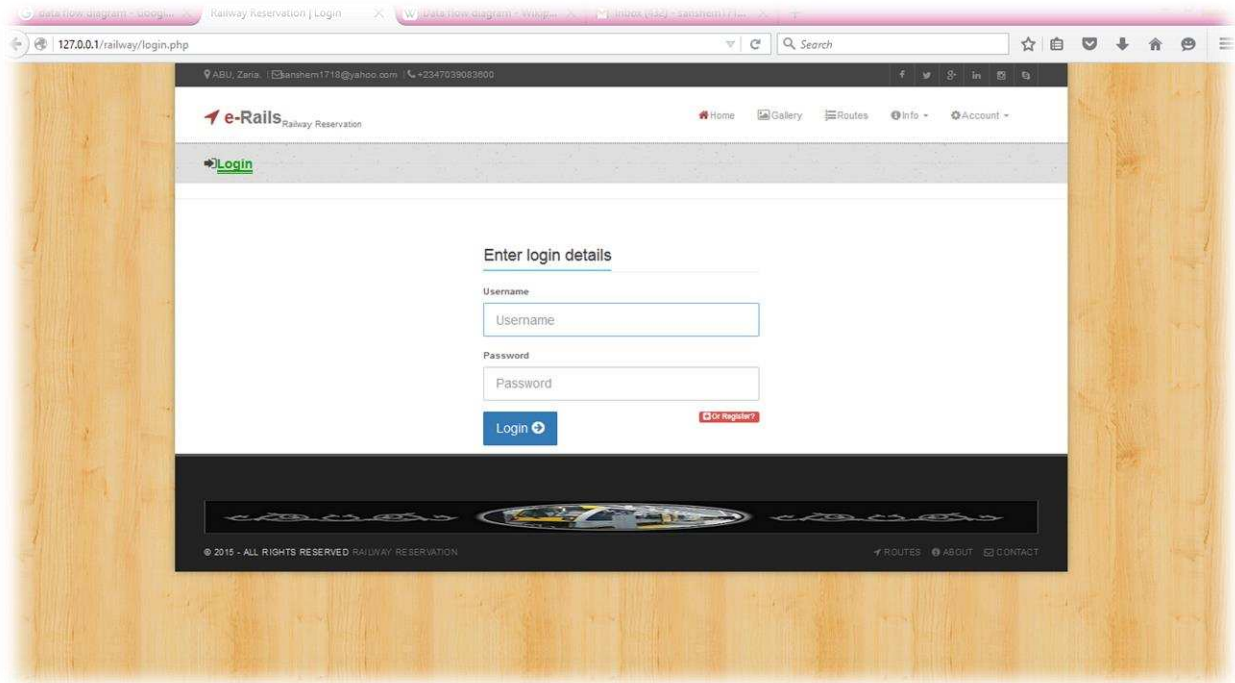
Fig 4.5 showing the login interface

d) Train Booking Form

This is accessed by clicking on start reservations on page/interface. This form is used by the registered customers to book Train/railways. All fields on this form are mandatory hence the user is expected to fill all the fields.
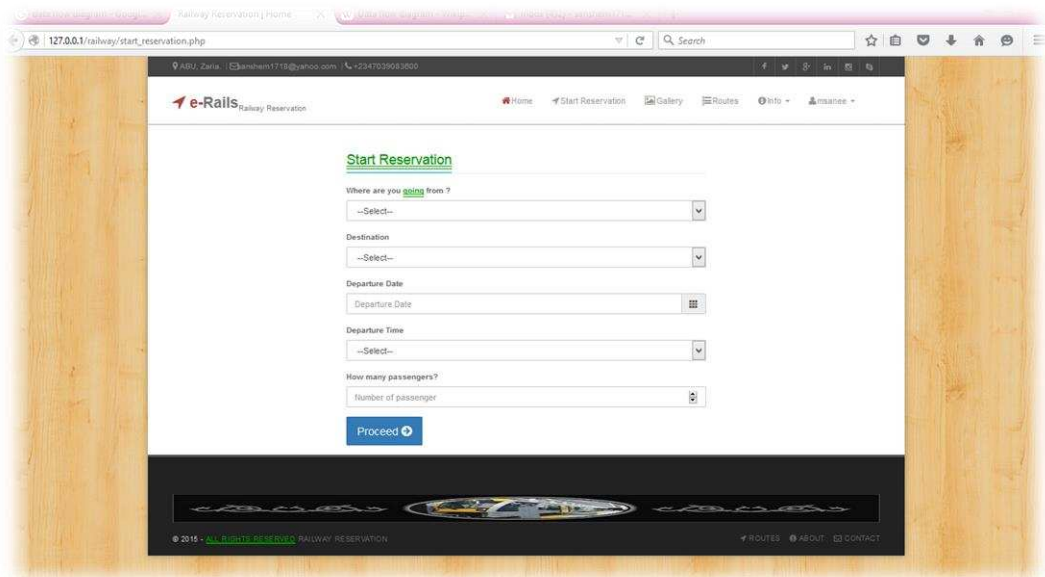
Fig. 4.6 showing Train Booking Form

e) Payment Interface

This interface is as a result of completing the reservation. Customer has the option of paying using debit/credit card or payment at point of departure.
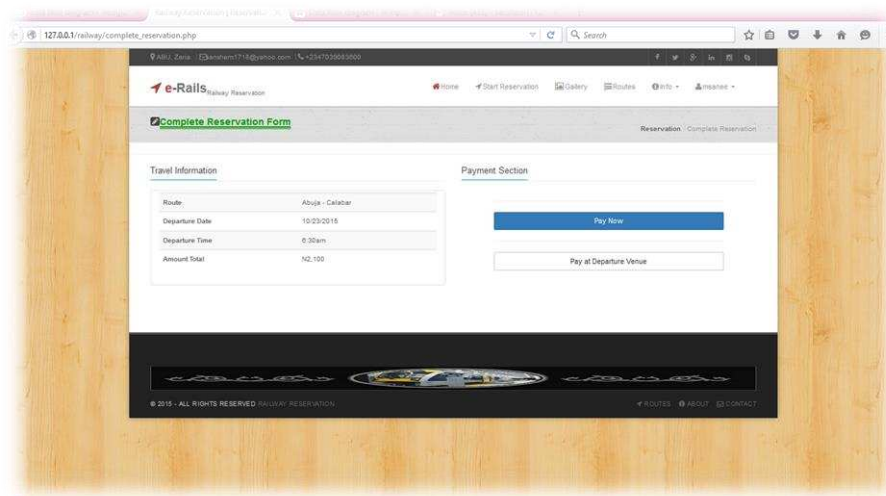

Fig 4.7 showing the payment interface

f) Ticket Detail Interface

This interface appears after a successful ticket booking process. The user is require to note the ticket Id as it will be required during train booking.
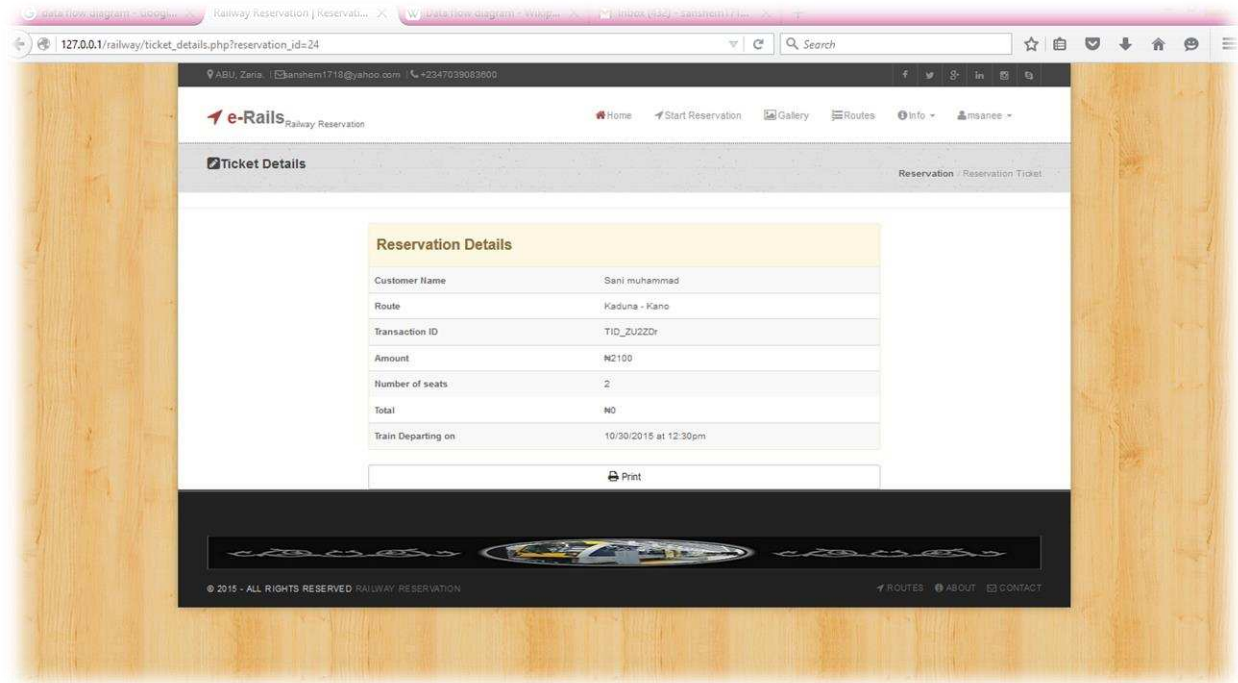
Fig 4.7 showing Ticket Detail Interface

g) Ticket rescheduling

This form is accessed after logging into an account, the user can click on my reservation button on the interface/ page. This form is used by customers who had already booked a ticket to reschedule their ticket in case they want to do so. To achieve this customer will edit his previous schedule plan and click on update Reservation. However, this is only achieved when payment is not made.
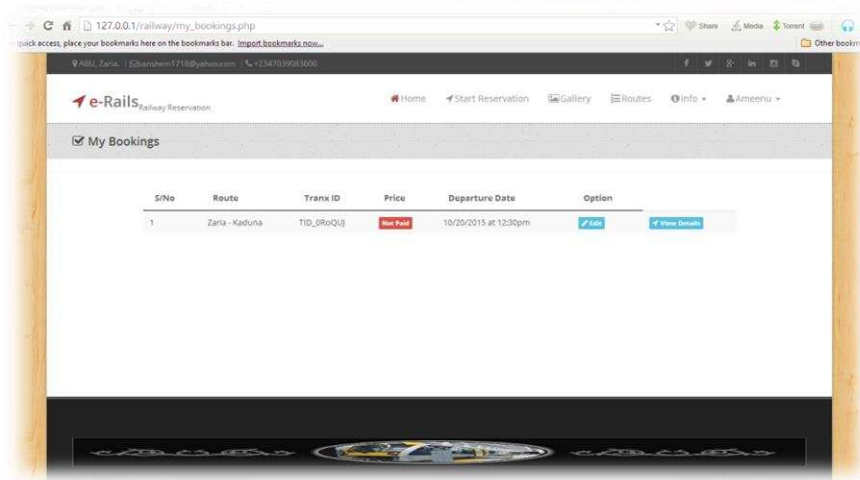
Fig 4.8 Showing Ticket Rescheduling

4.8.2 Administrator Environment

This is restricted environment; it is used by the administrator to change system content. It's accessed by clicking login link on the system menu. Access to this environment requires an admin password. Once the correct admin password is entered the person will have access to modify/ delete and all control of the system.

a) Administrators Home Interface

This is the administrator's home interface; it's accessed when a correct admin password is entered in the interface above. Once on this interface the administrator can Add Train, delete train, add route, delete route reschedule train, verify ticket information, change database passwords and control every aspect of the system.
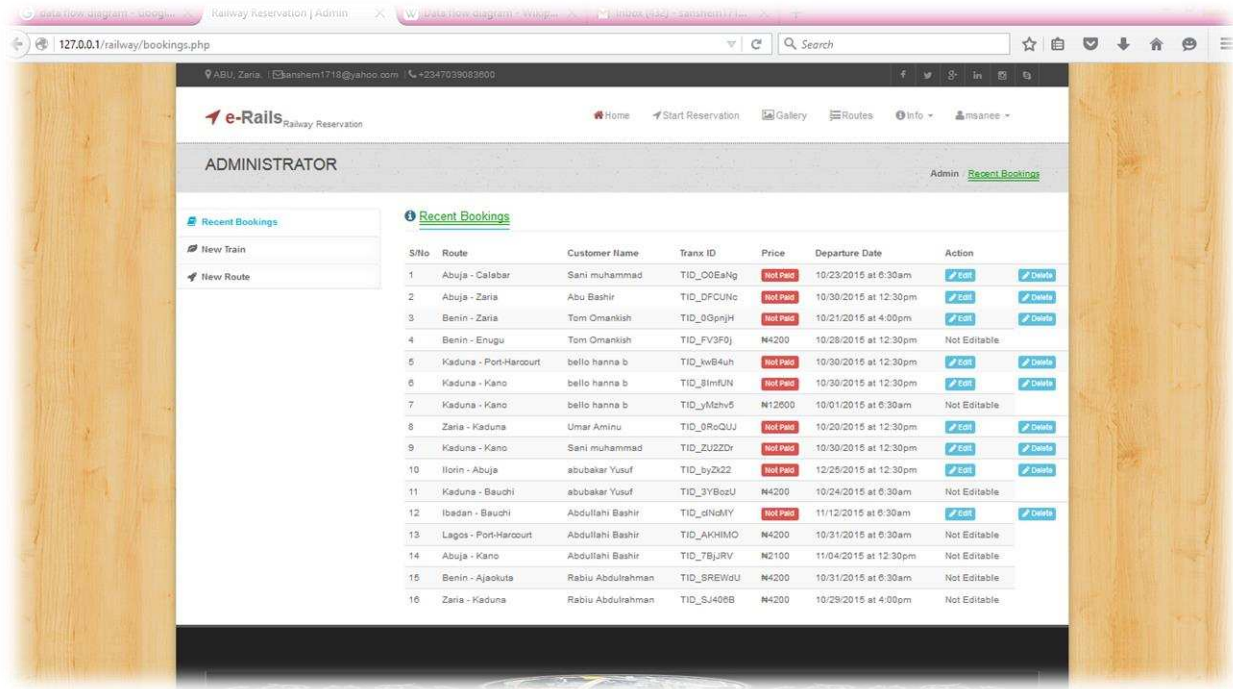
Fig. 4.9 Showing Administrators Home Interface

b) Add Schedule Interface

This interface is used by the administrator to add route /schedules in the system. Schedules added here can then be available for booking by the customer. In here the administrator can add a new schedule or update an existing schedule.
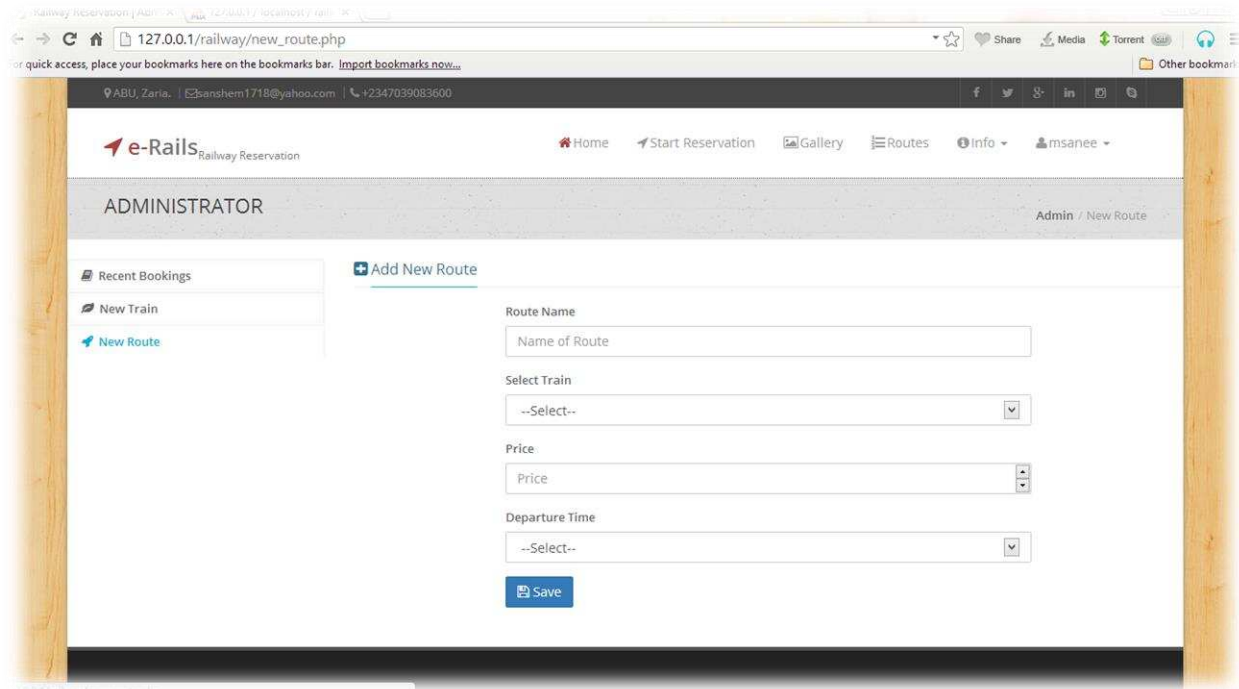
Fig 4.10 Showing Add Schedule Interface

c) Booking Information Interface

This interface is used by the administrator to view booked schedules, Tickets, route and trains. This interface gives a record of what has been booked.

3.6 System Implementation

This involved putting together or building various elements of a system for example Mysql/PHP for database Wamp Server for hosting the web pages. This is the stage in which the actual system was recognized. The technical architecture defined in the design stage was the baseline for developing the system. The interface ware designed using HTML, PHP, and Java script languages. This is because these languages provided tremendous friendly user interfaces; that is easy to learn and affordable. The database was designed in MYSQL basing on Wamp Server software. MYSQL provides a high level of security to the database, that is, authentication which can either be during the logging in to the database or on DML commands such as delete, add or even edit, it also reduces redundancy. In here the researcher achieved his second objective

3.7 System Testing

This involved testing the system in order to correct errors or remove defects that rose. This stage involved testing the source code to make sure that it produced the expected and desired results when subjected to a set of predefined conditions. It was subdivided into three major phases, that is, unit testing, system testing and user acceptance testing.

Under unit testing, specific parts of the source code were tested. Emphasis was put on the website-database connections to ensure that information sent by a user from the web page form reaches the systems database.

System testing involved putting the entire software to test in order to find out whether or not the functional requirements of the system had been efficiently and effectively integrated and satisfied.

Finally User acceptance testing was done; this was a key factor for the success of the system performance. The system under consideration was tested for user acceptance by constantly keeping in touch with the system users.

CHAPTER FIVE: **SUMMARY, RECOMMENDATION AND CONCLUSION**

5.1.   Summary

Today Railways are under unprecedented pressure to produce economic results or perish as fuel, labor, and asset costs escalate and demand declines, many companies are taking important role in transportation, and to make reservation reliable they need a strong system that will make reservation easier, faster and safer. The project designed is to meet requirements of an online train reservation system. It has been developed in XHTML, PHP, CSS, JAVASCRIPT and database has been built in MySQL. By using this application, the companies can provide reservation services and information to their customers without the limitation of office hours or manpower. Not only does it let customers book trips around the clock from any location with an internet connection but it is also designed for use by the company to internally manage their business processes; minimizing human errors and overcoming difficulties and problems that arose in the previous system.

The Train Ticket Reservation System will enable the customer to buy and pay for train ticket, ask for information online easily and even cancel a reservation. Furthermore, staff can sell ticket using Train Ticket Reservation System after checking train ticket availability for the customer and print the ticket to the customer that queue up in the counter. The method to solve this problem is to create an online train booking ticket system using System Development Life Cycle (SDLC). Customer can buy the bus ticket over the Internet, 24 hours a day, 7 days a week and the train ticket can't be lost, stolen or left behind.

5.2 Conclusion

Before modern computing, the reservation system was done using manual means. This means that a person about to travel had to spend a lot of unnecessary time waiting in queues in order to book their tickets. The manual process of reservation was also prone to human errors, which lead

to a lot of dissatisfaction amongst travelers. Nowadays competition is so fierce between transport industries that there are lot of discounts and a lot of luxuries given to customers that will give an edge to that particular industry. The online train reservation automates these processes of booking railways tickets online, thus reducing the time wasted as well as the errors that are involved in the manual process. People will argue that online reservation system are expensive, and create unfair competition between industries that don't use them.

From the research view, online train reservation is one the best innovation that has taken place in the rail industry and those companies that have not yet embraced online reservation system ought to lose out, they may sight additional costs, maintenance cost and the cost of development as their drawbacks but business is more than any other occupation, it is a continual dealing with the future; and continual calculation, an instinctive exercise in foresight. World Wide Web and the Internet is here and transport companies for the future will seize this opportunity to develop online reservation systems and prosper.

5.3 Recommendations

There is always room for improvement, and the software created can also be improved. This is especially because is created within a limited time. With more time, the software can be improved to include security and different types of users. This would be the first step in making the software network-enabled, and eventually more robust. This was the original after-thought to programming the software, In addition, the software can also be improved in terms of the calculations it can do, and more flexibility.

The research recommends the following about the system:

1. The administrators and staff of Railway company be trained on how to use the system, thus enabling them to understand the functionality of the entire system.

2. More research on this system is required to fully identify and eliminate some of the weaknesses and integrate it with banks to enable online payment

3. There is need for the system upgrade as user's requirements change. User requirements differ with time, therefore, it is of great help for the system to be flexible enough.

REFERENCES

Ainin, S., & Mohezar, J. N. (2008). *E-Ticketing as a New Way of Buying Tickets.* Kuala Lumur: Kamal-Raj.

Asad, A., & N.K, A. M. (2012). Design and Developing Online Iraqi Bus Reservation System. *International Jornal of Scientific Knowledge*, 50-62.

Athukorale, & Dissanayake. (2008). *Automated Train Ticket System.* Moratuwa: Univercity of
    Moratawa.

Athukorale, A., & Dissanayake, C. (2008). *Automated Train Ticket System.* Moratuwa:
    Univercity of Moratawa.

Farah, N. (2008, April 24). *Dspace*. Retrieved September 4, 2015, from unimap:
    http://dspace.unimap.edu.my:80/xmlui/handle/123456789/3112

Joshua, A. (2000). *Public–Private Participation to Rescue Railway Development in Nigeria.*
    Ibadan: Feature press.

kumar, N., & A.Gopikrishna. (2015). A Robust and Secure Online Bus ticket Reservation
    system. *International journal of computer science*, 159.

Melisa, K. (2007). *Online Train Ticketing System.* Kuala Lumpur: University of Malay.

O‟Brien, J. a. (2001). *Management information system* .

Payton, P. (2004). *Oxford Dictionary of National Biography.* Oxford: Oxford press.

Rochester, J. B. (1996). *"Tools for Knowledge Workers"Using Computers in Information.*
    Indianapolis.

Ryan, S. (2010). *The Impact of online Reservation System.* Houston: University of Houston.

Wardell, D. J. (1991). *Airline Reservation Systems.* Researcher Paper.

Wells, M. (2002). *"Introductory Microsoft Access* .

Winston, C. (1995). The Evolution of the Airline Industry. *Brookings Institution* , 61-62.

Wikipedia. (2012). Retrieved October 6, 2015, from ,

http://en.wikipedia.org/wiki/Computer_reservations_system

http://en.wikipedia.org/wiki/Computer_reservations_system

APPENDICES