

FAKE PRODUCT IDENTIFICATION SYSTEM USING BLOCKCHAIN TECHNOLOGY

A PROJECT REPORT

Submitted by

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In partial fulfilment for the award of the degree

Of

BACHELOR OF ENGINEERING

In

COMPUTER SCIENCE AND ENGINEERING

ANNAI MIRA COLLEGE OF ENGINEERING AND TECHNOLOGY

ARAPAKKAM, RANIPET-632517.



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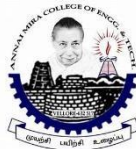
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BONAFIDE CERTIFICATE

Certified that this project report “**FAKE PRODUCT IDENTIFICATION SYSTEM USING BLOCKCHAIN TECHNOLOGY**” is the bonafide work of “**KARATHICKEYAN R (513519104014), SATHISHKUMAR P(513519104030), THANGARAJ S(513519104036), ABINASH B(513519104301)**” who carried out the project work under my supervision.

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FAKE PRODUCT IDENTIFICATION SYSTEM USING BLOCKCHAIN TECHNOLOGY

ABSTRACT:

In recent years, Counterfeit products play an important role in product manufacturing industries. This affects the companies name, sales, and profit of the companies. Blockchain technology is used to identification of real products and detects fake products. Blockchain technology is the distributed, decentralized, and digital ledger that stores transactional information in the form of blocks in many databases which is connected with the chains. Blockchain technology is secure technology therefore any block cannot be changed or hacked. By using Blockchain technology, customers or users do not need to rely on third-party users for confirmation of product safety. In this project, with emerging trends in mobile and wireless technology, Quick Response (QR) codes provide a robust technique to fight the practice of counterfeiting the products. counterfeit products are detected using a QR code scanner, where a QR code of the product is linked to a Blockchain.

So, this system may be used to store product details and generated unique code of that product as blocks in the database. It collects the unique code from the user and compares the code against entries in the Blockchain database. If the code matches, it will give a notification to the customer, otherwise it will give the notification to the customer that the product is fake. maintain reputation, trust in Product and proof of learning. Nowadays everyone has to show his/her Document and QR Code to any other person for some purpose/job. After seeing the document 3rd person cannot validate the originality of the QR Code. We can solve this problem or get trust by using blockchain technology. The blockchain is a chain of blocks and blocks are immutable in a distributed environment, it which storage devices are not all connected to a common processor. It is a database of records/public ledger of all transactions/Digital events that have been performed and information is shared within participating parties. Each entry in the system is verified by common consent of the participants in the system. Once information is entered in blockchain it cannot be erased. It could provide a system that is transparent and secure. Blocks (Ordered Records) are added to blockchain with timestamp and a link to a previous block. Verifying a diploma/QR Code today takes a good amount of time and requires human resources or human resources to request confirmation of details from Company. A possible solution is Blockchain; Blockchain for education may be a new concept. By using this technology, no need for a central authority to validate QR Codes. Your college won't have to send you a copy of your transcript and prove to anyone you have your degree.

LIST OF ABBREVIATIONS

HTML	-HYPER TEXT MARKUP LANGUNAGE
CSS	-CASCADING STYLE SHEETS
JS	-JAVASCRIPT
JSON	-JAVASCRIPT OBJECT NOTATION

LIST OF FIGURES

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INTRODUCTION

CHAPTER-1

INTRODUCTION

1.1 GENERAL CONCEPTS

Now a day, education has become essential part of life, still we need to maintain reputation and trust in Product. Everyone has to show his/her Document and QR Code to any other person for some purpose/job. After seeing the document 3rd person cannot validate the originality of the QR Code.

Blockchain - A Revolution Bigger Than the Internet

The Internet is entering the second era that's based on Blockchain [2] [3]- the Internet of Value, a new platform to change the world of business. It's novel solution to the age-old human problem of trust. It provides architecture for so-called trust less trust. It allows user to trust the outputs of the system without trusting any actor within it.

The pace with which this technology is evolving, it's making it difficult for different sectors/domains to keep, without the changes. The world is increasingly getting connected with the amalgamation of connected devices and solutions. So how do we fit in-For truly digitization process in Fintech / Banking and other sectors as well got to be seamless.

“Blockchain technology” can be seen as a group of technologies, like a bag of bricks. From the bag, we can take out bricks and put them together in different ways to create different results.

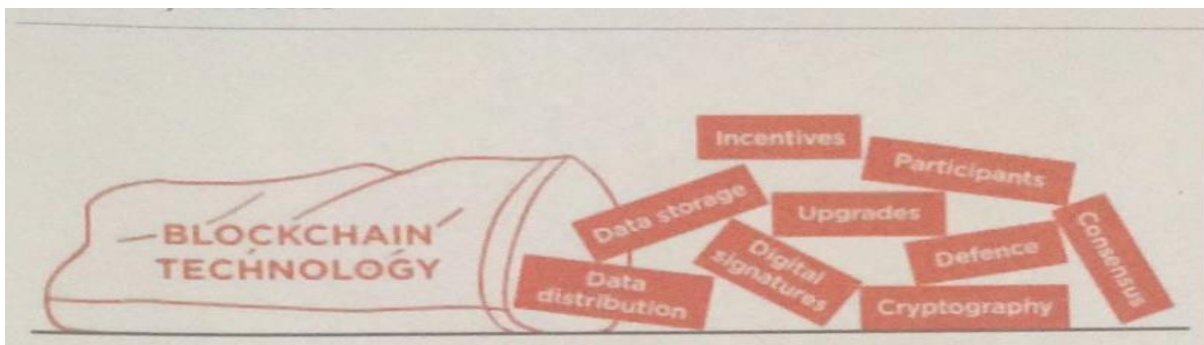


Figure 1.1: Blockchain Technology

1.2 MOTIVATION

In previous years, it has been come into the light and come in our daily routine life, that we got to know, below cases,

- Some company has fired xyz employee due to fraud Product document.
- Someone is selling the same Product to the number of peoples.
- The same driving license number is issued to the number of peoples.
- Same Voter ID is issued to many peoples.
- A doctor has a fake degree, and he is doing practicing.

Many people paste the other people photograph on some other ID proof and use the scan copy/ Photocopy as an Identity proof.

From above we see that above incident happens as we have no channel to check the authenticity. If someone has a fake document, we have no options to verify the authenticity.

But when we see the cryptocurrency mechanism/ Properties, we found that it uses blockchain as a base, and it is secure by nature and has following properties.

- Decentralized
- Digital cash system
- Digital money created from code.
- Monitored by a peer-to-peer internet protocol.
- An encrypted string of data or a hash encoded to signify one unit of currency.

We can build the trust for education QR Code by using blockchain technology. By using this technology, no need for a central authority to validate documents. Your college won't have to send you a copy of your transcript and prove to anyone you have your degree. We are building a platform that will be open, accessible and one piece of software at a time and Customer can get Blockchain-based Product Products. Blockchain-based Product Products are the digital QR Code and registered on the Ethereum Blockchain that will be cryptographically signed and tamper proof

1.3 PROBLEM STATEMENT

As education becomes more diversified, decentralized and democratized, we still need to maintain reputation, trust in Product, and proof of learning. Nowadays everyone has to show his/her Document and QR Code to any other person for some purpose/job. After seeing the document 3rd person cannot validate the originality of the QR Code.

Major problem:

- Authenticity
- Trust
- Database with no update feature
- Digital Signature
- Blockchain.

We are building a platform that will be open, accessible and one piece of software at a time and Customer can get Blockchain-based Product Products. Blockchain-based Product Products are the digital QR Code and registered on the Ethereum Blockchain that will be cryptographically signed and tamper proof. Other people can view the QR Code online, and no 3rd party validation is required for these digital QR Codes.

We are going to build a web-based platform for Customer where they can verify and select a product, which will have two major parts,

- After scanning the product, they have to give Verifies and result will be saved on blockchain server.

At admin/seller side, they can manage products and Company profiles.

1.4 EXISTING SYSTEM

- Generate the electronic file of a paper QR Code
- And calculate the hash value for it and store the hash value into the block
- The system creates a QR-code string code to affix to the paper QR Code.
- Used to verify the authenticity of the paper QR Code through Mobile phone scanning.
- Every popular brand has fake manufacturers selling a counterfeit item with misleading and invalid labels, which are sold at cheaper rates. Even the company experts may not be able to distinguish between counterfeit and original items.

Disadvantages of existing system:

- QR-code must be scanned with smartphone and internet connection is also required.
- Hyperledger cannot use public blockchain because of privacy and low scalability.
- Hyperledger preferred platform only for B2B business.

1.5 PROPOSED SYSTEM

DIGITAL CODE GENERATION:

- If the original manufacturer embeds a QR code on the product that is linked to the blockchain system, one could scan the QR code which would tell whether the product is fake or not.
- Suppose we come across a counterfeit item – we need to be able to identify that it is indeed fake through its QR code, verified across a blockchain. A hacker attempting to add said counterfeit QR through the blockchain must find it impossible to modify the chain.
- Each product has a blockchain and each block in the blockchain will have a set of transactions that are associated with the product.
- Each block will consist of –
 - a unique index (to differentiate between transactions)
 - timestamp (when the block was created)
 - verification code
 - proof
 - set of transactions

Suppose a person wants to buy a specific product. They must:

- Verify the QR code of the product with the blockchain to verify the product's validity, Insert the transaction data into a block while checking against it with the proof/nonce, wait for the block to be verified across all the decentralized database so it can be inserted into the blockchain.
- Additionally, the blockchain must be resilient to attacks and modifications to the product list by unknown sources

1.6 SCOPE OF THIS THISES

Previous work in the field of the blockchain, which is mainly focused on the cryptocurrency and its mining. In 2017, the blockchain rose to a high level, Most of the attention has been on cryptocurrencies such as Bitcoin and Ethereum as investors try to catch the next wave. Now it is going to different sector- Education, Product registry, Banking Share marking....

In this Project, I have investigated the possibilities of use of blockchain technology in the education sector. I have worked on Product generation by using this technology, in which candidate will enroll for a course and have to give the online Verify. After completion of the Verify, if a candidate is Pass result will be saved on blockchain ledger, and if a candidate fails, the result will not be kept on blockchain and user have to reattempt the Verify.

The purpose of this report/thesis is to analyze the use of new emerging technology (blockchain) in the field of education so that candidate gets the benefit and employer has the transparency. That will reduce the fraud cases as data cannot be erased/ Rewrite on blockchain server.

LITERATURE SURVEY

CHAPTER-2

LITERATURE SURVEY

2.1 BLOCKCHAIN

Since its 2008 appearance as a cornerstone of the cryptocurrency Bitcoin, the blockchain technology gained widespread attention as a modality to securely validate and store information without a trusted third party [6]. Blockchain is a decentralized transaction and data management technology developed first for Bitcoin cryptocurrency [7]. Blockchain features a decentralized and incorruptible database that has high potential for a diverse range of uses [8].

A blockchain, originally block chain, is a continuously growing list of records, called blocks, which are linked and secured using cryptography. Each block typically contains a cryptographic hash of the previous block, a timestamp and transaction data. By design, a blockchain is inherently resistant to modification of the data. It is "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way".

Blockchain is a decentralized ledger used to securely exchange digital currency, perform deals and transactions [8] and managed by peer to peer networks. All nodes follow same protocol for inter- node communication and validating new blocks. Once data is validated in any block it cannot be altered by any block. To alter particular block data all subsequent block data should be altered that will result in collusion of the network and that transaction will be rejected by all nodes.

In 2008, Satoshi Nakamoto invented the blockchain for the use of cryptocurrency and Bitcoin was its 1st implementation. Bitcoin was the 1st public transaction ledger. The invention of this currency solved the double-spending problem without the need of a 3rd party. After that other cryptocurrency were invented on same concept.

In short, a blockchain is a distributed database that contains a list of records (data). Distributed means that instead of being stored on a central device somewhere, the entire database is actively synced and stored on a bunch of other devices. This is called a peer-to-peer network, much like how Napster was a peer-to-peer network for sharing music files.

The main advantage this technology provides is its ability to exchange transactions without relying on trusted third party entities of any means. It can also provide data integrity, in-built authenticity and user transparency [9].

2.1.1 Blocks

A block contains set of valid transactions that are in hash form and make a Merkle Tree. Each block typically contains a hash pointer as a link to a previous block, a timestamp and transaction data. By design, blockchains are inherently resistant to modification of the data [11]. These linking forms a block of chain. This process is iterative and that confirms that previous block is reliable and correct. In this way we can go back to genesis block.

2.1.2 Block time

In blockchain block time refers to the time when network can create 1 more block in the chain. It time vary from blockchain to blockchain some blockchain allows new block as frequently as every five seconds. This time also include the time in which data becomes verifiable. In cryptocurrency term shorter block time means faster transaction. In Ethereum Blockchain Block time is approximate 14~15 seconds, while for Bitcoin is approx 10 minutes.

2.1.3 Decentralization

Blocks are stored in different locations (nodes) so blockchain eliminates a number of risks which comes if data is in single location/storage. In which we don't have no central point of failure. . Data stored on the blockchain is generally considered incorruptible, while centralized data is more easily controlled, information and data manipulation are possible.

2.2 BLOCKCHAIN WORKING

Blockchain can be considered as the "Internet of value". On the Internet, anyone can write data and others can read it. In terms of cryptocurrency Keys fills the role of recording the transfer, which is traditionally carried out by banks. It also fills a second role, establishing trust and identity, because no one can edit a blockchain. The major functions carried out by banks - verifying identities to prevent fraud and then recording legitimate transactions - can be carried out by a blockchain more quickly and accurately.

Block orders in a blockchain

Blockchain can be considered as a book where, Blocks in a chain = pages

in a book A book has number of pages and each page contains:

- **The text:** the information/data.
- **Information about itself:** Chapter number, Title or Page number which tells where we are in the book

Similarly, in a blockchain block, each block has:

- **The contents** of the block, for Verifypile in Bitcoin are it the Bitcoin transactions and the miner incentive reward.
- **Headers** which contain the data about the block. It includes some technical information about the block, a reference to the previous block, and a fingerprint (hash) of the data contained in this block.

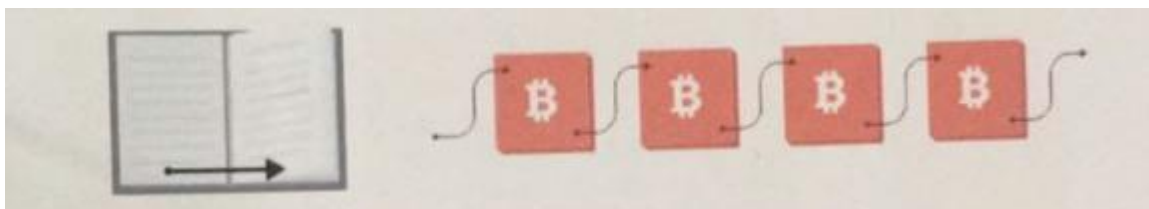


Figure 2.1: Blockchain vs Book

Page by page: In book, Pages have page number in order. If some pages are missed and shuffled then it easy to put them back into correct order so that information can be provided in proper way.

Block by block: In Blockchain, each block have previous block address and previous block have its previous block address till genesis block.

BOOK ORDERING	BLOCK ORDERING
Page 1,2,3,4,5	Block n58ufO built on 84n855 , Block 90fk5n built on n58ufO, Block 8n6d71 built on 90fk5n.
Implicit that the page builds on the page whose number is one less. eg Page 5 builds on page 4 (5 minus 1)	84n855 ,n58ufO, 90fk5n,8n6d71 represent fingerprints or hashes of the blocks.

Table 2.1: Book and Block Ordering

2.3 PUBLIC AND PRIVATE BLOCKCHAIN

Blockchains can be divided into 2 major categories (Public and Private).

Another way of describing public/private might be Permissionless vs. Permissioned or pseudonymous vs. identified participants.

2.3.1 Public Blockchains

It has below 2 basic properties:

- Anyone, without permission granted by another authority, can write data
- Anyone, without permission granted by another authority, can read data

1st blockchain, Bitcoin is designed as a 'anyone-can-write' blockchain, where participants can add to the ledger without needing approval (**there is no 'boss' to decide**). Some of the largest, most known public blockchains are Bitcoin and Ethereum.

2.3.2 Private Blockchain

Private Blockchain provides a network where participants are known and trusted in which many rules/protocol aren't needed (or rather they are replaced with legal contracts) as participants will behave properly because he has signed this piece of paper. They do not rely on anonymous nodes to validate transactions.

2.4 CRYPTOCURRENCY

Cryptocurrency is a medium of created, stored and exchanged electronically in the Blockchain using encryption technique to control the creation on monetary units and to verify the transfer of funds.

The transaction is known instantly by the whole network. But minors take some time to confirm this transaction. This is minor's job in a cryptocurrency-network, and in return they gets cryptocurrency token.

In a decentralized network, we don't need a central server who keeps record about the transactions. Every peer in the network needs to have a list of all transactions to check if current transactions are valid or an attempt to double spend.

2.4.1 Cryptocurrency Mining

Because of the random nature of hashing, achieving an acceptable block is never a guarantee. Thus, Bitcoin mining is a competitive venture, where miners are awarded new Bitcoin for each block successfully hashed and accepted in the blockchain [5].

Bitcoin mining is a process of creating new Bitcoin by verifying the transactions in the Bitcoin network. Every transaction is kept in a public ledger, and that ledger is verified and maintained by all of the computers participating in the Bitcoin network. This “chain” of transactions is known as the blockchain, and each transaction is essentially a public timestamp that can contain data [12].

Bitcoin miners donate their computer's processing power to run complex calculations. Who resolves the problem gets new cryptocurrency token as fees.

Miners, a decentralized network of users, validate and confirm transactions and they have setup of dedicated hardware to perform calculations, called „hashes“. They vote with their CPU power, expressing their acceptance of valid blocks by working on extending them and rejecting invalid blocks by refusing to work on them [4]. These strings of records (hashes) that keep track of every Bitcoin transaction and replicated on every system in the Bitcoin network.

The electricity power used to "mine" the cryptocurrency is a crucial factor as its prices are skyrocketing. According to the Bitcoin analysis blog Digiconomist, people mining the cryptocurrency across the globe are using more than 30 terawatts-hours of energy. This is higher than the individual energy usage of at least 159 countries like Hungary, Oman, IreProduct, and Lebanon [11].

Ethereum is the world's second-largest Blockchain network after Bitcoin and uses one- third the energy of Bitcoin. Approx 11 terawatt-hours a year, Ethereum use electricity which is the electricity consumption of Zambia. As Cryptocurrency mining is increasingly popular, its algorithm gets more and more difficult over time.

“More energy efficient algorithms, like proof-of-stake, have been in development over recent years. Bitcoin and mostly other cryptocurrency use proof-of-work methodology that required more energy consumption as compare to proof-of-stake algorithms. For Bitcoin mining operation setup, you need a place where energy costs are low. That's why an estimated 58 percent of global Bitcoin mining takes place in china.

2.5 SOME OTHER RECENT RESEARCHES

TITLE: Bitcoin BTC

AUTHOR: Satoshi Nakamoto

YEAR: 2009

Satoshi Nakamoto is the unknown inventor of Bitcoin. It was released in 2009, and its symbol is BTC.

"A new electronic cash system that uses a peer-to-peer network to prevent double-spending. It is completely decentralized with no central authority or server" – Satoshi Nakamoto, 09 January 2009, announcing Bitcoin on SourceForge [4]. It is a digital currency system based on peer-to-peer virtual data [5]. It uses peer-to-peer technology or network to operate with no central authority or banks; managing transactions and the issuing of Bitcoin is carried out collectively by the system.

Bitcoin is 1st cryptocurrency that usages Cryptography to control its creation and transactions, rather than a central authority. It provides a new payment system that is digital in nature and no central authority/mediators are involved. It can be considered as “Cash for Internet”.

➤ Market Cap: \$222,014,656,865

➤ Price: \$13,238.0000

Available Supply: 16,771,012

TITLE: Ripple XRP

AUTHOR: Ripple

YEAR: 2013

Ripple was developed by Arthur Britto, David Schwartz & Ryan Fugger. It was released in 2013, and its symbol is XRP.

It is a real-time payment network that offers immediately certain and low-cost international payments. It "enables banks to settle cross-border payments in real time, with end-to-end transparency, and at lower costs." It is based around a shared, public database which uses a consensus process that allows for payments, exchanges, and remittance in a distributed process. Its Ledger does not require mining that is the major difference from Bitcoin and other cryptocurrency that uses mining concept.

That's why it does not require more computing power.

- Market Cap: \$88,309,754,593
- Price: \$2.2796
- Available Supply: 38,739,144,847

TITLE: Ethereum ETH

AUTHOR: Ethereum

YEAR: 2015

Ethereum was developed by the Ethereum Foundation (a Swiss non-profit foundation). It was released in 2015, and its symbol is ETH.

It is a distributed SW platform that use Smart contract to interact with the blockchain. Application based on Ethereum runs without any fraud and 3rd party validation.

- Market Cap: \$66,287,547,582
- Price: \$686.4400
- Available Supply: 96,567140

TITLE: Bitcoin Cash BCH

AUTHOR: Bitmain Group

YEAR: 2017

Bitcoin Cash was developed by Bitmain group. It was released in 2017, and its symbol is BCH. It is the continuation of the Bitcoin project as peer-to-peer digital cash. It is a fork of the Bitcoin blockchain ledger, with upgraded consensus rules that allow it to grow and scale. Its block size limit to eight megabytes. The rule change increasing the Bitcoin block size limit of one megabyte to eight megabytes is classified as a hard fork.

- Market Cap: \$39,092,477,988
- Price: \$2,315.4250
- Available Supply: 16,883,500

TITLE: Cardano ADA

AUTHOR: Aggelos Kiayias

YEAR: 2017

Cardano was developed by Aggelos Kiayias, and it was released in 2017, and its symbol is ADA.

- Market Cap: \$13,290,216,358
- Price: \$0.5126
- Available Supply: 25,927,070,538

PROJECT IMPLEMENTATION

CHAPTER-3

PROJECT IMPLEMENTATION

3.1 MODULES

1.USER MODULE

2.ADMIN MODULE

3.DJANGO MODULE

4.SQLITE MODULE

5.USER INTERFACES

6.BLOCKCHAIN CREATION

7.VERIFICATION

3.2 USER MODULES

LOGIN: In this section, user can login with our name and password to entering page of product details.

ADD PRODUCT: In this section, user can be providing the product details and submit.

QRCODE: The submitted product details is convert a qrcode using block chain technology and it store the database of SQLite .And user verify the product is fake or not using qrcode scanner. If it is not fake it shows the verified successful and show the product details.

3.3 ADMIN MODULES

LOGIN: In this section, Admin can login with our name and password to entering page of product details.

ADD PRODUCT: In this section, Admin can be providing the product details and submit.

QRCODE: The submitted product details is convert a qrcode using block chain technology and it store the database of SQLite. And Admin verify the product is fake or not using qrcode scanner. If it is not fake it shows the verified successful and show the product details.

3.4 DJANGO MODULE

Django is a high-level Python web framework that encourages rapid development and clean, pragmatic design. Built by experienced developers, it takes care of much of the hassle of web development, so you can focus on writing your app without needing to reinvent the wheel. It's free and open source. Ridiculously fast.

3.5 SQLITE3 MODULE

Python SQLite3 module is used to integrate the SQLite database with Python. It is a standardized Python DBI API 2.0 and provides a straightforward and simple-to-use interface for interacting with SQLite databases. There is no need to install this module separately as it comes along with Python after the 2.5x version.

3.6 USER INTERFACES

User interface design which we use to this project is Anaconda and Python studio.

For server communication we develop an IDE using Anaconda.

Using Python studio we develop an Python application to share and scan the QR code. Testrpc is a Node.js based Ethereum client for testing and development.

It uses ethereumjs to simulate full client behavior and make developing Ethereum applications much faster.

3.7 BLOCKCHAIN CREATION

A block is a container data structure. The average size of a block seems to be 1MB (source).

Here every QR Codes number will be created as a block.

For every block an hash code will generate for security.

In this module, based on QR Code numbers Block code will generate.

While creating Blockchain code user can increase the count based on their needs.

The major advantage of this module user can share the Block chain code to another person in case of necessity.

When user scan the QR Code an OTP will be send to the registered mobile for verification.

3.8 VERIFICATION

In this module user will upload the QR Codes like Products and so on.

Before upload, those QR Codes will verified by the corresponding sector ,if we upload school QR Code, the QR Code number will check with corresponds school database server if that QR Code is verified after that it will stored on server otherwise it will discard.

SYSTEM DESIGN

CHAPTER-4

SYSTEM DESIGN

4.1 UNIFIED MODELING LANGUAGE

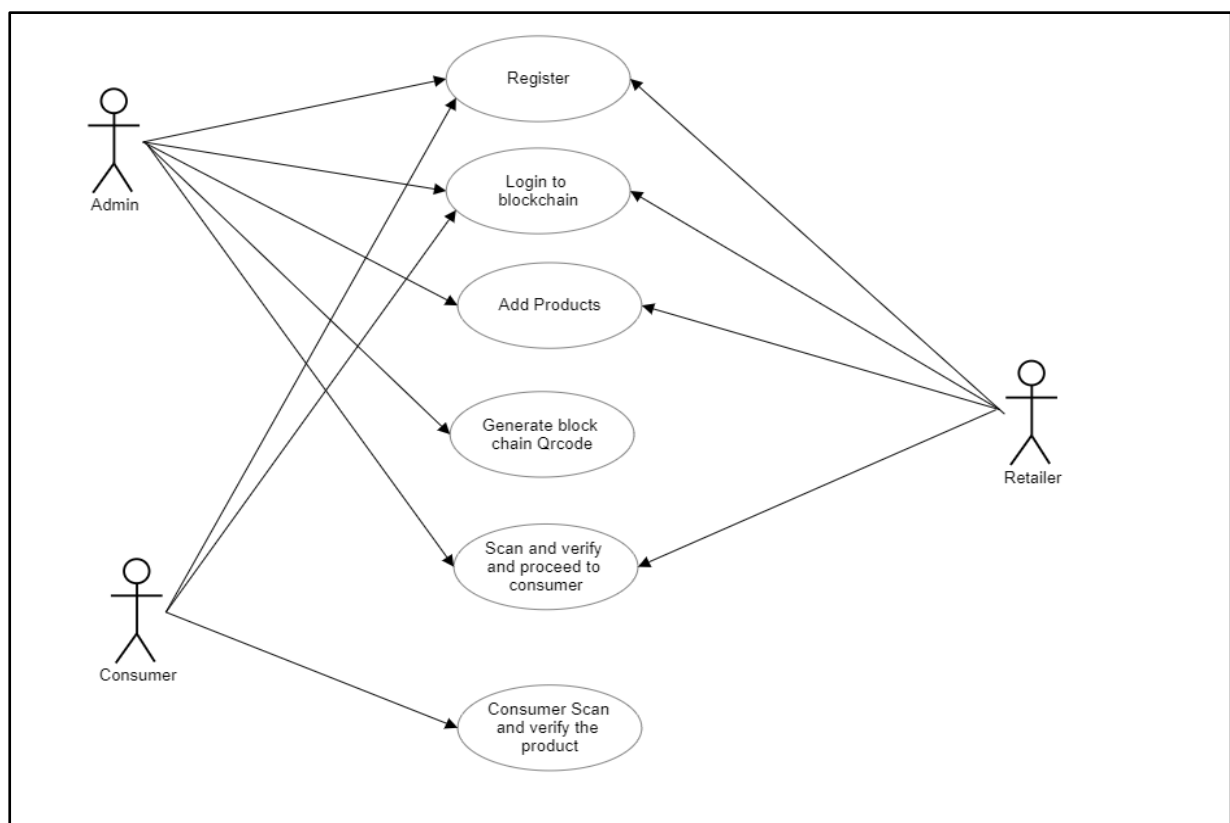
- UML stands for Unified Modelling Language.
- It is a third-generation method for specifying, visualizing and documenting the artifacts of an object-oriented system under development.
- Object modelling is the process by which the logical objects in the real world (problem space) are represented (mapped) by the actual objects in the program (logical or a mini world).
- This visual representation of the objects, their relationships and their structures is for the ease of understanding.
- This is a step while developing any product after analysis.
- The Unified Modelling Language encompasses a number of models.

1. Use case diagrams
2. Sequence diagrams
3. Class diagrams
4. Dataflow diagrams

4.2 USECASE DIAGRAM

Use case diagram consist of use cases and actors and shows the interaction between them. The key points are:

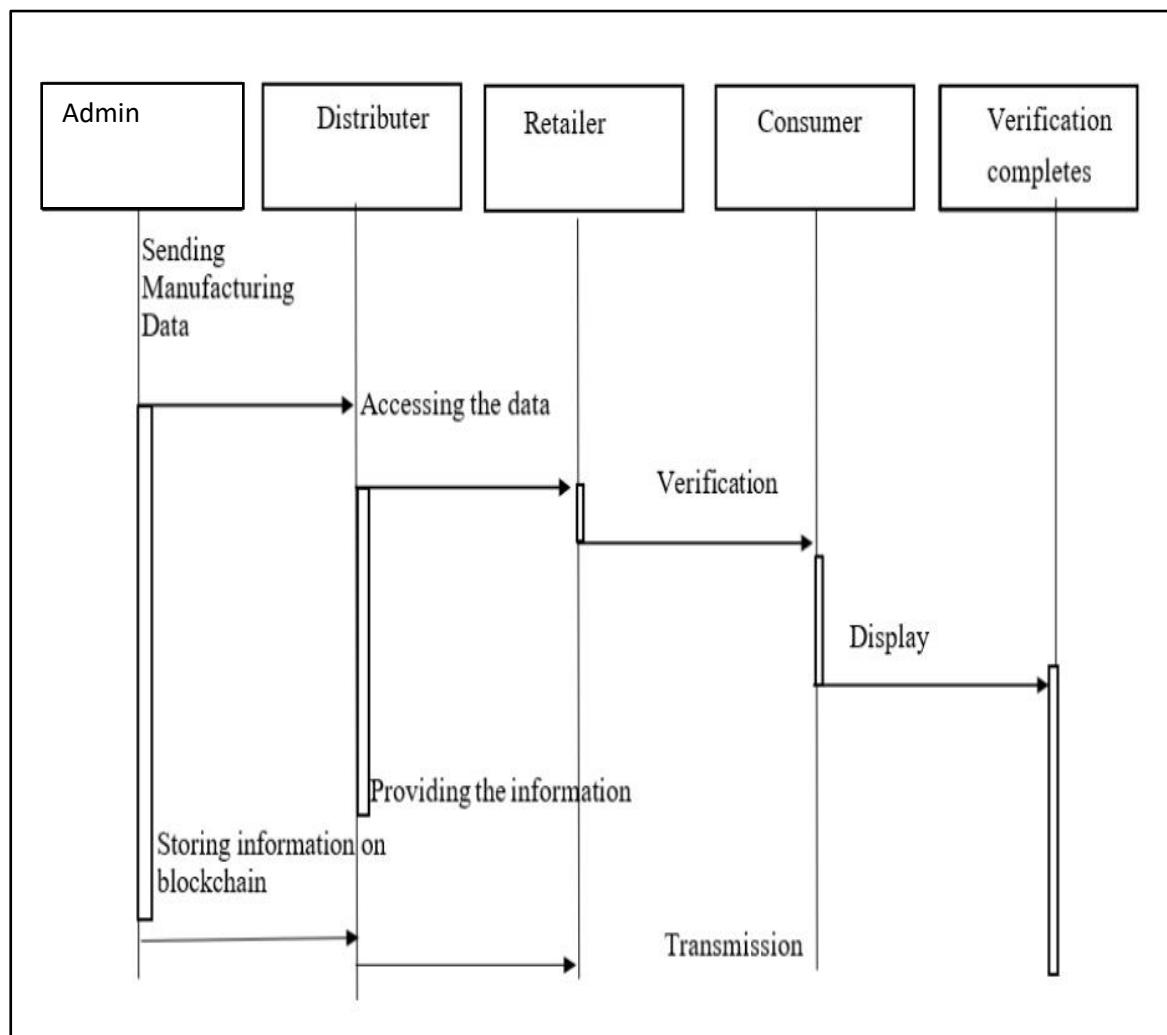
- The main purpose is to show the interaction between the use cases and the actor.
- To represent the system requirement from user's perspective.
- The use cases are the functions that are to be performed in the module.
- An actor could be the end-user of the system or an external system.



4.1 Figure

4.3 SEQUENCE DIAGRAM

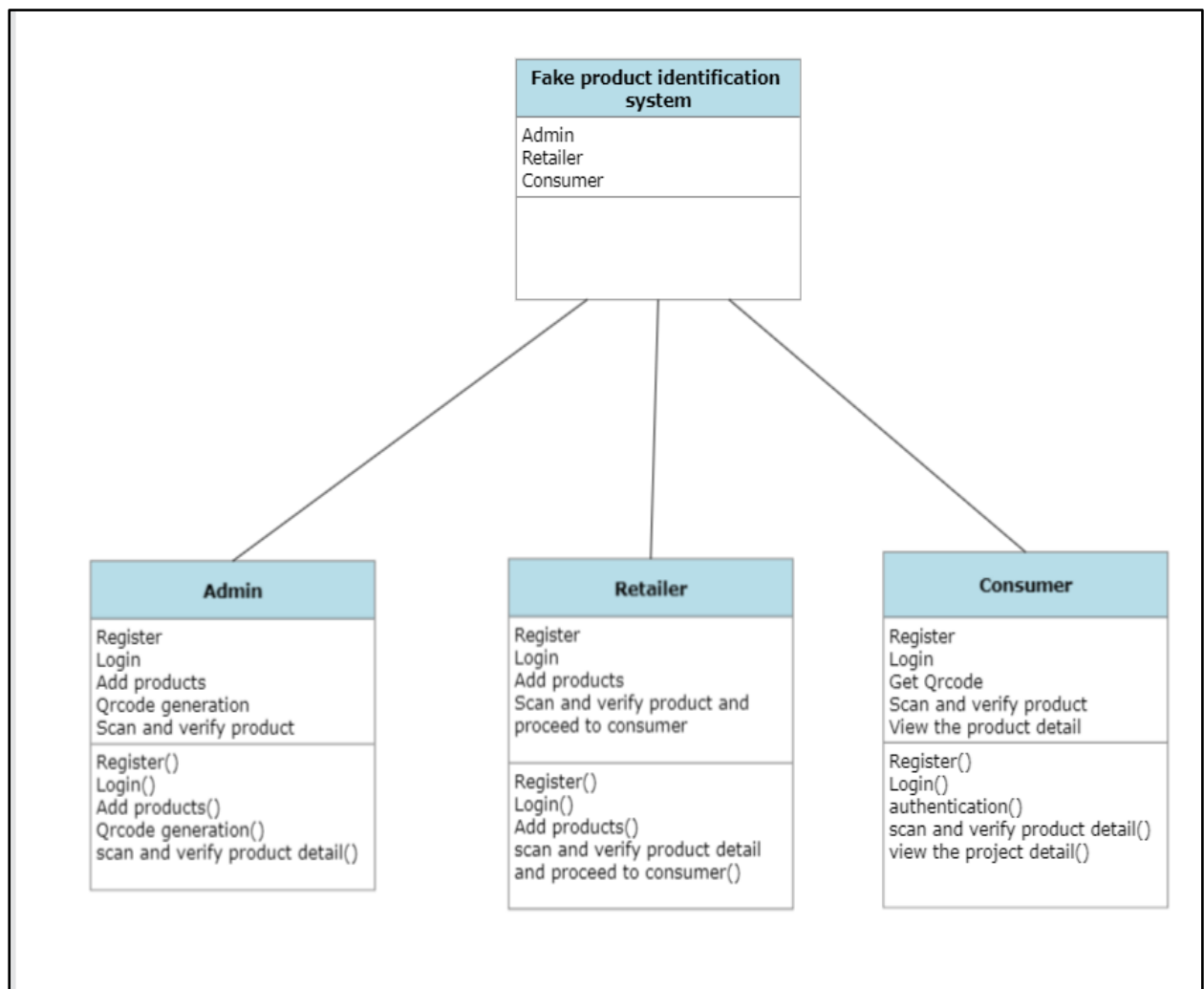
- The purpose of sequence diagram is to show the flow of the functionality through a use case.
- In other words, we call it a mapping process in terms of data transfers from the actor through the corresponding objects.



4.2 Figure

4.4 CLASS DIAGRAM

- A class diagram is an illustration of the relationships and source code dependencies among classes in the Unified Modelling Language (UML).
- In this context, a class defines the methods variables in an object, which is a specific entity in a program or the unit of code representing that entity.



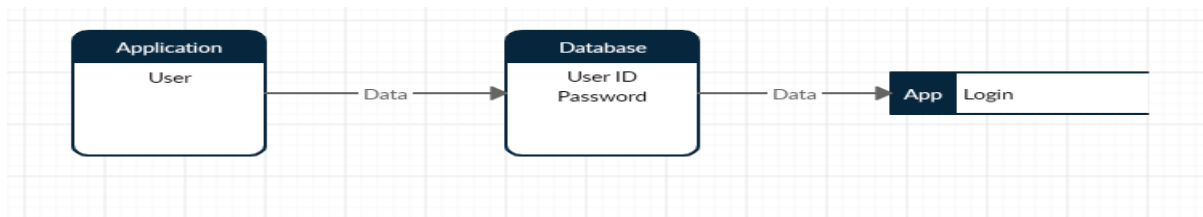
4.3 Figure

4.5 DATAFLOW DIAGRAM

A data flow diagram is a graphical tool used to describe and analyse the movement of data through a system. These are the central tool and the basis from which the other components are developed. The transformation of data from input to output, through processing, may be described logically and independently of physical components associated with the system. These are known as the logical data flow diagrams. The physical data flow diagrams show the actual implements and movement of data between people, departments and workstations. A full description of a system actually consists of a set of data flow diagrams. Using two familiar notations Yourdon, Gane and Samson notation develops the data flow diagrams. Each component in a DFD is labelled with a descriptive name. The Process is further identified with a number that will be used for identification purpose. The development of DFD'S is done on several levels.

LEVEL 1:

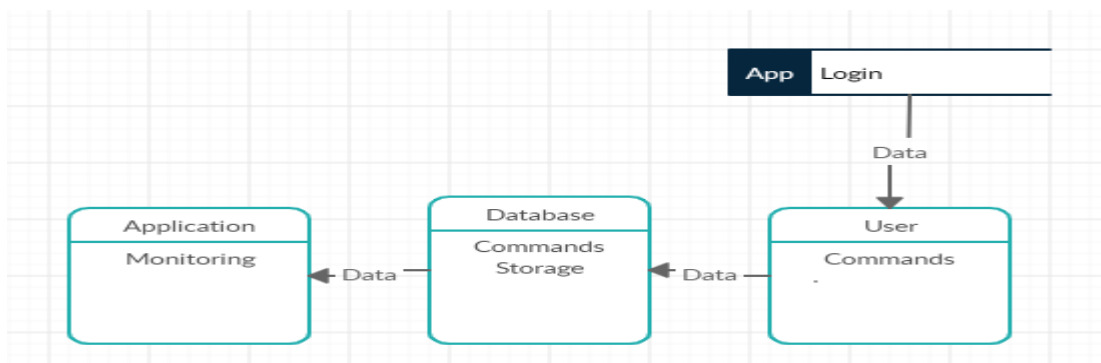
Login:



4.4 Figure

LEVEL 2:

User:



4.5 Figure

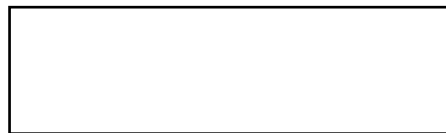
4.6 ER DIRAGRAM

An entity-relationship (ER) diagram is a specialized graphic that illustrates the interrelationships between entities in a database. ER diagrams often use symbols to represent three different types of information. Boxes are commonly used to represent entities. Diamonds are normally used to represent relationships and ovals are used to represent attributes

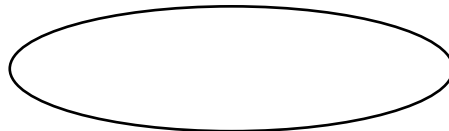
An entity-relationship model (ERM) in software engineering is an abstract and conceptual representation of data. Entity-relationship modelling is a relational schema database modelling method, used to produce a type of conceptual schema or semantic data model of a system, often a relational database, and its requirements in a top-down fashion.

Symbols used in this E-R Diagram:

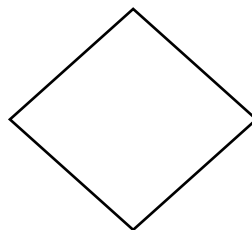
Entity: Entity is a “thing” in the real world with an independent existence. An entity may be an object with a physical existence such as person, car or employee. Entity symbol is as follows



Attribute: Attribute is a particular property that describes the entity. Attribute symbol is

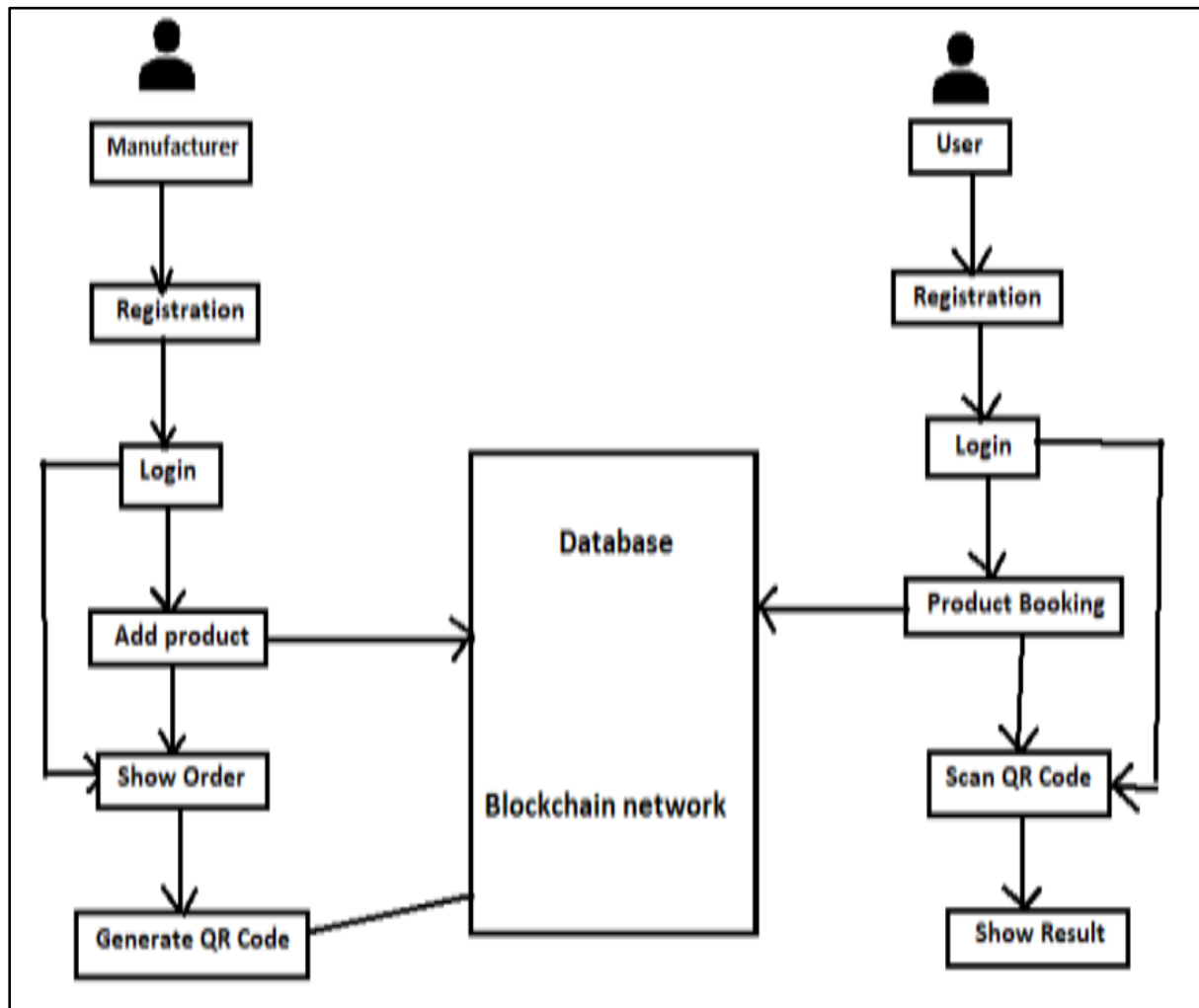


Relationship: Relationship will be several implicit relationships among various entity types whenever an attribute of one entity refers to another entity type some relationship exists. Relationship symbol is:



Key attributes: An entity type usually has an attribute whose values are distinct for each individual entity in the collection. Such an attribute is called key attribute.

4.7 SYSTEM ARCHITECTURE



4.6 Figure

SOFTWARE AND HARDWARE REQUIREMENTS

CHAPTER-5

SOFTWARE AND HARDWARE REQUIREMENTS

5.1 HARDWARE REQUIREMENTS

- Processor: Pentium-IV (or) Higher
- Ram:4GM (or) Higher
- Hard disk:500GB

5.2 SOFTWARE REQUIREMENTS

- Frontend -Anaconda (or) Sublime Text Editor
- Backend -SQL
- Language -Python
- Operating systems -Windows 8, 10 (32 -64 bit)

SOFTWARE SPECIFICATION

CHAPTER-6

SOFTWARE SPECIFICATION

6.1 PYTHON

Python is a widely used general-purpose, high level programming language. It was initially designed by Guido van Rossum in 1991 and developed by Python Software Foundation. It was mainly developed for emphasis on code readability, and its syntax allows programmers to express concepts in fewer lines of code.

Python is a programming language that lets you work quickly and integrate systems more efficiently.

Python is dynamically typed and garbage-collected. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library.

6.2 HTML

HTML (Hypertext Markup Language) is the set of markup symbols or codes inserted in a file intended for display on a World Wide Web browser page. The markup tells the Web browser how to display a Web page's words and images for the user. Each individual markup code is referred to as an element (but many people also refer to it as a tag). Some elements come in pairs that indicate when some display effect is to begin and when it is to end.

6.3 CASCADING STYLE SHEETS

Cascading Style Sheets (CSS) are a collection of rules we use to define and modify web pages. CSS are similar to styles in Word. CSS allow Web designers to have much more control over their pages look and layout. For instance, you could create a style that defines the body text to be Verdana, 10 points. Later on, you may easily change the body text to Times New Roman, 12 point by just changing the rule in the CSS. Instead of having to change the font on each page of your website, all you need to do is redefine the style on the style sheet, and it will instantly change on all of the pages that the style sheet has been applied to. With HTML styles, the font change would be applied to each instance of that font and have to be changed in each spot.

CSS can control the placement of text and objects on your pages as well as the look of those objects.

HTML information creates the objects (or gives objects meaning), but styles describe how the objects should appear. The HTML gives your page structure, while the CSS creates the "presentation". An external CSS is really just a text file with a .css extension. These files can be created with Dreamweaver, a CSS editor, or even Notepad.

The best practice is to design your web page on paper first so you know where you will want to use styles on your page. Then you can create the styles and apply them to your page.

6.4 JAVASCRIPT

JavaScript is a programming language commonly used in web development. It was originally developed by Netscape as a means to add dynamic and interactive elements to websites. While JavaScript is influenced by Java, the syntax is more similar to C and is based on ECMAScript, a scripting language developed by Sun Microsystems.

JavaScript is a client-side scripting language, which means the source code is processed by the client's web browser rather than on the web server. This means JavaScript functions can run after a webpage has loaded without COMMUNICATING with the server. For example, a JavaScript function may check a web form before it is submitted to make sure all the required fields have been filled out. The JavaScript code can produce an error message before any information is actually transmitted to the server.

Like server-side scripting languages, such as PHP and ASP, JavaScript code can be inserted anywhere within the HTML of a webpage. However, only the output of server-side code is displayed in the HTML, while JavaScript code remains fully visible in the source of the webpage. It can also be referenced in a separate .JS file, which may also be viewed in a browser.

6.5 DJANGO

Django is a web application framework written in Python programming language. It is based on MVT (Model View Template) design pattern. The Django is very demanding due to its rapid development feature. It takes less time to build application after collecting client requirement. This framework uses a famous tag line: The web framework for perfectionists with deadlines.

6.7 SQLITE

SQLite is an in-process library that implements a self-contained, serverless, zero-configuration, transactional SQL database engine. The code for SQLite is in the public domain and is thus free for use for any purpose, commercial or private. SQLite is the most widely deployed database in the world with more applications than we can count, including several high-profile projects.

SQLite is an embedded SQL database engine. Unlike most other SQL databases, SQLite does not have a separate server process. SQLite reads and writes directly to ordinary disk files. A complete SQL database with multiple tables, indices, triggers, and views, is contained in a single disk file. The database file format is cross-platform - you can freely copy a database between 32-bit and 64-bit systems or between big-endian and little-endian architectures. These features make SQLite a popular choice as an Application File Format. SQLite database files are a recommended storage format by the US Library of Congress. Think of SQLite not as a replacement for Oracle but as a replacement for fopen()

SOFTWARE TESTING

CHAPTER-7

SOFTWARE TESTING

7.1 GENERAL

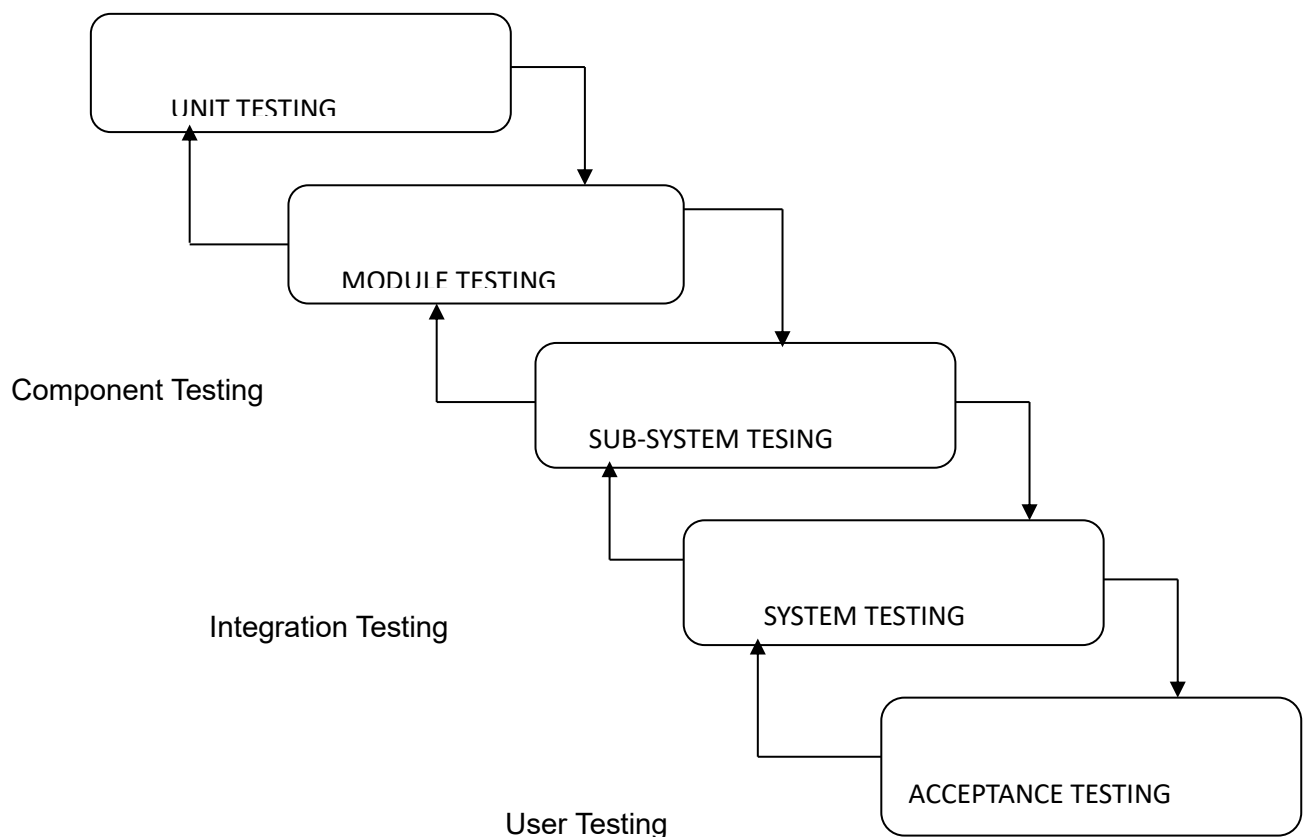
The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and or a finished product. It is the process of exercising software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

7.2 DEVELOPING METHODOLOGIES

The test process is initiated by developing a comprehensive plan to test the general functionality and special features on a variety of platform combinations. Strict quality control procedures are used.

The process verifies that the application meets the requirements specified in the system requirements document and is bug free. The following are the considerations used to develop the framework from developing the testing methodologies.

7.3 TYPES OF TESTING



7.3.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program Logic is functioning properly, and that program input produces 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.

7.3.2 FUNCTIONAL TESTING

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.

7.3.3 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.

7.3.4 PERFORMANCE TESTING

The Performance test ensures that the output be produced within the time limits, and the time taken by the system for compiling, giving response to the users and request being send to the system for to retrieve the results.

7.3.5 INTEGRATION TESTING

Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects.

The task of the integration test is to check that components or software applications, e.g. components in a software system or one step up-software applications at the company level-interact without error.

7.3.5 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

Acceptance testing for Data Synchronization:

- The Acknowledgements will be received by the Sender Node after the Packets are Received by the Destination Node.
- The Route add operation is done only when there is a Route request in need
- The Status of Nodes information is done automatically in the Cache Updating process

CODING

CHAPTER-8

CODING

8.1 LOGIN PAGE

Login.html

```
<!DOCTYPE html>

<html>

<head>

<title>Blockchain-Product-Verifier</title>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1">

<link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css"
integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm"
crossorigin="anonymous">

<link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">

<link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Raleway">

<style>

body,h1 {font-family: "Raleway", sans-serif}

body, html {height: 100%}

.bgimg {

background-image: url('https://www.ibm.com/blogs/blockchain/wp-
content/uploads/2019/12/Retina_Display-758591537.jpg');

height: 100%;

background-position: center;

background-size: cover;

}

.jumbo {

font-size: 6vw;

}

.pumbo {
```

```

    font-size: 1.5vw;
}
a:hover {
    color: white;
}
</style>
</head>
<body>
<div class="bgimg w3-display-container w3-animate-opacity w3-text-white">
    <div class="w3-display-topleft w3-padding-large w3-xlarge">
        Blockchain-Product-Verifier
    </div>
    <div class="w3-display-middle" align="center">
        {% for message in get_flashed_messages() %}
        <div class="alert alert-danger">
            <button type="button" class="close" data-dismiss="alert">&nbsp; &nbsp; &nbsp;
            &times;</button>
            {{ message }}
        </div>
        {% endfor %}
    <h1 align="center">Welcome to Blockchain Product Verifier</h1><br>
    <form method="POST" action="">
        <h3><input type="text" name="username" placeholder="username"></h3>
        <h3><input type="password" name="password" placeholder="password"></h3><br>
        <h3><button type="submit" class="btn btn-success">Login</button></h3><br>
    </form>
</div>
<div class="w3-display-bottomleft w3-padding-large">
    Powered by Blockchain
</div>

```

```

</div>

<script      src="https://code.jquery.com/jquery-3.2.1.slim.min.js"      integrity="sha384-
KJ3o2DKtIkVYIK3UENzmM7KCKRr/rE9/Qpg6aAZGJwFDMVNA/GpGFF93hXpG5KkN"
crossorigin="anonymous"></script>

<script      src="https://cdn.jsdelivr.net/npm/popper.js@1.12.9/dist/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>

<script      src="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/js/bootstrap.min.js"
integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5+76PVCmYI"
crossorigin="anonymous"></script>

</body>

</html>

```

8.2 ADMIN PAGE

Admin.html

```

<!DOCTYPE html>

<html>

<head>

<title>ADMIN - Product-Verifier</title>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1">

<link      rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css"
integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm"
crossorigin="anonymous">

<link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Raleway">

<link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">

<style>

body,h1 {font-family: "Raleway", sans-serif}

body, html {height: 100%}

.bgimg {

```

```

background-image: url('https://www.ibm.com/blogs/blockchain/wp-
content/uploads/2019/12/Retina_Display-758591537.jpg');
height: 100%;
background-position: center;
background-size: cover;
}
.jumbo {
font-size: 6vw;
}
.pumbo {
font-size: 1.5vw;
}
a:hover {
color: white;
}
</style>
</head>
<body>
<div class="bgimg w3-display-container w3-animate-opacity w3-text-white">
<div class="w3-display-topleft w3-padding-large w3-xlarge">
Blockchain-Product-Verifier
</div>
<div class="w3-display-middle" align="center">
<h1 align="center">Welcome to Blockchain Product Verifier</h1>
<h3><a href="http://127.0.0.1:5000/verifyNodes">Verify Blockchain</a></h3>
<!--<h3><a href="http://127.0.0.1:5000/medicine">Add Medicine</a></h3>
<h3><a href="http://127.0.0.1:5000/fertilizer">Add Fertilizer</a></h3>
<h3><a href="http://127.0.0.1:5000/wine">Add Wine</a></h3> -->
{% for message in get_flashed_messages() %}
{% if message == "All Nodes of Blockchain are valid" %}

```

```

    <div class="alert alert-success">

    {% else %}

    <div class="alert alert-danger">

    {% endif %}

    <button type="button" class="close" data-dismiss="alert">&times;</button>

    {{ message }}

</div>

{% endfor %}

</div>

<div class="w3-display-bottomleft w3-padding-large">

    Powered by Blockchain

</div>

</div>

<script      src="https://code.jquery.com/jquery-3.2.1.slim.min.js"      integrity="sha384-
KJ3o2DKtIkvYIK3UENzmM7KCKkRr/rE9/Qpg6aAZGJwFDMVNA/GpGFF93hXpG5KkN"
crossorigin="anonymous"></script>

<script      src="https://cdn.jsdelivr.net/npm/popper.js@1.12.9/dist/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>

<script      src="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/js/bootstrap.min.js"
integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5+76PVCmYI"
crossorigin="anonymous"></script>

</body>

</html>

```


8.3 HOME PAGE

Home.html

```
<!DOCTYPE html>

<html>

<head>

<title>Blockchain-Product-Verifier</title>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1">

<link rel="stylesheet"
href="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/css/bootstrap.min.css"
integrity="sha384-
Gn5384xqQ1aoWXA+058RXPxPg6fy4IWvTNh0E263XmFcJlSAwiGgFAW/dAiS6JXm"
crossorigin="anonymous">

<link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">

<link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Raleway">

<style>

body,h1 {font-family: "Raleway", sans-serif}

body, html {height: 100%}

.bgimg {

background-image: url('https://www.ibm.com/blogs/blockchain/wp-
content/uploads/2019/12/Retina_Display-758591537.jpg');

height: 100%;

background-position: center;

background-size: cover;

}

.jumbo {

font-size: 6vw;

}

.pumbo {

font-size: 1.5vw;

}
```

```

a:hover {
    color: white;
}
</style>
</head>
<body>
<div class="bgimg w3-display-container w3-animate-opacity w3-text-white">
    <div class="w3-display-topleft w3-padding-large w3-xlarge">
        Blockchain-Product-Verifier
    </div>
    <div class="w3-display-middle" align="center">
        {% for message in get_flashed_messages() %}
            <div class="alert alert-success">
                <button type="button" class="close" data-dismiss="alert">&nbsp; &nbsp; &nbsp;
                &times;</button>
                {{ message }}
            </div>
        {% endfor %}
        <h1 align="center">Welcome to Blockchain Product Verifier</h1>
        <h3><a href="http://127.0.0.1:5000/shoes">Add Shoes</a></h3>
        <h3><a href="http://127.0.0.1:5000/medicine">Add Medicine</a></h3>
        <h3><a href="http://127.0.0.1:5000/fertilizer">Add Fertilizer</a></h3>
        <h3><a href="http://127.0.0.1:5000/mobile">Add Mobile</a></h3>
        <h3><a href="logout">Logout</a></h3>
    </div>
    <div class="w3-display-bottomleft w3-padding-large">
        Powered by Blockchain
    </div>
</div>

```

```

<script      src="https://code.jquery.com/jquery-3.2.1.slim.min.js"      integrity="sha384-
KJ3o2DKtIkVYIK3UENzmM7KChRr/rE9/Qpg6aAZGJwFDMVNA/GpGFF93hXpG5KkN"
crossorigin="anonymous"></script>

<script      src="https://cdn.jsdelivr.net/npm/popper.js@1.12.9/dist/umd/popper.min.js"
integrity="sha384-
ApNbgh9B+Y1QKtv3Rn7W3mgPxhU9K/ScQsAP7hUibX39j7fakFPskvXusvfa0b4Q"
crossorigin="anonymous"></script>

<script      src="https://cdn.jsdelivr.net/npm/bootstrap@4.0.0/dist/js/bootstrap.min.js"
integrity="sha384-
JZR6Spejh4U02d8jOt6vLEHfe/JQGiRRSQQxSfFWpi1MquVdAyjUar5+76PVCmYl"
crossorigin="anonymous"></script>

</body>

</html>

```

8.4 MEDICINE PRODUCT PAGE

Medicinepage.html

```

<!DOCTYPE html>

<html lang="en" >

  <head>

    <meta charset="UTF-8">

    <title>Blockchain-Product-Verifier Registration Form </title>

    <link rel="stylesheet" href="{{ url_for('static', filename='MedicinePage.css')}} ">

  </head>

  <body class="bgimg">

    <h3 style="color:white;">MEDICAL PRODUCTS REGISTRATION FORM</h3>

    <table align="center" cellpadding = "10">

      <form method="POST" action="http://127.0.0.1:5000/addproduct">

        <tr>

          <td> BRAND </td>

          <td>

            <input type="text" name="brand" maxlength="30"/>

            (max 30 characters a-z and A-Z)

```

```

</td>
</tr>
<tr>
  <td> NAME </td>
  <td>
    <input type="text" name="name" maxlength="30"/>
    (max 30 characters a-z and A-Z)
  </td>
</tr>
<tr>
  <td> BATCH </td>
  <td>
    <input type="text" name="batch" maxlength="30"/>
    (max 30 numbers and characters)
  </td>
</tr>
<tr>
  <td> ID </td>
  <td>
    <input type="text" name="id" maxlength="30"/>
    (max 30 numbers and characters)
  </td>
</tr>
<tr>
  <td> MANUFACTURING DATE </td>
  <td>
    <input type="date" name="manfdate" />
  </td>
</tr>

```

```

<tr>
  <td> EXPIRY DATE </td>
  <td>
    <input type="date" name="expirydate" />
  </td>
</tr>
<tr>
  <td> PRICE </td>
  <td>
    <input type="text" name="price" maxlength="10" />
    (Must be in $ or ₹)
  </td>
</tr>
<tr>
  <td> SIZE </td>
  <td>
    <input type="number" name="size" />
  </td>
</tr>
<tr>
  <td> TYPE </td>
  <td>
    <input type="text" name="type" maxlength="30"/>
  </td>
</tr>
<tr>
  <td>
    <input type="submit" name="submit">
  </td>
</tr>

```

```
</form>
</table>
</body>
</html>
<!-- partial -->
</body>
</html>
```

Medicine page.css

```
h3{
  font-family: Calibri;
  font-size: 25pt;
  font-style: normal;
  font-weight: bold;
  color:rgb(0, 0, 0);
  text-align: center;
  text-decoration: underline
}
```

```
table{
  font-family: Calibri;
  color:white;
  font-size: 11pt;
  font-style: normal;
  font-weight: bold;
  text-align:;
  background-color: rgb(169, 214, 63);
  border-collapse: collapse;
  border: 2px solid navy
}
```

```
table.inner{
```

```

border: 0px
}
body,h1 {font-family: "Raleway", sans-serif; font-size: 14;}
body, html {height: 100%}
.bgimg {
background-image: url('https://img.freepik.com/free-vector/pharmaceutical-medicine-
healthcare-template-vector-presentation_53876-117796.jpg');
height: 100%;
background-position: center;
background-size: cover;
}
.jumbo {
font-size: 6vw;
}
.pumbo {
font-size: 1.5vw;
}

```

Loginpage.css

```

body {font-family: Arial, Helvetica, sans-serif;}
/* Full-width input fields */
input[type=text], input[type=password] {
width: 100%;
padding: 12px 20px;
margin: 8px 0;
display: inline-block;
border: 1px solid #ccc;
box-sizing: border-box;
}
/* Set a style for all buttons */
button {

```

```

background-color: #04AA6D;
color: white;
padding: 14px 20px;
margin: 8px 0;
border: none;
cursor: pointer;
width: 100%;
}
/* Center the image and position the close button */
.imgcontainer {
    text-align: center;
    margin: 24px 0 12px 0;
    position: relative;
}
img.avatar {
    width: 40%;
    border-radius: 50%;
}
.container {
    padding: 16px;
}
span.psw {
    float: right;
    padding-top: 16px;
}/* Modal Content/Box */
.modal-content {/*background-color: #fefefe;*/
    margin: 15% auto 30% auto; /* 5% from the top, 15% from the bottom and centered */
    border: 1px solid #888;
    width: 80%; /* Could be more or less, depending on screen size */
}

```


8.5 SHOES PRODUCT PAGE

Shoespage.html

```
<!DOCTYPE html>

<html lang="en" >

  <head>

    <meta charset="UTF-8">

    <title>Blockchain-Product-Verifier Registration Form </title>

    <link rel="stylesheet" href="{{ url_for('static', filename='Shoespage.css')}} ">

  </head>

  <body class="bgimg">

    <h3 style="color:white;">SHOES REGISTRATION FORM</h3>

    <table align="center" cellpadding = "10">

      <form method="POST" action="http://127.0.0.1:5000/addproduct">

        <tr>

          <td> BRAND </td>

          <td>

            <input type="text" name="brand" maxlength="30"/>

            (max 30 characters a-z and A-Z)

          </td>

        </tr>

        <tr>

          <td> NAME </td>

          <td>

            <input type="text" name="name" maxlength="30"/>

            (max 30 characters a-z and A-Z)

          </td>

        </tr>

        <tr>

          <td> BATCH </td>

          <td>
```

```

        <input type="text" name="batch" maxlength="30"/>
        (max 30 numbers and characters)
    </td>
</tr>
<tr>
    <td> ID </td>
    <td>
        <input type="text" name="id" maxlength="30"/>
        (max 30 numbers and characters)
    </td>
</tr>
<tr>
    <td> MANUFACTURING DATE </td>
    <td>
        <input type="date" name="manfdate" />
    </td>
</tr>
<tr hidden="">
    <td> EXPIRY DATE </td>
    <td>
        <input type="date" name="expydate" value="" />
    </td>
</tr>
<tr>
    <td> PRICE </td>
    <td>
        <input type="text" name="price" maxlength="10" />
        (Must be in $ or ₹)
    </td>
</tr>

```

```

<tr>
  <td> SIZE </td>
  <td>
    <input type="number" name="size" />
  </td>
</tr>
<tr>
  <td> TYPE </td>
  <td>
    <input type="text" name="type" maxlength="30"/>
  </td>
</tr>
<tr>
  <td>
    <input type="submit" name="submit">
  </td>
</tr>
</form>
</table>
</body>
</html>
<!-- partial -->
</body>
</html>

```

Shoespage.css

```

h3 {
  font-family: Calibri;
  font-size: 25pt;
  font-style: normal;
  font-weight: bold;

```

```

color:rgb(0, 0, 0);
text-align: center;
text-decoration: underline
}
table{
font-family: Calibri; color:white; font-size: 11pt; font-style: normal;
font-weight: bold;
text-align:;
background-color: rgb(35, 87, 218);
border-collapse: collapse;
border: 2px solid navy
}
table.inner{
border: 0px
}
body,h1 {font-family: "Raleway", sans-serif; font-size: 14;}
body, html {height: 100%}
.bgimg {
background-image: url('https://www.ibm.com/blogs/blockchain/wp-content/uploads/2019/12/Retina_Display-758591537.jpg');
height: 100%;
background-position: center;
background-size: cover;
}
.jumbo {
font-size: 6vw;
}
.pumbo {
font-size: 1.5vw;
}

```

8.6 MOBILE PRODUCT PAGE

Mobilepage.html

```
<!DOCTYPE html>

<html lang="en" >

  <head>

    <meta charset="UTF-8">

    <title>Blockchain-Product-Verifier Registration Form </title>

    <link rel="stylesheet" href="{{ url_for('static', filename='WinePage.css')}} ">

  </head>

  <body class="bgimg">

    <h3 style="color:white;">IMPORTED MOBILES REGISTRATION FORM</h3>

    <table align="center" cellpadding = "10">

      <form method="POST" action="http://127.0.0.1:5000/addproduct">

        <tr>

          <td> BRAND </td>

          <td>

            <input type="text" name="brand" maxlength="30"/>

            (max 30 characters a-z and A-Z)

          </td>

        </tr>

        <tr>

          <td> NAME </td>

          <td>

            <input type="text" name="name" maxlength="30"/>

            (max 30 characters a-z and A-Z)

          </td>

        </tr>

        <tr>

          <td> BATCH </td>

          <td>
```

```

        <input type="text" name="batch" maxlength="30"/>
        (max 30 numbers and characters)
    </td>
</tr>
<tr>
    <td> ID </td>
    <td>
        <input type="text" name="id" maxlength="30"/>
        (max 30 numbers and characters)
    </td>
</tr>
<tr>
    <td> MANUFACTURING DATE </td>
    <td>
        <input type="date" name="manfdate" />
    </td>
</tr>
<tr hidden="">
    <td> EXPIRY DATE </td>
    <td>
        <input type="date" name="expydate" value="" />
    </td>
</tr>
<tr>
    <td> PRICE </td>
    <td>
        <input type="text" name="price" maxlength="10" />
        (Must be in $ or ₹)
    </td>
</tr>

```

```

<tr>
  <td> SIZE </td>
  <td>
    <input type="number" name="size" />
  </td>
</tr>
<tr>
  <td> TYPE </td>
  <td>
    <input type="text" name="type" maxlength="30"/>
  </td>
</tr>
<tr>
  <td>
    <input type="submit" name="submit">
  </td>
</tr>
</form>
</table>
</body>
</html>
<!-- partial -->
</body>
</html>

```

Mobilepage.css

```

h3 {
  font-family: Calibri;
  font-size: 25pt;
  font-style: normal;
  font-weight: bold;

```

```

color:rgb(0, 0, 0);
text-align: center;
text-decoration: underline
}
table{
font-family: Calibri; color:white; font-size: 11pt; font-style: normal;
font-weight: bold;
text-align:;
background-color: rgb(56, 10, 10);
border-collapse: collapse;
border: 2px solid navy
}
table.inner{
border: 0px
}
body,h1 {font-family: "Raleway", sans-serif; font-size: 14;}
body, html {height: 100%}
.bgimg {
background-image: url('https://www.businessofapps.com/wp-content/uploads/2020/05/adcolony_supply_demand_source_cover.png');
height: 100%;
background-position: center;
background-size: cover;
}
.jumbo {
font-size: 6vw;
}
.pumbo {
font-size: 1.5vw;
}

```


8.7 FERTILIZER PRODUCT PAGE

Fertilizerpage.html

```
<!DOCTYPE html>

<html lang="en" >

  <head>

    <meta charset="UTF-8">

    <title>Blockchain-Product-Verifier Registration Form </title>

    <link rel="stylesheet" href="{{ url_for('static', filename='FertilizersPage.css')}} ">

  </head>

  <body class="bgimg">

    <h3 style="color:white;">AGRICULTURAL PRODUCTS REGISTRATION FORM</h3>

    <table align="center" cellpadding = "10">

      <form method="POST" action="http://127.0.0.1:5000/addproduct">

        <tr>

          <td> BRAND </td>

          <td>

            <input type="text" name="brand" maxlength="30"/>

            (max 30 characters a-z and A-Z)

          </td>

        </tr>

        <tr>

          <td> NAME </td>

          <td>

            <input type="text" name="name" maxlength="30"/>

            (max 30 characters a-z and A-Z)

          </td>

        </tr>

        <tr>

          <td> BATCH </td>

          <td>
```

```

        <input type="text" name="batch" maxlength="30"/>
        (max 30 numbers and characters)
    </td>
</tr>
<tr>
    <td> ID </td>
    <td>
        <input type="text" name="id" maxlength="30"/>
        (max 30 numbers and characters)
    </td>
</tr>
<tr>
    <td> MANUFACTURING DATE </td>
    <td>
        <input type="date" name="manfdate" />
    </td>
</tr>
<tr>
    <td> EXPIRY DATE </td>
    <td>
        <input type="date" name="expydate" />
    </td>
</tr>
<tr>
    <td> PRICE </td>
    <td>
        <input type="text" name="price" maxlength="10" />
        (Must be in $ or ₹)
    </td>
</tr>

```

```

<tr>
  <td> Weight </td>
  <td>
    <input type="number" name="size" />
  </td>
</tr>
<tr>
  <td> TYPE </td>
  <td>
    <input type="text" name="type" maxlength="30"/>
  </td>
</tr>
<tr>
  <td>
    <input type="submit" name="submit">
  </td>
</tr>
</form>
</table>
</body>
</html>
<!-- partial -->
</body>
</html>

```

Fertilizerpage.css

```

h3 {
  font-family: Calibri;
  font-size: 25pt;
  font-style: normal;
  font-weight: bold;

```

```

    color:rgba(0, 0, 0, 0.863);
    text-align: center;
    text-decoration: underline
}
table{
    font-family: Calibri; color:white; font-size: 11pt; font-style: normal;
    font-weight: bold;text-align:;
    background-color: rgb(53, 168, 65, 0.863);
    border-collapse: collapse;
    border: 2px solid navy
}
table.inner{
    border: 0px
}
body,h1 {font-family: "Raleway", sans-serif; font-size: 14;}
body, html {height: 100%}
.bgimg {
    background-image: url('https://media.istockphoto.com/id/959697442/photo/farmer-giving-
granulated-fertilizer-to-young-tomato-
plants.jpg?s=612x612&w=0&k=20&c=4sewLXboXwTJY9kAXcyjw0GAwN33XzEGVjln59
7d_aE=');
    height: 100%;
    background-position: center;
    background-size: cover;
}
.jumbo {
    font-size: 6vw;
}
.pumbo {
    font-size: 1.5vw;
}

```

8.8 VERIFICATION PAGES

Verify.html

```
<!DOCTYPE html>

<html>

<head>

<title>MAVTAG</title>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1">

<link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">

<link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Raleway">

<style>

body,h1 {font-family: "Raleway", sans-serif}

body, html {height: 100%}

.bgimg {

    background-image:                url('https://www.ibm.com/blogs/blockchain/wp-

content/uploads/2019/12/Retina_Display-758591537.jpg');

    height: 100%;

    background-position: center;

    background-size: cover;

}

.jumbo {

    font-size: 6vw;

}

.pumbo {

    font-size: 1.5vw;

}

</style>

</head>

<body>
```

```

<div class="bgimg w3-display-container w3-animate-opacity w3-text-white">
  <div class="w3-display-topleft w3-padding-large w3-xlarge">
    Blockchain-Product-Verifier
  </div>
  <div class="w3-display-middle">
    <!-- <form method="POST" action="http://localhost:8080/"> -->
    <form method="POST" action="http://127.0.0.1:5000/verify">
      <p class="jumbo w3-animate-top"><input type="text" name="keyId"
value={{keyId}}></p>
      <hr class="w3-border-grey" style="margin:auto;width:40%">
      <p class="pumbo w3-center"><button type="submit">Verify</button></p>
    </form>
  </div>
  <div class="w3-display-bottomleft w3-padding-large">
    Powered by Blockchain
  </div>
</div>
</body>
</html>

```

Product.html

```

<!DOCTYPE html>
<html lang="en" >
<head>
  <meta charset="UTF-8">
  <title>Blockchain-Product-Verifier Registration Form</title>
  <link rel="stylesheet" href="./FertilizersPage.css">
</head>
<body class="bgimg">
<h3 style="color:white;">{{type}}</h3>

```

```

<table align="center" cellpadding = "10">
<!-- First Name ----->
<tr>
<td> BRAND NAME </td>
<td><input type="text" name="First_Name" maxlength="30"/>
(max 30 characters a-z and A-Z)
</td>
</tr>
<!-- Last Name ----->
<tr>
<td>BATCH ID</td>
<td><input type="text" name="Last_Name" maxlength="30"/>
(max 30 numbers and characters)
</td>
</tr>
<!-- Date Of Birth ----->
<tr>
<td>MANUFACTURING DATE</td>
<td>
<select name="manufacturing_date" id="manufacturing_date">
<option value="-1">Day:</option>
<option value="1">1</option>
<option value="2">2</option>
<option value="3">3</option>
<option value="4">4</option>
<option value="5">5</option>
<option value="6">6</option>
<option value="7">7</option>
<option value="8">8</option>
<option value="9">9</option>

```

```
<option value="10">10</option>
<option value="11">11</option>
<option value="12">12</option>
<option value="13">13</option>
<option value="14">14</option>
<option value="15">15</option>
<option value="16">16</option>
<option value="17">17</option>
<option value="18">18</option>
<option value="19">19</option>
<option value="20">20</option>
<option value="21">21</option>
<option value="22">22</option>
<option value="23">23</option>
<option value="24">24</option>
<option value="25">25</option>
<option value="26">26</option>
<option value="27">27</option>
<option value="28">28</option>
<option value="29">29</option>
<option value="30">30</option>
<option value="31">31</option>
</select>

<select id="Manufacturing_Month" name="Manufacturing_Month">
<option value="-1">Month:</option>
<option value="January">Jan</option>
<option value="February">Feb</option>
<option value="March">Mar</option>
<option value="April">Apr</option>
<option value="May">May</option>
```



```

<option value="June">Jun</option>
<option value="July">Jul</option>
<option value="August">Aug</option>
<option value="September">Sep</option>
<option value="October">Oct</option>
<option value="November">Nov</option>
<option value="December">Dec</option>
</select>

<select name="Manufacturing_Year" id="Manufacturing_Year">
<option value="-1">Year:</option>
<option value="2012">2022</option>
<option value="2011">2021</option>
<option value="2010">2020</option>
<option value="2009">2019</option>
<option value="2008">2018</option>
<option value="2007">2017</option>
<option value="2006">2016</option>
<option value="2005">2015</option>
<option value="2004">2014</option>
<option value="2003">2013</option>
<option value="2002">2012</option>
<option value="2001">2011</option>
<option value="2000">2010</option>
</select>

</td>

</tr>

<tr>

<td>EXPIRY DATE</td>

<td>

<select name="manufacturing_date" id="manufacturing_date">

```

<option value="-1">Day:</option>
<option value="1">1</option>
<option value="2">2</option>
<option value="3">3</option>
<option value="4">4</option>
<option value="5">5</option>
<option value="6">6</option>
<option value="7">7</option>
<option value="8">8</option>
<option value="9">9</option>
<option value="10">10</option>
<option value="11">11</option>
<option value="12">12</option>
<option value="13">13</option>
<option value="14">14</option>
<option value="15">15</option>
<option value="16">16</option>
<option value="17">17</option>
<option value="18">18</option>
<option value="19">19</option>
<option value="20">20</option>
<option value="21">21</option>
<option value="22">22</option>
<option value="23">23</option>
<option value="24">24</option>
<option value="25">25</option>
<option value="26">26</option>
<option value="27">27</option>
<option value="28">28</option>
<option value="29">29</option>

```

<option value="30">30</option>
<option value="31">31</option>
</select>
<select id="Manufacturing_Month" name="Manufacturing_Month">
<option value="-1">Month:</option>
<option value="January">Jan</option>
<option value="February">Feb</option>
<option value="March">Mar</option>
<option value="April">Apr</option>
<option value="May">May</option>
<option value="June">Jun</option>
<option value="July">Jul</option>
<option value="August">Aug</option>
<option value="September">Sep</option>
<option value="October">Oct</option>
<option value="November">Nov</option>
<option value="December">Dec</option>
</select>
<select name="Manufacturing_Year" id="Manufacturing_Year">
<option value="-1">Year:</option>
<option value="2012">2025</option>
<option value="2011">2024</option>
<option value="2010">2023</option>
<option value="2009">2022</option>
<option value="2008">2021</option>
<option value="2007">2020</option>
<option value="2006">2019</option>
<option value="2005">2018</option>
<option value="2004">2017</option>
<option value="2003">2016</option>

```

```

<option value="2002">2015</option>
<option value="2001">2014</option>
<option value="2000">2013</option>
</select>
</td>
</tr>
<tr>
<td>PRODUCT ID</td>
<td><input type="text" name="Last_Name" maxlength="30"/>
(max 30 numbers and characters)
</td>
</tr>
<!-- Price of Product ----->
<tr>
<td>PRICE </td>
<td>
<input type="" name="Mobile_Number" maxlength="10" />
(Must be in $ or ₹)
</td>
</tr>
<!-- Country ----->
<tr>
<td>COUNTRY</td>
<td><input type="text" name="Country" value="India" readonly="readonly" /></td>
</tr> </form>
</body>
</html>
<!-- partial -->
</body>
</html>

```

Success.html

```
<!DOCTYPE html>

<html lang="en" >

  <head>

    <meta charset="UTF-8">

    <title>Blockchain-Product-Verifier Registration Form </title>

    <link rel="stylesheet" href="{{ url_for('static', filename='Shoespage.css')}}">

  </head>

  <body class="bgimg">

    <h3 style="color:#04AA6D;"><u>PRODUCT IS AUTHENTIC</u></h3>

    <table align="center" cellpadding = "10">

      <tr>

        <td> BRAND </td>

        <td>

          <b> {{brand}} </b>

        </td>

      </tr>

      <tr>

        <td> NAME </td>

        <td>

          <b> {{name}} </b>

        </td>

      </tr>

      <tr>

        <td> BATCH </td>

        <td>

          <b> {{batch}} </b>

        </td>

      </tr>

    </table>
```

```

<tr>
  <td> ID </td>
  <td>
    <b> {{id}} </b>
  </td>
</tr>
<tr>
  <td> MANUFACTURING DATE </td>
  <td>
    <b> {{manfdate}} </b>
  </td>
</tr>
<tr>
  <td> PRICE </td>
  <td>
    <b> ₹ {{price}} </b>
  </td>
</tr>
<tr>
  <td> SIZE </td>
  <td>
    <b> {{size}} </b>
  </td>
</tr>
<tr>
  <td> TYPE </td>
  <td>
    <b> {{type}} </b>
  </td>
</tr>

```

```

</table>
</body>
</html>
<!-- partial -->
</body>
</html>

```

Fruad.html

```

<!DOCTYPE html>
<html>
<head>
<title>Blockchain-Product-Verifier</title>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="stylesheet" href="https://www.w3schools.com/w3css/4/w3.css">
<link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Raleway">
<style>
body,h1 {font-family: "Raleway", sans-serif}
body, html {height: 100%}
.bgimg {
  background-image: url('https://www.ibm.com/blogs/blockchain/wp-
content/uploads/2019/12/Retina_Display-758591537.jpg');
  height: 100%;
  background-position: center;
  background-size: cover;
}
.jumbo {
  font-size: 6vw;
}
</style>
</head>

```

```

<body>
<div class="bgimg w3-display-container w3-animate-opacity w3-text-white">
  <div class="w3-display-topleft w3-padding-large w3-xlarge">
    Blockchain-Product-Verifier
  </div>
  <div class="w3-display-middle">
    <p class="jumbo w3-animate-top error">Verification Failed</p>
  </div>
  <div class="w3-display-bottomleft w3-padding-large">
    Powered by Blockchain
  </div>
</div>
</body>
</html>

```

Added.html

```

<!DOCTYPE html>
<html lang="en" >

  <head>
    <meta charset="UTF-8">
    <title>Product-Verifier Registration Form </title>
    <link rel="stylesheet" href="{{ url_for('static', filename='Shoespage.css')}}">
  </head>

  <body class="bgimg">
    <h3 style="color:#04AA6D;"><u>Product added successfully to the Blockchain</u></h3>

  </body>
</html>

```


8.9 SERVER CODE

Index.py

```
import sys
import json
import random
import qrcode
import hashlib
import datetime

# from config import mycol

# VERIFICATION_URL = "http://localhost:8080/?id="
VERIFICATION_URL = "http://127.0.0.1:5000/verify/"

class Login:
    MANF = ""
    LOGGEDIN = False
    MANUFACTURERS = {
        "DRREDDY": "password123",
        "LUPIN": "hello123",
        "KOTLIN": "qwerty",
        "ADMIN": "qwerty"
    }

    def main(self):
        loginid = input("Enter your login id:\t")
        password = input("Enter your password:\t")

        if loginid in self.MANUFACTURERS.keys():
            if self.MANUFACTURERS[loginid] == password:
                self.LOGGEDIN = True
                self.MANF = loginid

    def isLoggedIn(self):
        if self.LOGGEDIN:
```

```

        print("\nWelcome to the blockchain world\n")
    else:
        sys.exit("Please login to experience the blockchain world")

    def getManf(self):
        return self.MANF

class BlockChain:
    def __init__(self):
        self.product_brand = ""
        self.product_name = ""
        self.product_batch = ""
        self.manuf_date = ""
        self.expiry_date = ""
        self.product_id = ""
        self.product_price = ""
        self.product_size = ""
        self.product_type = ""

    def actions(self):
        choice = input("Enter 1 to ADD item or 2 to Verify BlockChain\n")
        if choice == "1":
            self.product_brand = input("Enter product brand:\n")
            self.product_name = input("Enter product name:\n")
            self.product_batch = input("Enter product batch:\n")
            self.manuf_date = input("Enter product manif date:\n")
            self.expiry_date = input("Enter product expiry date:\n")
            self.product_id = input("Enter product id:\n")
            self.product_price = input("Enter product price:\n")
            self.product_size = input("Enter product size:\n")
            self.product_type = input("Enter product type:\n")
            self.newProduct()
        elif choice == "2":

```

```

        if self.isBlockchainValid():
            sys.exit("BlockChain is valid")
        else:
            sys.exit("BlockChain is invalid")
    else:
        sys.exit("Logged out successfully")
def newProduct(self):
    data = {
        "Manufacturer": self.product_brand,
        "ProductName": self.product_name,
        "ProductBatch": self.product_batch,
        "ProductManufacturedDate": self.manuf_date,
        "ProductExpiryDate": self.expiry_date,
        "ProductId": self.product_id,
        "ProductPrice": self.product_price,
        "ProductSize": self.product_size,
        "ProductType": self.product_type,
    }
    proHash = hashlib.sha256(str(data).encode()).hexdigest()
    print(proHash)
    data["hash"] = proHash
    # x = mycol.insert_one(data)
    self.createBlock(data)
    imgName = self.imgNameFormatting()
    self.createQR(proHash, imgName)
def addProduct(
    self,
    product_brand,
    product_name,
    product_batch,

```

```

        manuf_date,
        expiry_date,
        product_id,
        product_price,
        product_size,
        product_type
    ):

        self.product_name = product_name
        data = {
            "Manufacturer": product_brand,
            "ProductName": product_name,
            "ProductBatch": product_batch,
            "ProductManufacturedDate": manuf_date,
            "ProductExpiryDate": expiry_date,
            "ProductId": product_id,
            "ProductPrice": product_price,
            "ProductSize": product_size,
            "ProductType": product_type,
        }
        proHash = hashlib.sha256(str(data).encode()).hexdigest()
        print(proHash)
        data["hash"] = proHash
        # x = mycol.insert_one(data)
        self.createBlock(data)
        imgName = self.imgNameFormatting()
        self.createQR(proHash, imgName)

    def createBlock(self, data):
        if self.isBlockchainValid():
            blocks = []
            for block in open('./NODES/N1/blockchain.json', 'r'):

```

```

        blocks.append(block)

    print(blocks[-1], "jsdata=====")

    preBlock = json.loads(blocks[-1])

    index = preBlock["index"] + 1

    preHash = hashlib.sha256(str(preBlock).encode()).hexdigest()

transaction = {
    'index': index,
    'proof': random.randint(1, 1000),
    'previous_hash': preHash,
    # 'hash': proHash,
    'timestamp': str(datetime.datetime.now()),
    'data': str(data),
}

with open("./NODES/N1/blockchain.json", "a") as file:
    file.write("\n" + json.dumps(transaction))

with open("./NODES/N2/blockchain.json", "a") as file:
    file.write("\n" + json.dumps(transaction))

with open("./NODES/N3/blockchain.json", "a") as file:
    file.write("\n" + json.dumps(transaction))

with open("./NODES/N4/blockchain.json", "a") as file:
    file.write("\n" + json.dumps(transaction))

# currHash = hashlib.sha256(str(transaction).encode()).hexdigest()

# imgName = self.imgNameFormatting()

# self.createQR(currHash, imgName)

return

def createQR(self, hashc, imgName):
    img = qrcode.make(VERIFICATION_URL + hashc)
    img.save("./QRcodes/" + imgName)

    # sys.exit("Product added successfully")

    return

```

```

def imgNameFormatting(self):
    dt = str(datetime.datetime.now())
    dt = dt.replace(" ", "_").replace("-", "_").replace(":", "_")
    return self.product_name + "_" + dt + ".png"

def isBlockchainValid(self):
    with open("./NODES/N1/blockchain.json", "r") as file:
        n1_hash = hashlib.sha256(str(file.read()).encode()).hexdigest()
        print(n1_hash)
    with open("./NODES/N2/blockchain.json", "r") as file:
        n2_hash = hashlib.sha256(str(file.read()).encode()).hexdigest()
        print(n2_hash)
    with open("./NODES/N3/blockchain.json", "r") as file:
        n3_hash = hashlib.sha256(str(file.read()).encode()).hexdigest()
        print(n3_hash)
    with open("./NODES/N4/blockchain.json", "r") as file:
        n4_hash = hashlib.sha256(str(file.read()).encode()).hexdigest()
        print(n4_hash)
    if n1_hash == n2_hash == n3_hash == n4_hash:
        return True
    else:
        return False

if __name__ == "__main__":
    lof = Login()
    lof.main()
    lof.isLoggedIn()
    LOGGEDINUSER = lof.getManf()
    bc = Blockchain()
    bc.actions()

```

main.py

```
from flask import Flask, render_template, request, redirect, url_for, session, flash
from index import BlockChain
import json

app = Flask(__name__)
app.secret_key = "alkdjfalkdjf"

@app.route("/")
def home():
    if session.get("user"):
        return render_template('home.html')
    else:
        flash("Please login to access Verifier")
        return redirect(url_for('login'))

@app.route("/login", methods=["POST", "GET"])
def login():
    if request.method == "POST":
        user = request.form["username"]
        pswd = request.form["password"]

        if user == "Admin":
            if pswd == "password":
                session["user"] = "Admin"
                return redirect(url_for("admin"))
        elif user == "Nike":
            if pswd == "password":
                session["user"] = "Nike"
                return redirect(url_for("shoes"))
        elif user == "Musigny":
            if pswd == "password":
                session["user"] = "Musigny"
```

```

        return redirect(url_for("mobile"))
    elif user == "Lupin":
        if pswd == "password":
            session["user"] = "Lupin"
            return redirect(url_for("medicine"))
    elif user == "Kisan":
        if pswd == "password":
            session["user"] = "Kisan"
            return redirect(url_for("fertilizer"))
    else:
        flash("Invalid Login details")
        return redirect(url_for('login'))
else:
    return render_template('login.html')
@app.route("/verify/<kid>", methods=["GET"])
def verify(kid):
    return render_template('verify.html', keyId=kid)
@app.route("/verify", methods=["POST"])
def success():
    post_data = request.form["keyId"]
    with open('./NODES/N1/blockchain.json', 'r') as bfile:
        n1_data = str(bfile.read())
    with open('./NODES/N2/blockchain.json', 'r') as bfile:
        n2_data = str(bfile.read())
    with open('./NODES/N3/blockchain.json', 'r') as bfile:
        n3_data = str(bfile.read())
    with open('./NODES/N4/blockchain.json', 'r') as bfile:
        n4_data = str(bfile.read())
    pd = str(post_data)
    if (pd in n1_data) and (pd in n2_data) and (pd in n3_data) and (pd in n4_data):

```



```

with open('./NODES/N1/blockchain.json', 'r') as bfile:
    for x in bfile:
        if pd in x:
            a = json.loads(x)["data"]
            b = a.replace("'", "\"")
            data = json.loads(b)
            product_brand = data["Manufacturer"]
            product_name = data["ProductName"]
            product_batch = data["ProductBatch"]
            manuf_date = data["ProductManufacturedDate"]
            expiry_date = data["ProductExpiryDate"]
            product_id = data["ProductId"]
            product_price = data["ProductPrice"]
            product_size = data["ProductSize"]
            product_type = data["ProductType"]

            return render_template('success.html', brand=product_brand,
name=product_name, batch=product_batch, manfdate=manuf_date, expydate=expiry_date,
id=product_id, price=product_price, size=product_size, type=product_type)
        else:
            return render_template('fraud.html')

@app.route("/addproduct", methods=["POST", "GET"])
def addproduct():
    if request.method == "POST":
        brand = request.form["brand"]
        name = request.form["name"]
        batch = request.form["batch"]
        pid = request.form["id"]
        manfdate = request.form["manfdate"]
        expydate = request.form["expydate"]
        price = request.form["price"]
        size = request.form["size"]

```

```

        ptype = request.form["type"]
        print(brand, name, batch, manfdate, expydate, pid, price, size, ptype)
        bc = Blockchain()
        bc.addProduct(brand, name, batch, manfdate, expydate, pid, price, size, ptype)
        flash("Product added successfully to the Blockchain")
        # return render_template('home.html')
        return redirect(url_for('home'))
    else:
        # return render_template('home.html')
        return redirect(url_for('home'))

@app.route("/admin")
def admin():
    if session["user"] == "Admin":
        return render_template('admin.html')
    else:
        return redirect(url_for('login'))

@app.route("/verifyNodes")
def verifyNodes():
    bc = Blockchain()
    isBV = bc.isBlockchainValid()
    if isBV:
        flash("All Nodes of Blockchain are valid")
        return redirect(url_for('admin'))
    else:
        flash("Blockchain Nodes are not valid")
        return redirect(url_for('admin'))

@app.route("/medicine")
def medicine():
    return render_template('MedicinePage.html')

```

```

@app.route("/fertilizer")
def fertilizer():
    return render_template('FertilizersPage.html')

@app.route("/shoes")
def shoes():
    return render_template('ShoesPage.html')

@app.route("/mobile")
def mobile():
    return render_template('WinePage.html')

@app.route("/logout")
def logout():
    session["user"] = ""
    return redirect(url_for('login'))

if __name__ == "__main__":
    app.run(debug=True)
    session["user"] = ""

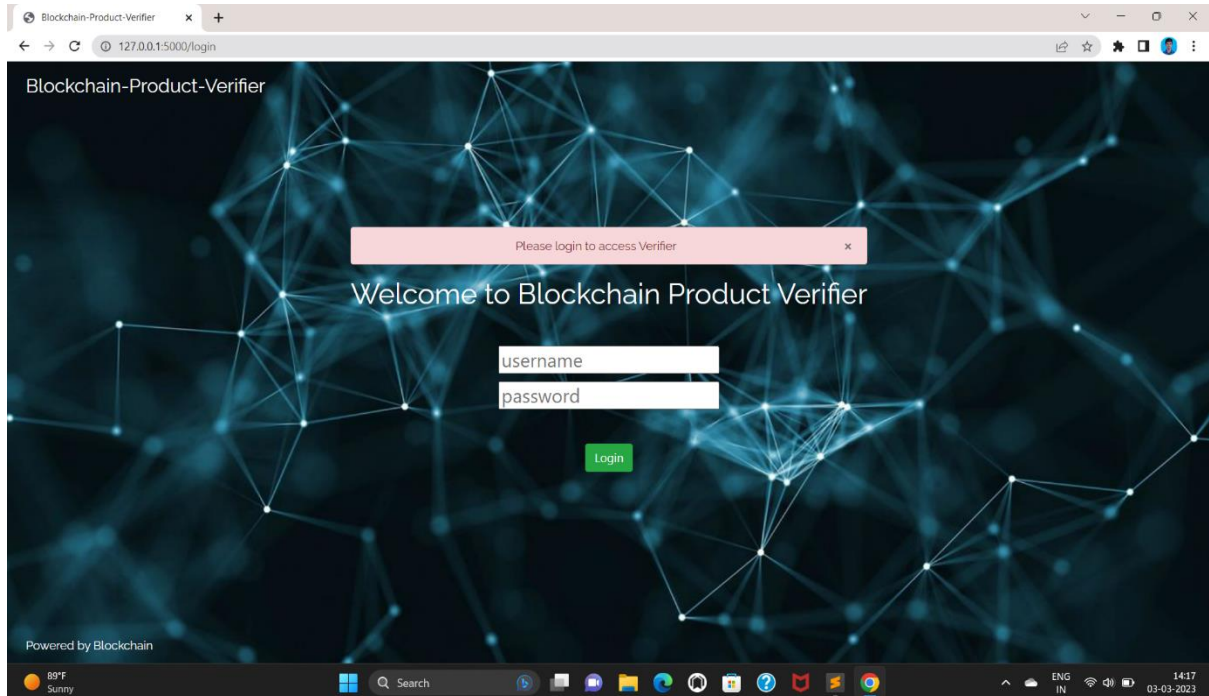
```

SCREEN SHOTS

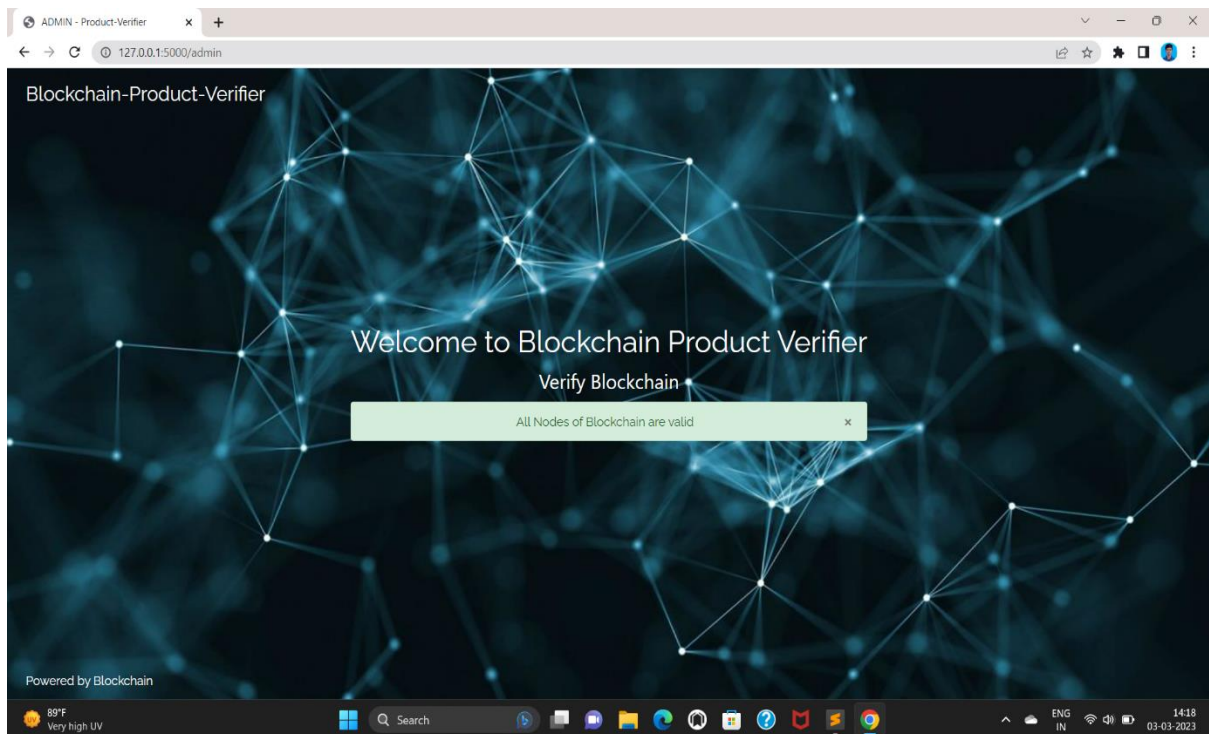
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SCREEN SCHOTS

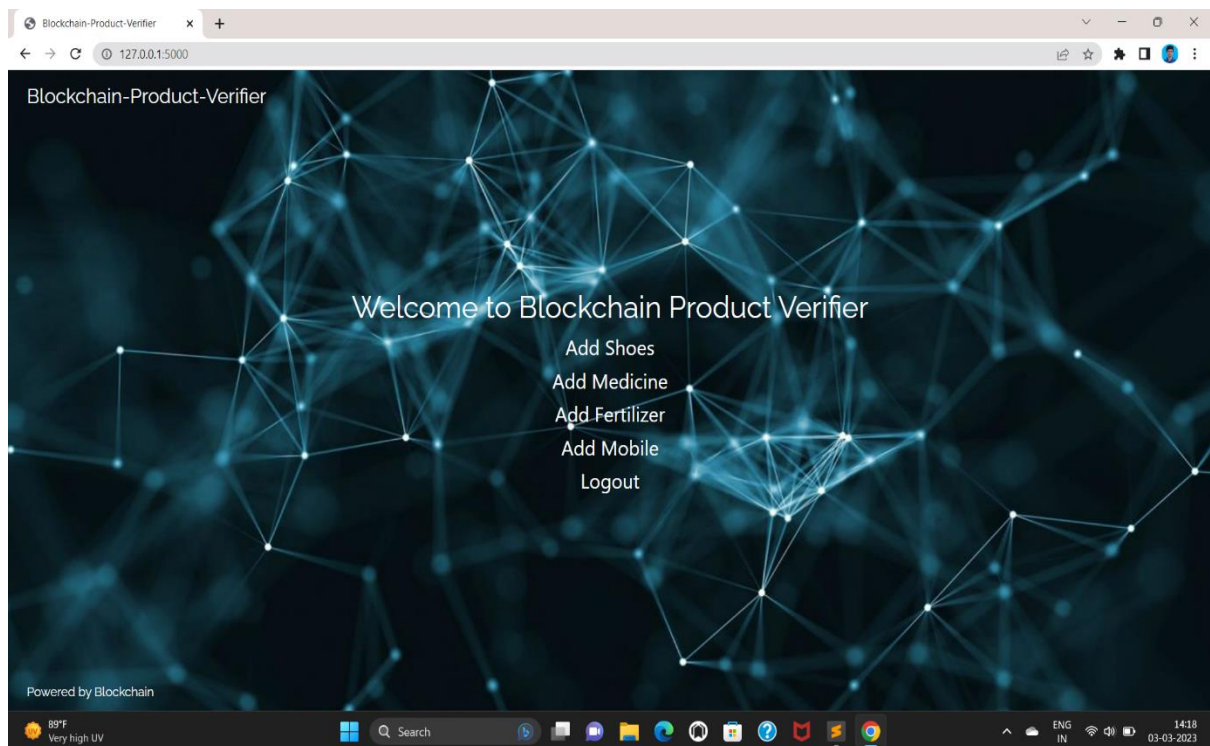
LOGIN PAGE:



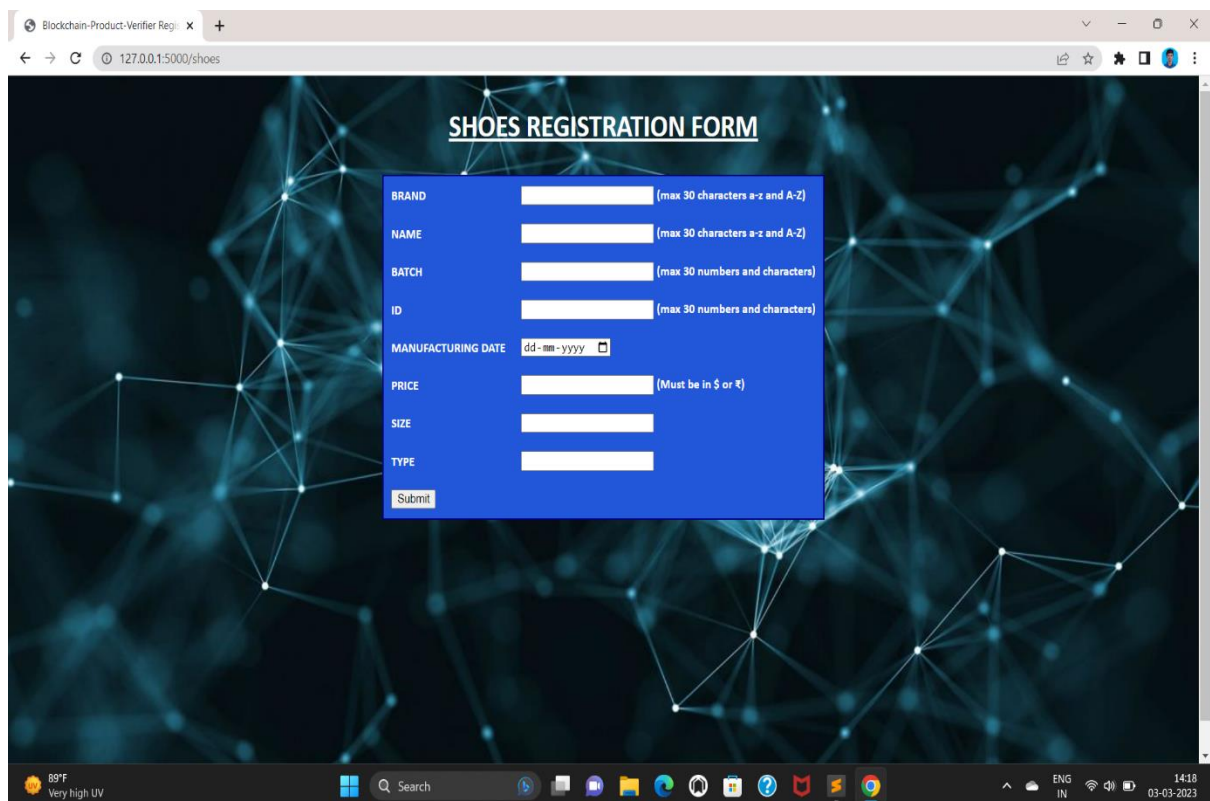
ADMIN PAGE:



PRODUCT ADD PAGE:



SHOES PRODUCT PAGE:



MEDICINE PRODUCT PAGE:

The screenshot shows a web browser window with the address bar displaying "Blockchain-Product-Verifier Regi" and "127.0.0.1:5000/medicine". The page features a light blue background with a molecular structure and pills. The title "MEDICAL PRODUCTS REGISTRATION FORM" is centered at the top. Below it is a green registration form with the following fields: BRAND (max 30 characters a-z and A-Z), NAME (max 30 characters a-z and A-Z), BATCH (max 30 numbers and characters), ID (max 30 numbers and characters), MANUFACTURING DATE (dd-mm-yyyy), EXPIRY DATE (dd-mm-yyyy), PRICE (Must be in \$ or ₹), SIZE, and TYPE. A "Submit" button is at the bottom of the form. The page also includes the text "PHARMACEUTICAL MEDICINE" and "Medical research and development". The Windows taskbar at the bottom shows the date as 03-03-2023 and the time as 14:18.

MEDICAL PRODUCTS REGISTRATION FORM

BRAND (max 30 characters a-z and A-Z)

NAME (max 30 characters a-z and A-Z)

BATCH (max 30 numbers and characters)

ID (max 30 numbers and characters)

MANUFACTURING DATE dd-mm-yyyy

EXPIRY DATE dd-mm-yyyy

PRICE (Must be in \$ or ₹)

SIZE

TYPE

PHARMACEUTICAL MEDICINE

Medical research and development

MOBILE PRODUCT PAGE:

The screenshot shows a web browser window with the address bar displaying "Blockchain-Product-Verifier Regi" and "127.0.0.1:5000/mobile". The page features a dark blue background with a smartphone and various data visualizations like bar charts and pie charts. The title "IMPORTED MOBILES REGISTRATION FORM" is centered at the top. Below it is a dark red registration form with the following fields: BRAND (max 30 characters a-z and A-Z), NAME (max 30 characters a-z and A-Z), BATCH (max 30 numbers and characters), ID (max 30 numbers and characters), MANUFACTURING DATE (dd-mm-yyyy), PRICE (Must be in \$ or ₹), SIZE, and TYPE. A "Submit" button is at the bottom of the form. The Windows taskbar at the bottom shows the date as 03-03-2023 and the time as 14:19.

IMPORTED MOBILES REGISTRATION FORM

BRAND (max 30 characters a-z and A-Z)

NAME (max 30 characters a-z and A-Z)

BATCH (max 30 numbers and characters)

ID (max 30 numbers and characters)

MANUFACTURING DATE dd-mm-yyyy

PRICE (Must be in \$ or ₹)

SIZE

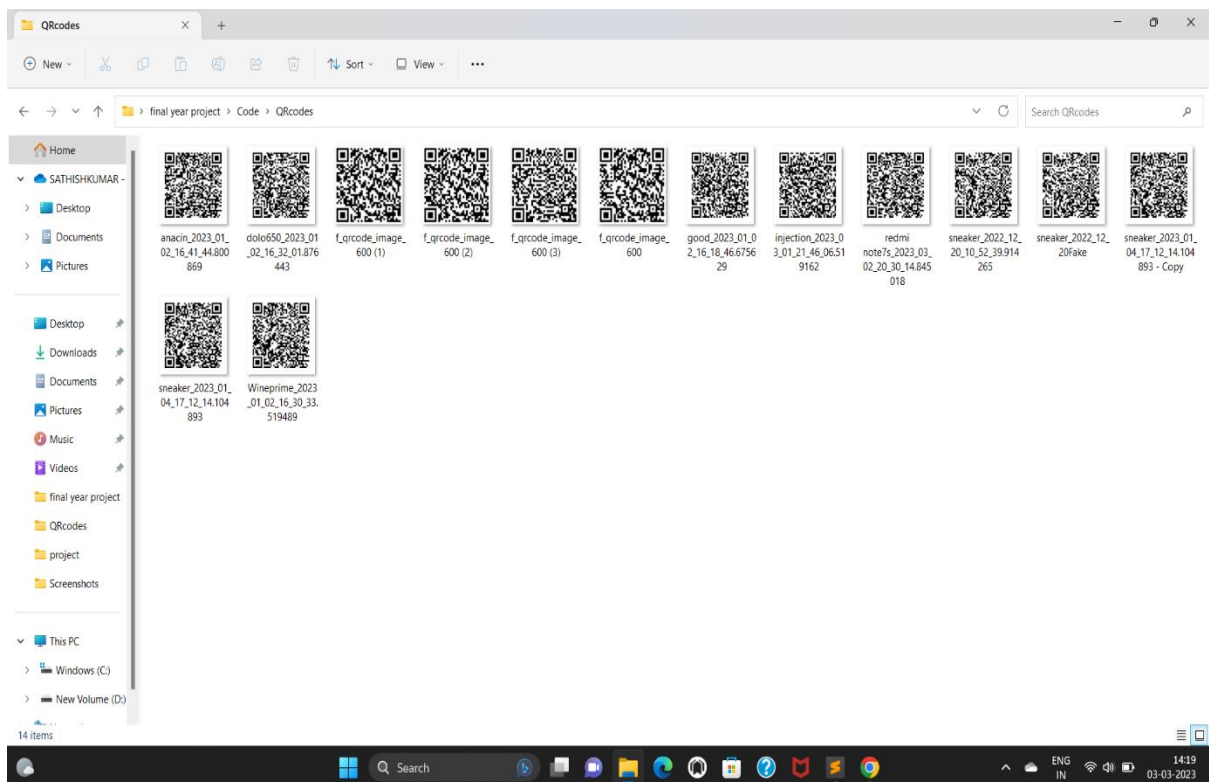
TYPE

FERTILIZER PAGE:

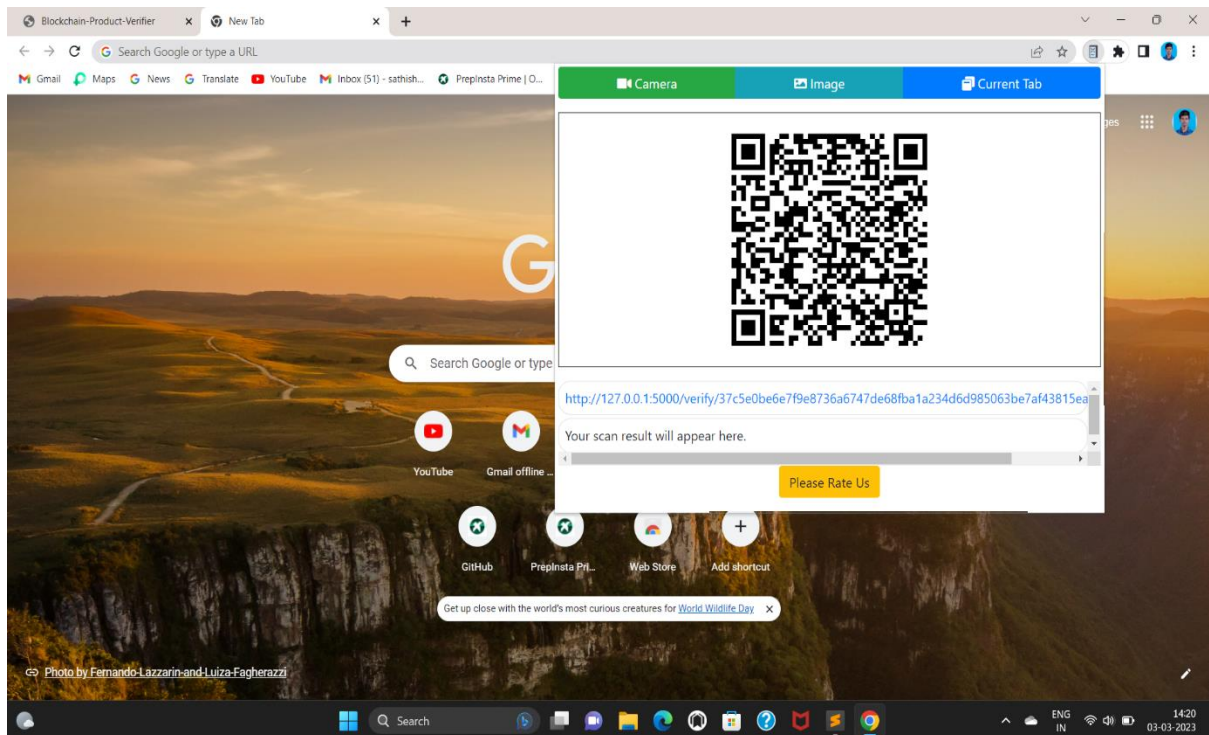
AGRICULTURAL PRODUCTS REGISTRATION FORM

BRAND	<input type="text"/>	(max 30 characters a-z and A-Z)
NAME	<input type="text"/>	(max 30 characters a-z and A-Z)
BATCH	<input type="text"/>	(max 30 numbers and characters)
ID	<input type="text"/>	(max 30 numbers and characters)
MANUFACTURING DATE	<input type="text" value="dd-mm-yyyy"/>	
EXPIRY DATE	<input type="text" value="dd-mm-yyyy"/>	
PRICE	<input type="text"/>	(Must be in \$ or ₹)
Weight	<input type="text"/>	
TYPE	<input type="text"/>	
<input type="button" value="Submit"/>		

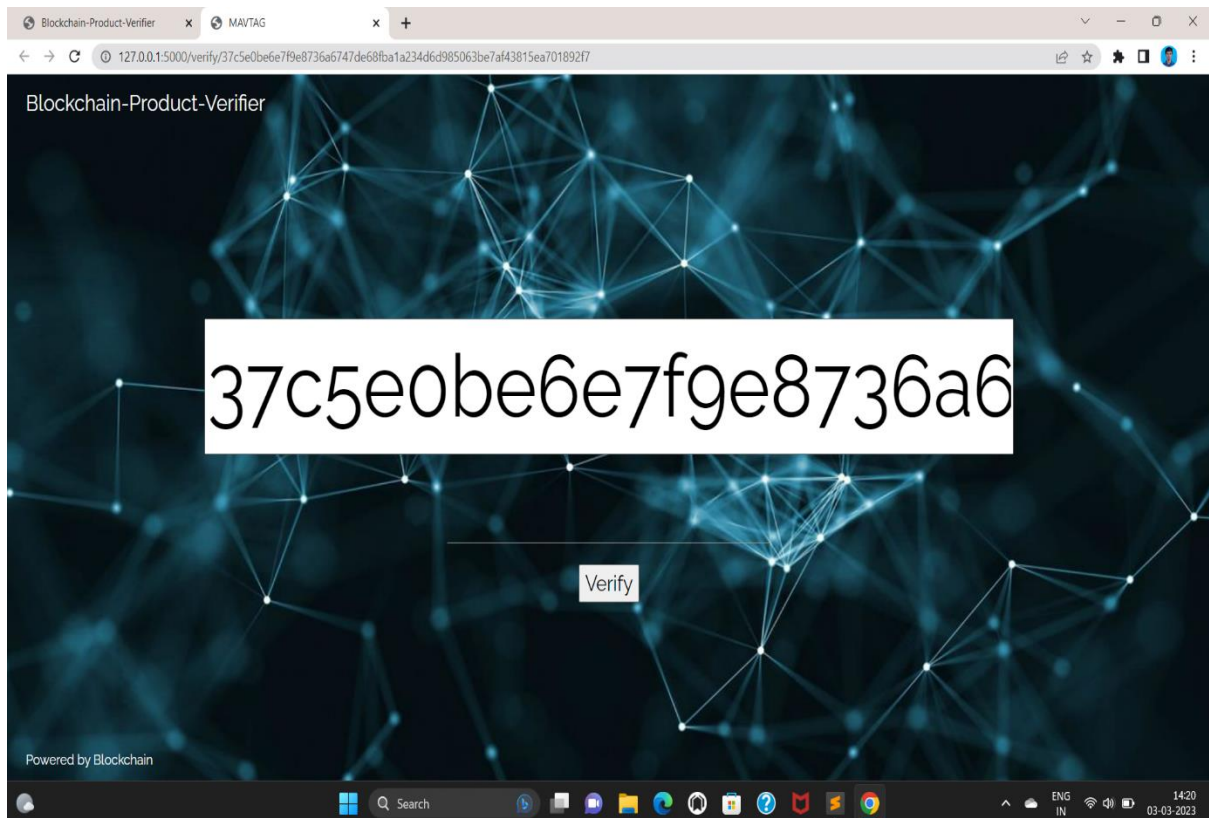
PRODUCT QR CODE GENERATED AND STORED PAGE:



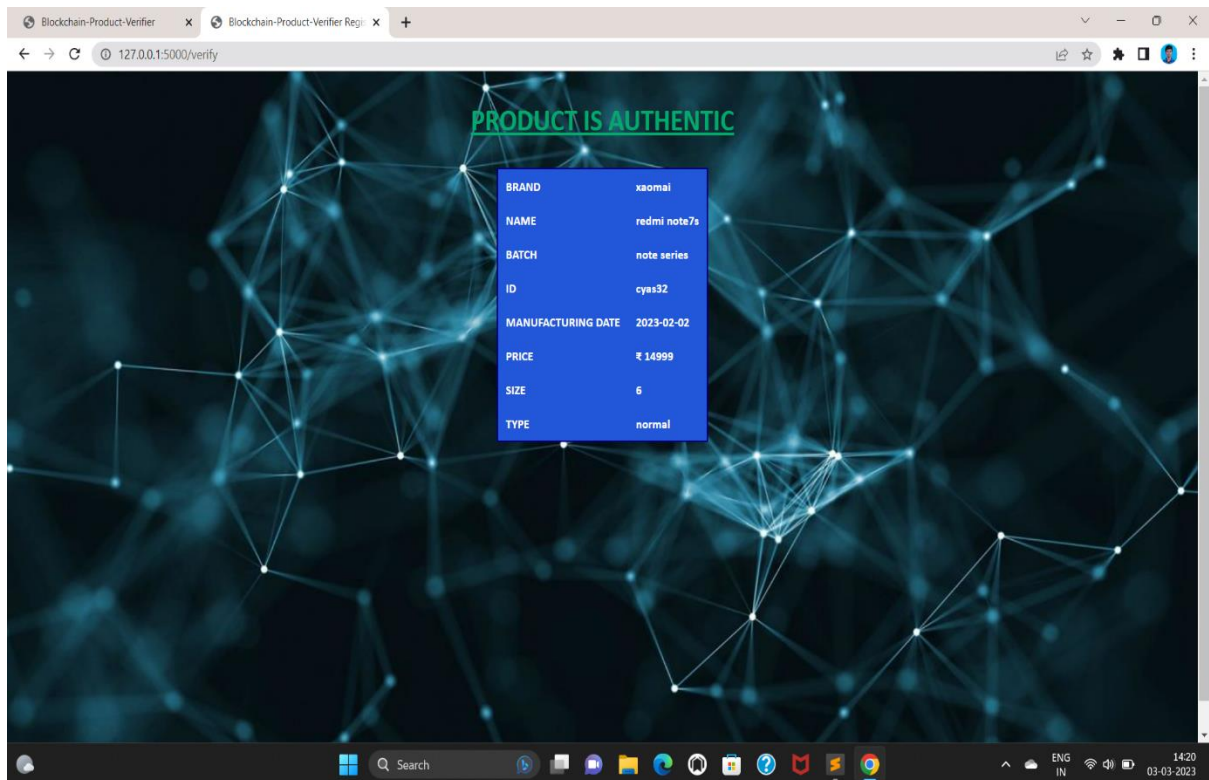
QRCODE SCANNING PAGE:



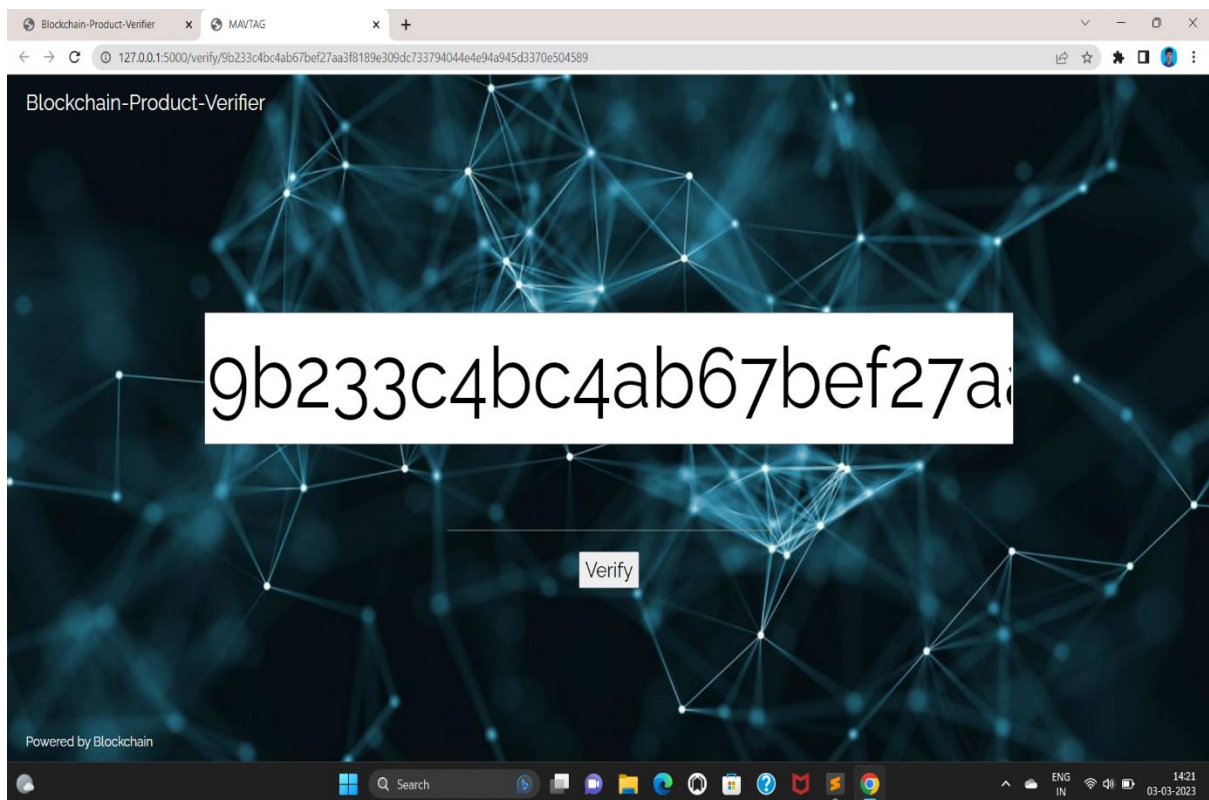
VERIFICATION PAGE:



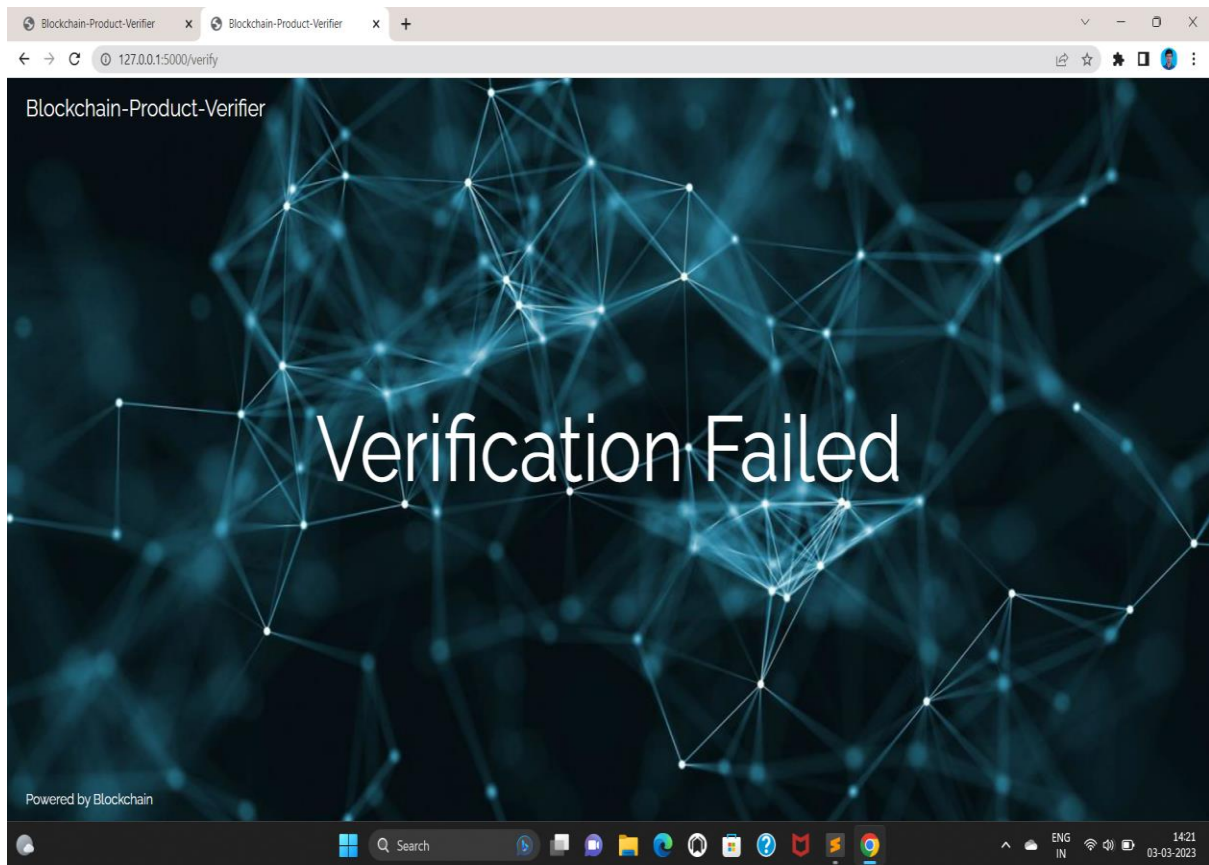
AFTER SUCCESSFUL VERIFICATION SHOWS PRODUCT DETAIL PAGE:



FAKE PRODUCT VERIFICATION:



AFTER VERIFICATION SHOWS VERIFICATION FAILED:



FUTURE ENHANCEMENT

CHAPTER-10

FUTURE ENANCEMENT

Blockchain technology is still in its general early stages in terms of usage, therefore more research is required. Future work on this framework may be proof of the simplicity of the code. The customer can believe that the proper applications and due to the simplicity of the code, without excessive code, will have additional use. With the experience gained in this project, it is clear that when assigning a chain of blocks that is counterfeit-resistant and traceable, then platform improvement is warranted by a move toward genuine product warranties. This would improve the customer experience by making the entire supply chain framework more open and transparent. In addition, it is hoped that a buyers' intellectual framework can be built on cross-line product tracing, providing more accurate and far-reaching product and seller tracing information to administrative authorities around the world. Obtaining data of such quality will be conceivable with estimates of coordinated efforts, for example, administrative support, framework creation, and data sharing.

CONCLUSION

CHAPTER-11

CONCLUSION

This system is the first blockchain system to propose a fully functional anti-counterfeiting system. By paying a very low transaction fee, users of our system no longer have to worry about the possibility of purchasing a counterfeit product. Manufacturers can use the system to store relevant information about product sales in blockchain for everyone to see. The total amount of sales that can be sold by the seller and the number of products that the seller currently has left are transparent. The user can use the functions provided by our system to carry out manufacturer verification immediately. The system provides identity verification using digital signatures. There are no other means of decrypting the key owner's private key unless the key owner accidentally loses their key. In our system analysis result, the cost of the initial product record contract is only \$1.2893394289 US, and the cost of each product sales process is \$0.17415436749 US. Both costs are much lower than working with reliable large chain stores and well-established direct selling stores. Our system can effectively lower the anti-counterfeiting threshold of branded goods and provide companies with limited financial resources with an easier approach to reassure consumers that they will not buy counterfeit goods. Blockchain technology is still in its general early stages in terms of usage, therefore more research is required.

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