ONLINE BUS RESERVATION SYSTEM

By

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Unlimited praise for Allah as the number of his creatures, the gratification of himself, the weight of his throne, and the extension of his words

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to all of my colleagues who assisted and supported, thanks

And to my partner in this project Razan Ahmed for her cooperative, indirect or directly contribution in finishing my project
DEDICATION

I dedicated my hummable efforts to my caring loving

MATHER and FATHER

And to the one and only person that I share a lot of sweet splendid memory with, for his love and

Kindness support that kept me going
ABSTRACT

Most monetary transactions on the world have a tendency to be electronic, in light of the fact that it gives effectiveness, security, precision and unwavering quality. In Sudan staffs at the ticket counter are using the manual system to sell tickets and manage the bus seat booking. Travelling companies spends a substantial cost to manage the reservation process.

Online bus reservation system allows customers to reserve seats, buy and pay tickets online the organization can give reservation administrations and data to their clients without the limitation of office hours or manpower. Not just does it let clients book trips around the clock from any location with an internet connection. yet it is additionally 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.
المستخلص

معظم المعاملات النقدية في العالم تميل إلى أن تصبح إلكترونية، في ضوء حقيقة أنه يعطى فعالية وأمن ودقة عالية.

الموظفين في السودان غي عداد التذاكر يستخدمون النظام اليدوي لبيع التذاكر وإدارة عملية حجز مقاعد الحافلة السفرية. مما يؤدي لأن تنفق الشركات السفر تكلفة كبيرة لإدارة عملية الحجز.

نظام الحجز في الحافلات السفرية عبر الإنترنت يسمح للعملاء لحجز المقاعد وشراء ودفع التذاكر عبر الإنترنت. باستخدام الدفع الإلكتروني في الباصات السفرية شركة النقل تعطي إدارات الحجز والبيانات لعملائها دون التقيد بساعات العمل أو القوى العاملة إذ يمكن لعميل الحجز على مدار الساعة من أي مكان به اتصال بالإنترنت. بالإضافة إلى ذلك يستخدم النظام الإلكتروني من قبل الشركة لإدارة عملياتها التجارية الداخلية والتقليل من الأخطاء البشرية والتغلب على الصعوبات والمشاكل التي نشأت في النظام الدفع اليدوي.
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LIST OF ABBREVIATIONS

EPS    Electronic Banking Services Co Ltd.
NFC    Near Field Communication.
RAM    Random Access Memory.
ROM    Read Only Memory.
SMS    Short Message Service.
PIN    Personal Identification Number.
WAP    Wireless Access Point.
PDA    Personal Digital Assistant.
CBOS   Central Bank Of Sudan.
SQL    Structure Query Language.
CSS    Cascading Style Sheet.
DOS    Denial-Of-Service Attack
MITM   Man In The Middle
XAMPP  Cross-Platform (X), Apache (A), MariaDB (M), PHP (P) and Perl (P).
PHP    Hypertext Processor
SQL    Structure Query Language
CSS    Cascading Style Sheet CSS
CHAPTER ONE
INTRODUCTION

Overview
An electronic payment system is a way of making transactions or paying for goods and services electronically without using cash or checks. In order to accept funding and meet customer needs, companies like traveling companies are accepting payments in many more forms than cash or checks. The application . is developed to make it easier for customers to reserve their ticket. The ycan simply book the ticket using the web page. In addition, customers can check the availability of the bus ticket before they reserve the ticket.

Problem statement
Currently, staffs at the ticket counter are using the manual system to sell tickets and manage the bus seat booking. company spends a large cost need to hire a developer to build a system for them. Many people find it hard to contact and go to the bus counter each time they want to find whether there is available ticket on the time they want to depart. It will take quite some time to do the process of finding the available ticket and often involved some cost to do so.

Objectives
- Manage reservations and seating effectively
- Safe and secure payment gateway module
- Detail reports for managing trips
- Save time spent by standing in queue for purchase of your
- Pay online using online payment facility
- Take a ticket printout
- Counter booking using online application
- Generate detailed report of sales details
- Manage various trips, rates and types
- Allow users to reserve seats online
- Allow user to pay for tickets online by Integrating system with EBS and benefiting of their services
- Build a secure system
- Participate in Reducing cash transaction to solve the traditional payment problems
- provide the better work efficiency, security, accuracy, reliability, feasibility.
- Reducing The error to almost nil
- Improving working conditions

**Thiess layout**

This thesis would be presented in five (5) chapters in well-structured and coordinated order as outlined below:

Chapter one (Introduction): is a general introduction of the project, it gives the general idea of the project and its objectives. Also the problem statement which is a clearly defined of the problem. finally the organization of the thesis.

Chapter two (Literature Review): This chapter presents description and explanation for various technologies used, definition of payment system and its forms, the history of electronic payment, the types of electronic payments, security and authentication in electronic payment, and the e-payment in public transport.

Chapter three (Methodology):

This chapter introduces a brief description of the system. And approaches overall framework used in building the system. Also it includes a brief description of the software and hardware components that were used, system functional and non-functional requirements, database design, and the payment process.

Chapter four (Results and test): This chapter shows the results obtained when the system executed, and discusses tests performed on the system

Chapter five (Conclusion and future work): This chapter provides the project conclusion, limitations, and future work will be performed to improve this project.
CHAPTER TWO
LITERATURE REVIEW

2.1 Definition

A payment system is any system used to settle financial transactions through the transfer of monetary value, and includes the institutions, instruments, people, rules, procedures, standards, and technologies that make such an exchange possible. A common type of payment system is the operational network that links bank accounts and provides for monetary exchange using bank deposits.

2.2 forms of payment

2.2.1 cash payment

There are many problems with the traditional payment systems that are leading to its fade out:

- Lack of Convenience: Traditional payment systems require the consumer to either send paper cheques by snail-mail or require them to physically come over and sign papers before performing a transaction. This may lead to annoying circumstances sometimes.
- Lack of Security: This is because the consumer has to send all confidential data on a paper, which is not encrypted, that too by post where it may be read by anyone.
- Lack of Coverage: When we talk in terms of current businesses, they span many countries or states. These business houses need faster transactions everywhere. This is not possible without the bank having branch near all of the company’s offices. This statement is self-explanatory.
- Lack of Eligibility: Not all potential buyers may have a bank account.
- Lack of support for micro-transactions: Many transactions done on the Internet are of very low cost though they involve data flow between two entities in two countries.

The same if done on paper may not be feasible at all.
advantages of cash:

- Easy to transport and transfer.
- No transaction costs (no third party is involved directly).
- No audit trail is left behind (that’s why criminals like it).

2.2.2 electronic payment

Electronic Payment is a financial exchange that takes place online between buyers and sellers. The content of this exchange is usually some form of digital financial instrument (such as encrypted credit card numbers, electronic cheques or digital cash) that is backed by a bank or an intermediary, or by a legal tender.

There are four main types of electronic payment: namely, the online credit card payment system, the electronic-cash payment system, the electronic-check payment system, and the smart-card-based electronic-cash payment system.

The characteristics of the payment device can have an important bearing on how easy the system is to use. The payment device could be a Contactless Smart Card. Another technology development involves the use of near field communication (NFC). NFC enables use phone to make payments just like a smart card. Make it easier and more convenient for consumers by making it simpler to make transactions, exchange digital content, and connect electronic devices with a touch.

These days you can pay for calls, for transit, and for parking using a transponder or tag, a smart card, or a smartphone. The latest in smart card technologies allows the card to be held close to the reader or to a reading plate, with no contact required. The card does not need to be inserted into a slot. Short-range communication technologies allow data to be transferred from the smart card to the reader and vice versa. This avoids customer issues related to difficulties in inserting a card in a slot and makes the system mechanically more reliable. Needless to say, the wireless messages communicated are required to be secured through the use of encryption.
2.3 History of electronic payment

Electronic systems grown at first to process checks between one bank and another, and afterward later used to process different sorts of electronic exchanges amongst shoppers and shippers (for example, a client educates a bank to automatically deduct their checking account to pay a monthly bill of a service organization)

The origin of e-payment is related to the beginning of the web. Alongside the web development, pioneer online payment services started to operate in the first half of the 90s. In 1983, a research paper by David Chaum introduced the idea of digital cash. In 1990, he founded Digi Cash, an electronic cash company, in Amsterdam to commercialize the ideas in his research. In 1994 Stanford Federal Credit Union was established – the first financial institution which offered online internet banking services to all of its members. But, first online payment systems weren’t user-friendly at all and required specific learning of encryption or data transfer protocol.

Furthermore, the systems weren’t adjusted to steady changing of clients’ number and their exchanges. In 1997, Coca-Cola offered buying from vending machines using mobile payments. After that PayPal emerged in 1998. Other system such as e-gold followed suit, but faced issues because it was used by criminals and was raided by US Feds in 2005. In 2008, bitcoin was introduced, which marked the start of Digital currencies.

At the outset, the main players on the e-payment market were Millicent (founded in 1995), E-Cash or Cyber-Coin (both in 1996). The majority of the first online services were using micropayment systems and their common attribute was the endeavor to implement the electronic cash alternatives (such as e-money, digital cash or tokens).

In addition, in 1994, the Amazon is founded (one of the e-commerce pioneers) and Pizza Hut starts accepting online food ordering. [1]

Although, in all nations cashes still the overpowering decision as a shopper installment system, especially for exchanges of little volumes (less than $100 USD). in creating nations—and to be sure in some created ones, for example, the United States—and speak to a moderately direct approach to start an installment.
2.4 Types of E-payment:

It is important to note that electronic payment systems rely on a number of transfer options. Today, there exist a wide variety of electronic payment systems, the main types of electronic payment system represent different ways to transfer money:

2.4.1 Smart card-based electronic payment system:

A smart card was first produced in 1977 by Motorola. It is a thin, credit card sized piece of plastic which contains a half-inch-square area that serves as the card’s input-output system. A smart card contains a programmable chip, a combination of RAM and ROM storage and can be refilled by connecting to the bank. It is known as smart card because the ability of chip to store the information in its memory makes the card smart. [2]

The smart card as a payment instrument has processing power that allows the smart card payment system to be used for multiple functions and/or applications. This of course, reduces the overall number of cards in the consumer’s wallet, though there are many arguments and issues about whether or not smart card is secured and safe enough to store such information.

International standards for the smart card procedures and the smart card itself are both still evolving. In general, smart cards currently cannot display information or directly accept input from the user. For the user to access the information the smart card contains, the card needs an interface to communicate with a reader or terminal, such as a merchant point-of-sale. [3]

2.4.2 Online payment system:

Online payments are based on Internet Banking and involve transferring money or making a purchase online via the Internet. Consumers can transfer money to third parties from their bank account, or they can use credit, debit and prepaid cards to make purchases online. [4] Credit card is the most used in online payment, a credit card is an account that lends money to the consumer, meaning consumers are allowed to purchase goods or services on credit. The credit card, being a token of trust, transfers the risk of granting credit from a merchant to the card-issuing bank. Both consumers and merchants must register with a bank. The participants involved in credit card payments include:
- Customer/Cardholder: The consumer doing the purchase, using a credit card that has been issued by its issuer.
- Issuer: The financial institution (i.e. bank) that issues the card to the cardholder. The issuer guarantees payment for authorized transactions.
- Merchant: The merchant offers the goods and services, and has a financial relationship with the acquirer.
- Acquirer: The financial institution of the merchant. The acquirer processes credit card authorizations and payments. [3]

![credit card processing steps](image)

**Figure 2-2-1: credit card processing steps**

### 2.4.3 Mobile phone based payment system

This system allows consumers to use their mobile phone in order to pay for transactions in several ways. Consumers can send an SMS message, transmit a PIN number, use WAP to make online payments, or perform other segments of their transaction with the phone. As phones develop
further, consumers are likely to be able to use infrared, Bluetooth, NFC and other to transmit full account data in order to make payments securely and easily from their phone.

Mobile devices may include mobile phones, PDAs, wireless tablets and any other device that connect to the mobile network and allow payments to be made. Mobile payments can become an alternative to paper money, cheques, credit cards and debit cards. It can also be used for payment of bills, electronic funds transfer, Internet banking payments, direct debit and electronic bill presentment [5]. SMS banking is a service that is offered from banks to its customers, permitting them to operate selected banking services over their mobile phones using SMS messaging. [6]

2.4.4 Electronic Cash (e Cash) Payment System

Electronic cash (e-Cash) also called digital cash is digital money that provides private customers with a safe, fast and low-cost means of payment on the Internet. Created by lots of individual parties, it moves through multiple networks instead of the current bank system and is best suited for micropayments. Electronic cash is independent of any network or storage device and portable. The electronic cash units and their values can be defined independently of real currency.

The application of e-cash requires that both the merchant and the customer establish e-cash accounts at the issuing bank, which issue tokens to their customers. In this electronic payment system, tokens are the payment instruments that represent monetary values. A customer must install a "cyber wallet" onto his computer, which will store the money requested from the bank. In e-cash transactions, the payee does not know the payer's identity and the issuing bank may or may not keep the identity of the recipient of the electronic bank notes, which makes the customer to remain anonymous.

Anonymity of users and double spending of the same tokens have been the major security holes of e-cash payment system. The only security mechanism provided by e-cash payment system is the encryption of payment instruments (tokens or coins) generated by a given customer. It makes use of single-factor authentication mechanism, which is not adequate for electronic payment systems involved in critical portions of payment processing [3].
2.4.5 Electronic Cheque (e Cheque) Payment System

Electronic cheques are the equivalent of paper-based cheques. The electronic cheques are initiated during an on-screen dialog and the funds are transferred over a computer network at the time of the transaction. Authorized users are assigned a portable electronic cheque book which is an amalgam of a secure hardware device and specialized software [7].

The payer writes the e-Cheque on a computer, cryptographically signs it, and e-mails it via the Internet. The payer signs the e-Cheque using the secure hardware device, and includes its authenticating certificate, signed by the issuing bank. The payee receives the e-Cheque, verifies the payer's signature on the e-Cheque, endorses it, writes a deposit slip, and signs the deposit slip [3].

The e Cheque is protected by PIN and digital signature. This means that it makes use of a two-factor authentication mechanism in verifying the users during payment process [3].

2.5 Security in e payment systems

The security is a critical aspect of any payment system, today the security issues that threaten Electronic payment systems are changing constantly, and often extremely quickly [8]. The most common threats include:

2.5.1 Viruses: spread via email or by downloading infected files. Nowadays there are thousands of different types of computer viruses and internet malicious programs. Malicious software can easily attack the mobile banking payment system by taking up passwords on the web browser or any cached information on operating system [5].

2.5.2 Worms: They are standalone programs that do not require a host program for activation and spread themselves independently from computer to computer by exploiting security vulnerabilities or configuration errors in operating systems or applications [9].

2.5.3 Trojan horse programs: the greatest threat to the e-Payment systems because they can bypass or subvert most of the authentication and authorization mechanisms used in an electronic transaction. The Trojan horses aim to spy on sensitive data (e.g. passwords, confidential data, etc.) and send it back to their owners to gain access to third-party computers and thus take control of them remotely [10].
2.5.4 denial-of-service attack (DoS): is attempt to make computer resources unavailable to its intended users (for example "flooding" a network in order to prevent access to a service or a particular device by disrupting the service and not allowing access to a specific device). The DoS attacks typically target sites or services hosted on web servers such as banks or credit card payment gateways.

2.5.5 Phishing and Pharming: methods used to solicit personal information by posing as a trustworthy organization. Phishing attacks use email or malicious websites to solicit personal information. Usually the attacker sends an email seemingly from a reputable credit card company or financial institution that requests account information, often suggesting that there is a problem. When users respond with the requested information, attackers can use it to gain access to the accounts [11].

Pharming is a type of fraud that involves diverting the client Internet connection to a counterfeit website, so that even when he enters the correct address into his browser, he ends up on the forged site.

2.5.6 Man-In-The-Middle (MITM): a type of attack where attackers intrude into an existing connection to intercept the exchanged data and inject false information. It involves eavesdropping on a connection, intruding into a connection, intercepting messages, and selectively modifying data [12].

2.5.7 Spoofing: is a situation in which one person or program successfully masquerades as another by falsifying data and thereby gaining an illegitimate advantage. A common method of spoofing consists in sending a message that appears to be from someone else [5].

2.5.8 Solutions:

- Encryption: Most online payment systems use an encryption system to add security to the transmission of personal and payment details. There are various encryption schemes in use to prevent from frauds of online payments.
- Digital Signatures: The parties involved in online payments, transactions should use digital signatures in order to ensure authentication of transactions.
Firewalls: A firewall is an integrated collection of security measures designed to prevent unauthorized electronic access to a networked computer system to protect private network and individuals machines from the dangers of the greater internet, a firewall can be employ to filter incoming or outgoing traffic based on a predefined set of rules called firewalls policies [2].

2.6 AUTHENTICATION MECHANISMS FOR ELECTRONIC PAYMENT SYSTEMS

It is therefore necessary that a method and system for authenticating the identity of a user by an authority makes use of multiple layers of protection. The method and system can be augmented by requesting for different security credentials such as PIN, cryptographic key, digital signature, biometrics, etc. to establish multiple layers of authentication.

the authentication factors mechanism should be strong to withstand the various kinds of internet threats used by cybercriminals. The layers of authentication mechanisms used by the different electronic payment systems are:

- A single-factor authentication mechanism uses or requires a user to prove his or her identity with an item of data only.
- A two-factor authentication presents two independent pieces of information in two coherent and dependent steps of just one single process.
- A three-factor authentication presents three independent pieces of information in three coherent and dependent steps of just one single process.

Table 2.1 shows the categories of electronic payment systems with their number of authentication-factor and authentication types [3].

Table 2-1: Electronic payment systems with their authentication factors and types

<table>
<thead>
<tr>
<th>Electronic payment systems</th>
<th>Number of authentication factor</th>
<th>Authentication type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic cash (e Cash)</td>
<td>1</td>
<td>Token encryption</td>
</tr>
<tr>
<td><strong>Electronic cheque (eCheque)</strong></td>
<td>2</td>
<td>PIN, digital signature</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>Smart card</strong></td>
<td>3</td>
<td>PIN, digital signature, biometric (fingerprint)</td>
</tr>
<tr>
<td><strong>Online credit card</strong></td>
<td>2</td>
<td>PIN, digital signature</td>
</tr>
</tbody>
</table>

### 2.7 E-payment in public transport

Electronic payment systems for transportation include ETC applications, transit ticketing applications, and car parking applications.

![Diagram](image)

**Figure 2-2-2: Electronic payment systems applications for transportation**
Electronic Toll Collection is a system for automated collection of tolls from moving or stopped vehicles through wireless technologies such as radio-frequency communication or optical scanning.

Electronic Transit Ticketing system involves the use of a smart card to make payment for trips on a transit vehicle. The smart card can hold the balance available on the card itself or can simply be used as an account key to deduct money from a central account similar to toll collection. The user can add additional funds to the card at transit agency offices, participating retail outlets, and on the web by transferring money from a credit card. Transit passes can also be stored on the smart cards for specific trip quantities or unlimited rides. This application is also known as automated fare collection or electronic fare payment.

According to the Smart Card Alliance, there were 15 million smart cards and 20,000 smart card readers in use by U.S. transit agencies in 2006, and public parking constituted an approximately $17 billion industry in 2006. This was composed of systems, equipment, facilities maintenance, and a variety of services, including revenue management. More than $1 billion was spent annually on parking revenue control systems, software, equipment, and related support services. Both off-street and on-street parking applications can be supported by electronic fee collection. In the case of off-street parking, there are a number of access point technologies and pay-on-foot technologies that can be used. Similarly, for on-street parking, smart parking meters and pay-on-foot parking kiosks can be utilized to allow drivers to pay using a smart card or a cell phone as a new technology for enhancing public transport services, smart card ticketing for public transport is becoming increasingly popular across the world.

One of the advantages of the smart card technique in public transport systems is that passengers can avoid handling cash for payment when boarding, therefore journey time can be reduced. Moreover, smart cards have greater security, higher reliability, and higher resistance to fraud than other payment means. Also it reduces Fare evasion, the unlawful use of public transport facilities by riding without paying the applicable fare [13].

2.8 EBS

Electronic Banking Services Co. LTD. known as EBS, is a technology organization jointly owned by Central Bank of Sudan (CBOS), commercial banks, and telecom companies.
EBS is the technical arm of Central bank of Sudan (CBOS); that provides and operates most of the national payment systems on behalf of Central Bank of Sudan, and the commercial banks of Sudan.

EBS aspires to be the leading trusted payment gateway providing a variety of E-payment solutions and services, to participate in developing the National Sudanese economy, by working with our partners banks, Governmental institutions, telecommunication companies and private sector under regulation of Central bank of Sudan, to spread the E-payment culture amongst the diversity of Sudanese society.

*Figure 2-2-3: 3 EBS SUDAN*
CHAPTER THREE

METHODOLOGY

Introduction

This chapter introduce a brief description of the system. And approaches overall framework used in building the system from define the requirements. Also it includes a brief description of the software and hardware components that were used.

Design Preparations

The design preparations is a phase before the actual development, they include the determination of the development tools and determination of the technique used to develop the application.

Determine Development Tools

Online bus reservation system has been developed by XAMP. It is a local web server which provides the suitable environment for PHP and SQL. XAMPP stands for Cross-Platform (X), Apache (A), MariaDB (M), PHP (P) and Perl (P).

Cross platform means it can be run in any computer machine and with any operating software. And the Apache is the most famous open source web server which is required for running most of the application like PHP. Maria DB is the popular database server which is open source. It supports the PHP. PHP is an open source general-purpose scripting language provides an environment for web development. PERL (Practical extraction and reporting language) is a high-level general purpose programming language. It is used in developing the web application.

System Requirements

Functional requirements

Functional requirements define the specific functions that the system performs, along with the data operated on by the functions. The functional requirements are presented in scenarios that depict an operational system from the perspective of its end users. Included are one or more examples of all system features and an enumeration of all the specific requirements associated with these features:
• The system shall incorporate mechanism to authenticate its users.
• The system shall verify and validate all user input and should notify in case of error detection and should help the user in error correction.
• The system shall allow sharing of files in the system.
• The system shall allow quick messages to be exchanged without face to face interaction.

Non-Functional Requirement

Non-functional requirements address aspects of the system other than the specific functions it performs. These aspects include system performance, costs, and such general system characteristics as reliability, security, and portability. The non-functional requirements also address aspects of the system development process and operational personnel. It includes the following:

• The system shall be user friendly and consistent.
• The system shall provide attractive graphical interface for the user.
• The system shall allow developer access to installed environment.
• The system shall target customer base.

System Description

The system is a web-based application that allows visitors to reserve seats, buy and pay ticket online. The proposed bus reservation system was developed using PHP Hypertext Processor (PHP), Structure Query Language (SQL), Cascading Style Sheet (CSS).

The design will take the following approach: designing the database, creating relationships, designing the user interfaces and the system processes

The system will work in almost all configurations. It has got following features:

• It will guarantee information precision.
• Availability of seats can be enquired.
• Passengers can reserve seats easily.
• Passengers can also pay for tickets easily.
- Minimum time required for the different preparing.
- It will provide better Service.

**System Flow Chart**

**User Activities**

The most common activities carried out by user are illustrated below:

- The user can choose journey date and the suitable,
- The user can check for the available seat
- The user can also do payment for the seat on the proposed system
- The user can print receipt on the system as evidence of payment

**Administrator Activities**

- The administrator can login to system.
- The administrator gives acknowledge to any payment user made on the system.
- The administrator can edit information of bus already exist in system.
- The administrator can add new bus.
- The administrator can add new route.
- The administrator can delete reservations.
- Show the data of whole system.
Figure 4 Admin Activities
3.3 Database design

Database design is the process of producing a detailed data model of database. This data model contains all the needed logical and physical design choices and physical storage parameters needed to generate a design in a data definition language, which can then be used to create a database.

The database will be implemented using MySQL. The database that was used for this project was , the database name is ticket, it consists of four tables:

- Customer table:
The customer table is used to store the customer details, which are the ID (the primary key), the first name, the last name, the contact of the customer, the address, the bus, the transaction number which is randomly generated, the payable value, the status, and the reserved seat numbers.

![customer table diagram]

*Figure 3-6: customer table*

- Admin table:

  The admin table contains admin details, which are the ID (the primary key), the user name, and the password.

![admin table diagram]

*Figure 3-7: admin table*

- Route table:

  The route table is used to store route details, it contains the following fields: route ID, the route, route price, number of seats, the vehicle type, and the route time.
Figure 3-8: route table

- Reserve table:

The reserve table contains the reserve details, which are reserve ID, reserve date, the bus, number of reserved seats, transaction number, and seat.

Figure 3-9: reserve table

3.4 Payment process

The payment process is handled by EBS, when the customer reaches the payment interface, will be redirected to EBS, where it required to enter the card’s (ATM card or cash card) serial number which consists of 16 digits, and the password.

The serial number will be added to the national switch in EBS, which links all the banks, it will verify the validity of the card, and handles the transaction process.

The redirection will be with the total amount calculated according to the number of seats reserved, then it will be deducted from the account of the customer in the specific bank, and added
to the bus company bank account, and then the booking process done, the customer will be notified that the reservation has done by SMS or email.

Figure 3-10: payment through national switch
CHAPTER FOUR
RESULTS AND TESTING

Introduction
It shows the results and interfaces of the system with aid of images. Moreover, discusses tests performed on the system.

System Design
Below is the home page of the website, shows all the information users need to reserve seats. Also it has ADMIN LOGIN which leads to admin page.

Customer Side
First of all, users choose the journey details. They choose route, type of Bus, time of departure, date of travel, and number of seats they attempt to reserve. Maximum seats he could reserve is nine. as shown in figures 11 and 12.
Then they should enter their personal information: First name, last name, address, and contact number, Figure 13. And show bus layout figure 14

*Figure 12 Ticket Booking 1*
Figure 13 Ticket Booking 2

Figure 14 User Information page
After that they enter card number and card pin which sent to EBS via API to accomplished the payment process. Finally, the users given a ticket in form of PDF as an approval that the process went well.

Then they can print the ticket from print page, figure 15. But If there is no enough seat at the chosen bus, the No Enough Seats Message will show up, figure 16.
Print and present this details upon boarding the bus

**Print**

**Ticket Reservation Details**

- **Transaction Number**: 366bk173
- **Name**: رزان أحمد
- **Address**: أتبرمان
- **Contact**: 01234321765
- **Payable**: 300
- **Route and Type of Bus**: مدي لسائحي
- **Time of Departure**: 8:00 am
- **Seat Number**: 6, 7, 8, 9, 10
- **Date Of Travel**: 19/10/2017

**Home**

---

**Figure 17 Print Page**

---

**Figure 18 No Enough Seats Message**
**Admin Side**

To access to admin page administrator should login by entering the correct user name and password.

![Admin Page](image)

*Figure 19 Admin Page*

If the login process went well the administrator could access to all system information, Every reserved ticket information as shown at. And the information of all buses in the system image. also the seats inventory; seats that are reserved till this moment.
Figure 20 Dashboard

Figure 21 Bus

Figure 22 Seats Inventory
In addition he could display information filtered with any criteria he chose. This illustrated in figures below.
Moreover he can add and delete routes, modify and delete existing bus information.
Software Validation (Testing)

Computer system validation (sometimes called computer validation or CSV) is the process of documenting that a computer system meets a set of defined system requirements. Validation of computer systems to ensure accuracy, reliability, consistent intended performance, and the ability to discern invalid or altered records is a critical requirement of electronic record compliance. [14]

The following types of test were performed on the system:

- Unit Testing: Testing that each component works very well separately; Each module has been tested separately and passed the test.
- Acceptance (Validation) Testing: make sure that system really does the imposed requirements. Provides final assurance that software meets all functional, behavioral, and performance requirements.
- Stress Testing: put greater emphasis on robustness, availability, and error handling under a heavy load, rather than on what would be considered correct behavior under normal circumstances. to determine the stability of the system.
- Recovery Testing: the failure which is forced into an application to check how well the recover process is performed.
## Test Cases

### Admin Case:

The table below show all test cases for admin and how the system responds:

<table>
<thead>
<tr>
<th>Case ID</th>
<th>Test case</th>
<th>Expected output</th>
<th>Actual output</th>
<th>Pass / fail</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Login test</td>
<td>Login with proper details</td>
<td>Successfully</td>
<td>pass</td>
<td>Good</td>
</tr>
<tr>
<td>2</td>
<td>Exception handling for fail login</td>
<td>Showing a message with a cause of failure i.e wrong user name or password</td>
<td>Not Successfully</td>
<td>fail</td>
<td>Poor</td>
</tr>
<tr>
<td>3</td>
<td>Add route</td>
<td>Add route properly</td>
<td>Successfully</td>
<td>Pass</td>
<td>Excellent</td>
</tr>
<tr>
<td>4</td>
<td>Add and update bus information</td>
<td>Add and update bus information correctly</td>
<td>Successfully</td>
<td>Pass</td>
<td>Excellent</td>
</tr>
<tr>
<td>5</td>
<td>Filtering information</td>
<td>Filter information displayed based on the choosing criteria</td>
<td>Successfully</td>
<td>Pass</td>
<td>Excellent</td>
</tr>
<tr>
<td>6</td>
<td>Managing details</td>
<td>Manage information properly stored</td>
<td>Successfully</td>
<td>Pass</td>
<td>Good</td>
</tr>
<tr>
<td>7</td>
<td>View details of a reserved ticket</td>
<td>View reservation information properly</td>
<td>Successfully</td>
<td>Pass</td>
<td>Good</td>
</tr>
</tbody>
</table>

*Table 2 Test Case, Admin Case*
**Customer Case:**

Next table show all test cases for user and how the system responds:

<table>
<thead>
<tr>
<th>Case ID</th>
<th>Test case</th>
<th>Expected output</th>
<th>Actual output</th>
<th>Pass / fail</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Search information</td>
<td>Search information properly</td>
<td>Successfully</td>
<td>pass</td>
<td>Excellent</td>
</tr>
<tr>
<td>2</td>
<td>View bus information</td>
<td>View bus information properly</td>
<td>Successfully</td>
<td>pass</td>
<td>Good</td>
</tr>
<tr>
<td>3</td>
<td>Enter personal information</td>
<td>Enter personal information properly</td>
<td>Successfully</td>
<td>pass</td>
<td>Good</td>
</tr>
<tr>
<td>4</td>
<td>Exception handling for no enough seats</td>
<td>Showing a message with a cause of failure i.e no enough seats</td>
<td>Successfully</td>
<td>pass</td>
<td>Good</td>
</tr>
<tr>
<td>5</td>
<td>Reserve ticket information</td>
<td>Reserve ticket information properly</td>
<td>Successfully</td>
<td>Pass</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

*Table 3Test Case, Customer Case*
CHAPTER FIVE
CONCLUSION AND FUTURE WORK

CONCLUSION

These days, bus agencies are taking essential role in transportation, and to make reservation reliable they require a strong solid system that they will make reservation less demanding, speedier and more secure. This undertaking intended to meet requirements of a bus reservation system. Several steps have been performed to construct the software; the work mainly consisted of using ready-made libraries, modifying existing open source projects and writing codes from scratch. Development platform that was used is XAMP v3.2.1

It has been developed in XHTML, PHP, CSS, and database has been built in MySQL. By using this application, the organization can give reservation administrations and data to their clients without the limitation of office hours or manpower. Not just does it let clients book trips around the clock from any location with an internet connection. yet it is additionally 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 web site was developed, without the payment process by EBS

Limitation

However, the system still suffers some limitations such as:

- The website is not linked to EBS server
- Admin can not change the password

FUTURE WORK

The application can be enhanced by many extra features. Some of these features can be summarized as follow:

- Improving the user interface, because the user interface always can be improved
- Back end the system to EBS to achieve the payment process
- Develop mobile application, since it is more easy to use
- Develop a version for fees collection in public transport
- At the interface, Mark the reserved seats with red flags
- Users who u
References


APPENDIX

PHP code

Contact:

```html
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" !>
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title>Welcome to James Buchanan Pub and Restaurant</title>
<link rel="stylesheet" type="text/css" href="xres/css/style.css">
<link rel="icon" type="image/png" href="xres/images/favicon.png">
<link type="text/css" href="css/styles.css" rel="stylesheet" media="all">
</head>
<body>
<div id="wrapper">
<div id="header">
<h1><a href="index.php"><img src="xres/images/logo.png" class="logo" alt="James Buchanan Pub and Restaurant" /></a></h1>
<ul id="mainnav">
<li><a href="index.php">Home</a></li>
<li><a href="gallery.php">Gallery</a></li>
<li><a href="history.php">History</a></li>
<li><a href="routes.php">Routes</a></li>
<li><a href="location.php">Location</a></li>
<li class="current"><a href="contact.php">Contact Us</a></li>
</ul>
</div>
<div id="content">
<div id="gallerycontainer">
<div class="portfolio-area" style="margin:0 auto; padding:140px 20px 20px; width:820px">
<div id="contactleft">
<FLORIDA BUS<br>
(G.V. FLORIDA TRANSPORT, INCORPORATED)<br>
Barangay West Kamias, Cubao, Quezon City, Metro Manila<br>
Phone: +63(2) 3525393<br>

<FLORIDA BUS<br>
(G.V. FLORIDA TRANSPORT, INCORPORATED)<br>
Lacson Avenue Corner Earnshaw Street, Manila, Metro Manila<br>
Florida Bus Co., Manila<br>
```
Florida Bus Terminal in Tuguegarao City by G.V. Florida Transport, Inc.

Location: Diversion Road, Pengue-Ruyu Tuguegarao City Cagayan Valley

Contact Numbers:

Florida Bus Company Tuguegarao

846-2265 (078) ; 4259 846 (078) 63+

Telephone No: (632) 781-5894
<br><br>

Contact Form

<form class="validate" action="messageexec.php" method="POST">
<p>
<label for="name" class="required">Name:</label><br>
<input id="name" class="contactform" type="text" name="name" />
</p>

<p>
<label for="email" class="required">Email:</label><br>
<input id="email" class="contactform" placeholder="Example: john@doe.com" type="text" name="email" />
</p>

<p>
<label for="subject" class="required">Subject:</label><br>
<input id="subject" class="contactform" type="text" name="subject" />
</p>

<p>
<label id="message-label" for="message">Message:</label><br>
<textarea id="message" class="contactform" name="message" cols="28" rows="5"></textarea>
</p>

<input class="contactform" id="submit-button" type="submit" name="Submit" value="Submit" style="height: 35px" />
</form>
h4>+63(2) 3525393 &bull; <a href="contact-us.php">Barangay West >
<Kamias, Cubao, Quezon City, Metro Manila</a></h4>
<p>Hours of Operation &bull; Mon - Sun: 10:00 am - 12:00 am</p>
<p>&copy; Copyright 2013 Florida Bus | All Rights Reserved</p>

Database:

```php
<?
// $mysql_hostname = "localhost"
// $mysql_user = "root"
// "" = mysql_password
// $mysql_database = "ticket"
// "" = prefix

$bd = mysql_connect($mysql_hostname, $mysql_user, $mysql_password) or die("Could not connect database")
mysql_select_db($mysql_database, $bd) or die("Could not select database")
?>
```

Login:

```php
<?
start session()

Connect to mysql server
require "db.php"

Function to sanitize values received from the form. Prevents SQL injection

function clean($str)
    $str = trim($str); if(get_magic_quotes_gpc())
        $str = stripslashes($str); if($str)
            return mysql_real_escape_string($str)

Sanitize the POST values

$login = clean($_POST['username'])
$password = clean($_POST['password'])

Create query
$qry="SELECT * FROM admin WHERE username='$login' AND $password='$password'"
$result=mysql_query($qry)
while($row = mysql_fetch_array($result))
    level=$row['position']
?>
```
Check whether the query was successful or not

if($result)
{
    if(mysql_num_rows($result) > 0)
    {
        session_regenerate_id($member = mysql_fetch_assoc($result))
        ;SESSION['SESS_MEMBER_ID'] = $member['id']$
        ;SESSION['SESS_FIRST_NAME'] = $member['username']$
        ;()session_write_close
        }if ($level="admin")//
        ;header("location: admin/dashboard.php")
        ;()exit
    } else{
        Login failed;
        ;header("location: index.php")
        ;()exit
    }
} else{
    die("Query failed")
    ;}
<?php
include('db.php');
$id=$_GET['id'];
$setnum=$_GET['setnum'];
?>

(function gotoprint) {
  // Code goes here
}()
"<?php}
</script>
< "div id="stylized" class="myform">

<label>
  <span class="small">Enter Card Number</span>
</label>
<input type="text" name="address" id="name"/>
<label>
  <span class="small">Enter Card Pin</span>
</label>
<input type="password" name="pin" id="pin"/>
<button type="submit" onclick="gotoprint()">Confirm</button>
</div>

Print:

<script language="javascript">
(function Clickheretoprint()
{
  var disp_setting="toolbar=yes,location=no,directories=yes,menubar=yes;"
  disp_setting+="scrollbars=yes,width=400, height=400, left=100, top=25;"
  var content_vlue = document.getElementById("print_content").innerHTML

  var docprint=window.open("","",disp_setting)
  docprint.document.open
  docprint.document.write('<html><head><title>Inel Power System</title>')
  docprint.document.write('</head><body onLoad="self.print()" style="width: 400px; font-size:12px; font-family:arial;">')
  docprint.document.write(content_vlue)
  docprint.document.write('</body></html>')
  docprint.document.close
  docprint.focus
}
</script>

Print and present this details upon boarding the bus<br>
<a href="javascript:Clickheretoprint()">Print</a>

<div id="print_content" style="width: 400px;">
  <strong>Ticket Reservation Details</strong><br><br>
  <?php
  include('db.php')
  $id=$_GET['id']
  $setnum=$_GET['setnum']
  $result = mysql_query("SELECT * FROM customer WHERE transactionum='$id'")
  while($row = mysql_fetch_array($result))
  {
    echo 'Transaction Number: '.$row['transactionum'].'<br>'
    echo 'Name: '.$row['fname'].' '.$row['lname'].'<br>'
    echo 'Address: '.$row['address'].'<br>'
    echo 'Contact: '.$row['contact'].'<br>
Seat location:

```
<?php

$id = $_GET['id'];

$result = mysql_query("SELECT * FROM route WHERE id='$id'");
while($row = mysql_fetch_array($result))
{
    $seatnum = $row['numseats'];
}

<?
</div>
<a href="index.php">Home</a>
```
Contact:

FLORIDA BUS<br>(G.V. FLORIDA TRANSPORT, INCORPORATED)<br>Barangay West Kamias, Cubao, Quezon City, Metro Manila<br>Phone: +63(2)3525393<br><br>FLORIDA BUS<br>(G.V. FLORIDA TRANSPORT, INCORPORATED)<br>Lacson Avenue Corner Earnshaw Street, Manila, Metro Manila<br>Florida Bus Co., Manila<br>912-5354 ; 743-3809 (02) - Telephone No: (632) 781-5894<br><br>Florida Bus Terminal in Tuguegarao City by G.V. Florida Transport, Inc.<br>Location: Diversion Road, Pengue-Ruyu Tuguegarao City Cagayan Valley<br><br>Contact Numbers:<br>Florida Bus Company Tuguegarao<br>846-2265 (078) ; 4259 846 (078) 63+
<h3>Message Form</h3>
<form class="validate" action="messageexec.php" method="POST">
	<label for="name" class="required">Name: </label>
	<input id="name" class="contactform" type="text" name="name" />
</p>
	<label for="email" class="required">Email: </label>
	<input id="email" class="contactform" placeholder="Example: john@doe.com" type="text" name="email" />
</p>
	<label for="subject" class="required">Subject: </label>
	<input id="subject" class="contactform" type="text" name="subject" />
</p>
	<label id="message-label" for="message" class="required">Message: </label>
	<textarea id="message" class="contactform" name="message" cols="28" rows="5"></textarea>
</p>
	<input class="contactform" id="submit-button" type="submit" name="Submit" value="Submit" style="height: 35px" />
</form>
</div>
</div>
</div>
</div>
</body>
</html>

<h4>+63(2)3525393 &bull; <a href="contact-us.php">Barangay West &bull; Kamias, Cubao, Quezon City, Metro Manila &nbsp;</a></h4>
<p>Hours of Operation &nbsp; Mon - Sun: 10:00 am &nbsp; 12:00 am</p>
<a href="index.php"><img src="xres/images/footer-logo.jpg" alt="James Buchanan Pub and Restaurant" /></a>
<p>&copy; Copyright 2013 Florida Bus | All Rights Reserved</p>
Database:

```php
$db = mysql_connect($mysql_hostname, $mysql_user, $mysql_password) or die("Could not connect database");
mysql_select_db($mysql_database, $bd) or die("Could not select database");
```

Login:

```php
Start session;

Connect to mysql server;

Function to sanitize values received from the form. Prevents SQL injection

    function clean($str)
    {
        str = @trim($str);
        if(get_magic_quotes_gpc())
            str = stripslashes($str);
    }

    return mysql_real_escape_string($str);

Sanitize the POST values

    $login = clean($_POST['username'])
    $password = clean($_POST['password'])

Create query

    qry="SELECT * FROM admin WHERE username='$login' AND $password='$password'"
    ;result=mysql_query($qry)
    while($row = mysql_fetch_array($result))
      {
        ;level=$row['position']
      }

    Check whether the query was successful or not

    if($result)
      {
        if(mysql_num_rows($result) > 0)
        {
          Login Successful;
          ;session_regenerate_id
          ;member = mysql_fetch_assoc($result)
          ;SESSION['SESS_MEMBER_ID'] = $member['id']
          ;SESSION['SESS_FIRST_NAME'] = $member['username']
          ;()session_write_close
        } if ($level="admin")
        {
          ;header("location: admin/dashboard.php")
        }
      }
```
}{
    Login failed
;header("location: index.php")
;(exit
    {
    } else{
    ;die("Query failed")
    {

Payment:

"link href="src/facebox.css" media="screen" rel="stylesheet" type="text/css">
</
<script src="lib/jquery.js" type="text/javascript"></script>
<script src="src/facebox.js" type="text/javascript"></script>
"<script type="text/javascript"
} ($)jQuery(document).ready(function
 }) ('a[rel*=facebox]').facebox$
, 'loadingImage : 'src/loading.gif
'closeImage : 'src/closelabel.png
{
    {
    <script/>
    <style>
    body
    font-family:"Lucida Grande", "Lucida Sans Unicode", Verdana, Arial,
 ;Helvetica, sans-serif
 ;font-size:12px
    {
    p, h1, form, button{border:0; margin:0; padding:0;}
    spacer{clear:both; height:1px;}.
 /* ----------- My Form ----------- */
    )myform.
 ;margin:0 auto
 ;width:400px
 ;padding:14px
    {
 /* ----------- stylized ----------- */
 )stylized#
 ;border:solid 2px #b7ddf2
 ;background:#ebf4fb
    {
 } stylized h1#
 ;font-size:14px
 ;font-weight:bold
 ;margin-bottom:8px
    {
 } stylized p#
 ;font-size:11px
 ;color:#666666
 ;margin-bottom:20px
 ;border-bottom:solid 1px #b7ddf2
 ;padding-bottom:10px

49
function gotoprint {
    window.location.href = "print.php?id=<?php echo($id)?>&setnum=<?php echo($setnum)?>";
}
</script>
</div id="stylized" class="myform">

<label>
    <span class="small">Enter Card Number</span>
</label>
<input type="text" name="address" id="name" />
<br />
<label>
    <span class="small">Enter Card Pin</span>
</label>
<input type="text" name="setnum" id="setnum" />

</div>

50
Print:

```javascript
<script language="javascript">
    (function Clickheretoprint()
    {
        var disp_setting="toolbar=yes,location=no,directories=yes,menubar=yes;disp_setting+="scrollbars=yes,width=400,height=400,left=100,top=25;
        var content_value=document.getElementById("print_content").innerHTML
        ;
        var docprint=window.open("","",disp_setting);
        docprint.document.write('<html><head><title>Inel Power System</title></head><body onLoad="self.print()" style="width:400px;font-size:12px;font-family:arial;">');</n        docprint.document.write(content_value);
        docprint.document.write('</body></html>');
        docprint.document.close;
        docprint.focus
    }()
</script>
</div>
</div/>

Print and present this details upon boarding the bus<br><br>
<a href="javascript:Clickheretoprint()">Print</a>

```

<?php
include('db.php');
$id=$_GET['id']

$result = mysql_query("SELECT * FROM customer WHERE transactionnum='$id'"
while($row = mysql_fetch_array($result))
{
    echo 'Transaction Number: '.$row['transactionum'].'<br>
    echo 'Name: '.$row['fname'].' '.$row['lname'].'<br>
    echo 'Address: '.$row['address'].'<br>
    echo 'Contact: '.$row['contact'].'<br>
    echo 'Payable: '.$row['payable'].'<br>
}

$results = mysql_query("SELECT * FROM reserve WHERE transactionnum='$id'"
while($rows = mysql_fetch_array($results))
{
    $gagaga=$rows['bus']
    ;echo 'Route and Type of Bus
resulta = mysql_query("SELECT * FROM route WHERE 
    id='$gagaga'"
while($rowa = mysql_fetch_array($resulta))
}echo $rowa['route'].'     :'.$rowa['type'];
time=$rowa['time']$}
echo 'Time of Departure: '.$time.'<br>'
'echo 'Seat Number: '.$setnum.'<br>'
'echo 'Date Of Travel: '.$rows['date'].'<br>'

{<?
<div>
<a href="index.php">Home</a>

Seat location:

<?php>
include('db.php')
$id=$_GET['id'];
$result = mysql_query("SELECT * FROM route WHERE Id='$id'")
while($row = mysql_fetch_array($result))
{
$seatnum=$row['numseats']$
}

.Bus Layout<br>
<div style="border:1px solid red; padding:10px 5px; border-radius:5px; width: 136px;">
<?php>
$N = $seatnum+1$;
for($i=1; $i < $N; $i++)
{
echo '<input type="button" style="border:none; width:23px; padding:2px; value="'.+$i
';
<??
</div>