KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY.

DEPARTMENT OF COMPUTER SCIENCE.

MINI - PROJECT

BY

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Project Title:

ONLINE BUS RESERVATION/BOOKING SYSTEM FOR KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY (K.N.U.S.T) S.R.C DURING VACATIONS

ACKNOWLEDGE

Unlimited praise to Al-mighty God for making this mini-project a success.

I would like to express my deepest gratitude to my superior, **Dr. E. O. Oppong** for his excellent guidance, caring, patience, providing me with an excellent atmosphere for doing research, and his confidence in me.

Many thanks and appreciation to the all my course mates, colleagues and everyone for their assist, support and contribution.

DEDICATION

I dedicate this mini-project to my parents.

ABSTRACT

Most monetary transactions on the 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. The KNUST SRC are using the manual system to sell tickets and manage the bus seat booking during vacations. Travelling companies spend a substantial cost to manage the reservation process.

The **KNUST SRC Vacation Bus Booking** system allows students to reserve seats and buy and pay tickets online. Transport organizations (registered on the system) can give reservation administrations and data to their clients (the students) without the limitation of office hours or manpower. Not just does it let students book seats around the clock from any location with an internet connection, but is additionally designed for use by the transport companies to internally manage their business processes; minimizing human errors and overcoming difficulties and problems that arose in the previous system on campus.

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LIST OF ABBREVIATIONS

NFC	Near Field Communication.
RAM	Random Access Memory.
ROM	Read Only Memory.
SMS	Short Message Service.
PIN	Personal Identification Number.
WAP	Wireless Access Point.
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

1.1 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 students to reserve their ticket during vacations and mid-semester breaks. They can simply book the ticket from the web page. In addition, students can check the availability of the bus ticket before they reserve the ticket and there is the Pa2Pa option which enables students to book without necessarily having to register and login as a user. Also, the link to the webpage would be sent to the various WhatsApp platforms of the various programs for easy reservation of tickets.

1.2 Problem statement

Currently, the type of system being used on Campus is an internal system which is manually used in selling the bus tickets where students have to first register by making a part payment. Even though the SRC has a system for organizing students it is not effective enough and this has caused individuals students to create other forms of transport groups for taking other students' home during vacations. The problems facing the various transport organizations are that students have to either go to the counter to buy bus ticket or ask for bus schedule, students will also have to queue up for a long time in order to secure a bus ticket and will also need to pay cash when they buy the bus ticket.

1.3 Objectives

The main purpose of this project is to automate the manual procedures of reserving a bus ticket for any journey made on campus during vacations. This system is said to be an automatic system and students can select seats by themselves. Specifically, objectives of this project will consist of:

- Managing 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 ticket and time spent by manually going students for reservation.
- 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 students to reserve seats online
- Allow students to pay for tickets online by Integrating system with online payment gateways 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.
- Ability of students to cancel their reservation.
- Admin user privileges in updating and canceling payment, route and vehicle records.

1.4 Project layout

This mini-project 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 project.

Chapter two (Literature Review): This chapter presents description and explanation for various technologies used, definition of online bus reservation system and its forms, the history of online bus booking system, the types of online bus reservation system, security and authentication in the online bus reservation system, and the e payment in the system.

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 reservation process.

Chapter four (Results and test): This chapter shows the results obtained when the system is 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.

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 Chaim 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), ECash 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. 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 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. 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.

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. 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.

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 be 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. 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.

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.

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. 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. 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.

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:

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].

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].

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.

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.

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. 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.

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.

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.

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.11
- **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.

2.6 AUTHENTICATION MECHAMISMS FOR ELECTRONIC PAYMENET 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

Electronic payment System	**Number of authentication factor**	**Authentication type**
Electronic cash (e Cash)	1	Token encryption
Electric cheque (e cheque)	2	PIN, digital signature

Smart card	3	PIN, digital signature, biometric (finger print)
Online credit card	2	PIN, digital signature

2.7 E-payment in public transport

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

2.8 ExpressPay

expressPay is a Ghanaian Online Payment Platform which gives customers (in this case Students) real-time access to services online

As a payment gateway provider, expressPay is an official Visa Payment Technology Provider (PTP) aside supporting all major international card networks – Visa, MasterCard, American Express, Discover, etc. as well as mobile money payments. It also meets all the international security standards making it very secure to make online payments

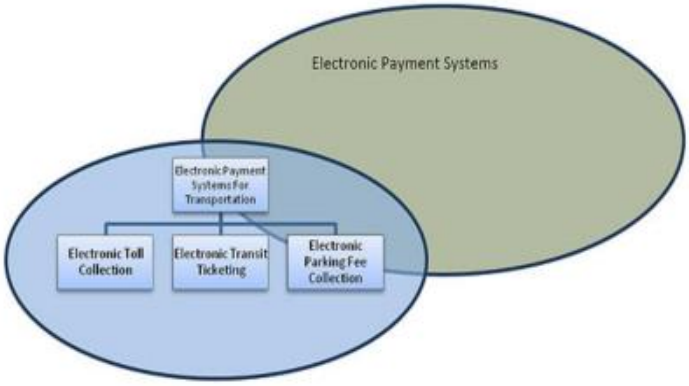


Figure 2-2-2: Electronic payment systems applications for transportation

CHAPTER THREE

METHODOLOGY

3.1 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.

3.1.1 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.

3.1.2 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.

3.2 System Requirements

3.2.1 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.

3.2.2 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.

3.3 System Description

The system is a web-based application that allows students 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

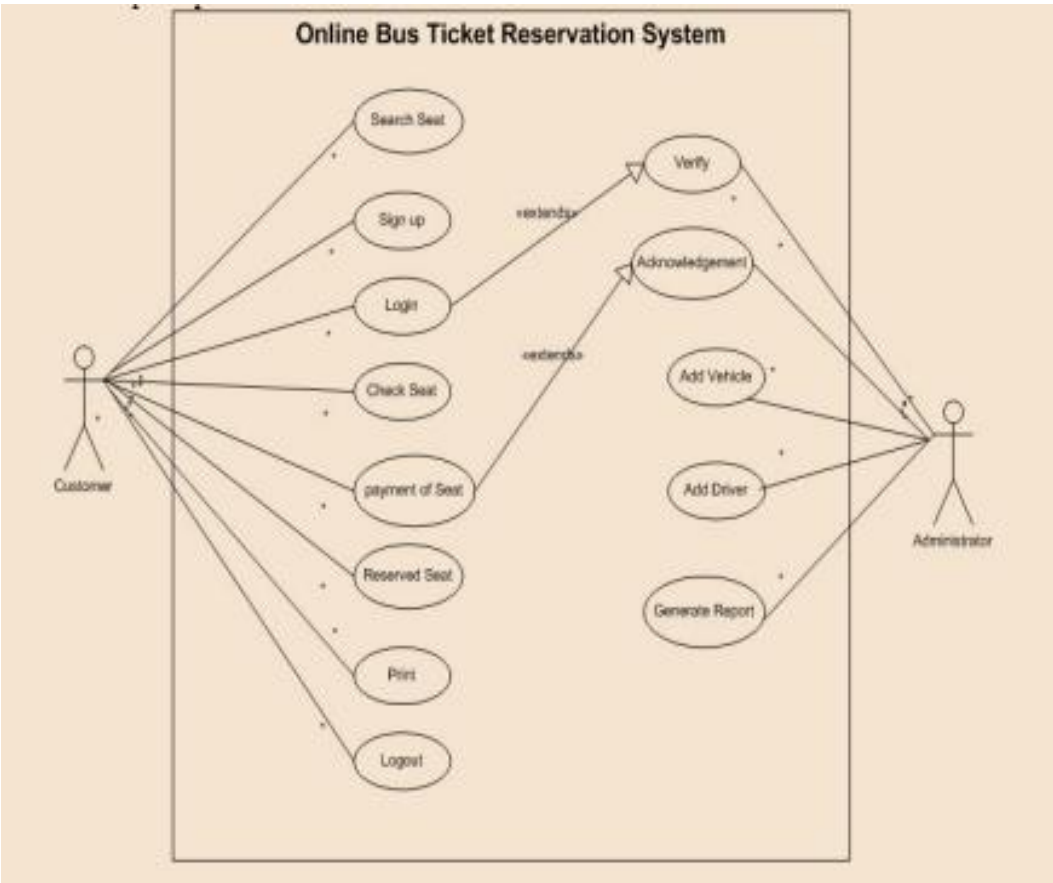
The system will work in almost all configurations. It has got following features:

- 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.

3.3.1 System Flow Chart

The functional model of the system

UML use case diagram of the bus reservation system is shown in the diagram below. In this figure, details of the various participants are also detailed.



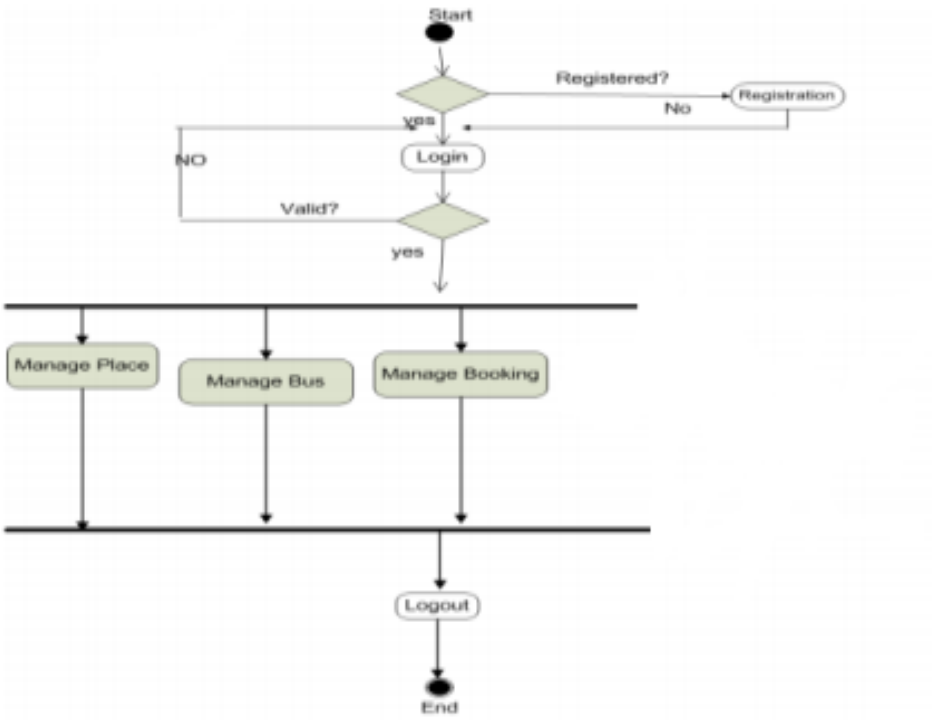
3.3.2 User/Student Activities

The most common activities carried out by student are illustrated bellow:

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

Administrator Activities

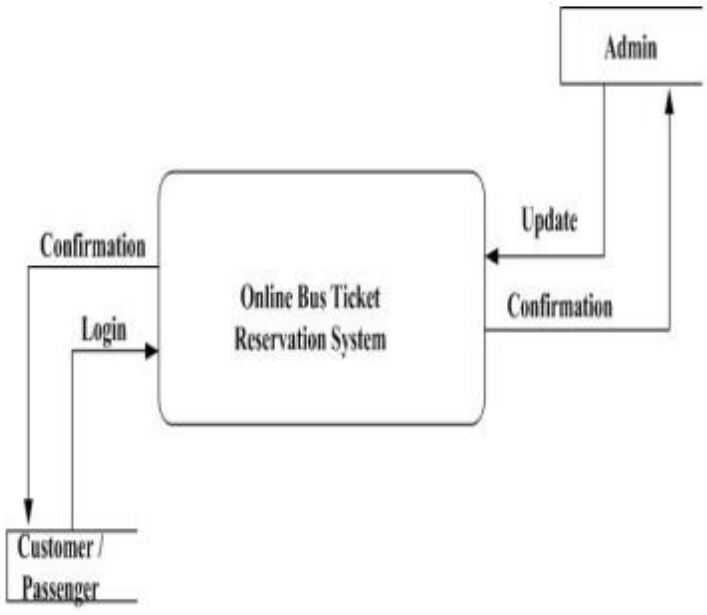
- The administrator can login to system.
- The administrator gives acknowledge to any payment user made on the system.
- The administrator can edit information of bus already exist in system.
- The administrator can add new bus.
- The administrator can add new route.
- The administrator can delete reservations.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



Structure flow of admin activities

3.3.3 *Data Flow Diagram*

Data flow diagram is used to show the flow of data from the external entries into the system. It is used to represent the physical and logical area of an information system. The data flow diagrams are pictorial or graphical representation of the Online Bus Reservation System. The data flow diagram covers all the processors and data storage area, which takes place during any transaction in the system.



3.4 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 named *OBRS_database* and consists of four tables:

- Admin table:

The Admin table contains admin details, which are the AdminID (the primary key), the username, and the password.

- Booking table:

The booking table is used to store the student details, which are the student's Booking ID (the primary key), bus ID, Seat no., fare of student, total fare, bank, the transaction number which is randomly generated, payment method.

- Bus table:

This is used to store the ID, Name, origin, destination, seats, arrival time, departure time, date and fare of the bus.

- User (the student) table:

The user table contains the user ID, first name, last name, email, username, password, timestamp, security and security of students.

3.5 Payment process

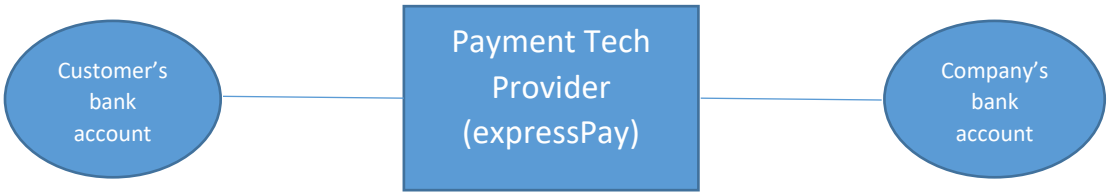
The payment process is handled by a Payment Service Provider using a payment gateway (**expressPay**), which is an official Visa Payment Technology Provider (PTP) in Ghana supporting all major international card networks – Visa, MasterCard, American Express, Discover, etc. As well as mobile money payments. It also meets all the internal security standards.

When the student reaches the payment interface, will be redirected to expressPay, where it is 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 expressPay, 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 student in the specific bank, and added to the bus company's

bank account, and then after the booking process is done, the customer will be notified that the reservation has been done by SMS or email.

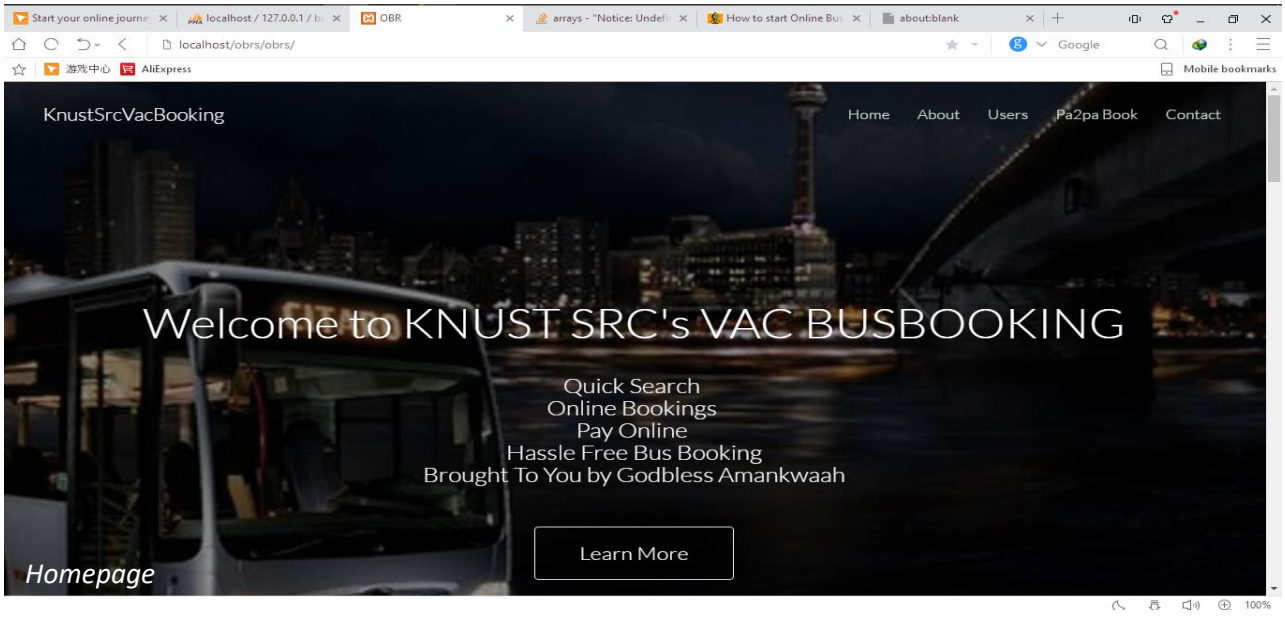


CHAPTER FOUR

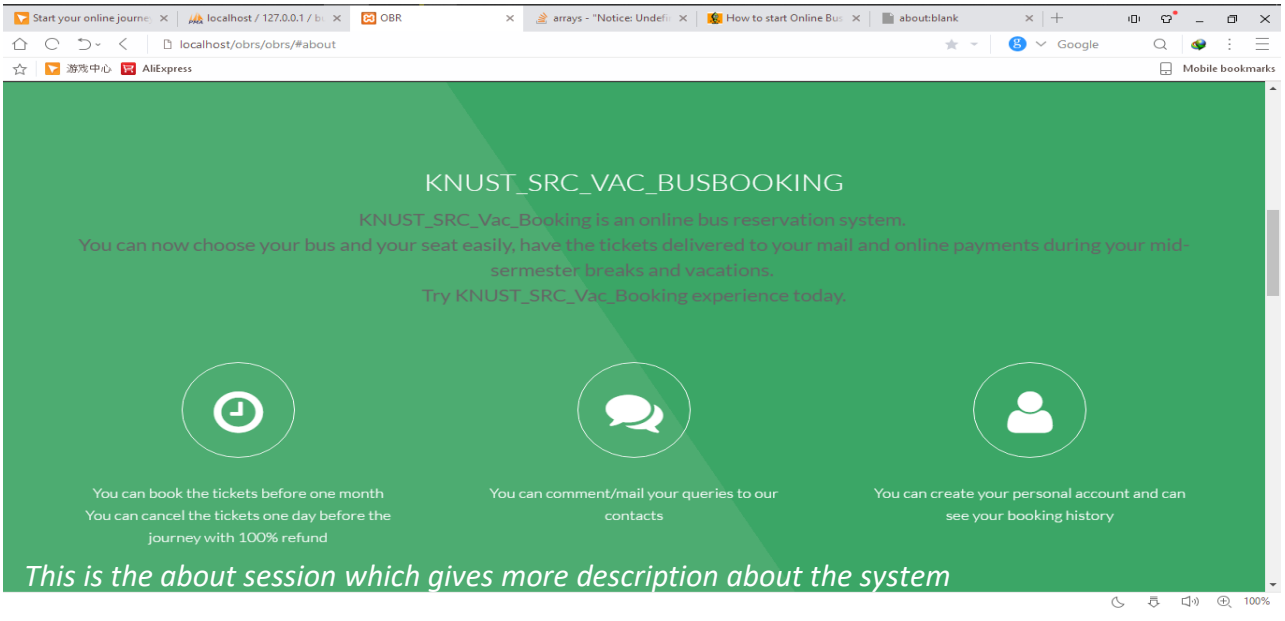
RESULT AND TESTING

4. Introduction

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



Home page of the website, shows all information students need to perform their booking and this special feature called the *Pa2Pa Book* where student can perform a straight book without necessarily registering to the system first.



Why KNUST_SRC_Vac_Booking for Bus Booking?

The only leading player in online Bus bookings on Campus, We offer lowest fares, exclusive discounts and a seamless online booking experience. Desktop or mobile site is a delightfully customer friendly experience, and with just a few clicks you can complete your booking.

Booking Bus Ticket with KNUST_SRC_Vac_Booking

With more bus routes spread across the country and integration with many bus operators, KNUST_SRC_Vac_Booking's online bus reservation system is simpler and smarter. It provides you a wide range of facilities, right from choosing your pickup point to your preferred choice of seat (for instance, luxury buses with sleeper berths). You can also choose from the widest range of available buses like Mercedes, VIP, Volvo, Volvo AC, AC luxury, Deluxe, Sleeper, Express and other private buses. The payment options are easier too- you can use either debit/credit card facility or net-banking. Not just that, in case of any change in your travel plan, bus tickets can be cancelled online. So, next time you need not stand in long queues or search at different bus ticket counters for your ride home during vacations or mid-sermester breaks. You can directly book bus tickets online with KNUST_SRC_Vac_Booking.com and stay assured.

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Gives further info about system, beneath the Homepage

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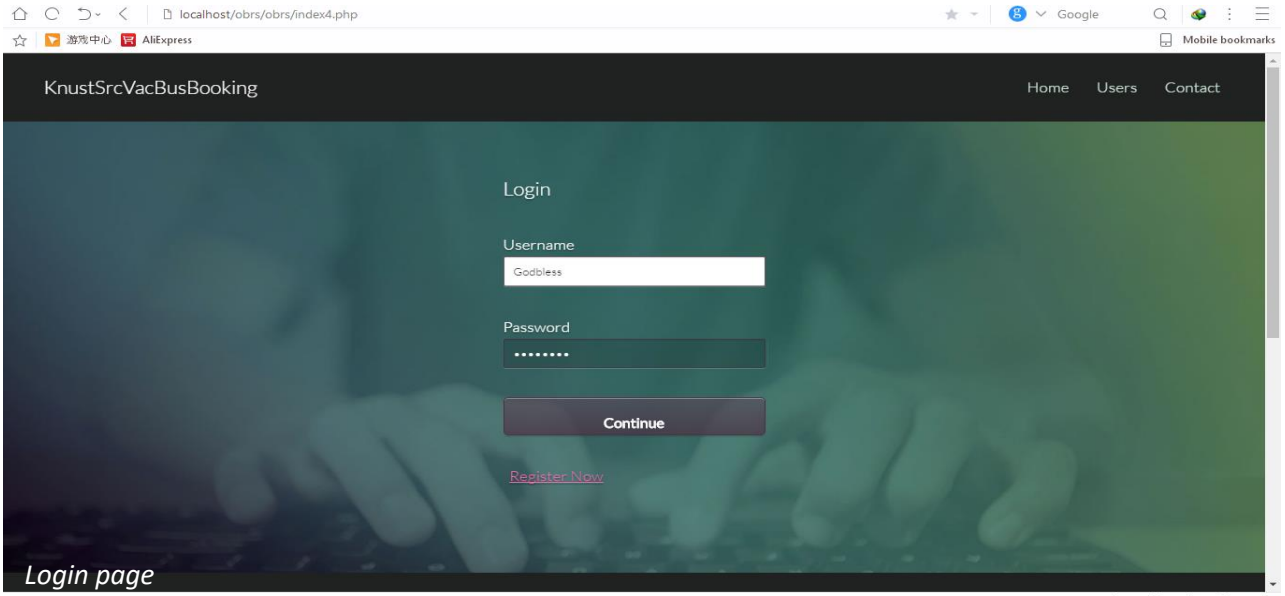
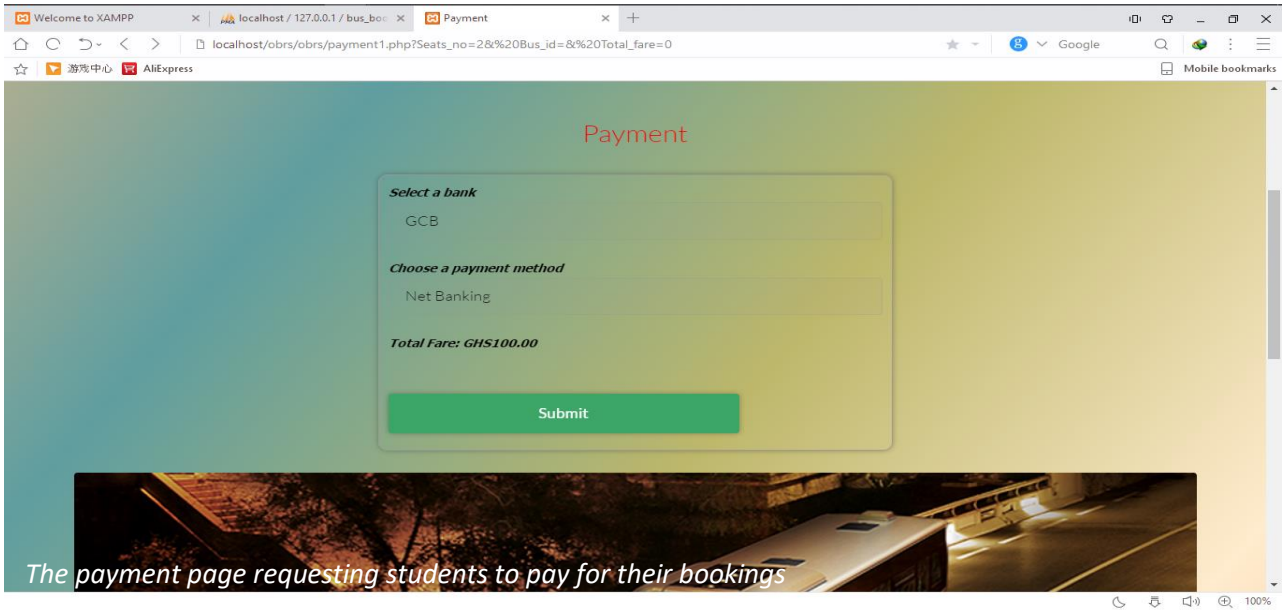
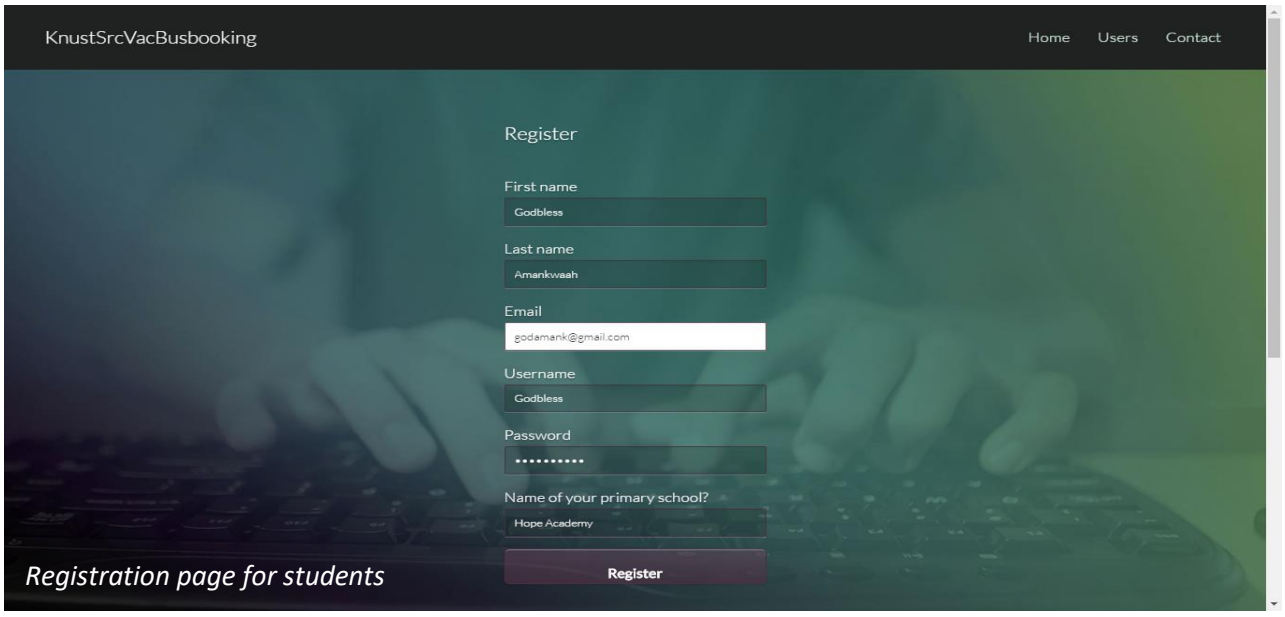
Contact Session. Students can engage developers through the numbers and various social media handles to comment and make complains



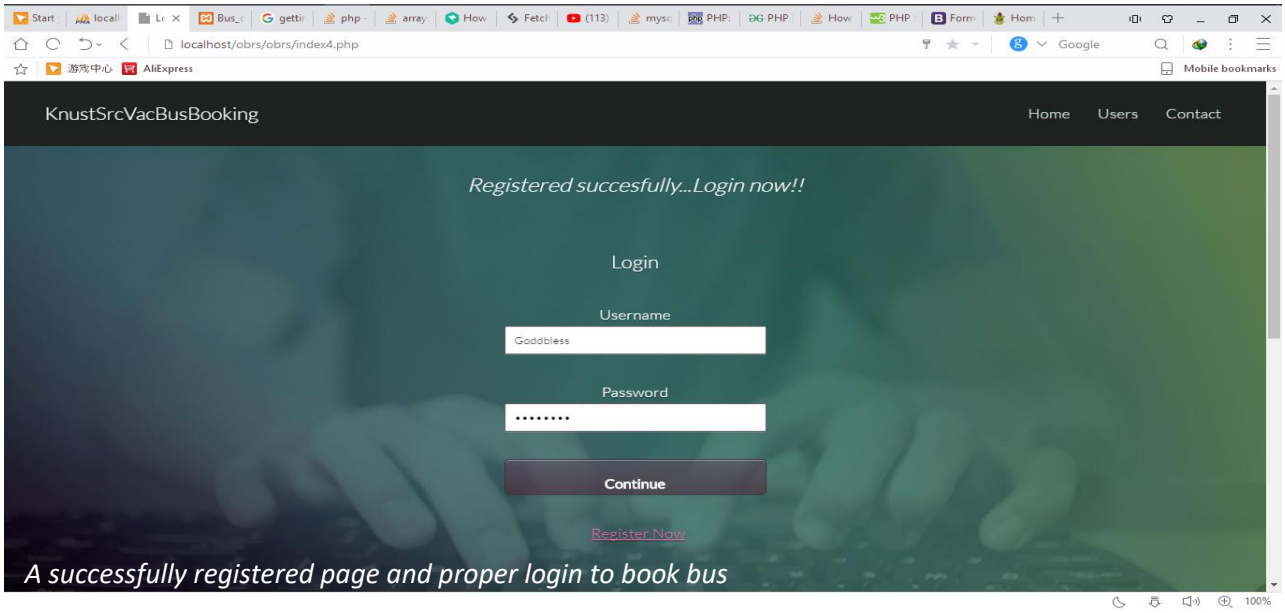
Login page



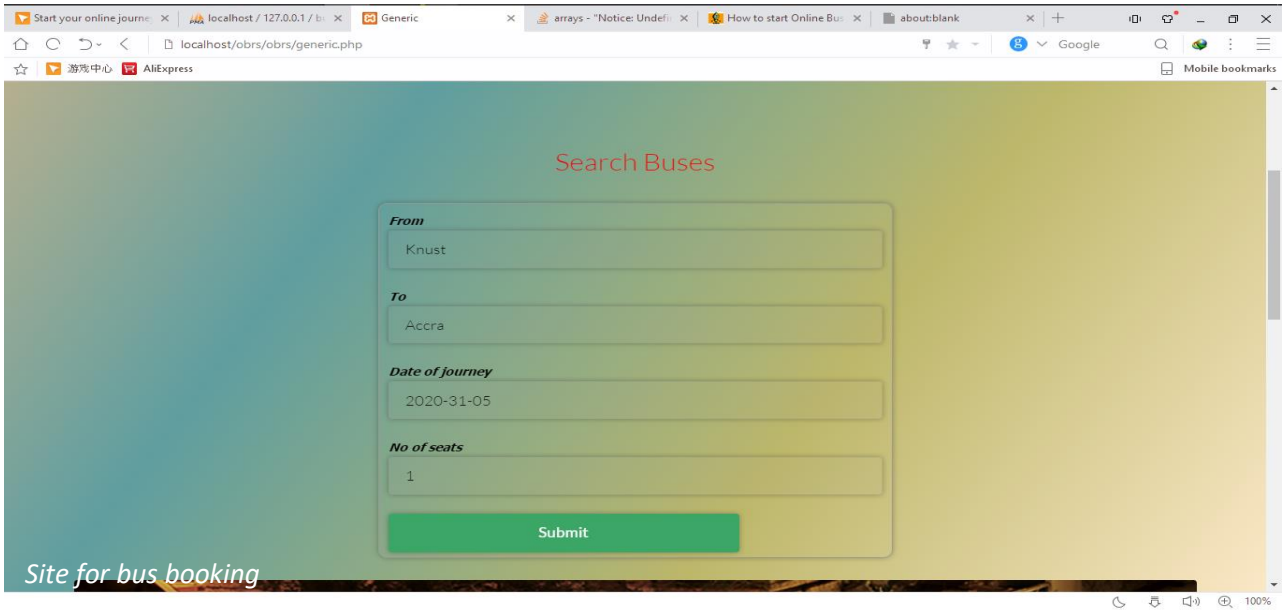
The payment page requesting students to pay for their bookings



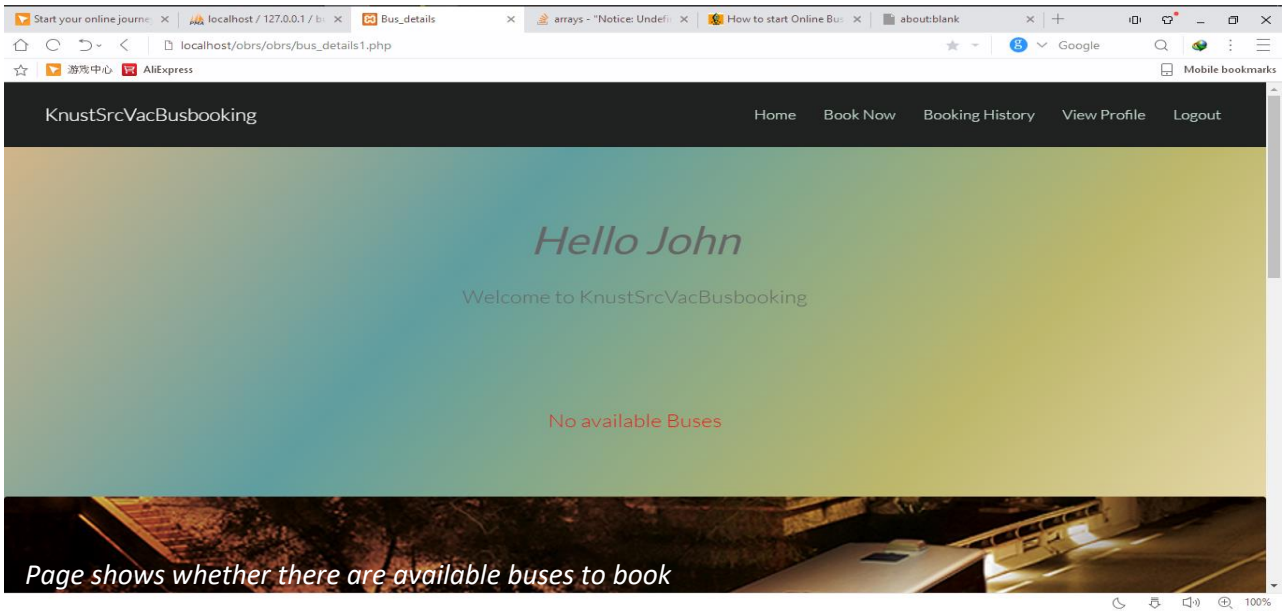
Registration page for students



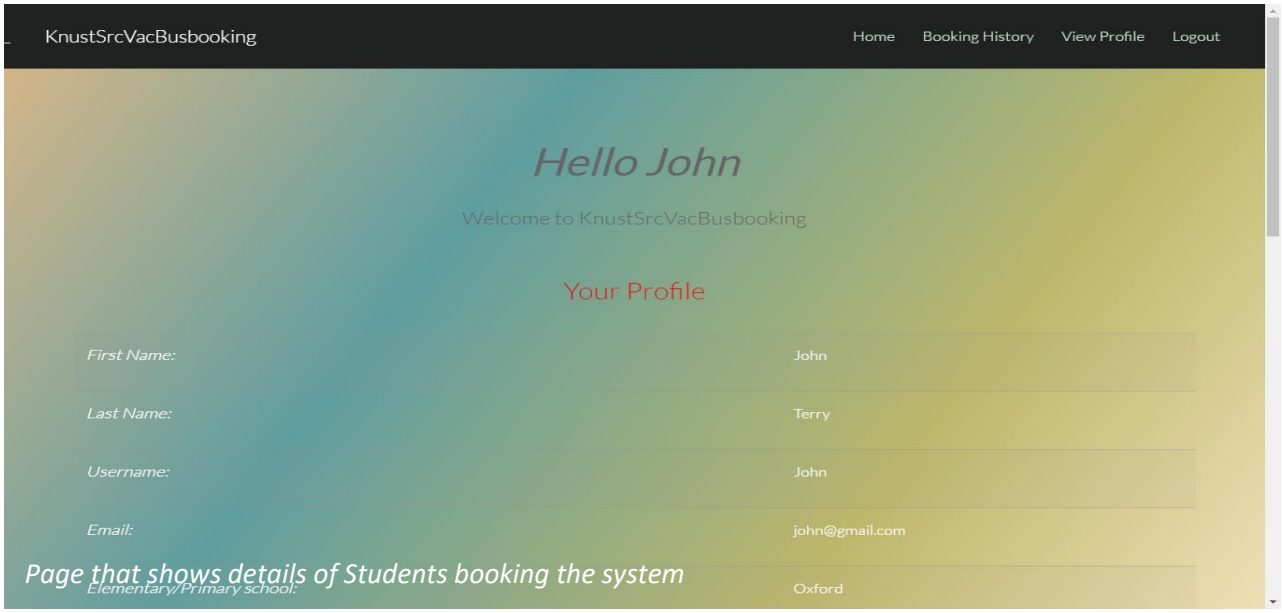
A successfully registered page and proper login to book bus



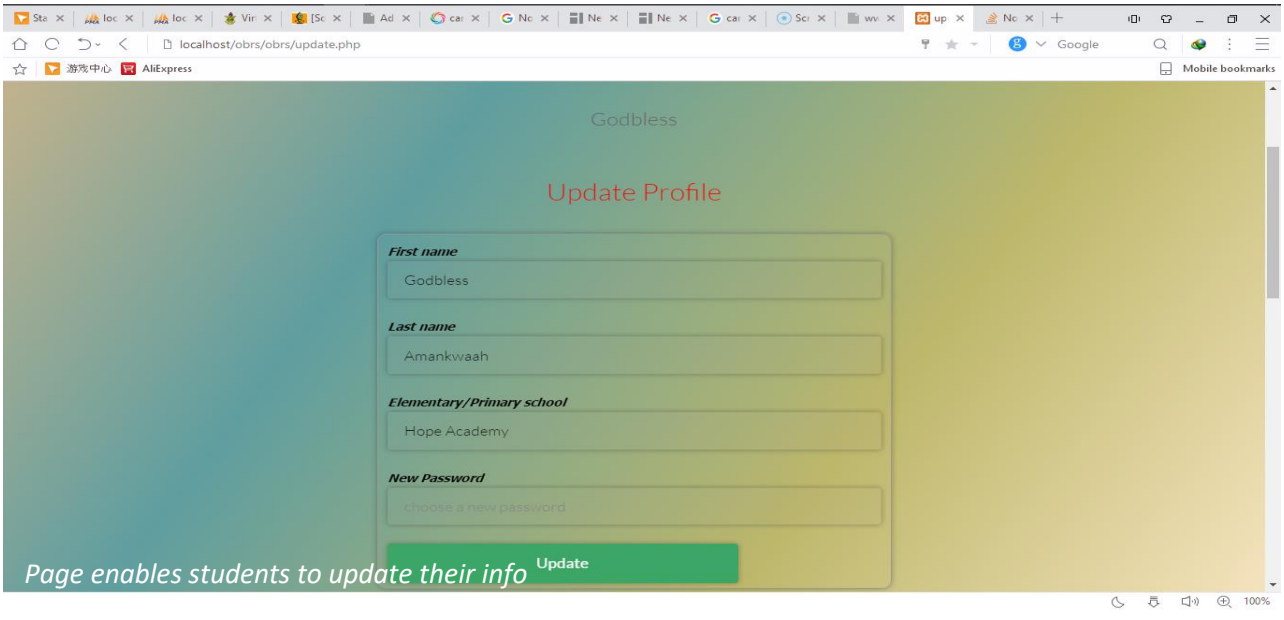
Site for bus booking



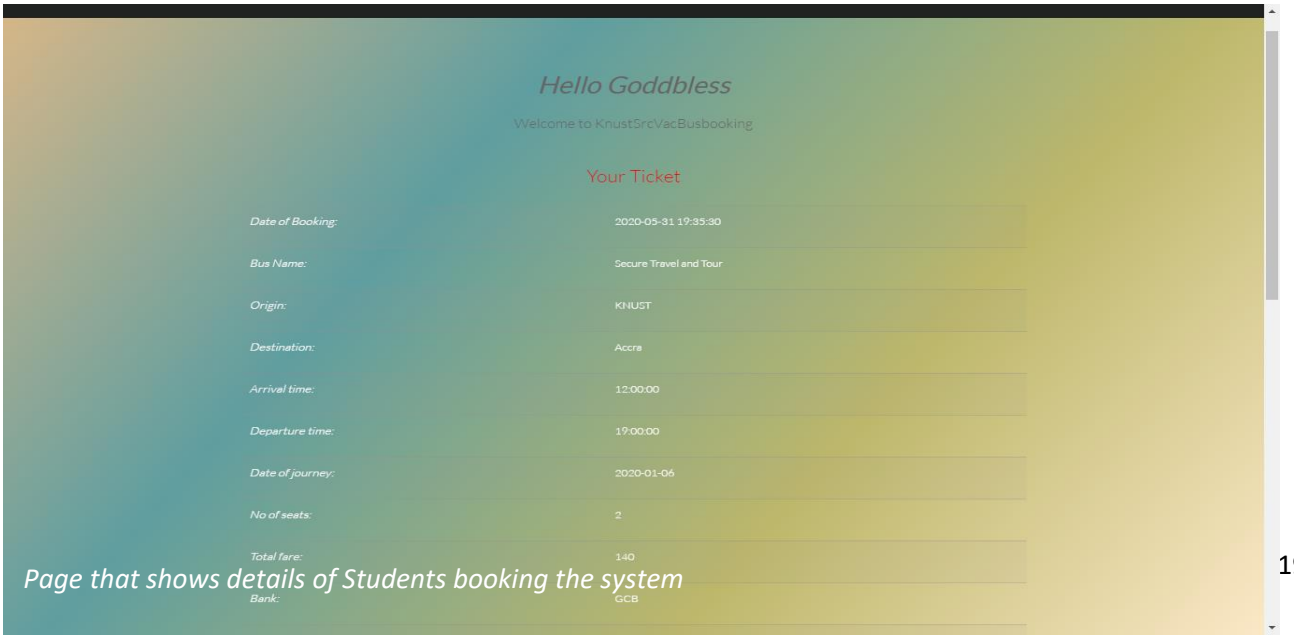
Page shows whether there are available buses to book



Page that shows details of Students booking the system



Page enables students to update their info



Page that shows details of Students booking the system

4.2 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.

s

CHAPTER FIVE

CONCLUSION AND FUTURE WORK

5.1 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 v7.3.12.

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

5.2 Limitation

However, the system still suffers some limitations such as:

- The website is not linked to expressPay server
- Admin cannot change the password

5.3 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 expressPay to achieve the payment process
- Develop mobile application, since it is more easy to use
- Develop a version for fees collection in public transport

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APPENDIX

Codes

Database (Creation of tables):

```
CREATE TABLE IF NOT EXISTS `admin` (
  `AdminID` int(11) NOT NULL AUTO_INCREMENT,
  `Fname` varchar(200) NOT NULL,
  `Lname` varchar(200) NOT NULL,
  `Email` varchar(200) NOT NULL,
  `Username` varchar(200) NOT NULL,
  `Password` varchar(200) NOT NULL,
  PRIMARY KEY (`AdminID`)
) ENGINE=InnoDB  DEFAULT CHARSET=latin1 AUTO_INCREMENT=2 ;

--
-- Dumping data for table `admin`
--

INSERT INTO `admin` (`AdminID`, `Fname`, `Lname`, `Email`, `Username`, `Password`) VALUES
(1, 'Godbless', 'Amankwaah', 'godamank@gmail.com', 'Godbless', 'd1051c4d4d2c9fff63cac2907ecc0c8c3881e603')
--
-- Table structure for table `booking`
--

CREATE TABLE IF NOT EXISTS `booking` (
  `Booking_id` int(11) NOT NULL AUTO_INCREMENT,
  `user` varchar(200) NOT NULL,
  `Date` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP,
  `Bus_id` int(11) NOT NULL,
  `Seats_no` int(11) NOT NULL,
  `Total_fare` double NOT NULL,
  `Bank` varchar(200) NOT NULL,
  `Payment_method` varchar(200) NOT NULL,
  PRIMARY KEY (`Booking_id`)
) ENGINE=InnoDB  DEFAULT CHARSET=latin1 AUTO_INCREMENT=7 ;

--
-- Dumping data for table `booking`
--

INSERT INTO `booking` (`Booking_id`, `user`, `Date`, `Bus_id`, `Seats_no`, `Total_fare`, `Bank`, `Payment_method`)
VALUES
(3, 'bob', '2015-11-04 07:34:38', 15, 2, 2200, 'GCB', 'Net Banking'),

-- Table structure for table `bus`

CREATE TABLE IF NOT EXISTS `bus` (
  `Id` int(11) NOT NULL AUTO_INCREMENT,
```

```
  `Name` varchar(200) NOT NULL,
  `Origin` varchar(200) NOT NULL,
  `Destination` varchar(200) NOT NULL,
  `Seats` int(11) NOT NULL,
  `Arrival_time` time NOT NULL,
  `Departure_time` time NOT NULL,
  `Date` date NOT NULL,
  `Fare` double NOT NULL,
  PRIMARY KEY (`Id`)
) ENGINE=InnoDB  DEFAULT CHARSET=latin1 AUTO_INCREMENT=31 ;

--
-- Dumping data for table `bus`
--

INSERT INTO `bus` (`Id`, `Name`, `Origin`, `Destination`, `Seats`, `Arrival_time`, `Departure_time`, `Date`, `Fare`)
VALUES
(1, 'O.A Travel & Tours', 'Knust', 'Accra', 8, '10:00:00', '16:00:00', '2020-05-20', 100),
(2, 'O.A Travel & Tours', 'Knust', 'Accra', 18, '10:00:00', '16:00:00', '2020-07-20', 100),

-- --------------------------------------------------------
--
-- Table structure for table `user`

CREATE TABLE IF NOT EXISTS `user` (
  `UserID` int(11) NOT NULL AUTO_INCREMENT,
  `Fname` varchar(200) DEFAULT NULL,
  `Lname` varchar(200) DEFAULT NULL,
  `Email` varchar(200) DEFAULT NULL,
  `Username` varchar(200) DEFAULT NULL,
  `Password` varchar(200) DEFAULT NULL,
  `Timestamp` timestamp NOT NULL DEFAULT CURRENT_TIMESTAMP,
  `Security` varchar(200) NOT NULL,
  PRIMARY KEY (`UserID`),
  UNIQUE KEY `Username` (`Username`)
) ENGINE=InnoDB  DEFAULT CHARSET=latin1 AUTO_INCREMENT=14 ;

-- Dumping data for table `user`
INSERT INTO `user` (`UserID`, `Fname`, `Lname`, `Email`, `Username`, `Password`, `Timestamp`, `Security`) VALUES
(2, 'bob', 'duah', 'bob@gmail.com', 'bob', 'f0488e300067bc295f044886b296f8cefbe08029', '2015-10-14 18:28:12', 'Accra');
```

***Home page*:**

```
<!DOCTYPE html>
<!--
        Brought to you by Godbless
-->
<html lang="en">
```

```
<head>
	<meta charset="UTF-8">
	<title>OBR</title>
	<meta http-equiv="content-type" content="text/html; charset=utf-8" />
	<meta name="description" content="" />
	<meta name="keywords" content=""/>
	<!--[if lte IE 8]><script src="css/ie/html5shiv.js"></script><![endif]-->
	<script src="js/jquery.min.js"></script>
	<script src="js/skel.min.js"></script>
	<script src="js/skel-layers.min.js"></script>
	<script src="js/init.js"></script>
	<noscript>
		<link rel="stylesheet" href="css/skel.css" />
		<link rel="stylesheet" href="css/style.css" />
		<link rel="stylesheet" href="css/style-xlarge.css" />
	</noscript>
	<!--[if lte IE 8]><link rel="stylesheet" href="css/ie/v8.css" /><![endif]-->
</head>
<body class="landing">

	<!-- Header -->
		<header id="header">
			<h1><a href="index.php">KnustSrcVacBooking</a></h1>
			<nav id="nav">
				<ul>
					<li><a href="index.php">Home</a></li>
					<li><a href="#about">About</a></li>
					<li><a href="index4.php">Users</a></li>
					<li><a href="pa2pabook.php">Pa2pa Book</a></li>
				<!--	<li><a href="admin1.php">Admin</a></li> -->
					<li><a href="#contact">Contact</a></li>
				</ul>
			</nav>sss
		</header>

	<!-- Banner -->
		<section id="banner">
			<h2>Welcome to KNUST SRC's VAC BUSBOOKING</h2>
			<p>Quick Search <br> Online Bookings <br> Pay Online <br> Hassle Free Bus
Booking<br>Brought To You by Godbless Amankwaah</p>
			<ul class="actions">
				<li>
					<a href="#about" class="button big">Learn More</a>
				</li>
			</ul>
		</section>
```

```
<!-- One -->
<a name="about"></a>
	<section id="one" class="wrapper style1 align-center">
		<div class="container">
			<header>
				<h2>KNUST_SRC_VAC_BUSBOOKING</h2>
				<p> <b>KNUST_SRC_Vac_Booking is an online bus reservation system. <br>You can now choose your bus and your seat easily, have the tickets delivered to your mail and online payments during your mid-sermester breaks and vacations. <br>Try KNUST_SRC_Vac_Booking experience today.</b></p>

			</header>
			<div class="row 200%">
				<section class="4u 12u$(small)">
					<i class="icon big rounded fa-clock-o"></i>
					<p>You can book the tickets before one month<br> You can cancel the tickets one day before the journey with 100% refund</p>
				</section>
				<section class="4u 12u$(small)">
					<i class="icon big rounded fa-comments"></i>
					<p>You can comment/mail your queries to our contacts</p>
				</section>
				<section class="4u$ 12u$(small)">
					<i class="icon big rounded fa-user"></i>
					<p>You can create your personal account and can see your booking history</p>
				</section>
			</div>
		</div>
	</section>

<!-- Two -->
	<section id="two" class="wrapper style2 align-center">
		<div class="container">
			<header>
				<h2>KNUST_SRC_VAC_BUSBOOKING</h2>
				<p>Book, Travel, Enjoy & Make Memories <br> "Pay Less Live Large"</p>
			</header>
			<div class="row">
				<section class="feature 6u 12u$(small)">
					<img class="image fit" src="images1/bus4.jpg" alt="" />

				</section>
				<section class="feature 6u$ 12u$(small)">
					<img class="image fit" src="images1/bus5.jpg" alt="" />

				</section>
				<p><b><strong> <em>Why KNUST_SRC_Vac_Booking for Bus
```

Booking?

The only leading player in online Bus bookings on Campus, We offer lowest fares, exclusive discounts and a seamless online booking experience. Desktop or mobile site is a delightfully customer friendly experience, and with just a few clicks you can complete your booking.

Booking Bus Ticket with KNUST_SRC_Vac_Booking
With more bus routes spread across the country and integration with many bus operators, KNUST_SRC_Vac_Booking's online bus reservation system is simpler and smarter. It provides you a wide range of facilities, right from choosing your pickup point to your preferred choice of seat (for instance, luxury buses with sleeper berths). You can also choose from the widest range of available buses like Mercedes, VIP, Volvo, Volvo AC, AC luxury, Deluxe, Sleeper, Express and other private buses. The payment options are easier too- you can use either debit/credit card facility or net-banking. Not just that, in case of any change in your travel plan, bus tickets can be cancelled online. So, next time you need not stand in long queues or search at different bus ticket counters for your ride home during vacations or mid-sermester breaks. You can directly book bus tickets online with KNUST_SRC_Vac_Booking.com and stay assured.

```
                                        </div>
                                        <footer>
                                                <ul class="actions">
                                                        <li>
                                                                <a href="#" class="button alt big">Learn More</a>
                                                        </li>
                                                </ul>
                                                <p> <b> SAVE BIG ONE BUS TICKETS!! GET UPTO GHS10.00 INSTANT DISCOUNT. <BR> COUPON CODE : DISBOOKBUS </b></p>
                                        </footer>
                                </div>
                        </section>
<!—Contact page →
<a name="contact"></a>
                                <!-- Footer --><footer id="footer">
                                <div class="container">
                                        <div class="row">
                                                <section class="4u 6u(medium) 12u$(small)">
                                                        <h3>KNUST_SRC_Vac_Booking</h3>
                                                        <ul class="alt">
                                                                <li>Quick Search</li>
                                                                <li>Online Bookings</li>
                                                                <li>Pay Online</li>
                                                                <li>Hassle Free Bus Booking</li>
                                                        </ul>
                                                </section>
                                                <section class="4u 6u$(medium) 12u$(small)">
                                                        <h3>Top Bus Routes</h3>
                                                        <ul class="alt">
                                                                <li>KNUST - ACCRA, TEMA</li>
                                                                <li>KNUST - TARKWA</li>
                                                                <li>KNUST - CAPECOAST</li>
                                                                <li>KNUST - TAKORADI</li>
                                                        </ul>
```

```
                                        </section>
                                    <section class="4u$ 12u$(medium) 12u$(small)">
                                        <h3>Contact Us</h3>
                                        <ul class="icons">
                <li><a href="#" class="icon rounded fa-twitter"><span class="label">Twitter</span></a></li>
            <li><a href="#" class="icon rounded fa-facebook"><span class="label">Facebook</span></a></li>
            <li><a href="#" class="icon rounded fa-pinterest"><span class="label">Pinterest</span></a></li>
            <li><a href="#" class="icon rounded fa-google-plus"><span class="label">Google+</span></a></li>
            <li><a href="#" class="icon rounded fa-linkedin"><span class="label">LinkedIn</span></a></li>
                                        </ul>
                                        <ul class="tabular">
                                            <li>
                                                <h3>Address</h3>
                                                Kumasi-Accara Road<br>
                        <a href="https://godblessprofile.html/">KNUST_SRC_Vac_Booking</a>
                                            </li>
                                            <li>
                                                <h3>Mail</h3>
                                    <a href="godamank@gmail.com">godamank@gmail.com</a>
                                            </li>
                                            <li>
                                                <h3>Phone</h3>
                                                0553451683 / 0501657725
                                            </li>
                                        </ul>
                                    </section>
                                </center>
                                </div>
                                <ul class="copyright">
                                    <li>&copy; 2020 KNUST_SRC_Vac_Booking. All rights reserved.
Brought To You By <a href="https://gb-projects.org/">Godbless-Projects</a></li>

                                </ul>
                            </div>
                        </footer>
    </body>
</html>
```

Login Page:

```
<?php
include "include.php";

/*if($_POST)
    echo "exists";*/
    $pass=sha1($_POST["Password"]);
//$sel="SELECT * FROM `user` where Username='".$_POST["Username"]."' and Password='".$_POST["Password"]."'";
$sel="SELECT * FROM `user` where Username='".$_POST["Username"]."' and Password='$pass'";
```

```
$result=mysqli_query($connec,$sel) or die(mysql_error());

if(mysqli_num_rows($result) == 0)
{
	session_start();
	$_SESSION['error'] = 'Invalid username or password';
	header('Location: index4.php');
	//echo "<h3>Invalid username and password combination<br>Go to <a href='home.php'>homepage</a></h3>";
}
//else
	//echo "welcome"
else
{
	//echo "welcome";
	session_start();
	$_SESSION['user']=$_POST["Username"];
echo '<script language="javascript">document.location.href="generic.php"</script>';
}
?>
```

Bus Search Page:

```
<?php
include "include.php";

/*if($_POST)
	echo "exists";*/
	$pass=sha1($_POST["Password"]);
//$sel="SELECT * FROM `user` where Username='".$_POST["Username"]."' and Password='".$_POST["Password"]."'";
$sel="SELECT * FROM `user` where Username='".$_POST["Username"]."' and Password='$pass'";

$result=mysqli_query($connec,$sel) or die(mysql_error());

if(mysqli_num_rows($result) == 0)
{
	session_start();
	$_SESSION['error'] = 'Invalid username or password';
	header('Location: index4.php');
	//echo "<h3>Invalid username and password combination<br>Go to <a href='home.php'>homepage</a></h3>";
}
//else
	//echo "welcome"
else
{
	//echo "welcome";
	session_start();
	$_SESSION['user']=$_POST["Username"];
```

```
echo '<script language="javascript">document.location.href="generic.php"</script>';
}

?>
```

Bus details page:

```
<?php
include 'include.php';
$query = "SELECT * FROM bus WHERE Origin=".$_POST["Origin"]." and Destination=".$_POST["Destination"]." and
Date=".$_POST["Date"]." and Seats>= ".$_POST["Seats"]." ";
$result = mysqli_query($connec,$query) or die(mysqli_error($connec));
$rows= mysqli_num_rows($result) ;

        $req=$_POST["Seats"];
        $Bus_id;
if($rows > 0)
{
//      header('Refresh:5; url=generic.php');

        echo '<h3 style= "text-align:center;"> <font color="red">No available Buses </font></h3>';
        echo "<br>";
//      echo '<p style= "text-align:center">Redirecting to the home page in 5 seconds</p>';
}
else
{

        echo '<h3 style= "text-align:center;"> <font color="red"><center>Available Buses </center></font></h3>';
echo '<table align="center" border=1 >
<tr>
<th> Id </th>
<th> Name of the bus</th>
<th> Available seats </th>
<th> Origin </th>
<th> Destination </th>
<th> Date of journey</th>
<th> Arrival time </th>
<th> Departure time </th>
<th> Fare </th>
<th> Book </th>
</tr>';

mysqli_data_seek($result, 0);
while($row=mysqli_fetch_row ($result))
{
        $Bus_id = $row['Id'];
        $Total_fare= $row['Fare'] * $req;
        echo $Bus_id;
```

```
        echo "<tr>";
                echo "<td>".$row['Id']."</td>";
                echo "<td>".$row['Name']."</td>";
                echo "<td>".$row['Seats']."</td>";
                echo "<td>".$row['Origin']."</td>";
                echo "<td>".$row['Destination']."</td>";
                echo "<td>".$row['Date']."</td>";
                echo "<td>".$row['Arrival_time']."</td>";
                echo "<td>".$row['Departure_time']."</td>";
                echo "<td>".$row['Fare']."</td>";
                /*echo
                '<td>  <form action="payment.php" method="POST" >
                <input name="Bus_id" type="hidden" value= "<?php echo $Bus_id; ?>" >
                <input name="Seats_no" type="hidden" value="<?php echo $Req; ?>" >
                <input class="btn btn-primary" type="submit" value="Book"  />
                </td>';*/
                echo "<td>";
                // echo "$req";
                echo '<a href="payment1.php?Seats_no='.$req.'& Bus_id='.$Bus_id.'& Total_fare='.$Total_fare.'">Book
Now</a>';
                echo "</td>";
        echo "</tr>";
}
echo "</table>";
}
?>
```

Code for connecting database server:

```
<?php
        $hostname = "localhost";
        $username = "root";
        $password = "";
        $database = "bus_booking_system.sql";

        $connec = mysqli_connect($hostname, $username, $password, $database);

?>
```

Register page:

```
        <table >
        <!--    <tr> <td> <h3>  <I> <font color="red"> Hello <?php// echo '$_GET['User']'; ?> </font></I> </h3> </td>
</tr>
                -->
                <?php
                session_start();
                if(isset($_SESSION['error']))
                {
```

```
                    echo '<p class="message"> <font size="5" color="MediumMagenta"> <center><i>';
                    echo $_SESSION['error'];
                    echo "</i></center></font></p>";
                    unset($_SESSION['error']);
                }
                ?>

        </table>

                    <section class="main">
                        <form action="register.php" method ="POST" class="form-4" >
                         <h1>Register</h1>
        First name
<input class="form-control" name="Fname" placeholder="eg:Johann" type="text">
        Last name
<input class="form-control" name="Lname" placeholder="eg:Bach" type="text">
 Email
<input class="form-control" name="Email" placeholder="eg:johannes@yaho.com" type="text">

        Username
<input class="form-control" name="Username" placeholder="choose a username" type="text">

   Password
<input class="form-control" name="Password" placeholder="choose a password" type ="password">
  Name of your primary school?
<input class="form-control" name="Security" placeholder="please answer the security question" type ="text">

 <input type="submit" class="btn btn-primary" name="sub" value="Register">
</form>
```

Book:

```
<?php
include "include.php";

session_start();
$ins="INSERT INTO
`booking`(`user`,`Bus_id`,`Seats_no`,`Total_fare`,`Bank`,`Payment_method`)VALUES('".$_SESSION['user']."','".$_SESSIO
N['Bus_id']."','".$_SESSION['Seats_no']."','".$_SESSION['Total_fare']."','".$_POST['Bank']."','".$_POST['Payment_method']
."')";
$req=$_SESSION['Seats_no'];
$id = $_SESSION['Bus_id'];

$upd= "UPDATE bus SET seats=(seats-$req) WHERE Id=$id";

// insert into booking
// train setas decrease
```

```
mysqli_query($ins) or die(mysql_error());
mysqli_query($upd) or die(mysql_error());

//echo "registered succesfully";
        //$_SESSION['user']=$_POST["Username"];
        $_SESSION['pay'] = 'Payment successful...';
        header('location: generic.php');
//echo '<script language="javascript">document.location.href="web_home.php"</script>';
?>
```

Admin Page:

```
<!DOCTYPE html>
<html lang="en">
   <head>
<header id="header">
                        <h1><a href="index.php">KnustSrcVacBusbooking</a></h1>
                        <nav id="nav">
                                <ul>
                                        <li><a href="index.php">Home</a></li>
                                <!--     <li><a href="#about">About</a></li>
                                -->      <li><a href="index4.php">Users</a></li>
                                        <li><a href="admin1.php">Admin</a></li>
                                        <li><a href="#contact">Contact</a></li>
                                </ul>
                        </nav>
                </header>
        <div class="container">



                <?php
         session_start();
         if(isset($_SESSION['msg']))
        {
                echo '<p class="message"> <font size="5" color="White"> <center> <i>';
                echo $_SESSION['msg'];
                echo "</i></center></font></p>";
                unset($_SESSION['msg']);
        }
        if(isset($_SESSION['error']))
        {
                echo '<p class="error-message"> <font size="6" color="White"> <center><i>';
                echo $_SESSION['error'];
                echo "</i> </center></font></p>";
                unset($_SESSION['error']);
        }
         if(isset($_SESSION['reg']))
```

```
		{
			echo '<p class="message"> <font size="5" color="White"><center> <i>';
			echo $_SESSION['reg'];
			echo "</i> <center></font></p>";
			unset($_SESSION['reg']);
		}
		if(isset($_SESSION['reg_error']))
		{
			echo '<p class="message"> <font size="5" color="White"> <center><i>';
			echo $_SESSION['reg_error'];
			echo "</i> </center></font></p>";
			unset($_SESSION['reg_error']);
		}
		if(isset($_SESSION['change']))
		{
			echo '<p class="message"> <font size="5" color="White"> <center><i>';
			echo $_SESSION['change'];
			echo "</i> </center></font></p>";
			unset($_SESSION['change']);
		}
		?>
			<section class="main">
				<form class="form-4" action="admin_login.php" method ="POST" >
				   <h1>Admin Login</h1>
				   <p>
				      Username
				      <input type="text" class="form-control" name="Username"
placeholder="eg:Johannes" required>
				   </p>
				   <p>
				      Password
				      <input type="password" class="form-control" name='Password'
placeholder="eg:Johannes123" required>
				   </p>

	<p> <input type="submit" class="btn-btn-primary" name="submit" value="Continue"> </p>
				   <p>
					<a href="index4.php" > User Login</a>

				   </p>
				</form>
			</section>

		</div>
			<footer id="footer">
				<div class="container">
					<div class="row">
						<section class="4u 6u(medium) 12u$(small)">
```

```
                                        <h3>KnustSrcVacBusbooking</h3>
                                        <ul class="alt">
                                                <li>Quick Search</li>
                                                <li>Online Booking</li>
                                                <li>Pay Online</li>
                                                <li>Hassle Free Bus Booking</li>
                                        </ul>
                                </section>
                                <section class="4u 6u$(medium) 12u$(small)">
                                        <h3>Top Bus Routes</h3>
                                        <ul class="alt">
                                                <li>KNUST - ACCRA</li>
                                                <li>KNUST - TARKWA</li>
                                                <li>KNUST - CAPECOAST</li>
                                                <li>KNUST - TAKORADI</li>
                                        </ul>
                                </section>
                        <section class="4u$ 12u$(medium) 12u$(small)">
                                        <h3>Contact Us</h3>
                    <ul class="tabular">
                                                <li>
                                                        <h3>Address</h3>
                                                        Kumasi-Accara Road<br>
                        <a href="https://godblessprofile.html/">KNUST_SRC_Vac_Booking</a>
                                                </li>
                                                <li>
                                                        <h3>Mail</h3>
                        <a>href="godamank@gmail.com">godamank@gmail.com</a>
                                                </li>
                                                <li>
                                                        <h3>Phone</h3>
                                                        0553451683 / 0501657725
                                                </li>
                                        </ul>
                        </section>
                        </div>
                        <ul class="copyright">
                                <li>&copy; 2020 KNUST_SRC_Vac_Booking. All rights reserved.
Brought To You By <a href="https://gb-projects.org/">Godbless-Projects</a></li>
                        </ul>
                    </div>
                </footer>
        </body>
</html>
```