NEAR EAST UNIVERSITY INSTITUTE OF GRADUATE STUDIES
DEPARTMENT OF SOFTWARE ENGINEERING

DESIGN AND IMPLEMENTATION OF AN E-COMMERCE WEB-BASED PORTAL

M.Sc. THESIS

Anigbo Stella ONYINYE

Nicosia February, 2022

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Supervisor Assoc. Prof. Dr. Boran Sekeroglu

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Thesis defence was held online. The jury members declared their acceptance verbally which is recorded.

Approval

We certify that we have read the thesis submitted by **Anigbo Stella Onyinye** titled "**Design and Implementation of An E-Commerce Web-Based Portal**" and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Educational Sciences.

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Declaration

I hereby declare that all information, documents, analysis and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study.

Name and Surname of the Student

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Day/Month/Year

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This thesis would not have been possible without the help, support, and patience of my supervisor, Assoc. Prof. Dr. Dr. Boran SEKEROGLU, not to mention her good advice and unsurpassed knowledge. Her mentorship and generosity have been invaluable on both an academic and a personal level, for which I am extremely grateful. I also thank the Chairperson, and the entire staff member of the department of Information System Engineering, Near East University, for granting me the privilege of suitable and successful academic struggle. It is a great honor to acquire my Master's qualification under their persistent guidance. And finally, I am indebted to my parents, whose value to me only grows with time. My sincere gratitude goes to my mother Anigbo Christiana ifeoma for their love and support throughout my life. Thank you for giving me the strength to reach for the stars and chase my dreams.

Dedication

I dedicated this thesis to God and my Mum for their great consistent support even when things were so tough for both sides, but constantly kept encouraging me to work extra hard.

Abstract

Design And Implementation of An E-Commerce Web-Based Portal

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Advancement in Information Technology as well as the demand for such across industries, is growing on a daily basis. It's of high advantage in research community to develop ecommerce application. Innovative communication tools usage in business domain has proven beneficial record especially the use of internet and other information tools such as Fax, Telephone and etcetera. E-commerce and internet might significantly shape the future of economic development through encouraging retail businesses, if deployed and used adequately. The business world begins to realize that e-commerce technology is the future of market places. However, it comes with different challenges and opportunities, and how to maximize its benefits is the main aim of this research. e-commerce application was developed using Reacts Js accompanied with MySQL, using the methodology of waterfall approach. An interview on GitHub with users was conducted coupled with personal experiences, and suggested the need to add and drop product from cart and as well as allowed customer sign-in and sign-out on their personal profile.

Keywords: web development, e-commerce, my-sql,database, javascript.

Özet

Bilgi Teknolojisindeki ilerlemenin yanı sıra endüstriler arasında bu tür talepler her geçen gün artıyor.

E-ticaret uygulaması geliştirmek, araştırma camiasında yüksek avantaj sağlamaktadır. İş alanında yenilikçi iletişim araçlarının kullanımı, özellikle Internet ve Faks, Telefon ve benzeri diğer bilgi araçlarının kullanımında faydalı olduğunu kanıtlamıştır. E-ticaret ve internet, yeterince yaygınlaştırılır ve kullanılırsa, perakende işletmelerini teşvik ederek ekonomik kalkınmanın geleceğini önemli ölçüde şekillendirebilir. İş dünyası, e-ticaret teknolojisinin pazar yerlerinin geleceği olduğunu anlamaya başlamıştır. Bununla birlikte, farklı zorluklar ve fırsatlarla birlikte gelir ve faydalarının nasıl en üst düzeye çıkarılacağı bu araştırmanın temel amacıdır. E-ticaret uygulaması, şelale yaklaşımı metodolojisi kullanılarak MySQL ile birlikte Reacts Js kullanılarak geliştirilmiştir. GitHub'da kullanıcılarla kişisel deneyimlerle birleştirilmiş bir röportaj yapıldı ve sepete ürün ekleme ve bırakma ihtiyacının yanı sıra kişisel profillerinde müşteri oturum açma ve oturum kapatmalarına izin verilmesi önerildi.

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List of Abbreviation

B2C	Business to Customer
CSS	Cascading Style Sheets
CPU	Central Processing Unit
DBMS	Database Management System
EDI	Electronic Data Interchange
GB	Giga Byte
LTE	Long Term Evaluation
HTML	Hypertext Markup Language
MAC OS	Macintosh Computer Operating System
MB	Mega Byte
MySQL	My Structured Query Language
OECD	Organization for Economic Co-operation and Development
PHP	Hypertext Preprocessor
PKI	Public Key Infrastructure
RAM	Random Access Memory
SQL	Structured Query Language
UI	User Interface
WAMP	Window Apache, MySQL, and PHP
Wi-Fi	Wireless Fidelity
WWW	World Wide Web

CHAPTER ONE

Introduction Background to the Study

By connecting faraway places and bringing together scientists, administrators, development experts, managers, and individuals into projects and programmers, ecommerce and growing digital technology and services can help improve millions of people's lives globally (Goldsmith & McGregor, 2000). Businesses use modern communication tools such as telephone, fax and internet to do business. By connecting faraway places and bringing together scientists, administrators, development experts, managers, and individuals into projects and programmers, e-commerce and growing digital technology and services can help improve millions of people's lives globally (Goldsmith & McGregor, 2000). Businesses use modern communication tools such as telephone, fax and internet to do business. E-commerce is not just a new technology, but also a new frontier for world-wide business and trade. It is vital that the world understands what e-commerce is, the obstacles and possibilities it presents, and what can be done to maximize its advantages. This study focuses on them all. If used properly, e-commerce and the internet may help ensure future economic growth by promoting retail enterprises. The substantial influence of electronic commerce on global economics and societies will undoubtedly increase economic efficiency, competitiveness, and profitability (for ecommerce participants) and so lead to the growth of the information society. It's a completely different method of conducting business on a new medium that changes the way business is done in the past. It is thus about strategy and business management rather than technology (ILO, 1999). E-commerce is divided into two sub-categories: Emerchandise and E-finance. The subject of this study is e-commerce in the retail industry, E-merchandising includes online shopping for groceries, tickets, music, clothing, hardware, travel, books, flowers, and gift goods, to name a few examples of products. According to Ahmed (2001), the internet's great flexibility has enabled e-commerce, which has disrupted the old corporate management model. All aspects of traditional business may now be done online, including advertising, ordering, publishing, banking, investing, auctions, and professional services. They are important because they assist to describe the scope of the technology and how it may be used to retailing. E-commerce is, in essence, the act of conducting business through the internet. The OECD defines

electronic commerce as "enterprise conducted over networks using nonproprietary protocols created through an open standard establishing procedure such as the internet." Many individuals are addicted to online services through the internet and other websites, making e-commerce a key commercial operation. However, enhancing customer happiness is critical to increasing customer loyalty and repeat business. The purpose of this research is to determine whether or not e-commerce can boost customer pleasure (OECD, 1999). This separates it from private networks or intranets based on electronic data interchanges (EDI) that are not open (and hence not cost effective) like the internet. It is defined as the electronic production, distribution, marketing, sales, and delivery of products and services by the World Trade Organization's electronic commerce work programme.

A business transaction has three primary stages: advertising and searching, ordering and payment, and delivery. Any or all of these may be done electronically, and hence fall under the umbrella of electronic commerce. In general, electronic commerce refers to all business transactions conducted over an electronic medium or network, i.e., the internet. The usage of e-commerce websites can lead to accepting and gratifying goals, which subsequently influences client satisfaction behavior towards an e-commerce website. It is associated with interpersonal trust (Geyskens, Stenkamp, Scheer and Kumar, 1996).

According to Zins (2001), better levels of customer satisfaction led to higher levels of loyalty. It is, however, a complicated relationship. Fisher (2001) feels that customer happiness is just half of the reason customers switch suppliers. Other research shows that customer pleasure influences loyalty (Anderson and Lehmann 1994). Loyalty is described as the willingness to go the extra mile. frequency of repeat purchases or the volume of same-brand purchases. Olivier (1997) defines as a result of client loyalty a solid commitment to buy or use a particular product/service again in the foreseeable future, regardless of external circumstances or marketing efforts that can lead to switching behavior. Loyal consumers are incredibly valuable in e-commerce, Today's e-retailers want to know how to establish consumer loyalty. Loyal consumers not only need more information, but also help other customers. Customer loyalty is a major issue in businessto-consumer e-commerce. Customer loyalty has several predecessors. In order for

patronage behavior to occur (Pavlou, 2003) for long-term consumer connections to exist, customer pleasure and trust must first be established (Papadopoulos, Andreou, Kanellis, and Martakos 2001). Customer loyalty is improved when vendors provide great services and ensure that online clients are satisfied.

Statement of The Problem

It comprises any information or services that a firm may give to its clients through the internet, from pre-purchase information to post-purchase service and support. Some of the issues with the current system are:

- In order to increase customer loyalty and repeat business, a slower system that provides customer pleasure is essential. This is reliant on a variety of elements.
- The inability to update new products that have been stocked in the warehouse and are ready to be made public.
- Removal of out-of-date and expired products from the most recent product menu in order to avoid a drop in business sales and customer loyalty.

• Customers may place an order and select their preferred items within a reasonable time frame, as well as cancel their order. **Aim and Objectives of The Study**

Despite the fact that the computer is one of the most recent technological developments, the general public is unaware of its various retrieving implications. This research intends to improve the design and execution of an e-commerce store, as well as to completely eliminate misunderstandings and prejudices about computers, as well as to discourage the tedious way of raising awareness. The following are the study's objectives:

- Create an e-commerce website for a shopping center selling bags with the greatest design and security.
- Build a relational database that collects, stores, and organizes information and knowledge about consumers.
- An immediate message dissemination system for client order cancellations and security measures at the time of delivery should be developed.
- Implement a Customer Help Desk System to send complaint and Reports to the administrator.
- Customer complaints and reports should be routed through a Customer Help Desk System.

Significance of The Study

The following are the significance of this study:

- Findings from the study may be used to educate retail management about the impact of online shopping.
- Contributing to the body of research about the influence of personality characteristics on academic achievement, this study will serve as a foundation for further studies in the field.

Extent of The Study

For the purposes of this study, an e-commerce online shop is defined as an e-commerce website. It also demonstrates the site's authentication, i.e., an outside user cannot purchase anything online unless they have a legitimate account and password.

CHAPTER TWO

Literature Review Preamble

It is the outcome of mixing information technology and business operations, which has expedited the velocity of enterprise information, allowing for the creation of new business possibilities, the reduction of transaction costs, and the access to optimize profits. Ecommerce, as a new phenomenon in the information era, is penetrating people's lives at an extremely quick rate of development, creating chances for businesses while also altering people's routines. According to some, e-commerce was an unavoidable consequence of economic activity when human society entered the information age, and it will continue to be a significant path for the growth of the information industry. (2012); (Wang, L. F.,2012).

Shopping and selling online is referred to as e-commerce. The cash and data are moved utilizing a computerized system in the course of a commercial transaction. Arrangements are made for a transaction between two participants in the transaction when the sale of any type of product (both physical and digital) or service is arranged in this way (E Commerce Fundamentals, 2018). A few of commercial sales websites were discovered in the year 1990, but it was the advent of Amazon and Ebey in 1995 that marked the beginning of electronic commerce as a legitimate business venture. It was eight years after Amazon's

founding when the company first announced its yearly profit. According to the 2018 edition of E Commerce Fundamentals,

Almost all of the definitions are fairly broad, encompassing not just the actual economic, not just an agreement between two parties, but also the preceding events during, and after the transaction to make the transaction feasible. E-commerce refers to the act of doing business transactions through the internet, in order for this technology to function properly, it must be able to process and transmit data in electronic form, text that can be included, audio, and video. Among the many diverse activities covered by this umbrella term are the Technologies such is the exchanging of products and services through the internet, online distribution of digital information, electronic cash transfers, electronic stock trading, E-bills of lading are Documents such as electronic shipping invoices, commercial auctions, collaborative design and engineering projects, on-line sourcing, and public procurement are some examples of those that are becoming more common. Direct consumer marketing, and after-sales service. Traditional activities (such as healthcare and education) as well as new activities (such as consumer products, specialist medical equipment) are included. It also includes service industries (including information, financial, and legal services are all available.) (e.g., virtual malls). LLINCOLN (1997) defines formalized informality as "the ability to express oneself in a way that is not constrained by the constraints of one's own beliefs or beliefs of others."

It is Because different definitions of electronic commerce are used by different experts, the estimates offered by different analysts are quite disparate in scope. Approximately 3% of when it comes to doing business with other businesses websites are created for straight sales rather than marketing and customer support, according to the study (Benjamin, 1997). In fact, just 9% of websites allow for online transactions for customer enterprises." An additional poll conducted by Nielsen (1997) discovered that "although 53 percent of internet users in the United States and Canada had used the internet to reach a decision on a purchase, just 15 percent had completed the final transaction over the internet." While regular internet users are becoming less prevalent, the number of customers who access the internet on a regular basis to purchase for consumer products and services continues to climb (Forrester, December 2001). According to research conducted by the GFK in 2002, the proportion of internet a survey of buyers in six major European markets showed

increase of 31.4% from 27.7% the previous year. This translates to 59 million people. Europeans often purchase on the internet, which is a good thing for the economy. However, not only is the number of online customers increasing, but so is the amount of their purchases, which is growing at an out-of-control rate. Online sales in the U.S.A are expected to surpass $36 billion in 2002 and expand at a compound annual rate of 20.9% to reach $81 billion in 2006. Europeans are also spending more money on the internet in general. According to one example, "internet purchasing is dependent on the direct effects of appropriate online shopping elements at the beginning of the process" (Davis, 1993). It is possible to detect online purchase characteristics by examining customers' aspects of function and utility as seen by the public such as "ease of use" and "usefulness," in addition to their evaluations of sentimental and pleasurable qualities, such as happiness "enjoyment" (Menon and Kahn, 2002; Childers et al., 2001; Mathwick et al., 2001).Components from the literature on information systems or technology have been included into the framework by including both utilitarian and hedonic qualities., as well as aspects from the research on Buying patterns and marketing strategies are intertwined within our structure. Also, to these essential online buying characteristics, instigators that affect the interactions involving the framework's main components are taken into account. The following exogenous factors are relevant in this instance: "consumer traits" (Burke, 2002; Dabholkar and Bagozzi, 2002; Brown et al., 2001; Eastin and LaRose, 2000), "environmental factors" (Wolfinbarger and Gilly, 2001; Avery, 1996), "product characteristics" (Grewal et al., 2002; Elliot and Fowell, 2000), "previous online shopping experiences (Yoon, 2002; Lee and Turban, 2001). The paradigm is appropriate in the context of online purchasing since it incorporates these external aspects in addition to the fundamental drivers of customers' attitude toward and desire to utilize a technology. These consequences and factors on customers' attitudes regarding online purchasing, taken together, give a foundation for comprehending the needs of customers intents to purchase on the internet. The following is a crucial point to remember about our proposed framework: throughout this article, we shall refer as opposed to internet shopping or online shopping as the case may be usage of online stores by customers up to and including the business deal step of purchase as well as transportation.

Payment System in Electronic Format in B2c And C2c Ec

In electronic currency, a unique identifier code is paired with a certain quantity of money, similar to how a credit card or a debit card is used. Electronic cash, often known as e-cash or cyber cash, is a type of digital currency (Jewson, 2001). This approach was created instead of usage of When making purchases, credit cards are used. over the internet for products or services, such as software. Customers must first acquire electronic digital currency from the issuing firm in order to use this payment mechanism (Abrazhevich, 2004). The money can then be transmitted through computers or other forms of telecommunication technology, if necessary (Hsieh, 2001). Digital cash is issued and redeemed by one entity, which is responsible for both the act of issuing and redeeming of currency. Because of the cheap cost of electronic currency, it is considered to be one of the most promising payment systems.

Advantages of E-Commerce

In its most basic definition, electronic commerce refers to business that is performed electronically, such as through the use of the internet. Customers and businesses are increasingly moving in this direction as technology continues to advance in this direction. This is due to the numerous benefits it provides, including time savings for the customer, access to a greater selection of goods and services for the customer, and opening up a number of fresh market opportunities for the enterprise. In spite of the fact that there are several drawbacks to internet commerce, the ones related with criminal activity are those that should be of particular concern. Ultimately, the goal of this essay is to bring the issue to light benefits and drawbacks of this recent phenomenon of business venture. Time savings is one of the most evident advantages of electronic commerce (Rutter & Southernton, 2000). Studies have shown that time savings is the most important reason for embracing internet commerce nowadays (Rutter & Southernton, 2000). As a result, people can now access their money from any location, including their homes and places of work, using a personal computer on a desk. Paying monthly payments to major corporations that use electronic transactions eliminates the requiring you to wait in line or take significant quantities of money from your bank account that you may have in your wallet at all times then pay at a point of sale. Not only can you pay your bills online, but you can also buy for food, clothing, and hobbies. The possibilities are infinite because

most items These days, it is possible to acquire directly from a retailer by logging into a website accessed through your own computing device. Therefore, the single most important cause for the growth and incorporation of e-commerce into major organizations in recent years has been the ability to save money.

Additionally, customers have better to a larger pool of potential client's choice of items as a result of the growth in e-commerce. The ability for businesses to utilize their websites as storefronts means that consumers may now explore and purchase from a bigger number of vendors, reducing its importance difficult for them to locate and acquire exactly what they wish. Based on the findings of Keenay (1999), customers are no longer limited to what is accessible to them in their local market immediate region; instead, they now have more access to a greater variety of electronic commerce buying and sale of products and services through the internet., which also provides them with more competitive pricing and more value. Simply because a location is remote and there are no competitors in the area, a firm cannot retain a pricing monopoly in that territory any more. Because ecommerce gives the remote client the option to acquire items from a different location, prices in the local area are driven down and the quality of goods is raised as a result of the practice. Electronic commerce also offers the benefit of allowing small firms to compete with large corporations online. For a very minimal cost, a new business may set itself up to accept payments online and conduct transactions with other businesses. A new firm may get started trading online for as little as $1,000 dollars, according to the website (Wood, 2004). The website also states that If we consider the situation, Smaller businesses are generally chosen over large, well-established organizations when it comes to internet commerce in light of the fact that the smaller need more particular attention enterprises deliver. Another advantage of e-commerce is that businesses may now reach a larger range of customers and even export their products or services internationally, giving them the ability to offer their goods to areas that were previously inaccessible to their products. The computer store cyberian outpost is an example of a business that employs this strategy. This computer store's ability to quadruple its income every 90 days is explained by Peck (1996). Whereas the store previously made just $400 per day, it is now able to make that much in twelve seconds in the internet market place.

Disadvantages of E-Commerce

Forgery is a kind of offence the internet is having difficulties, and even the most casual client may become a victim of this type of fraud. Despite their appearances, websites that look trustworthy can be misleading, and email messages that appear valid can be nothing more than a scam designed to get information such is a bank account number or credit card number. Specifically, according to Goldsborough (2003), the vast majority of email scams originate in Nigeria and all utilize the same sort of fraud, in the hopes of fooling a dumb user people are led to believe that they are helping a less fortunate individual. While online auction sites are the primary target of fraudsters, accounting for 46 percent of all internet-based fraud according to Goldsborough (2003), the truth is that "while it may be quick and anonymous, it does come at a cost" (valentine, 2003). The person who is selling the items or providing the service to you will virtually never be able to see you when you do a transaction on the internet. The question is, how do you know that the assessments of a website are accurate, and that the protected information you are sending is, in fact, secure? As a matter of fact, there is no way to be confident that the business or people with whom you are dealing will genuinely fulfill their half of the contract.

Another drawback of online shopping is that clients are unable to view or touch the goods before purchasing it. Some websites have a proclivity to send out bogus or outdated merchandise to their customers. Occasionally, this might result in clients being dissatisfied when they receive a product that does not meet their expectations (i.e., the difference between what they ordered and what they received). Customers who shop online are also denied the satisfaction of immediate pleasure. When you purchase a thing at a physical store, you may use it right away, test it, and discover the benefits of that particular product immediately after purchase. However, with e-commerce, you must wait for the items to be shipped and delivered to you, which may take anywhere from a couple of hours to a couple of weeks, depending on the product (E commerce Fundamentals ,2018).

As well as having the capability of stealing credit card information from the consumer, many businesses that engage in some type of electronic transaction demand the user to provide a plethora of personal information. You are effectively handing your personal information to the firm by providing them with this information, which is generally maintained on a company database.

According to the Gow, (2005) article, this is the type of information that hackers are most interested in obtaining, since it provides them with a wealth of personal information that they can use to open fraudulent credit cards and bank accounts in your name. Another significant drawback of internet commerce is the requirement to give your personal information to an entity with whom you may only interact once in your lifetime, as a result, it is an enormous hassle. On the internet, it is not just the consumer who is at danger; extortion is also a significant issue for businesses that conduct online transactions with their consumers. According to (Gow, 2005), recent studies have found that more than twothirds of businesses that have been the target of computer-assisted terrorism do not tell the federal police or F.B.I about the incident. It is preferable for them to just pay the offending criminal, The penalty, which may be hundreds of thousands of dollars or perhaps millions of dollars, is intended to deter the offender from disclosing the consumer's personal information on other websites in order to gain public attention. In the event that such information is made public, it has the potential to damage the firm's business while also exposing the corporation to privacy litigation. As a result, the FBI is kept in the dark about these highly targeted assaults.

A number of benefits are readily apparent, as is the case with any other benefit to making transactions online, such as the ability to save both time and money by taking use of the ever-expanding service of e-commerce., but it is also evident that both customers and businesses must exercise caution and remain watchful. Consequently, with the advent of this relatively new kind of commerce, a whole new sort of fraud, theft, and extortion has begun to arise, which customers now need to be aware of, posing a significant disadvantage for online trading as a result of the increased visibility of these crimes. For the sake of conclusion, it is evident that both the pros and downsides of business on the internet must be considered; while there are advantages, there are also drawbacks.

E-Commerce Models

The term "e-commerce" refers to the usage of the internet and electronic commerce World Wide Web to conduct business transactions. The term "e-business" refers to a type of commercial transaction that takes place between and among organizations and individuals that is enabled by digital technology. This includes information systems that are under the jurisdiction of the firm. The term "electronic business transaction" refers to commercial

transactions that take place between and among organizations and persons that are facilitated by digital technology, including information systems under the control of the company (or e-business). Nowadays, the term "e-commerce" is gaining popularity, and most, if not all, products and services are becoming digitally accessible. As a result, it becomes more vital to distinguish clearly between different forms of commerce or company that are interwoven with the 'e' element. E-commerce models may be divided into five categories.:

From Company to Client

It is, as the name implies, a business strategy that involves both businesses and customers. This is the most often seen e-commerce sector. Individual customers are the target market for internet firms operating under this approach. After 1995, B2C had a modest part of the market at the time of its inception, but it grew at an exponential rate after that. With this sort of marketing, the underlying notion is that online merchants and marketplaces may offer their items to online consumers by utilizing crystal clear data that is made available through a variety of different online marketing methods. For example, a B2C model is followed by an online pharmacy that provides free medical consultations while also selling drugs to consumers. *From one company to another*

It is the most significant kind of the practice of e-commerce, which includes billions of dollars in transactions. Individual consumers are not involved in this sort of transaction because both the buyers and sellers are corporate entities. A retailer or wholesaler is analogous to a manufacturer who supplies items to another retailer or wholesaler. For example, Dell sells laptops and other associated equipment on the internet, but the company does not manufacture all of the things it sells. It then acquires such things from a variety of various firms, i.e., from the makers of those products, before selling them.

Consumer to Consumer

It makes it easier for two persons to conduct an online transaction for the purchase or sale of products or services. Despite the fact that there is no apparent middleman involved, the parties are unable to complete the transactions without the platform offered by an online market maker such as eBay.

Individual to Individual

Despite the fact that it is an e-commerce model. In addition to that, it is a technology in and of itself that allows users to directly exchange computer files and computer resources without the need to go via a central web server. In order to make advantage of this, both parties must install the necessary software in order to be able to interact on the same platform. This sort of e-commerce generates relatively little income since, from the outset, it has been oriented toward free usage, which has resulted in it becoming caught in cyber laws on occasion.

M-Commerce

It refers to the usage of mobile devices for the purpose of carrying out financial transactions online. Using their mobile devices, these individuals may speak with one another and do business. Companies that specialize in web design and development make modifications to their websites in order for them to be properly shown on mobile phones and tablets.

E-Commerce Security

Because of the specific nature of the dangers that face e-commerce businesses, new technologies and processes are required to ensure a safe transaction environment. When dealing with numerous payment concerns, (James, 2004), it is impossible to guarantee the security of websites 100 percent of the time. However, certain technologies may be used to assist lessen the danger of personal information being hacked when completing electronic commerce transactions.

Password

Password protection is the most frequent type of internet security that may be discovered. There are passwords for email accounts, bank accounts, retail accounts, eBay accounts, and a variety of other accounts available online. Passwords are used to safeguard information that is kept online, and they allow or deny access to restricted sections by requiring users to submit a username/ID and password before visiting the site before entering the site itself. Customers may save their personal information and data in their accounts, allowing them to avoid having to fill it in for each and every purchase in the future. People commonly share their passwords with others, write them down, or select passwords that are simple for others to guess as a result of this (birth date, name spelt

backwards, etc). Even if the person attempting to hack into your account doesn't know you very well, indicators such as using Hotmail as a secret question might make it much easier for them to gain or alter the password they are currently using.

Encryption

Alternatively, the information Being translated into another language using encoding or encryption. (Typically, some type of mathematical formula) before being sent via the internet in order to ensure that it remains secret while being transported. The data is then decoded at the other end of the spectrum, the receiver. The majority of encryption software use algorithms that are so complicated that it would take years for even the machines with the highest processing power decipher the communications (James, 2004).

Public key infrastructure

A public key infrastructure (PKI) is an additional layer of security that prevents a third party from decrypting encrypted information using any sort of software. Cryptography software makes use of extra software components Keys are used to guarantee that only the right people have access to the information. individuals who have created or received the information may obtain a copy of it. To send encrypted data from one computer to another, a set of two keys, consisting of a public key and a private key, must be used together.

Protecting businesses against external threats

When purchasing online or conducting business through e-commerce, it is not just customers who are at danger of being victims of fraud or virus. Companies must safeguard themselves against a diverse range of criminals, including thieves, hackers, and virus creators, to mention a few. Companies employ a variety of measures to safeguard themselves against these dangers.

Firewalls

It is a mix of at the time of purchase, a computer and software that is installed entrance into a networked system. In the case of a firewall being put between two or more networks that needs to be protected and the internet or another network that may be vulnerable, it acts as the first line of defense against intrusion. It is mandatory for access to and from the internet for the whole company to pass via a firewall. Internally, the firewall secures the

network as well as the computers that are being protected. When it comes to computing, firewalls are computers that have specific characteristics, such as the following:

- Only those who are specifically approved by the local security policy are permitted to travel through it.
- Everything that travels via the network, both from within and outside of it, must pass through this device.
- The barrier itself is impenetrable by outside forces.
- A trusted network is a network that is contained within the firewall, whereas an untrusted network is a network that is beyond the firewall.

CHAPTER THREE

System Analysis and Design Preamble

This chapter focuses on the system design approach and includes topics such as requirement definition, which is aimed at articulating the system requirements intends for use in the proposed system, as well as in the system analysis and design. An approach to problem-solving that breaks down a system into its component aspects in order to analyses how effectively those parts work together to accomplish their objectives is known as systems analysis. Bentley, Lonnie D. (2009). System analysis, according to the TUTORIAL POINT website, is the process of obtaining knowledge about a system, discovering the problem, and correcting the problem one step at a time. The basic purpose of system analysis is to guarantee that all system components are functioning properly in order to achieve a specific goal. As scientific approaches, analysis and synthesis are always complementary to one another. Every synthesis is based on the findings of a previous analysis, and every analysis necessitates a follow-up synthesis to confirm and correct the findings. It's also "an explicit formal inquiry conducted to assist someone (referred to as the decision maker) in identifying a better course of action and making a

better decision than she would have chosen otherwise." Tome Ritchey is a fictional character created by Tome Ritchey (2011). The focus of system analysis is on the systems, processes, and design.

System Requirement Specification

According to [Pete Sawyer,2002], a requirement is a property that a system must have or display in order to solve a real-world problem, which essentially implies that requirements are attributes that a system must have or exhibit in order to solve a problem. Requirement of the system can be gathered through secondary or primary method. Primary method: These requirements are compiled by several sources. Secondary method: These requirements compare the existing e-commence. A system's fundamental needs are critical and must be taken into consideration while designing and implementing a successful system; these system requirements include the following.

Functional requirement of the system

This criterion pertains to the manner in which the system should operate. Essentially, it provides a solution to the query "what will the system do?" The functional requirement of a system is the way in which the system should work in order to allow a user to utilize the site effectively. (Md. Golam Rabbi, et al., 2019) The aspects of the website that meet the functional requirements of the website are as follows:

Responsive design

The website will work both on desktop and mobile. statistics shows that users tend to use their mobile more often than desktop. When the website is mobile friendly in gets lot of traffic on the site it shouldn't be limited to just on source. The mobile responsive feature will be used on the site in other to monetize the website.

Registration Page

An email is sent to the user when registered on the site. The website should have a register or login form in order to allow the user make use of the site and also for the admin to have the users detail on the database.

Checkout flow

Checkout flow: A guest user is not permitted to use the order or check out functions on the website; in order to use the checkout feature, a user must first register on the website, which can only be done after the products chosen by the user have been placed to the

shopping cart. This is where it is announced that there is a product sale and that there is a promotion going on the site. The website will inform the user whether or not the order has been confirmed, delivered, or cancelled. The price, quality, and description of the goods will all be shown in the checkout option.

Security

The system has security access control that enforce users to sign in before accessing any function or feature of the system.

Nonfunctional requirement of the system

In the system's inability to operate, these are the characteristics that the system should possess. Specifically, this criterion provides a solution to the question "How should the system operate?" The effectiveness or efficiency with which a system is employed is determined by the system's performance. It is the system's quality that is the nonfunctional requirement. Specifically, it specifies how a given job should be carried out by the system. For a constraint to be applied on how the functional requirement should operate, a nonfunctional requirement must be specified.

Usability

The user interface (UI) should be welcoming, and the website should be developed in such a manner that it does not take more than 130 seconds for a new user to create an account and 120 seconds for an existing user to make an order on the website.
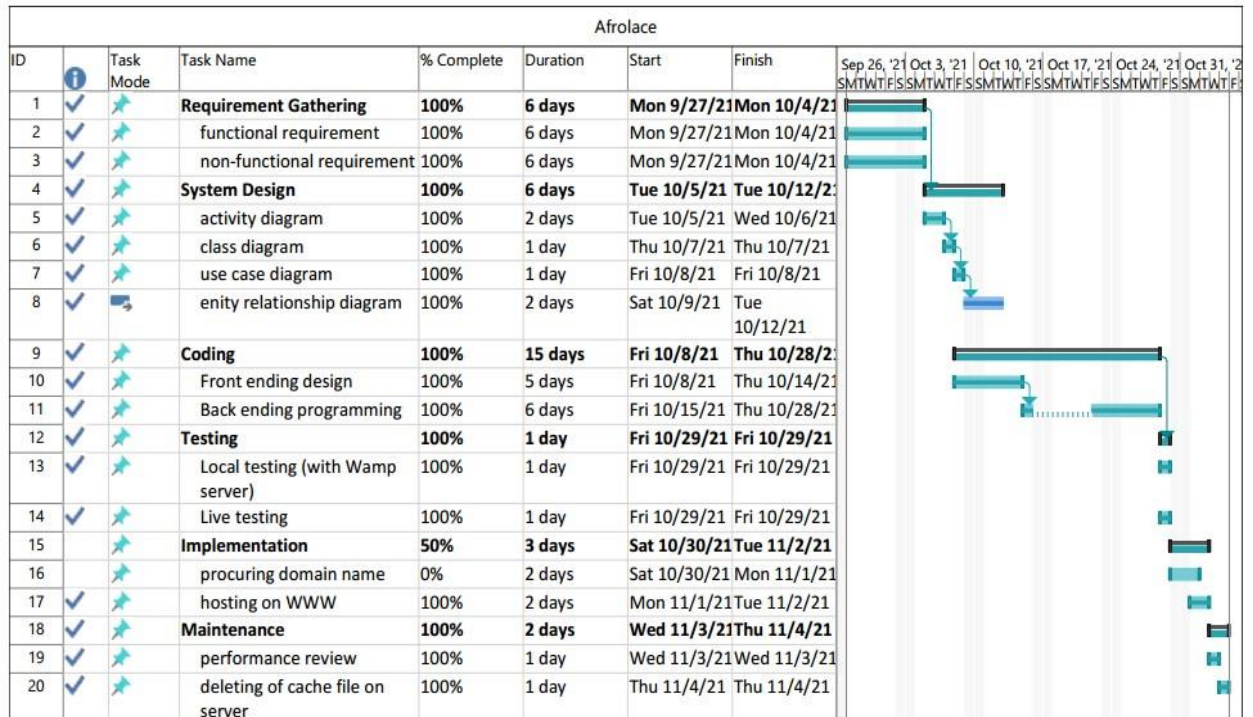
Scalability

This capacity of a system to handle changes in workload as it grows or shrinks. Michael Jankie (2016) defines scalability as the ability to add and remove capacity from a system without having an influence on its availability, while simultaneously optimizing maintainability and maintaining costs as low as reasonably possible.

Project Time Line (Gantt Chart)

This is a project planning tool which illustrates the start and the end date of this project. it shows the graphical representation of the project from the start date to the finish date.
Each task is dependent on the next task.

Figure 1. Project Time Line (Gantt Chart)

ID		Task Mode	Task Name	% Complete	Duration	Start	Finish
							Afrolace
1	✓	📌	**Requirement Gathering**	100%	6 days	Mon 9/27/21	Mon 10/4/21
2	✓	📌	functional requirement	100%	6 days	Mon 9/27/21	Mon 10/4/21
3	✓	📌	non-functional requirement	100%	6 days	Mon 9/27/21	Mon 10/4/21
4	✓	📌	**System Design**	100%	6 days	Tue 10/5/21	Tue 10/12/21
5	✓	📌	activity diagram	100%	2 days	Tue 10/5/21	Wed 10/6/21
6	✓	📌	class diagram	100%	1 day	Thu 10/7/21	Thu 10/7/21
7	✓	📌	use case diagram	100%	1 day	Fri 10/8/21	Fri 10/8/21
8	✓		enity relationship diagram	100%	2 days	Sat 10/9/21	Tue 10/12/21
9	✓	📌	**Coding**	100%	15 days	Fri 10/8/21	Thu 10/28/21
10	✓	📌	Front ending design	100%	5 days	Fri 10/8/21	Thu 10/14/21
11	✓	📌	Back ending programming	100%	6 days	Fri 10/15/21	Thu 10/28/21
12	✓	📌	**Testing**	100%	1 day	Fri 10/29/21	Fri 10/29/21
13	✓	📌	Local testing (with Wamp server)	100%	1 day	Fri 10/29/21	Fri 10/29/21
14	✓	📌	Live testing	100%	1 day	Fri 10/29/21	Fri 10/29/21
15		📌	**Implementation**	50%	3 days	Sat 10/30/21	Tue 11/2/21
16		📌	procuring domain name	0%	2 days	Sat 10/30/21	Mon 11/1/21
17	✓	📌	hosting on WWW	100%	2 days	Mon 11/1/21	Tue 11/2/21
18	✓	📌	**Maintenance**	100%	2 days	Wed 11/3/21	Thu 11/4/21
19	✓	📌	performance review	100%	1 day	Wed 11/3/21	Wed 11/3/21
20	✓	📌	deleting of cache file on server	100%	1 day	Thu 11/4/21	Thu 11/4/21

Waterfall Method

The methodology used in this system is the water fall methodology. it is a project management methodology where one phase is completely finished before the next phase begins.

Figure 2 Waterfall Method
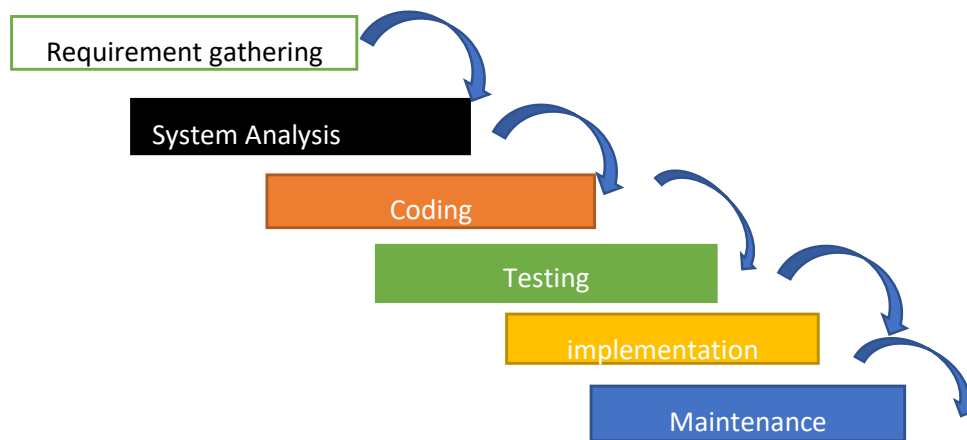
A problem is fixed in a particular phase before it moves to the next phase. This model doesn't work until a problem in a particular phase is fixed. This model has 6 phases ***Advantages of waterfall model***

- It is self-explanatory
- It is clear and very easy to understand
- Milestones are clearly defined
- It enables early design modifications**.**
- It is easy to manage
- Each phase is properly documented.

System Design

Designing an E-commerce website entails translating the requirements specification into a physical form which requires using different patterns to realize the intended system.

System design will also be discussed, and it will cover topics such as activity diagrams, class diagrams, and programme specifications among others. The structure of the database design will be shown at the conclusion of this chapter.

The information obtained from the preliminary investigation and the feasibility study in the system design were put together to achieve the system design stage. The knowledge of the existing manual method is also essential. This stage calls for the design tools such as:

i. Requirement of the system ii.

Class diagram iii. Use-case

diagram iv. Entity-

relationship diagram

v. Technology used.

Class Diagram of The Site

Class diagram is the blueprint of this system.it displays the relationship between objects that makes up the system, it displays what each object does and the service they provide.

Figure 3. Class Diagram of The Site
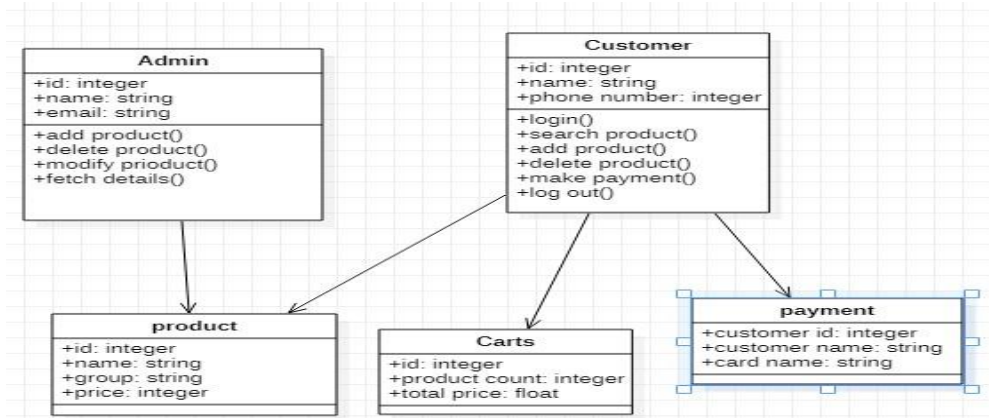
Use Case Diagram

This summarizes the details of this system and the users within the system.it also shows how the actors communicate with the use cases. is used in this system to arrange, identify and clarify the system requirement. The use case diagram consists of

- System
- Use case: These are operations or task performed by the system.
- Actor: These are people which interact with the system.
- Relationship: The relationship consists of

  Include

  Extend: the extend in this system (show wrong password) happens when the password is wrong Generalization

Figure 4. Use Case Diagram
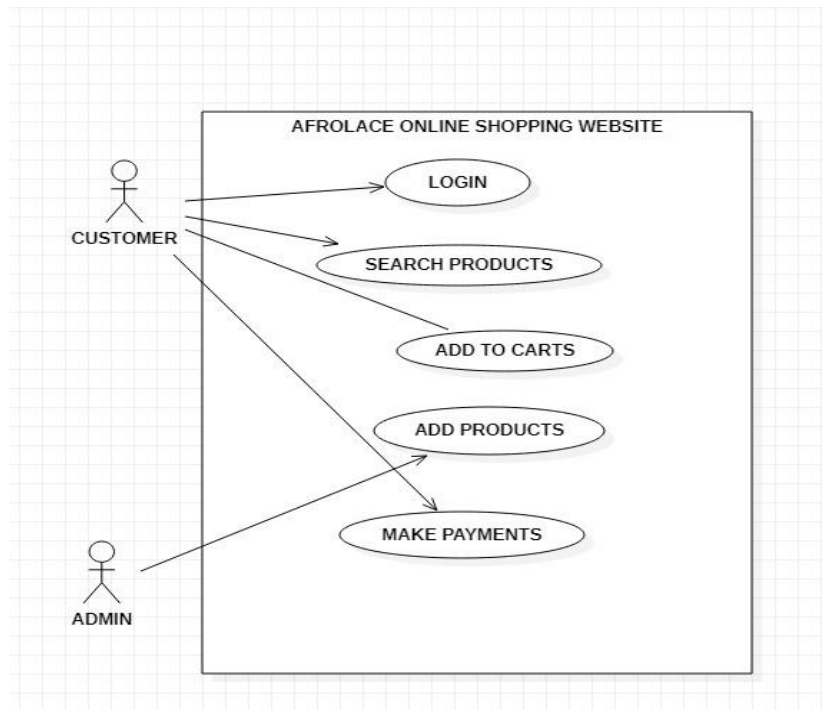
Entity Relationship Diagram of The Site

This diagram shows the flow chart of the application.

Figure 5. Entity Relationship Diagram of The Site
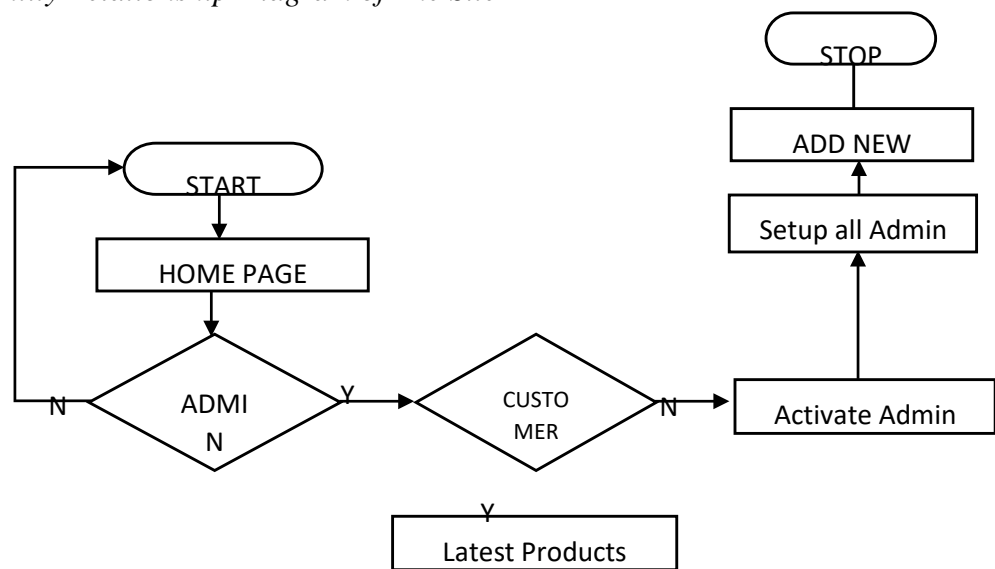
Logical Design

It is the logical design that translates the system requirements specification into a system model, which is accomplished by implementing the system's primary features. This design offers a mechanism for a user to register patients and to give payment information for services delivered to patients using an online interface.

Figure 6. Login Design

User Interface

The user interface provides a means through which the customer login and search through the e-commerce website with their respective username and password after login, in order to carry out a purchase and checkout their product purchased. *Figure 7, User Interface*
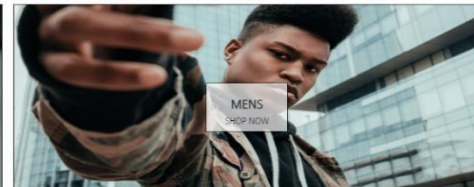
Programming Language selection

React Js

This is a JavaScript framework   used for building user interfaces. It is declarative and divides each part of a page into a component. React is declarative because its allows a user to design simple views efficiently update and render the components. Using React, huge and complicated web-based apps may be developed without the need for repeated page refreshes because of its ability to dynamically update its data. Less codes are written in React Js and it does extremely wonder with the less code. React Js is basically called a game changer because of how efficiently it is used. Most of reputable industry like Netflix, Amazon, Yahoo use React because of the benefits it offers. React is component based and as such allows each individual component to manage its own state. Users are looking for easy way to use a website and react has all it takes to meet the user's requirement. (Sanchit Aggarwal.2018)

Advantages oF React Js

Clarity

React makes the development process swift by allowing developers share components off a website without rewriting them it helps programmers deliver on time.

Flexibility

Some e commerce website has some complex projects which might be very difficult to modify in future but with React is code it makes it easier to modify changes in the site by saving time and cost for the developer.

Easy Testing

React is has a powerful testing tool or feature which helps programmers test or debug their codes with ease. React is made it easy during code testing it provides a scope where the code was tested and debugged.

Programmer friendly

With the basic knowledge I have ON HTML, CSS and JavaScript using React to develop a website is not difficult because the features are self-explanatory

Rich User interface

React is helps programmers build rich dynamic and interactive user interfaces.

Used by multiple and strong community

Communities like GitHub, Quora and Stack overflow renders help to a programmer when stocked while using this framework, I posted challenges I encountered while using the framework on GitHub I was marveled with multiple contributions I got from programmers from different part of the world. *Seo friendly*

search engine optimization is first considered before developing a website a user shouldn't be bored while trying to load a website so that's why programmers make use of react is to reduce how long it takes to load a website whereas enchaining the speed.

Git hub

Was used as a storage facility to store all the code used for easy accessibility from anywhere around the world. This technology also helped us to share ideas with programmers around the world on how the website should function properly.

Stripe

This is the payment gateway used for this website, It is a full stack payment process which was integrated on the website to allow processing of credit and debit cards.it also allows safe and efficient processing of funds. Stripe was chosen because it is developer user friendly and it is integration easy.

MySQL Database

We establish a SQL database in order to dynamically populate the information that will show on the E-commerce website. Generally speaking, a database is a structured collection of data that is stored and retrieved electronically via a computer system. When databases get more sophisticated, formal design and modelling approaches are often used in their development and maintenance. When it comes to capturing and analysing data, the database management system (DBMS) is the software that interacts with end-users, applications, and the database itself. The database is required for data storage purposes in this project. Following the creation of the database, a user is established in order to provide rights such as reading, writing, and so on. After we have finished establishing the database and user, we will access the phpMyAdmin dashboard in order to begin building tables in the database. We have built six tables, which include the following information: Username, password, email, item description, price list, and item photo (if applicable).

Dedicated Server

The dedicated server used for the project is WAMP server. By using WAMP server all the files inside a folder are placed in the www folder in the www directory. The application decides to use WAMP server because it is rather also easy to work with and runs without any delay.

Table 1. Challenges Associated with the existing e-commerce system and the advantages of Proposed system

S/NO.	Disadvantage of Existing Designed E-commerce System	Advantage of Proposed System
1.	Unsecured payment system, that may result to loss of fund by user.	Payment system are confidential and highly secured in various form.
2.	No assurance of product quality	Easy access to global market
3.	Technical instability may pose distractions to the entire processes	User and device friendliness.
4.	Limited customer to Customer activity opportunities.	Authentication of new user
5.	Consistent Check on customer loyalty	User interface for both new and existing users are simplified
6.	Hackers attack on payment	Low maintenance cost
7.	Poor personalization queries	Easy step for purchases
8.	Inefficient customization of product to suit user expectation.	Allow customers to compare prices
9.	Poor KYC, in order to reduce scammers, proper details of users need to be captured.	Customization of the product to match with customers preference
10.	Limitation on number of users	Global access to the site

CHAPTER FOUR

System Evaluation and Testing

The process of translating a new system design into operation and making it functional is known as implementation; Jeffrey and Whitten define it as "the process of converting a new system design into operation and making it functional" (2001). All of the requirement's analysis and system design are put to the test in this phase to ensure the system's effective delivery. The process of evaluating the performance of a full system in order to determine how it will function in the future is known as system evaluation. (David Bromely,2016).

System Requirements

Certain requirements must be met in order for a computer application to be implemented successfully. Because system requirements are taken into account on both a hardware and software level, the developed application's hardware and software requirements will be taken into account.

Hosting Requirement

For effective implementation of web application, certain requirements are to be fulfilled. The server requirements are considered on both the hardware and software basis; therefore, the consideration will be given to both the hardware and the software requirements of the developed application. The application hosting is at the heart of each web application. The built program is transferred to the intended web server, and the user can then call client interfaces from the web server. The web server software is responsible for the hosting procedure. Besides hosting, the web server will require domain name setting. This is a requirement for the internet-based operation of servers.

Hosting requirement

CPU: 4 cores

RAM: 7 GB

Operating system: Ubuntu

Hard disk: 130GB

Dedicated IP: 2 IPv4

Datacenter Location: Phoenix, Arizona

Bandwidth: 3000 GB/month

Database: MySQL

Client Hardware Requirements

Computer system that will use the developed application must satisfy the following minimum requirements:

- Windows 7,8, 10 ,11, Linux, Solaris, MAC OS are examples of a network-based operating system.
- Web browsers such as Safari, Google Chrome, Firefox, opera, etc.
- Payment method: Stripe payment system was integrated on the site to allow users purchase an item and pay with their credit card. When a user checks out, they input their credit card detail, an information will be sent to the website which verifies the funds before it's been sent to the merchants, the merchants then receive the payment to confirm the sale from the buyer and seller.

Implementation Procedures

After acquiring the system that meets the above specified requirements, the following procedures are needed to fully implement the system.

System Testing

System testing strategies will be discussed here, programs are tested and debugged to ensure that the general operation of the program meets the overall system objectives. The chapter also covers the computer target requirements, lastly, maintenance issues are discussed, and the researcher also states how the software can be maintained. Performance is crucial for every web application, we ensure that the suggested web application's performance is fully optimized since if it is slow, the end-user will become discouraged and seek for other relevant applications that perform better. Our solution is compatible with and capable of utilizing existing features in today's e-commerce web applications. We chose this technique since we're interested in the application's e-commerce (buying and selling) part.

Test Environment and Test Plan.

The test environment consists of the two environments where the test will run, as well as the tools and associated hardware. This study's test environment includes the following:

i. Web browser testing ii. Tools for keeping track of how much of a server's resources are being used. For each test, we measure the time required for a task to execute, the usage of RAM and CPU. The tests were run on Wi-Fi and 4G network. The time required for a task to execute is calculated within the code. The execution time for cloud calculations will include the overall time needed for the request to finish. Additionally, the server time needed for processing will be measured so that we can observe the delay for each cloud request. To measure the utilization of the device's resources, RAM, and processor, the Android Profiler tool will be used. SQL Server monitoring is part of SQL tools It provides a graphical representation of CPU, memory, and network utilization in real time. One approach is to take physical measurements on a piece of real hardware with specialized measurement equipment. There are software tools to perform this type of measurement, but it is hard to get an accurate value. So, the focus here is on execution time, CPU, and memory utilization of web application functions, where more accurate values can be gathered. *Speed Test.*

The speed test helps us to check the best network condition to operate the application. The speed of the device is listed on the y-axis in Kbps while the devices with their parameters which we call devices and the network type are listed on the x-axis. We have analyzed the connection speed on three different Web browsers which are Firefox, google chrome and Safari.

Figure 8. Speed Test
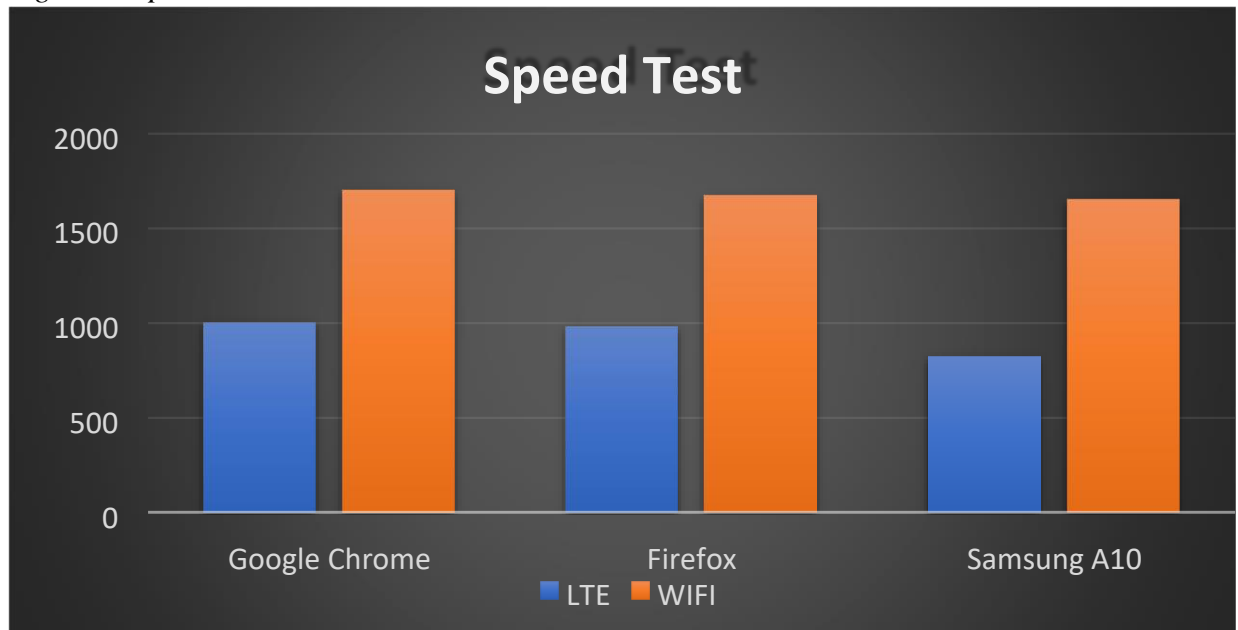
The tests were executed on a network with the taking after normal download/upload speed: 1800kbps/100kbps for Wi-Fi association, and 1200Kbps/700kbs for LTE association. The normal execution time is taken for each test. Values are shown in milliseconds. In the above figure the execution time of getting to a component is appeared, for nearby, Wi-Fi and LTE. In this test, a cluster of predefined lengths is made, and to begin with, a component is returned.

4.6. Tool for Monitoring the Utilization of Hardware Resource.

Memory Usage

This memory usage focuses on the utilization of the random-access memory (RAM) The application is design to consume a maximum RAM usage of 311Mb when running and 180Mb while running in the background. This was subjected to testing on three different phones and we came up with the below

Figure 9. RAM Usage
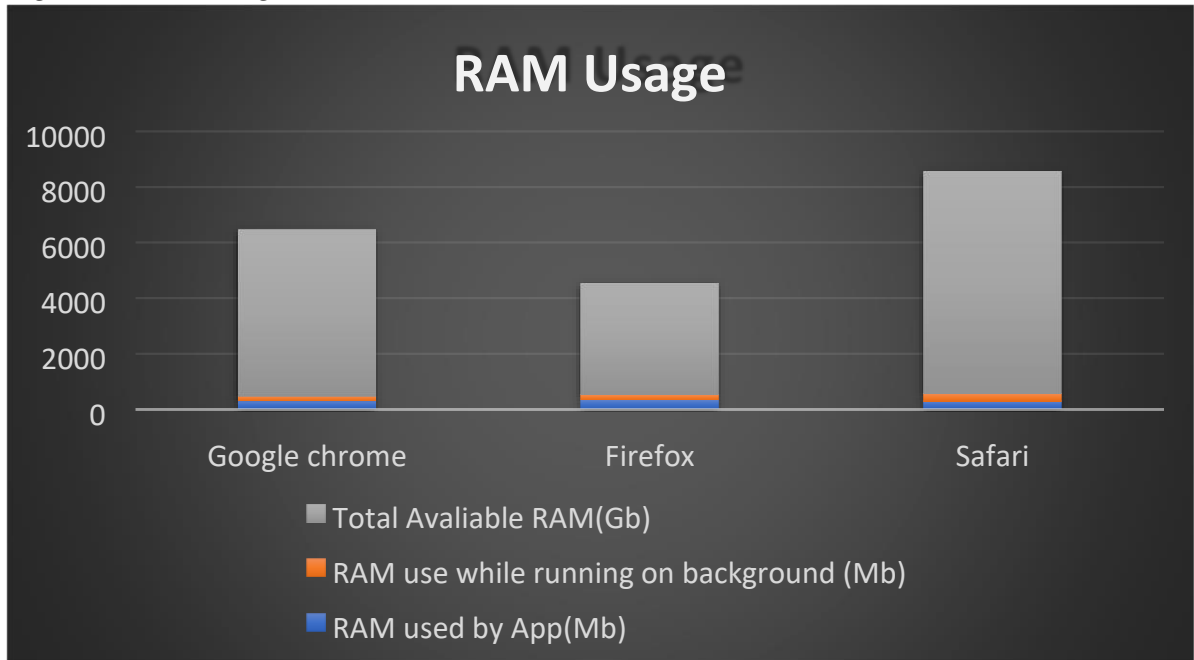
The Central Processing Unit (CPU) Usage

This validation/test show us how the application utilizes the user's phone CPU processing power. The displayed CPU utilization rate is in terms of the entire CPU capacity. Since we utilize single-threaded code, one center is utilized for processing. The CPU utilization bounces for neighborhood preparing, in test cases with the final three tests in google chrome, Firefox, and Safari. In the various test case, the CPU usage ranges from 4%-9%

Figure 10. CPU Usage.
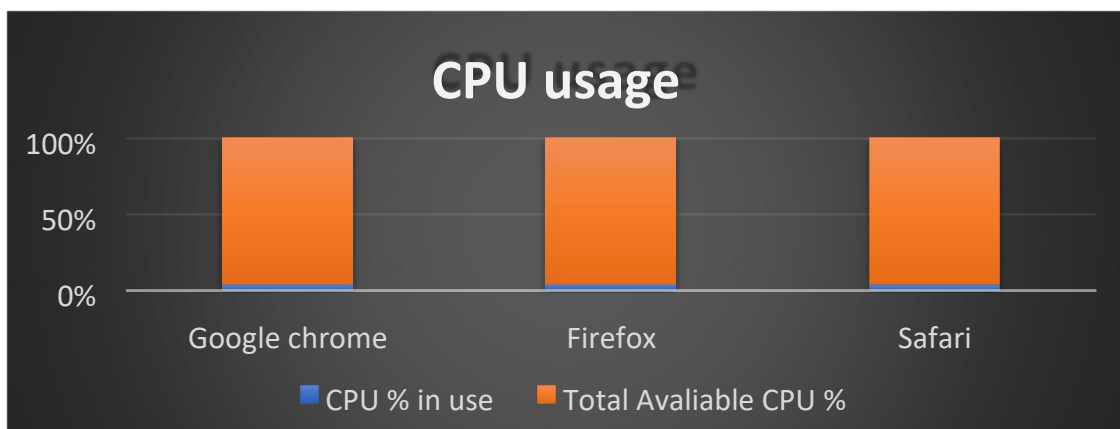
Sever Bandwidth Usage

This function allows me to see the bandwidth usage for the application. It shows the total bandwidth usage when fifteen users access the application for 24hrs as shown in figure 5.13 and one week as shown in figure 5.14. The test server has an unlimited band with size which enable the application to function without any error message, having a bandwidth of 320mb for 10 users for 24hr is a good sign that application will function as expected. Web application has proven to function as expected when operating from the server end and the result of this bandwidth has confirmed that.

Figure 11. 24 Hours Chat
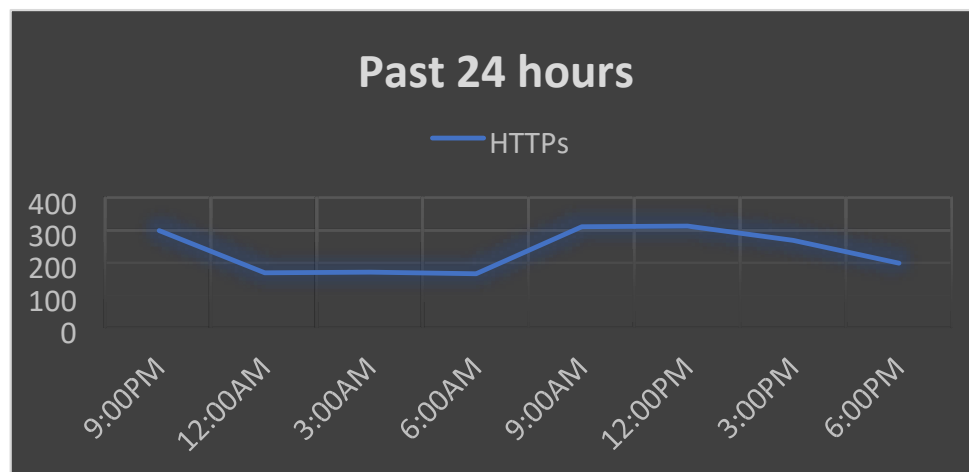
Figure 12. Previous Chat
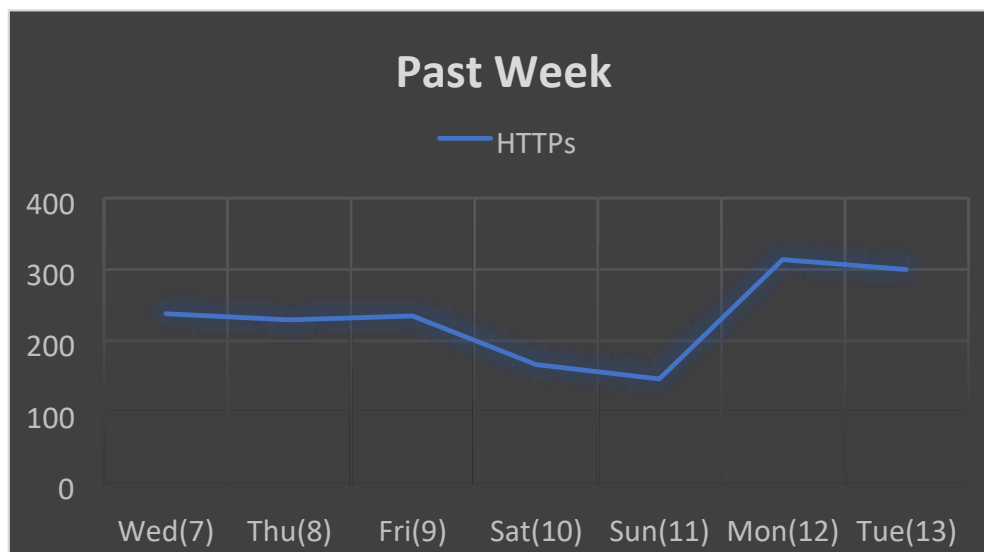
Responds Time

There are a few guidelines that address application reaction speed and user experience. On the user's device, a response time of less than 100ms is extremely rapid. To the users, any

response time of up to one second(s) is sufficient. Web application testing is a type of A/B testing in which different user groups are given different versions of an in-app experience to see which one prompts the most activity. Web application testing encompasses all capabilities tests that run on the server side, as well as allowing advertisers and product managers to optimize end-to-end user interface experiences. To determine the instruments for the cross-platforms to display the examination, a few models are explored. Most crucially, there is the ability to use the device to perform a Property Cross. This does not limit the investigation, as most well-known and frequently used cross-platform devices are supported. (Retrieved, 2012).

CHAPTER FIVE

Conclusion

This project has explored the strengths and weakness of Ecommerce website. The functional and Non-functional requirement. The need to add product and delete products from cart and also allow customers login and logout to their unique account. These proposed solutions were achieved through interviews with some online e-commerce users on GitHub and also from a personal experience. This system was developed with React Js and accompanied with MYSQL for the database. The main objective of this project is to proffer solutions to these shortcomings and design a prototype system that actually rectifies the faults in the already existing systems. This was achieved by designing a system where accurate description of products is given, only items available in stock are displayed, customers' orders are processed in real time, tracking information is provided and customers get their goods on the date given upon purchase. It was tested and assessed against the requirements derived and the authentication mechanism was able to satisfy all of them to ensure better shopping experiences for online shoppers.

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Appendices

Appendix 1

Image of the website

Appendix 2

Similarity Report (Turnitin)

Assoc.Prof.Dr. Boran Sekeroglu

Appendix 3 Ethical Approval

NEAR EAST UNIVERSITY

ETHICAL APPROVAL DOCUMENT

Date: 25/02/2022

To the Institute of Graduate Studies,

For the thesis project entitled as "DESIGN AND IMPLEMENTATION OF AN E-COMMERCE WEBBASED PORTAL" the researchers declare that they did not collect any data from human/animal or any other subjects. Therefore, this project does not need to go through the ethics committee evaluation.

Title: Assoc. Prof. Dr.

Name Surname: Boran Şekeroğlu

Signature:

Role in the Research Project: Supervisor