CRYPTOGRAPHIC LEDGER PREDICATED PERSPECTIVE CAUSE LINIMENT DETECTABLE CURRENT FETTLE ATTENTION PRODUCT DISTRIBUTION

A PROJECT REPORT

Submitted by

BHARATHI V - 510820104003

SHANMATHI A - 510820104017

in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

GANADIPATHY TULSI'S JAIN ENGINEERING COLLEGE

VELLORE

ANNA UNIVERSITY: CHENNAI 600 025

JUNE 2023

ANNA UNIVERSITY: CHENNAI 600 025

BONAFIDE CERTIFICATE

Certified that this project report **"CRYPTOGRAPHIC LEDGER PREDICATED PERSPECTIVE CAUSE LINIMENT DETECTABLE CURRENT FETTLE ATTENTION PRODUCT DISTRIBUTION"** is the bonafide work of

BHARATHI V - 510820104003

SHANMATHI A - 510820104017

who carried out the project work under my supervision.

SIGNATURE	**SIGNATURE**
Mrs.S.I.SANTHANALAKSHMI.M.E.,	Mrs.SARANYA.R
	SUPERVISOR
HEAD OF THE DEPARTMENT	**ASSISTANT PROFESSOR**
Department of Computer Science	Department of Computer Science
and Engineering	and Engineering
GTEC	GTEC
Kaniyambadi	Kaniyambadi

Submitted for the university examination held on _____

INTERNAL EXAMINER **EXTERNAL EXAMINER**

ACKNOWLEDGEMENT

We first offer our deepest gratitude to our **GOD** the Almighty who has given us strength and good health during the course of the project.

We are conscious about our indebtedness to our **Managing Trustee Shri**. **N. Sugalchand Jain**, our **Chairman Shri. P. Pyarelal Jain**, our Secretary Shri. **T. Amarchand Jain**, our **Principal Dr. M. Barathi M.E., Ph.D.,** who inspired us to reach greater heights in the pursuits of knowledge.

We articulate our sincere gratitude to our **Head of the Department Mrs. S.I. Santhanalakshmi, M.E.,** who had taught us the way to do successful project and without whose constant encouragement and whole idea, the project would not have been possible.

We wish to express our sincere thanks to our **Internal Guide Mrs.R.Saranya,M.E.,**who had helped us a lot and had given valuable suggestions, which made us finish this project in a very successful and neat way.

We wish to express our sincere thanks and honor to our **Project Coordinator Mrs.S.I.Santhanalakshmi,M.E.,** we extend our thanks to **Mrs. S. Vennila, M.E,Mr.R.Sudarsan,M.E and Mrs.Y.Mohanapriya, M.E** for their motivation. We also express our sincere thanks to the entire team of **teaching and non-teaching staff of CSE Department.**

We take this opportunity to thank our parents and friends who have been the source of inspiration and an encouraging factor throughout the project period.

ABTRACT

Healthcare deliver chains are complex structures spanning across more than one organizational and geographical limitation, providing important spine to services crucial for ordinary lifestyles. The inherent complexity of such systems can introduce impurities including inaccurate statistics, lack of transparency and constrained records provenance. Consequently, present studies have emphasized the need for a strong, end to-cease track and hint system for pharmaceutical supply chains. There in a case-to-quit product monitoring gadget across the pharmaceutical supply chain is paramount to making sure product protection and removing counterfeits. Most existing music and trace systems are centralized main to statistics privacy, transparency and authenticity problems in healthcare supply chains. In this paper, we gift and the clever agreement guarantees facts provenance, removes the want for intermediaries and gives a at ease, immutable history of transactions to all stakeholders. We present the machine structure and designated algorithms that govern the working concepts of our proposed answer. We perform trying out and validation, and gift price and security evaluation of the device to evaluate its effectiveness to enhance traceability inside pharmaceutical supply chains

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
API	**A**ctive **P**harmaceutical **I**ngredient
UTXO	**U**nspent **T**ransaction Outputs
USFDA	**US F**ood and **D**rug **A**dministration
ODBC	**O**pen **D**ata **B**ase **C**onnectivity
JDBC	**J**ava **D**ata **B**ase **C**onnectivity
J2ME	**J**ava **2 M**icro **E**dition
IPFS	**I**nter **P**lanetary **F**ile **S**ystem
JRE	**J**ava **R**untime **E**nvironment

CHAPTER 1

INTRODUCTION

1.1 OBJECTIVE

The main objective of this project is to monitor a trace of drug and smart contracts and decentralized off-chain storage by using block chain in the healthcare supply chain.

1.2 OVERVIEW

The overview of this project is to propose a secure healthcare system in a block chain. It gives the effective interaction between the admin and users.

1.3 INTRODUCTION

Healthcare supply chain is a complex network of several independent entities that include raw material suppliers, manufacturer, distributor, pharmacies, hospitals and patients. Tracking supplies through this network is non-trivial due to several factors including lack of information, centralized control and competing behavior among stakeholders. Such complexity not only results in in-efficiencies such as those highlighted through COVID-19 pandemic but can also aggravate the challenge of mitigating against counterfeit drugs as these can easily permeate the healthcare supply chain. Counterfeit drugs are products deliberately and fraudulently produced and/or mislabeled with respect to identity and/or source to make it appear to be a genuine product. Such drugs can include medications that contain no active pharmaceutical ingredient (API), an incorrect amount of API, an inferior-quality API, a wrong API, contaminants, or repackaged expired products. Some counterfeit medications may even be incorrectly formulated and produced in substandard conditions.

According to the Health Research Funding Organization, up to 30% of the drugs sold in developing countries are counterfeit. Further, a recent study by

World Health Organization (WHO) indicated counterfeit drugs as one of the major causes of deaths in developing countries, and in most case the victims are children. In addition to the adverse impact on human lives, counterfeit drugs also cause significant economic loss to the pharmaceutical industry. In this respect, the annual economic loss to the US pharmaceutical industry due to counterfeit medicine is estimated around $200 billion.

An API supplier is responsible for delivering the raw materials to manufacture drugs approved by a regulatory agency such as the US Food and Drug Administration (US FDA). The manufacturer packages the drug into a Lot or sends it to a re-packager. The primary distributor receives several Lots of the product and is responsible for transferring them pharmacies based on product demand or secondary distributors (in case the quantity of Lots is very large) who can transfer these Lots to the pharmacies Finally, a pharmacy will dispense the drug to patient typically based on a doctor's prescription. Throughout the supply chain, the transfer of drugs is usually facilitated third party logistic service providers such as UPS or FedEx and in some cases the distributors operate their own fleet of vehicles to transport the products.

CHAPTER 2

LITERATURE SURVEY

[1]. TITLE: "Drug ledger: A Practical Blockchain System for Drug Traceability and Regulation"

AUTHOR: Yue Zhang, Jing Wu

YEAR: 2018

DECRIPTION:

Drug traceability system is essentially important for public drug security and business of pharmaceutical companies, which aims to track or trace where the drug has been and where it has gone along the drug supply chain. Traditional centralized server-client technical solutions have been far from satisfying for their bad performances in data authenticity, privacy, system resilience and flexibility. In this paper, we propose a scenario-oriented blockchain system for drug traceability and regulation called Drug ledger, which reconstructs the whole service architecture by separating service provider into three independent service components and ensures the authenticity and privacy of traceability data. Drug ledger is more resilient than traditional solutions with its p2p architecture. Furthermore, Drug ledger could efficiently prune its storage, achieving a finally stable and acceptable blockchain storage. Besides, algorithms reflecting the real drug supply chain are designed based on the expanded UTXO workflow in Drug ledger. To our knowledge, it is the first systematic work from both a technical and practical perspective on how blockchain system could be designed for drug traceability and regulation.

LIMITATIONS:

It been far from satisfying for their bad performances in data authenticity, privacy, and it is less flexibility and data stored in the form of a ledger.

[2]. TITLE: "Analysis of the Bitcoin UTXO Set**"**

AUTHOR: Ser Gi Delgado-Segura, Cristina Pérez-Sola,

YEAR: 2019

DESCRIPTION:

Bitcoin relies on the Unspent Transaction Outputs (UTXO) set to efficiently verify new generated transactions. Every unspent output, no matter its type, age, value or length is stored in every full node. In this paper we introduce a tool to study and analyze the UTXO set, along with a detailed description of the set format and functionality. Our analysis includes a general view of the set and quantifies the difference between the two existing formats up to the date. We also provide an accurate analysis of the volume of dust and unprofitable outputs included in the set, the distribution of the block height in which the outputs where included, and the use of non-standard outputs.

LIMITATIONS:

The analysis plots included in this section show cumulative distribution functions and implementation does not use a deterministic function - computation.

[3]. TITLE: "A Novel Medical Blockchain Model for Drug Supply Chain Integrity Management in a Smart Hospital"

AUTHOR: Faisal Jamil ,Lei Hang ,

YEAR: 2019

DECSRIPTION:

At present, in pharmacology one of the most serious problems is counterfeit drugs. The Health Research Funding organization reported that in developing countries, nearly 10–30% of the drugs are fake. Counterfeiting is not the main issue itself, but, rather, the fact that, as compared to traditional drugs, these counterfeit drugs produce different side effects to human health. According to WHO, around 30% of the total medicine sold in Africa, Asia, and Latin America is counterfeit. This is the major worldwide problem, and the situation is worse in developing countries, where one out of every 10 medicines are either fake or do not follow drug regulations. The rise of Internet pharmacies has made it more difficult to standardize drug safety. It is difficult to detect counterfeits because these drugs pass through different complex distributed networks, thus forming opportunities for counterfeits to enter the authentic supply chain. The safety of the pharmaceutical supply chain has become a major concern for public health, which is a collective process. In this paper, we propose a novel drug supply chain management using Hyperledger Fabric based on blockchain technology to handle secure drug supply chain records.

LIMITATIONS:

A smart contract is launched to give time-limited access to electronic drug records and also patient electronic health records and also carried out a number of experiments.

[4]. TITLE: “Investigating performance constraints for blockchain based secure e-voting system”

AUTHOR: Kashif Mehboob Khan, Junaid Arshad

YEAR: 2020

DECRIPTION:

Voting is one of the fundamental pillars of modern democracy. Continuous efforts have been made to strengthen the processes and methods involved to achieve verifiable, transparent voting systems. In recent years, blockchain has been increasingly used to address multi-dimensional challenges across widespread application domains including healthcare, finance and e-voting. However, achieving an efficient solution via use of blockchain requires consideration of a range of factors such as block generation rate, transaction speed, and block size which have a profound role in determining the overall performance of the solution. Current research into this aspect of blockchain is focused on Bitcoin with the objective to achieve comparable performance as of existing online payment systems such as VISA. However, there exists a gap in literature with respect to investigating performance constraints for wider application domains

LIMITATIONS:

The rate of incoming transactions to the unconfirmed pool of transactions does not match to rate of confirmation of transactions to the blocks by the miners, it can result in significant performance overhead as well as delays in transaction confirmation time.

[5]. TITLE: “Conceptual framework for general traceability solution: description and bases”

AUTHOR: Abdesselam Bougdira , Abdelasis Ahaitouf

YEAR: 2021

DESCRIPTION:

The purpose of this paper is to describe a proposed framework for traceability purpose. Hence, the framework provides a formal and structured way of viewing a traceability solution. This structure lays the required bases for a traceability system before starting development and deployment. Design/methodology/approach. The paper examines several traceability publications, including systems and literature review. The study covers the traceability implementation phase. Therefore, this research approaches the traceability issue from three perspectives (description, engineering and executive one). The separation between aspects is essential when describing and comparing traceability systems. This distinction is also helpful when recommending solution improvements. Findings The framework identifies six traceability bases: aims, functions, specifications, data classification, processes and procedures. These can establish a basis for a General. Purpose tool that can enable users to develop an efficient traceability solution.

LIMITATIONS:

The framework helps users to develop a general, interoperable and scalable traceability solution. Some studied cases could require more research angles.

CHAPTER 3

SYSTEM ANALYSIS

3.1 PROBLEM DEFENTION

The purpose of the system to enhance the secured interaction between the Each supply chain in a block of data system.

3.2 EXISTING SYSTEM

- Drugs is one consequence of such limitations within existing supply chains which not only has serious adverse impact on human health but also causes severe economic loss to the healthcare industry.
- A recent study by World Health Organization (WHO) indicated counterfeit drugs as one of the major causes of deaths in developing countries, and in most cases the victims are children.
- The smart contracts in are programmed for specific roles such as supplier, manufacturer, and wholesaler which requires each participant to manually confirm which drugs are received. Such approach can introduce delays and inaccuracies in the immutable data stored on the ledger.

3.2.1 DRAWBACK

- Most existing track and trace systems are centralized leading to data privacy, transparency and authenticity issues in healthcare supply chains.
- In addition to the adverse impact on human lives, counterfeit drugs also cause significant economic loss to the pharmaceutical industry.

3.3 PROPOSED SYSTEM

- We propose a block chain-based solution for the pharmaceutical supply chain that provides security, traceability, immutability, and accessibility of data provenance for pharmaceutical drugs.

- We design a smart contract capable of handling various transactions among pharmaceutical supply chain stakeholders.
- We present, implement and test the smart contract that defines the working principles of our proposed solution.
- We conduct security and cost analysis to evaluate the performance of the proposed block chain-based solution.

3.3.1 ADVANTAGE

- We are developing a Drug Traceability System based on Block chain Technology that will be used to track drugs throughout the healthcare supply chain.
- We perform testing and validation, and present cost and security analysis of the system to evaluate its effectiveness to enhance traceability within pharmaceutical supply chains.

CHAPTER 4

SYSTEM SPECIFICATION

4.1 HARDWARE REQUIREMENTS

PROCESSOR	:	Intel Dual Core, I3
RAM	:	1 GB
MONITOR	:	15” COLOR
HARD DISK	:	80 GB

4.2 SOFTWARE REQUIREMENTS

FRONT END	:	Html/CSS, java script.
BACK END	:	java script
OPERATING SYSTEM	:	WINDOWS 7/8/9
TOOL	:	Net bean.

4.3 SOFTWARE DESCRIPTION

Java Technology

Java technology is both a programming language and a platform.

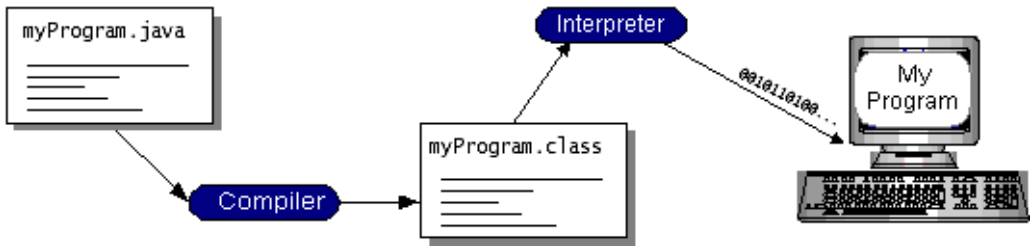
The Java Programming Language

The Java programming language is a high-level language that can be characterized by all of the following buzzwords:

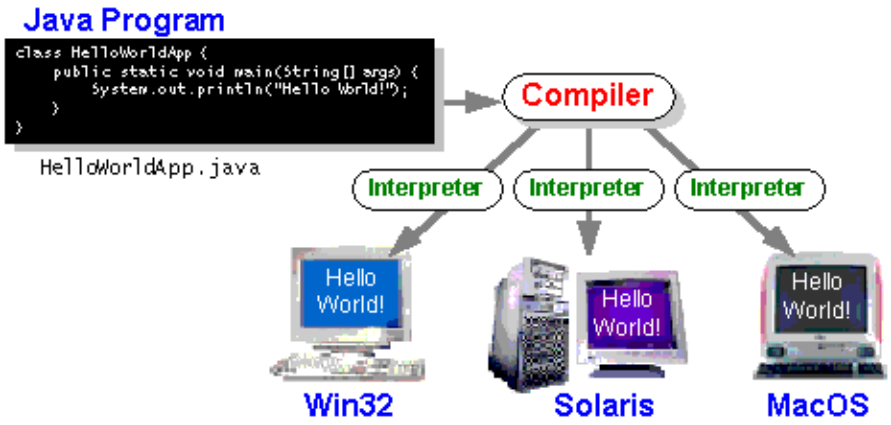
- Simple
- Architecture neutral
- Object oriented
- Portable
- Distributed
- High performance

- Interpreted
- Multithreaded
- Robust
- Dynamic
- Secure

With most programming languages, you either compile or interpret a program so that you can run it on your computer. The Java programming language is unusual in that a program is both compiled and interpreted. With the compiler, first you translate a program into an intermediate language called Java byte codes the platform-independent codes interpreted by the interpreter on the Java platform. The interpreter parses and runs each Java byte code instruction on the computer. Compilation happens just once; interpretation occurs each time the program is executed. The following figure illustrates how this works.



You can think of Java byte codes as the machine code instructions for the Java Virtual Machine (Java VM). Every Java interpreter, whether it's a development tool or a Web browser that can run applets, is an implementation of the Java VM. Java byte codes help make "write once, run anywhere" possible. You can compile your program into byte codes on any platform that has a Java compiler. The byte codes can then be run on any implementation of the Java VM. That means that as long as a computer has a Java VM, the same program written in the Java programming language can run on Windows 2000, a Solaris workstation, or on an iMac.



The Java Platform

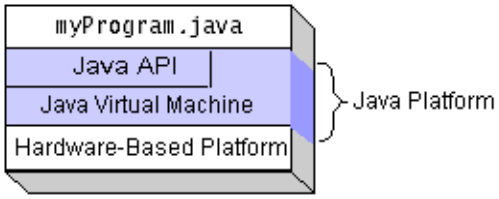
A platform is the hardware or software environment in which a program runs. We've already mentioned some of the most popular platforms like Windows 2000, Linux, Solaris, and MacOS. Most platforms can be described as a combination of the operating system and hardware. The Java platform differs from most other platforms in that it's a software-only platform that runs on top of other hardware-based platforms.

The Java platform has two components:

- The Java Virtual Machine (Java VM)
- The Java Application Programming Interface (Java API)

You've already been introduced to the Java VM. It's the base for the Java platform and is ported onto various hardware-based platforms.

The following figure depicts a program that's running on the Java platform. As the figure shows, the Java API and the virtual machine insulate the program from the hardware.



What Can Java Technology Do?

The most common types of programs written in the Java programming language are applets and applications. If you've surfed the Web, you're probably already familiar with applets. An applet is a program that adheres to certain conventions that allow it to run within a Java-enabled browser.

However, the Java programming language is not just for writing cute, entertaining applets for the Web. The general-purpose, high-level Java programming language is also a powerful software platform. Using the generous API, you can write many types of programs.

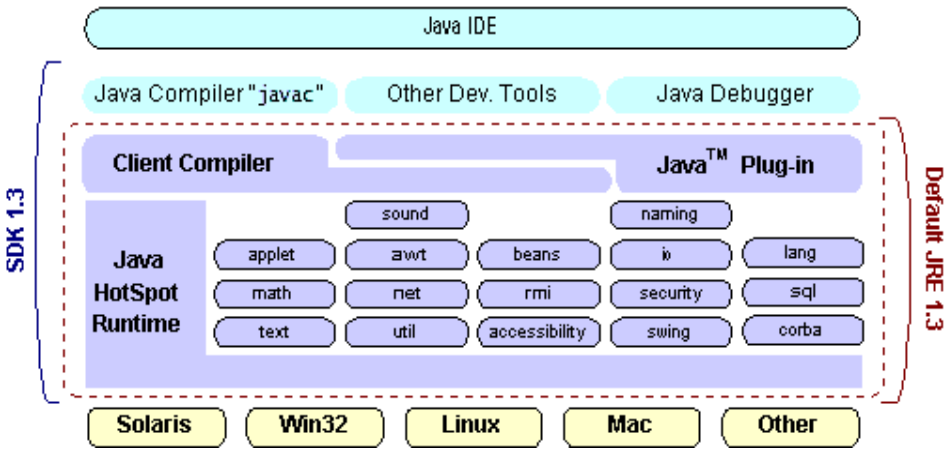
An application is a standalone program that runs directly on the Java platform. Instead of working in browsers, though, servlets run within Java Web servers, configuring or tailoring the server.

Every full implementation of the Java platform gives you the following features:

- **The essentials**: Objects, strings, threads, numbers, input and output, data structures, system properties, date and time, and so on.
- **Applets**: The set of conventions used by applets.
- **Networking**: URLs, TCP (Transmission Control Protocol), UDP (User Data gram Protocol) sockets, and IP (Internet Protocol) addresses.
- **Internationalization**: Help for writing programs that can be localized for users worldwide. Programs can automatically adapt to specific locales and be displayed in the appropriate language.
- **Security**: Both low level and high level, including electronic signatures, public and private key management, access control, and certificates.

- **Software components**: Known as Java Beans ™, can plug into existing component architectures.
- **Object serialization**: Allows lightweight persistence and communication via Remote Method Invocation (RMI).
- **Java Database Connectivity (JDBC™)**: Provides uniform access to a wide range of relational databases.

The Java platform also has APIs for 2D and 3D graphics, accessibility, servers, collaboration, telephony, speech, animation, and more. The following figure depicts what is included in the Java 2 SDK.



How Will Java Technology Change My Life?

We can't promise you fame, fortune, or even a job if you learn the Java programming language. Still, it is likely to make your programs better and requires less effort than other languages. We believe that Java technology will help you do the following:

- **Get started quickly**: Although the Java programming language is a powerful object-oriented language, it's easy to learn, especially for programmers already familiar with C or C++.
- **Write less code**: Comparisons of program metrics (class counts, method counts, and so on) suggest that a program written in the Java

programming language can be four times smaller than the same program in C++.

- **Write better code**: The Java programming language encourages good coding practices, and its garbage collection helps you avoid memory leaks. Its object orientation, its JavaBeans component architecture, and its wide-ranging, easily extendible API let you reuse other people's tested code and introduce fewer bugs.
- **Develop programs more quickly**: Your development time may be as much as twice as fast versus writing the same program in C++. Why? You write fewer lines of code and it is a simpler programming language than C++.
- **Avoid platform dependencies with 100% Pure Java**: You can keep your program portable by avoiding the use of libraries written in other languages. The 100% Pure Java™ Product Certification Program has a repository of historical process manuals, white papers, brochures, and similar materials online.
- **Write once, run anywhere**: Because 100% Pure Java programs are compiled into machine-independent byte codes, they run consistently on any Java platform.
- **Distribute software more easily**: You can upgrade applets easily from a central server. Applets take advantage of the feature of allowing new classes to be loaded "on the fly," without recompiling the entire program.

ODBC

Microsoft Open Database Connectivity (ODBC) is a standard programming interface for application developers and database systems providers. Before ODBC became a de facto standard for Windows programs to interface with database systems, programmers had to use proprietary languages for each database they wanted to connect to. Now, ODBC has made the choice of

the database system almost irrelevant from a coding perspective, which is as it should be. Application developers have much more important things to worry about than the syntax that is needed to port their program from one database to another when business needs suddenly change.

The ODBC system files are not installed on your system by Windows 95. Rather, they are installed when you setup a separate database application, such as SQL Server Client or Visual Basic 4.0. When the ODBC icon is installed in Control Panel, it uses a file called ODBCINST.DLL\

The advantages of this scheme are so numerous that you are probably thinking there must be some catch. The only disadvantage of ODBC is that it isn't as efficient as talking directly to the native database interface. ODBC has had many detractors make the charge that it is too slow. Microsoft has always claimed that the critical factor in performance is the quality of the driver software that is used. In our humble opinion, this is true. The availability of good ODBC drivers has improved a great deal recently\

JDBC

In an effort to set an independent database standard API for Java; Sun Microsystems developed Java Database Connectivity, or JDBC. JDBC offers a generic SQL database access mechanism that provides a consistent interface to a variety of RDBMSs. This consistent interface is achieved through the use of "plug-in" database connectivity modules, or *drivers*. If a database vendor wishes to have JDBC support, he or she must provide the driver for each platform that the database and Java run on.

To gain a wider acceptance of JDBC, Sun based JDBC's framework on ODBC. As you discovered earlier in this chapter, ODBC has widespread support on a variety of platforms. Basing JDBC on ODBC will allow vendors to bring JDBC drivers to market much faster than developing a completely new connectivity solution.

JDBC was announced in March of 1996. It was released for a 90 day public review that ended June 8, 1996. Because of user input, the final JDBC v1.0 specification was released soon after.

JDBC Goals

Few software packages are designed without goals in mind. JDBC is one that, because of its many goals, drove the development of the API. These goals, in conjunction with early reviewer feedback, have finalized the JDBC class library into a solid framework for building database applications in Java.

The goals that were set for JDBC are important. They will give you some insight as to why certain classes and functionalities behave the way they do. The eight design goals for JDBC are as follows:

- **SQL Level API**

  The designers felt that their main goal was to define a SQL interface for Java. Although not the lowest database interface level possible, it is at a low enough level for higher-level tools and APIs to be created. Conversely, it is at a high enough level for application programmers to use it confidently. Attaining this goal allows for future tool vendors to "generate" JDBC code and to hide many of JDBC's complexities from the end user.

- **SQL Conformance**

  SQL syntax varies as you move from database vendor to database vendor. In an effort to support a wide variety of vendors, JDBC will allow any query statement to be passed through it to the underlying database driver.

- **JDBC must be implemental on top of common database interfaces**

  The JDBC SQL API must "sit" on top of other common SQL level APIs. This goal allows JDBC to use existing ODBC level drivers by the use of a software interface. This interface would translate JDBC calls to ODBC and vice versa.

- **Provide a Java interface that is consistent with the rest of the Java system**

Because of Java's acceptance in the user community thus far, the designers feel that they should not stray from the current design of the core Java system.

- **Keep it simple**

This goal probably appears in all software design goal listings. JDBC is no exception. Sun felt that the design of JDBC should be very simple, allowing for only one method of completing a task per mechanism. Allowing duplicate functionality only serves to confuse the users of the API.

- **Use strong, static typing wherever possible**

Strong typing allows for more error checking to be done at compile time; also, less error Appear at runtime.

- **Keep the common cases simple**

Because more often than not, the usual SQL calls used by the programmer are simple SELECT's, INSERT's, DELETE's and UPDATE's, these queries should be simple to perform with JDBC. However, more complex SQL statements should also be possible.

Java ha two things: a programming language and a platform.

Java is a high-level programming language that is all of the following

Simple	Architecture-neutral
Object-oriented	Portable
Distributed	High-performance
Interpreted	multithreaded
Robust	Dynamic

Java is also unusual in that each Java program is both compiled and interpreted. With a compile you translate a Java program into an intermediate language called Java byte codes the platform-independent code instruction is passed and run on the computer.

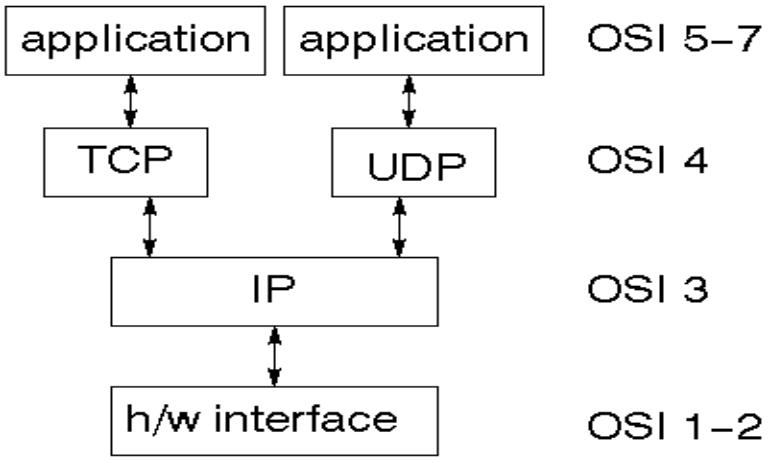
Compilation happens just once; interpretation occurs each time the program is executed. The figure illustrates how this works.

Java byte codes help make “write once, run anywhere” possible. You can compile your Java program into byte codes on my platform that has a Java compiler.

Networking

TCP/IP stack

The TCP/IP stack is shorter than the OSI one:



TCP is a connection-oriented protocol; UDP (User Datagram Protocol) is a connectionless protocol.

IP datagram’s

The IP layer provides a connectionless and unreliable delivery system. It considers each datagram independently of the others. Any association between datagram must be supplied by the higher layers.

UDP

UDP is also connectionless and unreliable. What it adds to IP is a checksum for the contents of the datagram and port numbers. These are used to give a client/server model - see later.

TCP

TCP supplies logic to give a reliable connection-oriented protocol above IP. It provides a virtual circuit that two processes can use to communicate.

Internet addresses

In order to use a service, you must be able to find it. The Internet uses an address scheme for machines so that they can be located. The address is a 32bit integer which gives the IP address. This encodes a network ID and more addressing. The network ID falls into various classes according to the size of the network address.

Network address

Class A uses 8 bits for the network address with 24 bits left over for other addressing. Class B uses 16bit network addressing. Class C uses 24bit network addressing and class D uses all 32.

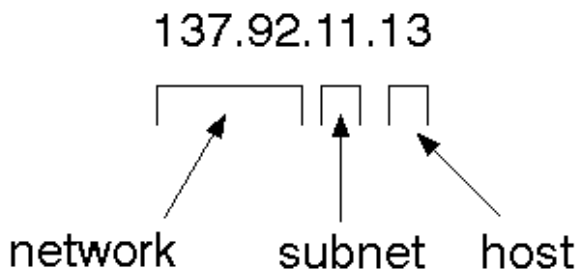
Subnet address

Internally, the UNIX network is divided into sub networks. Building 11 is currently on one sub network and uses 10-bit addressing, allowing 1024 different hosts.

Host address

8 bits are finally used for host addresses within our subnet. This places a limit of 256 machines that can be on the subnet.

Total address



The 32bit address is usually written as 4 integers separated by dots.

Port addresses

A service exists on a host, and is identified by its port. This is a 16bit number. To send a message to a server, you send it to the port for that service of the host that it is running on. This is not location transparency! Certain of these ports are "well known".

Sockets

A socket is a data structure maintained by the system to handle network connections. A socket is created using the call socket. It returns an integer that is like a file descriptor. In fact, under Windows, this handle can be used with Read File and Write File functions.

```
#include <sys/types. h>
#include <sys/socket. h>
int socket (int family, int type, int protocol);
```

Here "family" will be AF_INET for IP communications, protocol will be zero, and type will depend on whether TCP or UDP is used. Two processes wishing to communicate over a network create a socket each.

J Free Chart

J free chart has a java chart library

J Free Chart is a free 100% Java chart library that makes it easy for developers to display professional quality charts in their applications.

J Free Chart's extensive feature set includes:

A consistent and well-documented API, supporting a wide range of chart types;

A flexible design that is easy to extend, and targets both server-side and client-side applications;

J Free Chart is "open source" or, more specifically, free software. It is distributed under the terms of the GNU Lesser General Public License (LGPL), which permits use in proprietary applications.

1. Map Visualizations

Charts showing values that relate to geographical areas. Some examples include: (a) population density in each state of the United States, (b) income per capita for each country in Europe, (c) life expectancy in each country of the world. The tasks in this project include:

Sourcing freely redistributable vector outlines for the countries of the world, states/provinces in particular countries (USA in particular, but also other areas);

Creating an appropriate dataset interface (plus default implementation), a rendered, and integrating this with the existing XY Plot class in J Free Chart;

Testing, documenting, testing some more, documenting some more.

2. Time Series Chart Interactivity

Implement a new (to J Free Chart) feature for interactive time series charts --- to display a separate control that shows a small version of ALL the

time series data, with a sliding "view" rectangle that allows you to select the subset of the time series data to display in the main chart.

3. Dashboards

There is currently a lot of interest in dashboard displays. Create a flexible dashboard mechanism that supports a subset of J Free Chart Chart types (dials, pies, thermometers, bars, and lines/time series) that can be delivered easily via both Java Web Start and an applet.

4. Property Editors

The property editor mechanism in J Free Chart only handles a small subset of the properties that can be set for charts. Extend (or reimplement) this mechanism to provide greater end-user control over the appearance of the charts.

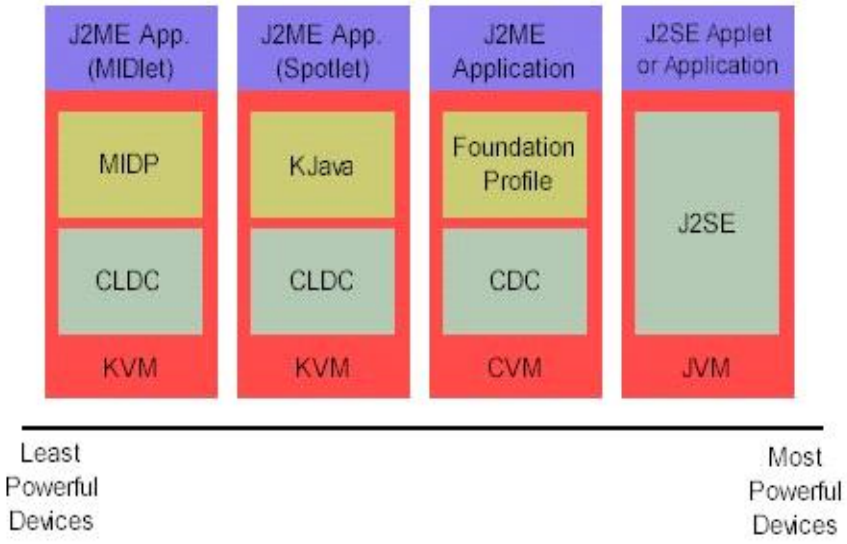
J2ME (Java 2 Micro edition):-

Sun Microsystems defines J2ME as "a highly optimized Java run-time environment targeting a wide range of consumer products, including pagers, cellular phones, screen-phones, digital set-top boxes and car navigation systems." Announced in June 1999 at the Java One Developer Conference, J2ME brings the cross-platform functionality of the Java language to smaller devices, allowing mobile wireless devices to share applications. With J2ME, Sun has adapted the Java platform for consumer products that incorporate or are based on small computing devices.

1. General J2ME architecture

J2ME uses configurations and profiles to customize the Java Runtime Environment (JRE). As a complete JRE, J2ME is comprised of a configuration, which determines the JVM used, and a profile, which defines the application by adding domain-specific classes. The configuration defines

the basic run-time environment as a set of core classes and a specific JVM that run on specific types of devices.



2. Developing J2ME applications

Introduction In this section, we will go over some considerations you need to keep in mind when developing applications for smaller devices. We'll take a look at the way the compiler is invoked when using J2SE to compile J2ME applications. Finally, we'll explore packaging and deployment and the role pre verification plays in this process.

3. Design considerations for small devices

Developing applications for small devices requires you to keep certain strategies in mind during the design phase. It is best to strategically design an application for a small device before you begin coding. Correcting the code because you failed to consider all of the "gotchas" before developing the application can be a painful process. Here are some design strategies to consider:

* **Keep it simple:** Remove unnecessary features, possibly making those features a separate, secondary application.

* **Smaller is better:** This consideration should be a "no brainer" for all developers. Smaller applications use less memory on the device and require shorter installation times. Consider packaging your Java applications as compressed Java Archive (jar) files.

* **Minimize run-time memory use.** To minimize the amount of memory used at run time, use scalar types in place of object types. Also, do not depend on the garbage collector. You should manage the memory efficiently yourself by setting object references to null when you are finished with them. Another way to reduce run-time memory is to use lazy instantiation, only allocating objects on an as-needed basis. Other ways of reducing overall and peak memory use on small devices are to release resources quickly, reuse objects, and avoid exceptions.

4. Configurations overview

The configuration defines the basic run-time environment as a set of core classes and a specific JVM that run on specific types of devices.

5. J2ME profiles

What is a J2ME profile?

As we mentioned earlier in this tutorial, a profile defines the type of device supported. The Mobile Information Device Profile (MIDP), for example, defines classes for cellular phones. It adds domain-specific classes to the J2ME configuration to define uses for similar devices. Profiles are built on top of configurations. Because profiles are specific to the size of the device (amount of memory) on which an application runs, certain profiles are associated with certain configurations.

A skeleton profile upon which you can create your own profile, the Foundation Profile, is available for CDC.

Profile 1: K Java

K Java is Sun's proprietary profile and contains the K Java API. The K Java profile is built on top of the CLDC configuration. The K Java virtual machine, KVM, accepts the same byte codes and class file format as the classic J2SE virtual machine.

Profile 2: MIDP

MIDP is geared toward mobile devices such as cellular phones and pagers. The MIDP, like K Java, is built upon CLDC and provides a standard run-time environment that allows new applications and services to be deployed dynamically on end user devices.

* Java.io

* Java. util

* Java x. microedition.io

SYSTEM STUDY

FEASIBILITY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus, the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

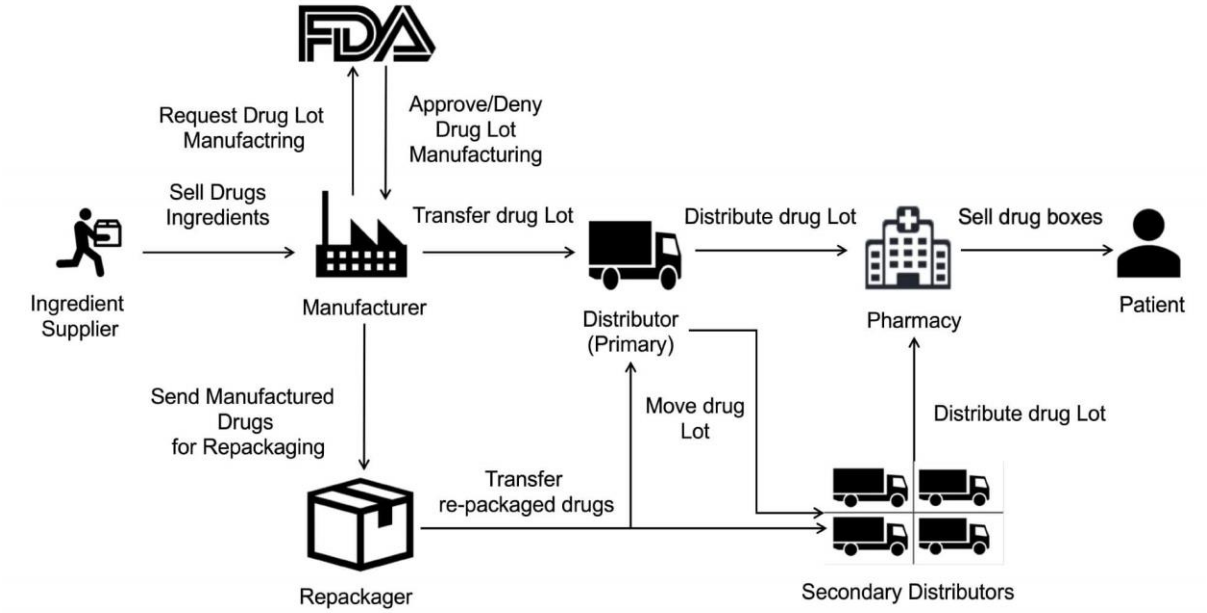
SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

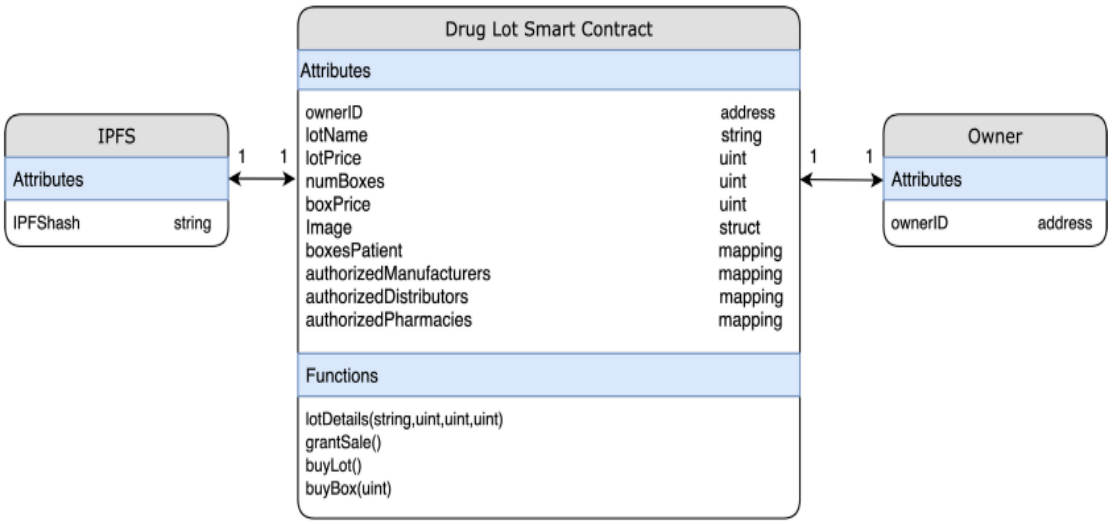
CHAPTER 5

SYSTEM SPECICICATION

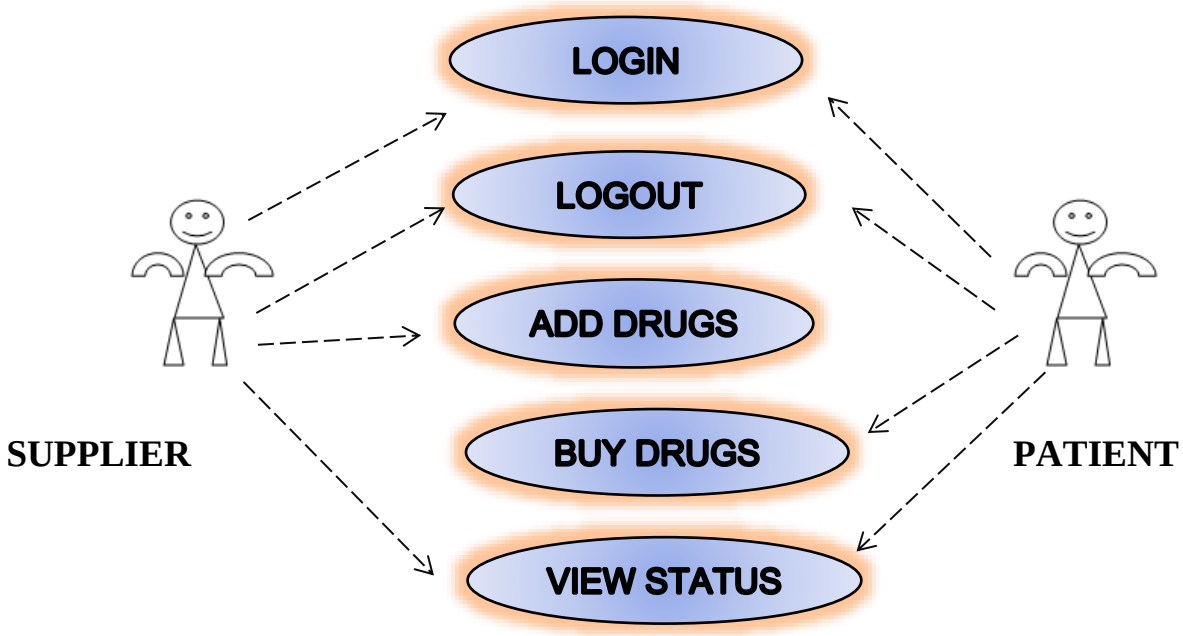
5.1.ARCHITECTURE DIAGRAM



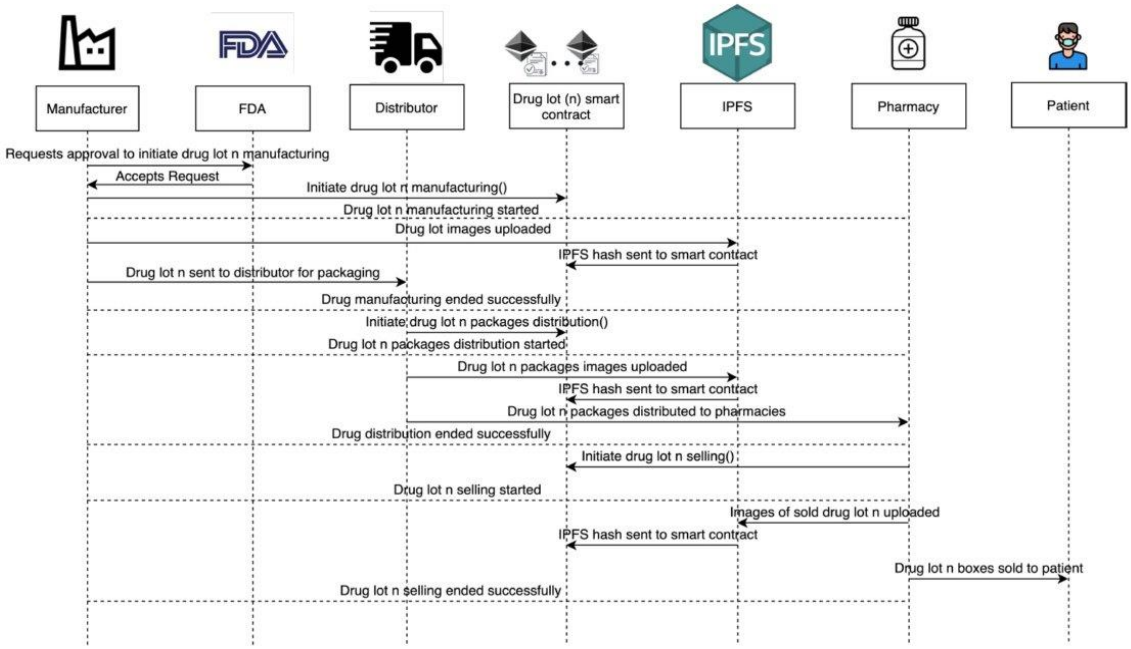
5.2.ENTITY RELATIONSHIP DIAGRAM



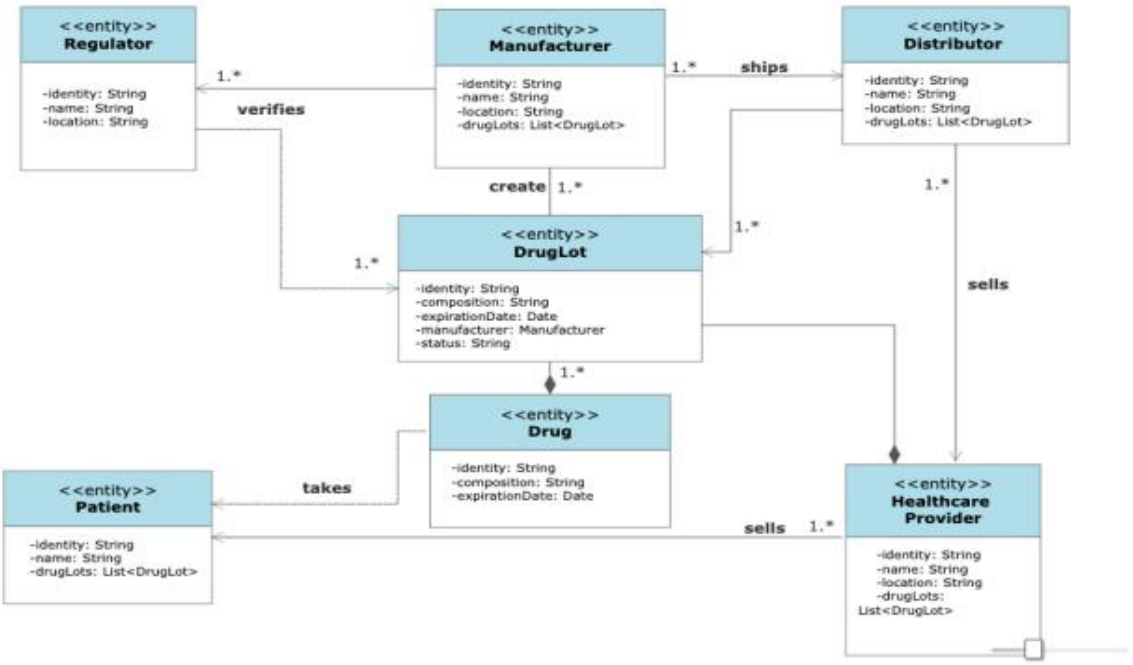
5.3.USE CASE DIAGRAM



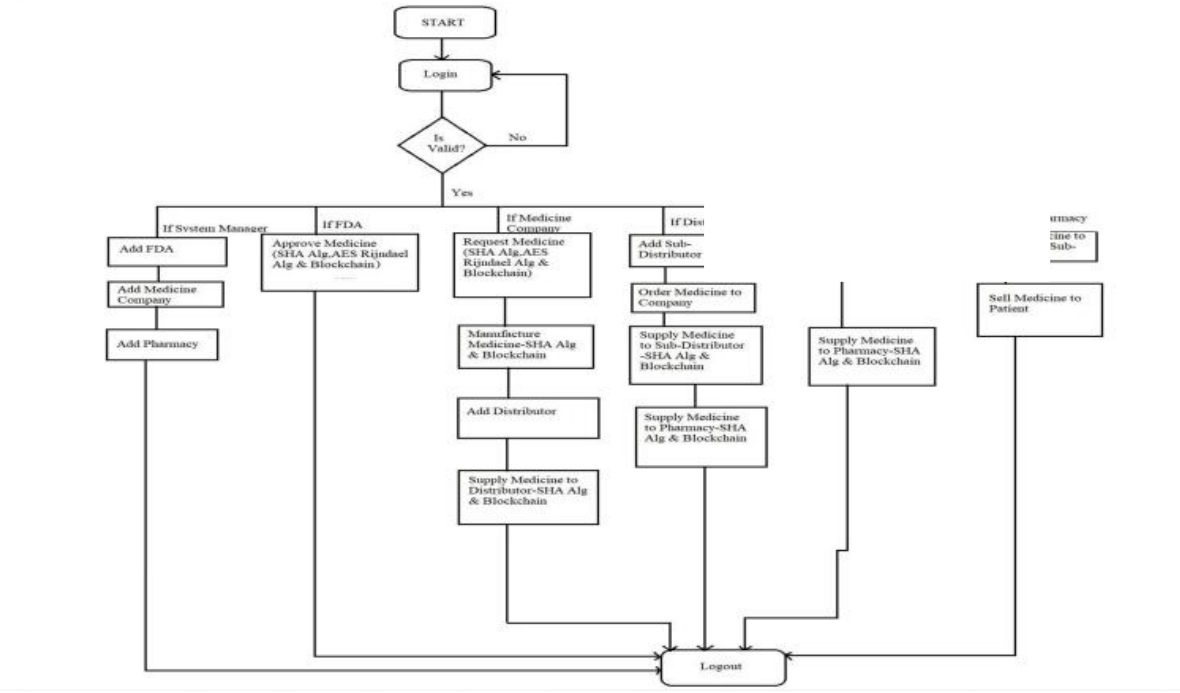
5.4. SEQUENCE DIAGRAM



5.5. CLASS DIAGRAM



5.6. ACTIVITY DIAGRAM



CHAPTER 6

SYSTEM IMPLEMENTATION

6.1MODULES

- Decentralized Storage System
- Ethereum Smart Contract
- On-Chain Resources
- Stakeholders
- Manufacturing
- Distribution
- Sale/Consumption

6.1.1 DECENTRALIZED STORAGE SYSTEM

In this Modules, It Provides a low-cost off-chain storage to store supply chain transactions data to ensure reliability, accessibility, and integrity of the stored data. The integrity of data is maintained by generating a unique hash for every uploaded file on its server, and the different hashes for the different uploaded files are then stored on the block chain and accessed through the smart to contract, and any change that any of the occur uploaded file is reflected in the associated hash.

6.1.2 ETHEREUM SMART CONTRACT

Ethereum Smart Contract is used to handle the deployment of the supply chain. The smart contract is central and essential for tracking the history of transactions and manages the hashes from the decentralized storage server which allows the participants to access the supply chain information. Moreover, the functions of the different stakeholders in the supply chain are defined within the smart contract and access to these functions is given to the authorized

participants by using modifiers. A modifier is basically a way to decorate a function by adding additional features to it or to apply some restrictions. The smart contract also handles the transactions, such as selling drug Lots or boxes.

6.1.3 ON-CHAIN RESOURCES

On-chain Resources are used to store the logs and events that are created by the smart contract allowing track and trace. Moreover, a registration and identity system is used as an on-chain resource to associate the Ethereum address of the different function calls and with the decentralized storage systems to access data files. Finally, their interaction with the on-chain resources will be for obtaining information such as logs, IPFS hashes, and transactions. More details on the system components are presented below.

6.1.4 STAKEHOLDERS

Drug traceability is the process of identifying the originality and legitimacy of drugs by enabling the stakeholders (sellers, manufacturers, wholesalers, pharmacies, and patients) in the drug supply chain to track and trace the flow of transactions executed amongst them.

6.1.5 MANUFACTURING

Typically, a manufacturer will send a request for approval from the FDA to initiate the manufacturing process of a drug Lot. Once the FDA approves the request, the manufacturer initiates the manufacturing process and an event is declared to all participants. The manufacturer will upload images of the drug Lot to the IPFS, and the IPFS will send a hash to the smart contract so that the images can be accessed later by authorized participants. The drug Lot will be delivered to the distributor for packaging concluding the manufacturing process.

6.1.6 DISTRIBUTION

The next step is the initiation of the distribution process, the distributor will pack the drug Lot, and an image of the package will be uploaded to the IPFS which will send a hash to the smart contract. Once this step is completed, the drug Lot packages will be delivered to pharmacies, and this ends the distribution phase.

6.1.7 SALE/CONSUMPTION

The last step in the sequence diagram is related to the interaction between the pharmacy and the patients. Here, the pharmacy will initiate the sale of drug Lot box and it will be declared to the participants of the supply chain. Then, an image of the sold drug package will be uploaded to the IPFS, and a hash will be sent by the IPFS to the smart contract. The drug Lot box will be sold to the patient, and this concludes the drug Lot selling phase. This process will ensure that all the transactions are stored and can be accessed later by all the supply chain participants to check the authenticity and validity of the products in the supply chain in the form of a sequence of events.

CHAPTER 7

SYSTEM TESTING AND MAINTENCE

7.1 TESTING OBJECTIVES

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of tests. Each test type addresses a specific testing requirement.

7.2 TYPES OF TESTING

7.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

7.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is

more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

7.2.3 FUNCTIONAL TEST

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

7.3 SYSTEM TESTING

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration-oriented system integration test.

System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

7.3.1 WHITE BOX TESTING

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

7.3.2 BLACK BOX TESTING

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box. you cannot “see” into it. The test provides inputs and responds to outputs without considering how the software works.

7.4 UNIT TESTING

Unit testing is usually conducted as part of a combined code and unit test phase of the software lifecycle, although it is not uncommon for coding and unit testing to be conducted as two distinct phases.

7.5 ACCEPTANCE TESTING

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

CHAPTER 8

CONCLUSION & FUTURE ENHANCEMENT

8.1 CONCLUSION

In this paper, we have investigated the challenge of drug traceability within pharmaceutical supply chains highlighting its significance specially to protect against counterfeit drugs. We have developed and evaluated a blockchain-based solution for the pharmaceutical supply chain to track and trace drugs in a decentralized manner. Specifically, our proposed solution leverages cryptographic fundamentals underlying block chain technology to achieve tamper-proof logs of events within the supply chain and utilizes smart contracts within Ethereum block chain to achieve automated recording of events that are accessible to all participating stakeholders.

We have demonstrated that our proposed solution is cost efficient in terms of the amount of gas spent in executing the different functions that are triggered within the smart contract. Moreover, the conducted security analysis has shown that our proposed solution achieves protection against malicious attempts targeting is integrity, availability and nonrepudiation of transaction data which is critical in a complex multi-party settings such as the pharmaceutical supply chain.

8.2 FUTURE ENHANCEMENT

We continue our efforts to enhance the efficiency of pharmaceutical supply chains and envision to focus on extending the proposed system to achieve end to end transparency and verifiability of drugs use as future work.

APPENDIX I

SAMPLE CODING

ADDCROPS.JSP:

```
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>BLOCKCHAIN BASED DRUG TRACEABILITY</title>
<meta http-equiv="Content-type" content="text/html; charset=utf-8" />
<link rel="stylesheet" href="css/style.css" type="text/css" media="all" />
<script type="text/javascript" src="js/jquery-1.4.2.min.js"></script>
<script type="text/javascript" src="js/jquery-fns.js"></script>
<link rel="shortcut icon" type="image/x-icon" href="css/images/favicon.ico" />
<!--[if IE 6]><link rel="stylesheet" href="css/ie.css" type="text/css"
media="all" /><![endif]-->
<style type="text/css">
<!--
.style1 {color: #1F73A5}
.style5 {font-size: 16}
.style6 {font-size: 16px}
.style8 {font-weight: bold}
.style10 {color: #196EA0}
.style12 {color: #1F73A5; font-size: 16px; font-weight: bold; }
.style13 {color: #585F63; }
.style14 {
        font-size: large;
        color: #003300;
}
```

```
.style15 {color: #126698}
.style21 {font-size: medium; font-weight: bold; }
.style22 {color: #1B6FA1}
.style20 {color: #FFFFFF; }
-->
</style>
</head>
<body>
<!-- START PAGE SOURCE -->
<div id="shell">
  <div id="header">
    <h1 id="logo"><a href="#">BLOCKCHAIN BASED DRUG TRACEABILITY</a></h1>
    <div id="social">
      <ul>
      </ul>
    </div>
  </div>
  <div id="navigation">
    <ul>
      <li><a href="addcrop.jsp">AddDrug</a></li>
      <li><a href="viewstatus.jsp">ViewStatus</a></li>
      <li><a href="farmerlogin.jsp">Logout</a></li>
    </ul>
  </div>
  <div id="main">
    <div id="featured">
```


<h2>DRUG NETWORK </h2>

innovation management and social construction ism to investigate interrelationships of Drug Services provisions and innovations in Medicine management. It is based on the evaluation of Drug Tracebility solutions and innovations that combine strategic dimensions of drug management with practice-driven initiatives, including incremental (processes and technologies) and radical innovations.

<form id="form1" name="form1" method="post" action="AddCrop">

<table width="417" height="334" border="0">

<tr>

<td colspan="2" bgcolor="#4197C9" class="style21"> Add Drug </td>

</tr>

<tr>

```
<td width="164" class="style21">Drug Name :</td>
<td width="215"><span><span>
<input type="text" id="cropname" name="cropname"
class="login_input" />
</span></span></td>
</tr>
<tr>
<td class="style21">Quantity :</td>
<td><span><span>
<input name="quantity" type="text" class="login_input"
id="quantity" />
</span></span></td>
</tr>
<tr>
<td class="style21">Price :</td>
<td><input type="text" id="price" name="price"
class="login_input" /></td>
</tr>
<tr>
<td colspan="2"><div align="center">
<label>
<input type="submit" name="Submit" value="Submit" />
</label>
</div></td>
</tr>
</table>
<p class="style21"> </p>
```

```
            <p class="style21"> </p>
          </form>
        </div>
      </div>
    </div>
    <div class="gallery-info">
      <div class="box-head">
        <h3> </h3>
        <h3> </h3>
        <p class="style1"><span class="style5"><span class="style6"><span
class="style1"><span class="style8"><span class="style10"><span
class="style1"><a href="addcrop.jsp">Add Drug
</a></span></span></span></span></span></span></p>
        <p class="style12"> </p>
        <p><span class="style12"><a href="viewstatus.jsp">View status
</a></span></p>
        <p> </p>
        <p class="style1"><span class="style5"><span class="style6"><span
class="style8"><span class="style10"><a
href="farmerlogin.jsp">Logout</a></span></span></span></span></p>
        <p> </p>
        <p>  </p>
      </div>
    </div>
    <div class="cl"> </div>
  </div>
</div>
<div class="footer">
```

```
    <p class="lf"><a href="#"></a> -   </p>
    <div style="clear:both;"></div>
  </div>
</div>
<!-- END PAGE SOURCE -->
<div align=center></div>
</body>
</html>
```

BUYCRROP.JSP

```
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>BLOCKCHAIN BASED DRUG TRACEABILITY</title>
<meta http-equiv="Content-type" content="text/html; charset=utf-8" />
<link rel="stylesheet" href="css/style.css" type="text/css" media="all" />
<script type="text/javascript" src="js/jquery-1.4.2.min.js"></script>
<script type="text/javascript" src="js/jquery-fns.js"></script>
<link rel="shortcut icon" type="image/x-icon" href="css/images/favicon.ico" />
<!--[if IE 6]><link rel="stylesheet" href="css/ie.css" type="text/css"
media="all" /><![endif]-->
<style type="text/css">
<!--
.style1 {color: #1F73A5}
.style5 {font-size: 16}
.style6 {font-size: 16px}
.style8 {font-weight: bold}
.style10 {color: #196EA0}
```

```
.style12 {color: #1F73A5; font-size: 16px; font-weight: bold; }
.style13 {color: #585F63; }
.style14 {
        font-size: large;
        color: #003300;
}
.style15 {color: #126698}
.style21 {font-size: medium; font-weight: bold; }
.style22 {color: #1B6FA1}
.style20 {color: #FFFFFF; }
.style23 {font-size: large}
.style24 {font-size: x-large}
.style23 {color: #E1EAF1;
        font-size: 24px;
}
-->
</style>
</head>
<body>
<!-- START PAGE SOURCE -->
<div id="shell">
  <div id="header">
    <h1 id="logo"><a href="#">BLOCKCHAIN BASED DRUG TRACEABILITY</a></h1>
    <div id="social">
      <ul>
      </ul>
```

```
  </div>
 </div>
 <div id="navigation">
  <ul>
   <li><a href="buycrop.jsp">Buy Drug</a></li>
   <li><a href="processorstatus.jsp">ViewStatus</a></li>
   <li><a href="processorlogin.jsp">Logout</a></li>
  </ul>
 </div>
 <div id="main">
  <div id="featured">
   <div class="post-image"> <span class="tl round"> </span> <span class="tr round"> </span> <span class="bl round"> </span> <span class="br round"> </span> <a href="#"><img src="css/images/featured.jpg" alt="" /></a></div>
   <div class="post-info">
    <h2>DRUG NETWORK </h2>
    <p>innovation management and social construction ism to investigate interrelationships of Drug Services provisions and innovations in Medicine management. It is based on the evaluation of Drug Tracebility solutions and innovations that combine strategic dimensions of drug management with practice-driven initiatives, including incremental (processes and technologies) and radical  innovations.</p>
   </div>
   <div class="cl"> </div>
  </div>
  <div id="content">
   <div class="holder">
    <div class="cl"> </div>
```

```
</div>
<div class="gallery">
  <div class="projects">
    <div align="center">
      <table width="604" height="250" border="0" >
        <tr>
          <td height="67" colspan="8" bgcolor="#3C9BEB"><div
align="center"><span class="style23">BUY PRODUCT </span></div></td>
        </tr>
        <tr>
        <td width="91"><div align="center"><span
class="style21">Options</span></div></td>
          <td width="152"><div align="center"><span
class="style21">Supplier name </span></div></td>
          <td width="157"><div align="center"><span
class="style21">Product</span></div></td>
          <td width="157"><div align="center"><span
class="style21">Quantity</span></div></td>
          <td width="120"><div align="center"><span
class="style21">Price</span></div></td>
          <td><div align="center" class="style21"></div></td>
        </tr>
        <%
            try {
                //String username = "username";
                String username=session.getAttribute("username").toString();
                String status = "nil";
                PreparedStatement ps;
```

```
ResultSet rs,rs2;
//Connection con = null;
Statement st,st1,st2,st3,st4;
Class.forName("com.mysql.jdbc.Driver");
Connection con =
DriverManager.getConnection("jdbc:mysql://localhost:3306/foodnetworkblockc
hain","root","password");
String query = "select * from cropdetails where processor='"+status+"'";
st = con.createStatement();
rs = st.executeQuery(query);
while (rs.next()) {
String id = rs.getString(7);
String s1 = rs.getString(1);
String s2 = rs.getString(2);
String s3 = rs.getString(3);
String s4 = rs.getString(4);
%>
<tr>
<form id="form1" name="form1" method="post"
action="ProcessorProcess">
<td><div align="center">
<input type="radio" name="id" value="<%=id%>" />
</div></td>
<td><div align="center"><%=s1%></div></td>
<td><div align="center"><%=s2%></div></td>
<td><div align="center"><%=s3%></div></td>
<td><div align="center">
<label></label>
```

```
                <%=s4%></div></td>
              <td width="62"><input type="submit" name="Submit" value="BUY"
/></td>
          </form>
            </tr>
            <p>
           <%
                                  }
                                     con.close();
                                  } catch (Exception e) {
                                     out.println(e);
                                  }
                               %>
            </p>
           </table>
          </div>
        </div>
      </div>
      <div class="gallery-info">
        <div class="box-head">
          <h3> </h3>
          <h3> </h3>
          <p class="style1"><span class="style5"><span class="style6"><span
class="style1"><span class="style8"><span class="style10"><span
class="style1"><a href="buycrop.jsp">Buy Product
</a></span></span></span></span></span></span></p>
          <p class="style12"> </p>
```

```
        <p><span class="style12"><a href="processorstatus.jsp">View status
</a></span></p>
        <p> </p>
        <p class="style1"><span class="style5"><span class="style6"><span
class="style8"><span class="style10"><a
href="processorlogin.jsp">Logout</a></span></span></span></span></p>
        <p> </p>
        <p>  </p>
       </div>
     </div>
     <div class="cl"> </div>
   </div>
  </div>
  <div class="footer">
    <p class="lf"><a href="#"></a> -   </p>
    <div style="clear:both;"></div>
  </div>
</div>
<!-- END PAGE SOURCE -->
<div align=center></div>
</body>
</html>
```

CONSUMERBUY.JSP

```
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>BLOCKCHAIN BASED DRUG TRACEABILITY</title>
<meta http-equiv="Content-type" content="text/html; charset=utf-8" />
```

```
<link rel="stylesheet" href="css/style.css" type="text/css" media="all" />
<script type="text/javascript" src="js/jquery-1.4.2.min.js"></script>
<script type="text/javascript" src="js/jquery-fns.js"></script>
<link rel="shortcut icon" type="image/x-icon" href="css/images/favicon.ico" />
<!--[if IE 6]><link rel="stylesheet" href="css/ie.css" type="text/css" media="all" /><![endif]-->
<style type="text/css">
<!--
.style1 {color: #1F73A5}
.style5 {font-size: 16}
.style6 {font-size: 16px}
.style8 {font-weight: bold}
.style10 {color: #196EA0}
.style12 {color: #1F73A5; font-size: 16px; font-weight: bold; }
.style13 {color: #585F63; }
.style14 {
        font-size: large;
        color: #003300;
}
.style15 {color: #126698}
.style21 {font-size: medium; font-weight: bold; }
.style22 {color: #1B6FA1}
.style20 {color: #FFFFFF; }
.style23 {font-size: large}
.style24 {font-size: x-large}
.style23 {color: #E1EAF1;
        font-size: 24px;
```

```
}
-->
</style>
</head>
<body>
<!-- START PAGE SOURCE -->
<div id="shell">
  <div id="header">
    <h1 id="logo"><a href="#">BLOCKCHAIN BASED DRUG TRACEABILITY</a></h1>
    <div id="social">
      <ul>
      </ul>
    </div>
  </div>
  <div id="navigation">
    <ul>
      <li><a href="consumerbuy.jsp">BuyProduct</a></li>
      <li><a href="consumerstatus.jsp">ViewStatus</a></li>
      <li><a href="consumerlogin.jsp">Logout</a></li>
    </ul>
  </div>
  <div id="main">
    <div id="featured">
      <div class="post-image"> <span class="tl round"> </span> <span class="tr round"> </span> <span class="bl round"> </span>
```


<h2>DRUG NETWORK </h2>

innovation management and social construction ism to investigate interrelationships of Drug Services provisions and innovations in Medicine management. It is based on the evaluation of Drug Tracebility solutions and innovations that combine strategic dimensions of drug management with practice-driven initiatives, including incremental (processes and technologies) and radical innovations.

<table width="604" height="250" border="0" >

<tr>

<td height="67" colspan="7" bgcolor="#3C9BEB"> BUY PRODUCT </td>

</tr>

<tr>

<td width="91"> Options </td>

```
            <td width="152"><div align="center"><span
class="style21">Pharmacy </span></div></td>
            <td width="157"><div align="center"><span
class="style21">Product</span></div></td>
            <td width="120"><div align="center"><span
class="style21">Price</span></div></td>
            <td><div align="center" class="style21"></div></td>
          </tr>
          <%
                        try {
                            //String username = "username";
        String username=session.getAttribute("username").toString();
        String status = "nil";
        PreparedStatement ps;
       ResultSet rs,rs2;
       //Connection con = null;
        Statement st,st1,st2,st3,st4;

Class.forName("com.mysql.jdbc.Driver");
Connection con =
DriverManager.getConnection("jdbc:mysql://localhost:3306/foodnetworkblockc
hain","root","password");
String query = "select * from cropdetails where consumer='"+status+"' &&
retailer!='"+status+"'";
                            st = con.createStatement();
                            rs = st.executeQuery(query);
                            while (rs.next()) {
                                String id = rs.getString(7);
                                String s1 = rs.getString(10);
```

```
String s2 = rs.getString(2);
String s3 = rs.getString(3);
String s4 = rs.getString(4):
int price=Integer.parseInt(s4);
double percent = (double)((double)price +
(double)((double)((double)price*(double)40)/(double)100));
%>
<tr>
<form id="form1" name="form1" method="post" action="ConsumerProcess">
<td><div align="center">
<input type="radio" name="id" value="<%=id%>" />
</div></td>
<td><div align="center"><%=s1%></div></td>
<td><div align="center"><%=s2%></div></td>
<td><div align="center">
<label></label>
<%=percent%></div></td>
<td width="62"><input type="submit" name="Submit" value="BUY"
/></td>
</form>
</tr>
<p>
<%
}
con.close();
} catch (Exception e) {
out.println(e);
```

```
                        }
                    %>
            </p>
          </table>
        </div>
      </div>
    </div>
    <div class="gallery-info">
      <div class="box-head">
        <h3> </h3>
        <h3> </h3>
        <p class="style1"><span class="style5"><span class="style6"><span class="style8"><span class="style10"><a href="consumerbuy.jsp">Buy Product </a></span></span></span></span></p>
        <p class="style12"> </p>
        <p><span class="style12"><a href="consumerstatus.jsp">View status </a></span></p>
        <p> </p>
        <p class="style1"><span class="style5"><span class="style6"><span class="style8"><span class="style10"><a href="consumerlogin.jsp">Logout</a></span></span></span></span></p>
        <p> </p>
        <p>  </p>
      </div>
    </div>
    <div class="cl"> </div>
  </div>
</div>
```

```
  <div class="footer">
    <p class="lf"><a href="#"></a> -   </p>
    <div style="clear:both;"></div>
  </div>
</div>
<!-- END PAGE SOURCE -->
<div align=center></div>
</body>
</html>
```

CONSUMERLOGIN.JSP

```
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>BLOCKCHAIN BASED DRUG TRACEABILITY</title>
<meta http-equiv="Content-type" content="text/html; charset=utf-8" />
<link rel="stylesheet" href="css/style.css" type="text/css" media="all" />
<script type="text/javascript" src="js/jquery-1.4.2.min.js"></script>
<script type="text/javascript" src="js/jquery-fns.js"></script>
<link rel="shortcut icon" type="image/x-icon" href="css/images/favicon.ico" />
<!--[if IE 6]><link rel="stylesheet" href="css/ie.css" type="text/css"
media="all" /><![endif]-->
<style type="text/css">
<!--
.style1 {color: #1F73A5}
.style5 {font-size: 16}
.style6 {font-size: 16px}
.style8 {font-weight: bold}
.style10 {color: #196EA0}
```

```
.style12 {color: #1F73A5; font-size: 16px; font-weight: bold; }
.style13 {color: #585F63; }
.style14 {
        font-size: large;
        color: #003300;
}
.style15 {color: #126698}
.style21 {font-size: medium; font-weight: bold; }
.style22 {color: #1B6FA1}
.style20 {color: #FFFFFF; }
-->
</style>
</head>
<body>
<!-- START PAGE SOURCE -->
<div id="shell">
  <div id="header">
    <h1 id="logo"><a href="#">BLOCKCHAIN BASED DRUG TRACEABILITY</a></h1>
    <div id="social">
      <ul>
      </ul>
    </div>
  </div>
  <div id="navigation">
    <ul>
      <li><a href="index.jsp">HOME</a></li>
```

```
      <li><a href="farmerlogin.jsp">SUPPLIER</a></li>
      <li><a href="processorlogin.jsp">PROCESSOR</a></li>
      <li><a href="distributorlogin.jsp">DISTRIBUTOR</a></li>
      <li><a href="retailerlogin.jsp">PHARMACY</a></li>
      <li><a href="consumerlogin.jsp">PATIENT</a></li>
    </ul>
  </div>
  <div id="main">
    <div id="featured">
      <div class="post-image"> <span class="tl round"> </span> <span
class="tr round"> </span> <span class="bl round"> </span>
<span class="br round"> </span> <a href="#"><img
src="css/images/featured.jpg" alt="" /></a></div>
      <div class="post-info">
        <h2>DRUG NETWORK </h2>
        <p>innovation management and social construction ism to investigate
interrelationships of Drug Services provisions and innovations in Medicine
management. It is based on the evaluation of Drug Tracebility solutions and
innovations that combine strategic dimensions of drug management with
practice-driven initiatives, including incremental (processes and technologies)
and radical  innovations.</p>
      </div>
      <div class="cl"> </div>
    </div>
    <div id="content">
      <div class="holder">
        <div class="cl"> </div>
      </div>
      <div class="gallery">
```

```
<div class="projects">
<div align="center">
<form id="form1" name="form1" method="post"
action="ConsumerLogin">
<table width="413" height="256" border="0">
<tr>
<td colspan="2" bgcolor="#3D93C5" class="style21"><div
align="center" class="style20">Consumer Login </div></td>
</tr>
<tr>
<td width="164" class="style21">User Name:</td>
<td width="215"><span><span>
<input name="username" type="text" class="login_input"
id="username" />
</span></span></td>
</tr>
<tr>
<td class="style21">Password:</td>
<td><input type="password" id="password" name="password"
class="login_input" /></td>
</tr>
<tr>
<td colspan="2"><div align="center">
<label>
<input type="submit" name="Submit" value="Login" />
</label>
</div></td>
```

```
            </tr>
          </table>
          <p class="style21"><a href="consumerregister.jsp"
class="style22">Patient Registration </a></p>
        </form>
      </div>
    </div>
  </div>
  <div class="gallery-info">
    <div class="box-head">
      <h3> </h3>
      <h3> </h3>
      <p class="style1"><span class="style5"><span class="style6"><span
class="style1"><span class="style8"><span class="style10"><span
class="style1"><a
href="farmerlogin.jsp">Supplier</a></span></span></span></span></span></
span></p>
      <p class="style12"> </p>
      <p><span class="style12"><a
href="processorlogin.jsp">Processor</a></span></p>
      <p> </p>
      <p class="style1"><span class="style5"><span class="style6"><span
class="style8"><span class="style10"><a
href="distributorlogin.jsp">Distributor</a></span></span></span></span></p
>
      <p class="style12"> </p>
      <p><span class="style12"><a
href="retailerlogin.jsp">Pharmacy</a></span></p>
      <p class="style12"> </p>
```

```
        <p><span class="style12"><a
href="consumerlogin.jsp">Patient</a></span></p>
        <p> </p>
        <p>  </p>
       </div>
     </div>
     <div class="cl"> </div>
   </div>
  </div>
  <div class="footer">
    <p class="lf"><a href="#"></a> -   </p>
    <div style="clear:both;"></div>
  </div>
</div>
<!-- END PAGE SOURCE -->
<div align=center></div>
</body></html>
```

CONSUMER REGISTER.JSP

```
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>BLOCKCHAIN BASED DRUG TRACEABILITY</title>
<meta http-equiv="Content-type" content="text/html; charset=utf-8" />
<link rel="stylesheet" href="css/style.css" type="text/css" media="all" />
<script type="text/javascript" src="js/jquery-1.4.2.min.js"></script>
<script type="text/javascript" src="js/jquery-fns.js"></script>
<link rel="shortcut icon" type="image/x-icon" href="css/images/favicon.ico" />
```

```
<!--[if IE 6]><link rel="stylesheet" href="css/ie.css" type="text/css"
media="all" /><![endif]-->
<style type="text/css">
<!--
.style1 {color: #1F73A5}
.style5 {font-size: 16}
.style6 {font-size: 16px}
.style8 {font-weight: bold}
.style10 {color: #196EA0}
.style12 {color: #1F73A5; font-size: 16px; font-weight: bold; }
.style13 {color: #585F63; }
.style14 {
        font-size: large;
        color: #003300;
}
.style15 {color: #126698}
.style21 {font-size: medium; font-weight: bold; }
.style22 {color: #1B6FA1}
.style20 {color: #FFFFFF; }
-->
</style>
</head>
<body>
<!-- START PAGE SOURCE -->
<div id="shell">
  <div id="header">
```

```
    <h1 id="logo"><a href="#">BLOCKCHAIN BASED DRUG
TRACEABILITY</a></h1>
    <div id="social">
      <ul>
      </ul>
    </div>
  </div>
  <div id="navigation">
    <ul>
      <li><a href="index.jsp">HOME</a></li>
      <li><a href="farmerlogin.jsp">SUPPLIER</a></li>
      <li><a href="processorlogin.jsp">PROCESSOR</a></li>
      <li><a href="distributorlogin.jsp">DISTRIBUTOR</a></li>
           <li><a href="retailerlogin.jsp">PHARMACY</a></li>
      <li><a href="consumerlogin.jsp">PATIENT</a></li>
    </ul>
  </div>
  <div id="main">
    <div id="featured">
      <div class="post-image"> <span class="tl round"> </span> <span
class="tr round"> </span> <span class="bl round"> </span>
<span class="br round"> </span> <a href="#"><img
src="css/images/featured.jpg" alt="" /></a></div>
      <div class="post-info">
        <h2>DRUG NETWORK </h2>
        <p>innovation management and social construction ism to investigate
interrelationships of Drug Services provisions and innovations in Medicine
management. It is based on the evaluation of Drug Tracebility solutions and
```

innovations that combine strategic dimensions of drug management with practice-driven initiatives, including incremental (processes and technologies) and radical innovations.</p>

<form id="form1" name="form1" method="post" action="ConsumerRegistration">

<table width="417" height="533" border="0">

<tr>

<td colspan="2" bgcolor="#4197C9" class="style21"> Consumer Registration </td>

</tr>

<tr>

<td width="164" class="style21">Full Name:</td>

<td width="215">

<input type="text" id="fullname" name="fullname" class="login_input" />

```
    </span></span></td>
  </tr>
  <tr>
    <td class="style21">User Name:</td>
    <td><span><span>
      <input name="username" type="text" class="login_input"
id="username" />
    </span></span></td>
  </tr>
  <tr>
    <td class="style21">Password:</td>
    <td><input type="password" id="password" name="password"
class="login_input" /></td>
  </tr>
  <tr>
    <td class="style21">Profession :</td>
    <td><span><span>
      <input type="text" id="company" name="company"
class="login_input" />
    </span></span></td>
  </tr>
  <tr>
    <td class="style21">Place:</td>
    <td><label>
      <input name="place" type="text" id="place" />
    </label></td>
  </tr>
```

```
                <tr>
                  <td class="style21">Mobile :</td>
                  <td><label><span><span>
                  <input type="text" id="mobile" name="mobile"
class="login_input" />
                  </span></span></label></td>
                </tr>
                <tr>
                  <td colspan="2"><div align="center">
                    <label>
                    <input type="submit" name="Submit" value="Submit" />
                    </label>
                  </div></td>
                </tr>
              </table>
            </form>
          </div>
        </div>
      </div>
    </div>
    <div class="gallery-info">
      <div class="box-head">
        <h3> </h3>
        <h3> </h3>
```

```
        <p class="style1"><span class="style5"><span class="style6"><span
class="style1"><span class="style8"><span class="style10"><span
class="style1"><a
href="farmerlogin.jsp">Supplier</a></span></span></span></span></span></
span></p>

        <p class="style12"> </p>

        <p><span class="style12"><a
href="processorlogin.jsp">Processor</a></span></p>

        <p> </p>

        <p class="style1"><span class="style5"><span class="style6"><span
class="style8"><span class="style10"><a
href="distributorlogin.jsp">Distributor</a></span></span></span></span></p
>

        <p class="style12"> </p>

        <p><span class="style12"><a
href="retailerlogin.jsp">Pharmacy</a></span></p>

        <p class="style12"> </p>

        <p><span class="style12"><a
href="consumerlogin.jsp">Patient</a></span></p>

        <p> </p>

        <p>  </p>

       </div>

     </div>

     <div class="cl"> </div>

   </div>

  </div>

  <div class="footer">

   <p class="lf"><a href="#"></a> -   </p>

   <div style="clear:both;"></div>
```

```
  </div>
</div>
<!-- END PAGE SOURCE -->
<div align=center></div>
</body>
</html>
```

DISTRIBUTESTATUS:

```
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>BLOCKCHAIN BASED DRUG TRACEABILITY</title>
<meta http-equiv="Content-type" content="text/html; charset=utf-8" />
<link rel="stylesheet" href="css/style.css" type="text/css" media="all" />
<script type="text/javascript" src="js/jquery-1.4.2.min.js"></script>
<script type="text/javascript" src="js/jquery-fns.js"></script>
<link rel="shortcut icon" type="image/x-icon" href="css/images/favicon.ico" />
<!--[if IE 6]><link rel="stylesheet" href="css/ie.css" type="text/css"
media="all" /><![endif]-->
<style type="text/css">
<!--
.style1 {color: #1F73A5}
.style5 {font-size: 16}
.style6 {font-size: 16px}
.style8 {font-weight: bold}
.style10 {color: #196EA0}
.style12 {color: #1F73A5; font-size: 16px; font-weight: bold; }
.style13 {color: #585F63; }
```

```
.style14 {
        font-size: large;
        color: #003300;
}
.style15 {color: #126698}
.style21 {font-size: medium; font-weight: bold; }
.style22 {color: #1B6FA1}
.style20 {color: #FFFFFF; }
.style23 {font-size: large}
.style24 {font-size: x-large}
.style23 {color: #E1EAF1;
        font-size: 24px;
}
-->
</style>
</head>
<body>
<!-- START PAGE SOURCE -->
<div id="shell">
  <div id="header">
    <h1 id="logo"><a href="#">BLOCKCHAIN BASED DRUG TRACEABILITY</a></h1>
    <div id="social">
      <ul>
      </ul>
    </div>
  </div>
```

```
<div id="navigation">
  <ul>
   <li><a href="distributorbuy.jsp">BuyDrug</a></li>
    <li><a href="distributorstatus.jsp">ViewStatus</a></li>
    <li><a href="distributorlogin.jsp">Logout</a></li>
  </ul>
</div>
<div id="main">
  <div id="featured">
    <div class="post-image"> <span class="tl round"> </span> <span class="tr round"> </span> <span class="bl round"> </span> <span class="br round"> </span> <a href="#"><img src="css/images/featured.jpg" alt="" /></a></div>
    <div class="post-info">
      <h2>DRUG NETWORK </h2>
      <p>innovation management and social construction ism to investigate interrelationships of Drug Services provisions and innovations in Medicine management. It is based on the evaluation of Drug Tracebility solutions and innovations that combine strategic dimensions of drug management with practice-driven initiatives, including incremental (processes and technologies) and radical  innovations.</p>
    </div>
    <div class="cl"> </div>
  </div>
  <div id="content">
    <div class="holder">
      <div class="cl"> </div>
    </div>
    <div class="gallery">
```

```
<div class="projects">
  <div align="center">
    <table width="604" height="250" border="0" >
      <tr>
        <td height="67" colspan="7" bgcolor="#3C9BEB"><div
align="center"><span class="style23">VIEW STATUS </span></div></td>
      </tr>
      <%
     try {
            //String username = "username";
    String username=session.getAttribute("username").toString();
    String status = "no";
    PreparedStatement ps;
    ResultSet rs,rs2;
          //Connection con = null;
          Statement st,st1,st2,st3,st4;
                  Class.forName("com.mysql.jdbc.Driver");
                 Connection con =
DriverManager.getConnection("jdbc:mysql://localhost:3306/foodnetworkblockc
hain","root","password");
     String query = "select * from cropdetails where
distributor='"+username+"'";
                          st = con.createStatement();
                          rs = st.executeQuery(query);
                          while (rs.next()) {
                            String s1 = rs.getString(2);
                            String s2 = rs.getString(3);
                            String s3 = rs.getString(4);
```

```
                String s4 = rs.getString(10);
                String s5 = rs.getString(11);
            int price=Integer.parseInt(s3);
            double percent = (double)((double)price +
(double)((double)((double)price*(double)15)/(double)100))
            %>
        <tr>
          <td><div align="center" class="style21">Product name </div></td>
          <td><div align="center" class="style21">Quantity</div></td>
          <td><div align="center" class="style21">Price</div></td>
          <td><div align="center" class="style21">Pharmacy</div></td>
          <td><div align="center" class="style21">Hash Key </div></td>
        </tr>
        <tr>
          <td width="141"><div align="center"><%=s1%></div></td>
          <td width="126"><div align="center">
            <label></label>
            <%=s2%></div></td>
          <td width="119"><div align="center"><%=percent%></div></td>
          <td width="96"><div align="center"><%=s4%></div></td>
          <td width="100"><div align="center"><%=s5%></div></td>
        </tr>
        <p>
          <%
                    }
                    con.close();
                } catch (Exception e) {
```

```
                    out.println(e);
                }
            %>
          </p>
        </table>
      </div>
    </div>
  </div>
  <div class="gallery-info">
    <div class="box-head">
      <h3> </h3>
      <h3> </h3>
      <p class="style1"><span class="style5"><span class="style6"><span class="style8"><span class="style10"><a href="distributorbuy.jsp">Buy Product </a></span></span></span></span></p>
      <p class="style12"> </p>
      <p><span class="style12"><a href="distributorstatus.jsp">View status </a></span></p>
      <p> </p>
      <p class="style1"><span class="style5"><span class="style6"><span class="style8"><span class="style10"><a href="distributorlogin.jsp">Logout</a></span></span></span></span></p>
      <p> </p>
      <p>  </p>
    </div>
  </div>
  <div class="cl"> </div>
</div>
```

```
  </div>
  <div class="footer">
    <p class="lf"><a href="#"></a> -   </p>
    <div style="clear:both;"></div>
  </div>
</div>
<!-- END PAGE SOURCE -->
<div align=center></div>
</body></html>
```

INDEX.JSP

```
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>BLOCKCHAIN BASED DRUG TRACEABILITY</title>
<meta http-equiv="Content-type" content="text/html; charset=utf-8" />
<link rel="stylesheet" href="css/style.css" type="text/css" media="all" />
<script type="text/javascript" src="js/jquery-1.4.2.min.js"></script>
<script type="text/javascript" src="js/jquery-fns.js"></script>
<link rel="shortcut icon" type="image/x-icon" href="css/images/favicon.ico" />
<!--[if IE 6]><link rel="stylesheet" href="css/ie.css" type="text/css"
media="all" /><![endif]-->
<style type="text/css">
<!--
.style1 {color: #1F73A5}
.style5 {font-size: 16}
.style6 {font-size: 16px}
.style8 {font-weight: bold}
.style10 {color: #196EA0}
```

```
.style12 {color: #1F73A5; font-size: 16px; font-weight: bold; }
.style13 {color: #585F63; }
.style14 {
        font-size: large;
        color: #003300;
}
.style15 {color: #126698}
-->
</style>
</head>
<body>
<!-- START PAGE SOURCE -->
<div id="shell">
  <div id="header">
    <h1 id="logo"><a href="#">BLOCKCHAIN BASED DRUG TRACEABILITY IN HEALTHCARE SUPPLYCHAIN</a></h1>
    <div id="social">
      <ul>
      </ul>
    </div>
  </div>
  <div id="navigation">
    <ul>
      <li><a href="index.jsp">HOME</a></li>
      <li><a href="farmerlogin.jsp">SUPPLIER</a></li>
      <li><a href="processorlogin.jsp">PROCESSOR</a></li>
      <li><a href="distributorlogin.jsp">DISTRIBUTOR</a></li>
```

```
        <li><a href="retailerlogin.jsp">PHARMACY</a></li>
      <li><a href="consumerlogin.jsp">PATIENT</a></li>
    </ul>
  </div>
  <div id="main">
    <div id="featured">
      <div class="post-image"> <span class="tl round"> </span> <span class="tr round"> </span> <span class="bl round"> </span> <span class="br round"> </span> <a href="#"><img src="css/images/featured.jpg" alt="" /></a></div>
      <div class="post-info">
        <h2>Drug Traceability </h2>
        <p>innovation management and social construction ism to investigate interrelationships of Drug Services provisions and innovations in Medicine management. It is based on the evaluation of Drug Tracebility solutions and innovations that combine strategic dimensions of drug management with practice-driven initiatives, including incremental (processes and technologies) and radical  innovations. </p>
      </div>
      <div class="cl"> </div>
    </div>
    <div id="content">
      <div class="holder">
        <div class="cl"> </div>
      </div>
      <div class="gallery">
        <div class="projects">
          <div align="center">
            <p> </p>
```

```
<p class="style14"><a href="timeanalysis.jsp" class="style15"><img
src="images/Untitled1.png" width="430" height="405" /></a></p>
</div>
</div>
</div>
<div class="gallery-info">
<div class="box-head">
<h3> </h3>
<h3> </h3>
<p class="style1"><span class="style5"><span class="style6"><span
class="style1"><span class="style8"><span class="style10"><span
class="style1"><a
href="farmerlogin.jsp">Supplier</a></span></span></span></span></span></
span></p>
<p class="style12"> </p>
<p><span class="style12"><a
href="processorlogin.jsp">Processor</a></span></p>
<p> </p>
<p class="style1"><span class="style5"><span class="style6"><span
class="style8"><span class="style10"><a
href="distributorlogin.jsp">Distributor</a></span></span></span></span></p
>
<p class="style12"> </p>
<p><span class="style12"><a
href="retailerlogin.jsp">Pharmacy</a></span></p>
<p class="style12"> </p>
<p><span class="style12"><a
href="consumerlogin.jsp">Patient</a></span></p>
<p> </p>
<p>  </p>
```

```
      </div>
    </div>
    <div class="cl"> </div>
  </div>
 </div>
 <div class="footer">
  <p class="lf"><a href="#"></a> -  </p>
  <div style="clear:both;"></div>
 </div>
</div>
<!-- END PAGE SOURCE -->
<div align=center></div>
</body></html>
```

ADDCROP.JAVA

```
import java.io.IOException;
import java.io.PrintWriter;
import java.net.InetAddress;
import java.net.UnknownHostException;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;
import java.text.DecimalFormat;
import java.util.Random;
import javax.servlet.RequestDispatcher;
import javax.servlet.ServletException;
```

```
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
import javax.servlet.http.HttpSession;
/**
 *
 * @author java.2
 */
@WebServlet(name = "Register", urlPatterns = {"/Register"})
public class AddCrop extends HttpServlet {
Connection con=null;
   Statement st=null,st1=null;
   ResultSet rs=null;
   RequestDispatcher rd=null;
        public void doPost(HttpServletRequest req, HttpServletResponse res)
throws IOException,ServletException {
          HttpSession sn = req.getSession(true);
          String username=sn.getAttribute("username").toString();
           String cropname= req.getParameter("cropname");
          String quantity= req.getParameter("quantity");
         String price= req.getParameter("price");
         RequestDispatcher rd;
        Random generator1 = new Random();
          int seckey = generator1.nextInt(1000000);
         try {
          Class.forName("com.mysql.jdbc.Driver");
```

```
            con =
DriverManager.getConnection("jdbc:mysql://localhost:3306/foodnetworkblockc
hain","root","password");
           String processor="nil";
            String nil="nil";
            st1 = con.createStatement();
        } catch(Exception e2)
         {
            System.out.println("Exception : "+e2.toString());
        }
    }
}
```

PROCESS.JAVA

```
  import java.io.*;
  import java.sql.*;
  import javax.servlet.*;
  import javax.servlet.http.*;
  import java.lang.*;
import java.security.MessageDigest;
import java.text.DecimalFormat;
import java.text.SimpleDateFormat;
public class RetailerProcess extends HttpServlet
Connection con=null;
    Statement st=null,st1=null;
    ResultSet rs=null;
    RequestDispatcher rd=null;
```

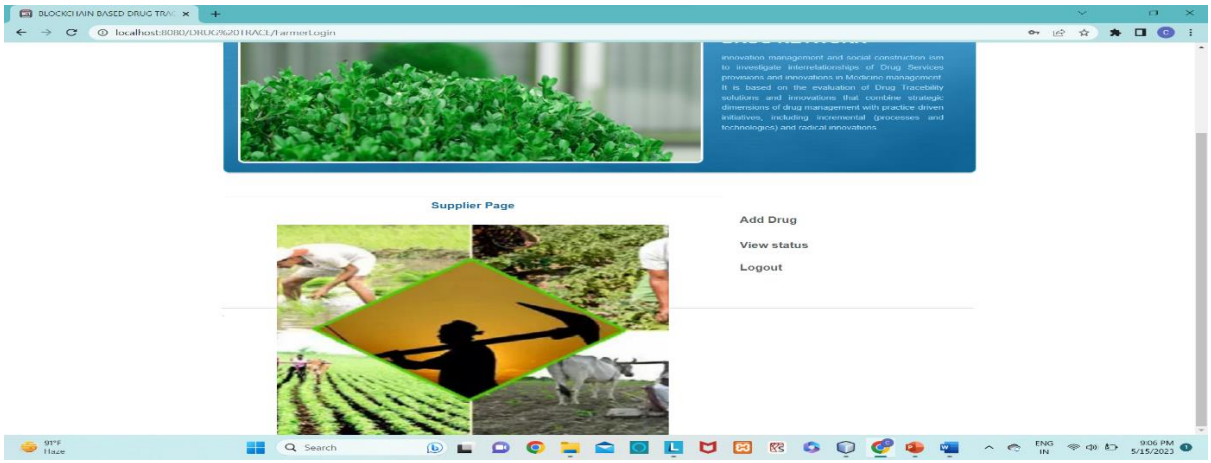
```
public void doPost(HttpServletRequest req, HttpServletResponse res) throws IOException,ServletException {
HttpSession sn = req.getSession(true);
String username= sn.getAttribute("username").toString();
String id= req.getParameter("id");
String status="approved";
RequestDispatcher rd
try{Class.forName("com.mysql.jdbc.Driver");
con=DriverManager.getConnection("jdbc:mysql://localhost:3306/foodnetworkblockchain","root","password");
int id1=0;
String prevdata="";
st = con.createStatement();
ResultSet rs1 = st.executeQuery("select * from blockchain");
while(rs1.next()) {
id1=rs1.getInt(1)+1;
prevdata=rs1.getString(20);
MessageDigest md = MessageDigest.getInstance("MD5");
preparedStmt.setString  (1, username);
preparedStmt.setString(2, sb.toString());
preparedStmt.setString(3, id)
preparedStmt.executeUpdate();
rd=req.getRequestDispatcher("retailerstatus.jsp");
rd.forward(req,res);
} catch(Exception e2) }
System.out.println(e2);
}}
```

APPENDIX II

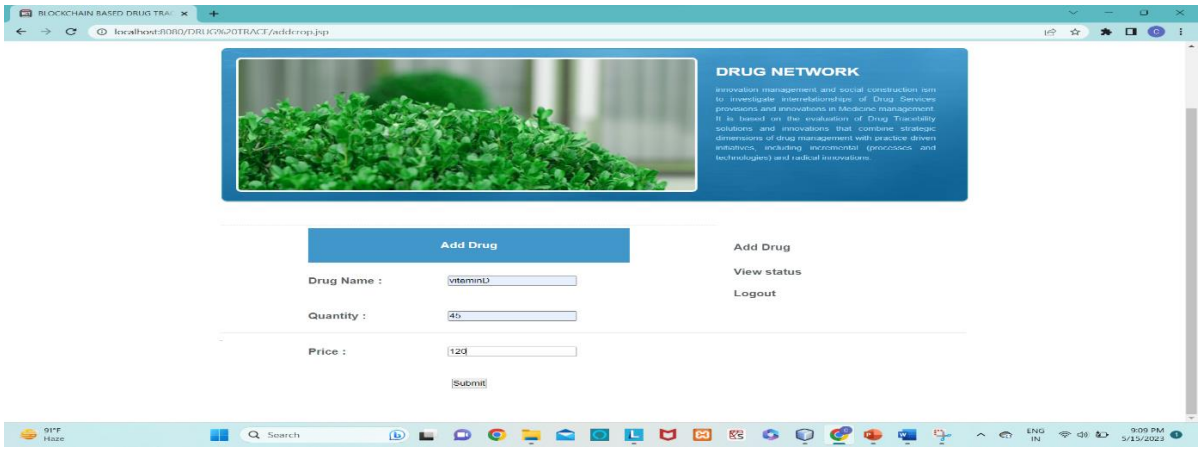
SNAP SHOTS

Home Page

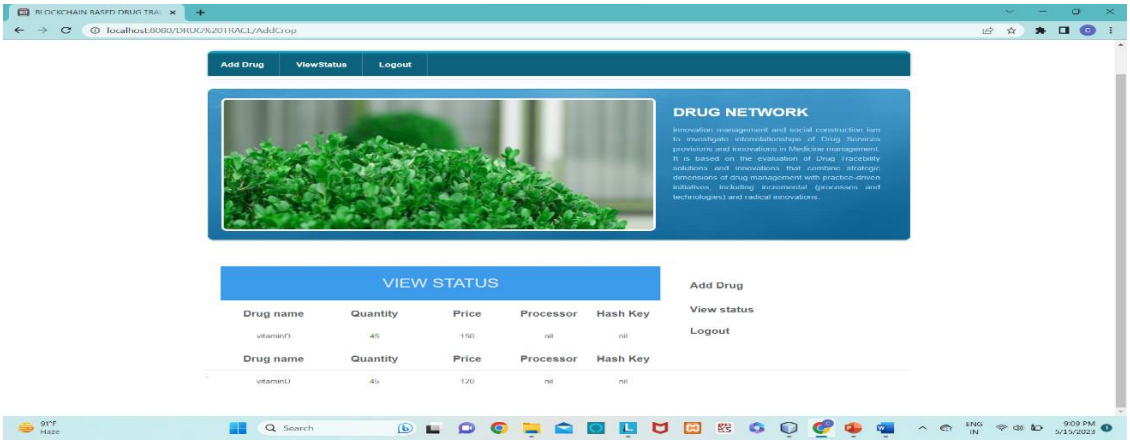
Supplier page



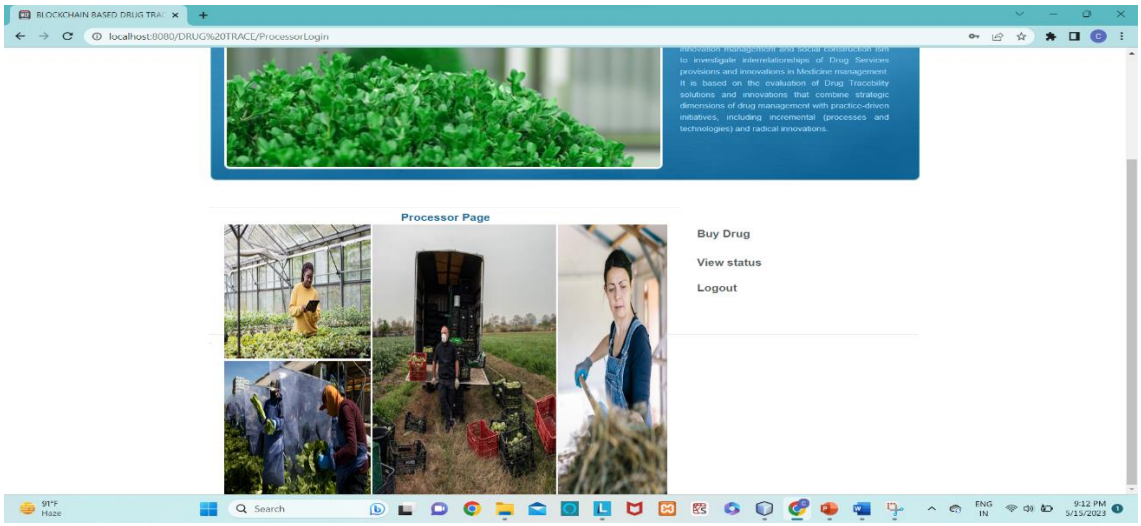
Add Drug



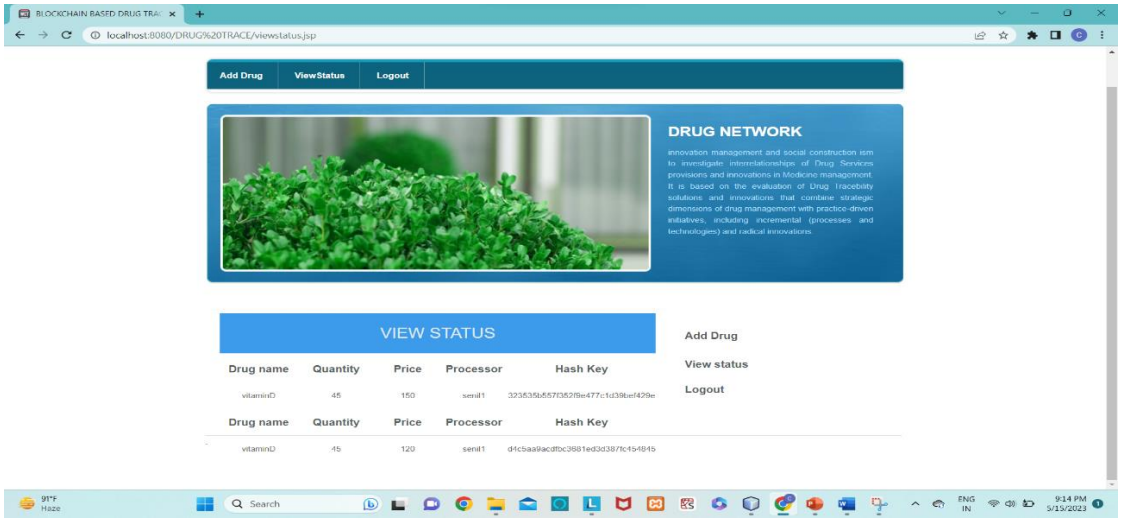
View Status



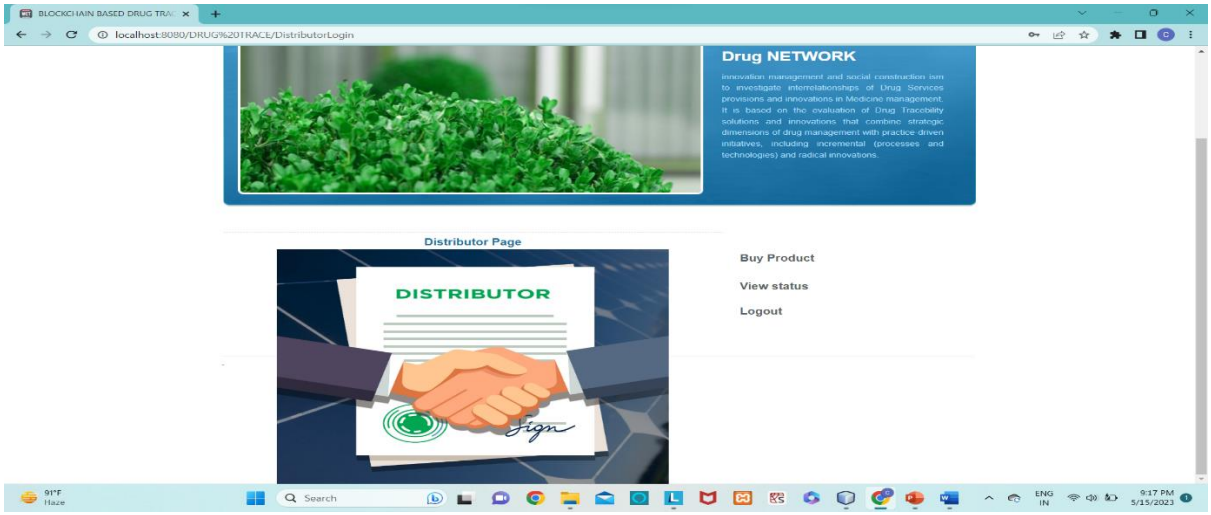
Processor Home



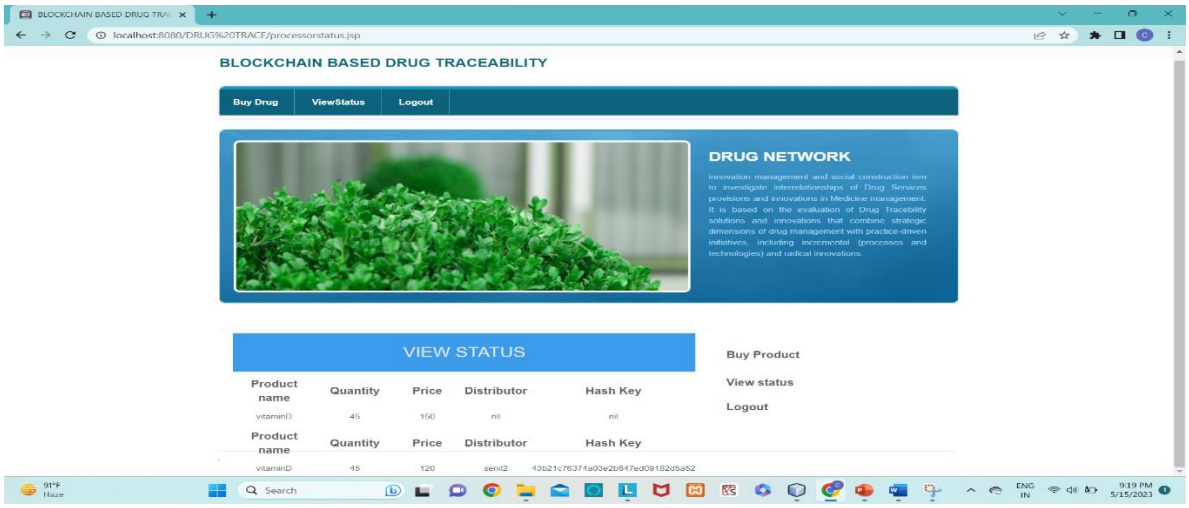
Supplier view Status



Distributer Home Page



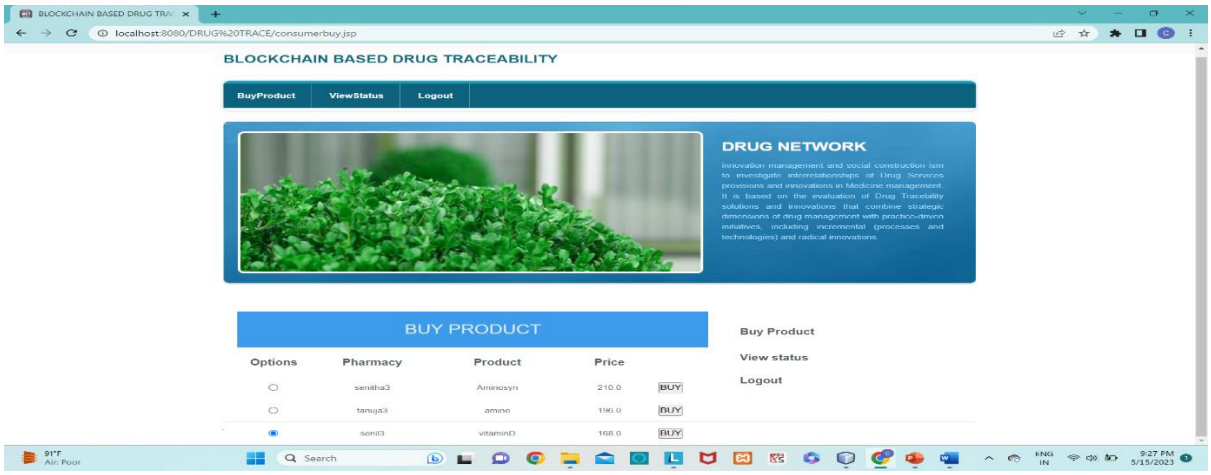
Processor status



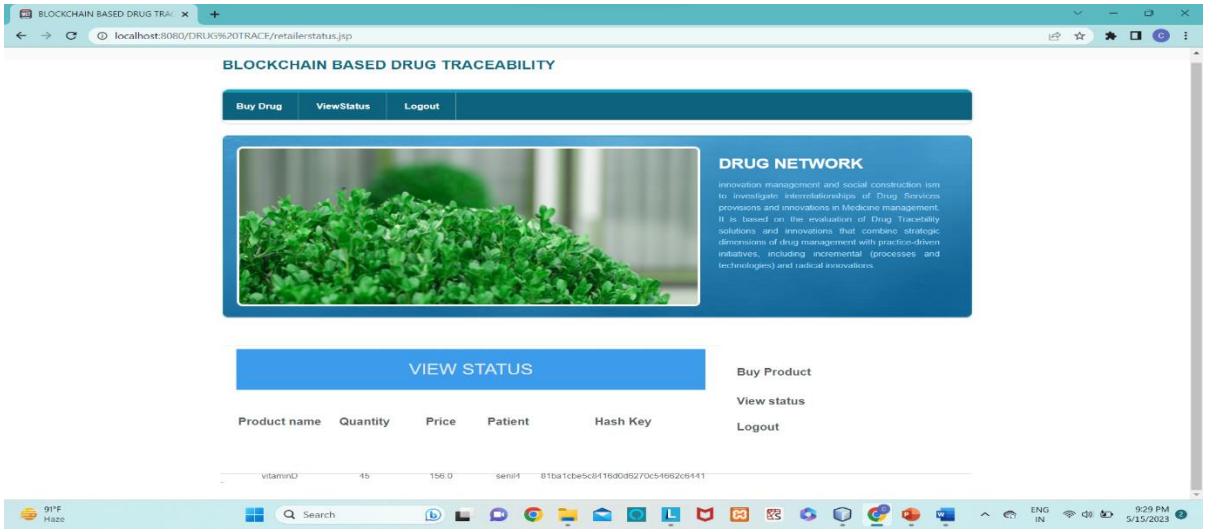
Pharmacy home

Patient home

Buy drugs



View Status



REFERENCES

[1] Shortage of Personal Protective Equipment Endangering Health Workers Worldwide. Accessed: Jun. 3, 2020. [Online]. Available: https://tinyurl. com/v5qauvp

[2] W. G. Chambliss, W. A. Carroll, D. Kennedy, D. Levine, M. A. Moné, L. D. Ried, M. Shepherd, and M. Yelvigi, ‘‘Role of the pharmacist in preventing distribution of counterfeit medications,’’ J. Amer. Pharmacists Assoc., vol. 52, no. 2, pp. 195–199, Mar. 2012.

[3] Z. RJ, ‘‘Roles for pharmacy in combating counterfeit drugs,’’ J. Amer. Pharmacists Assoc., vol. 48, pp. e71–e88, Jul. 2008.

[4] P. Toscan. The Dangerous World of Counterfeit Prescription Drugs. Accessed: Jun. 3, 2020. [Online]. Available: http://usatoday30.

usatoday.com/money/industries/health/drugs/story/2011-10-09/cnbcdrugs/50690880/1

[5] T. Adhanom. (2017). Health is a Fundamental Human Right. Accessed: May 26,2020.Available:https://www.who.int/mediacentre/news/statements/fundamental-human-right/en