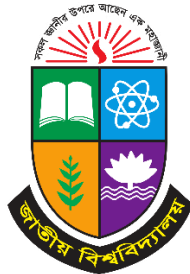


# DIGITAL COIN EXCHANGER USING BLOCKCHAIN



A Project presented to the National University in partial fulfillment of the requirement for the degree of Bachelor of Science (Hon's) in Computer Science & Engineering

## **Submitted To**

**Controller of Examinations**

National University  
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**Affiliated by National University**



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**Date of Submission: 30 September, 2023**

# **APPROVAL**

The project “Digital Coin Exchanger using blockchain” is submitted to the Department of Computer Science & Engineering, DIIT under the National University of Bangladesh in partial fulfillment of the requirement for the degree of Bachelor of Science (Hon’s) in Computer Science and Engineering and approved as to its style and content.

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**Daffodil Institute of IT**

Department of Computer Science & Engineering  
Daffodil Institute of IT  
Affiliated by National University

# DECLARATION

I declare that the project work titled “Digital Coin Exchanger using blockchain” being submitted in partial fulfillment for the degree of B.Sc. (Hon’s) in Computer Science & Engineering is the original work carried out by me. It has not formed part of any other project work submitted for any degree or diploma, either in this or any other University.

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# ACKNOWLEDGEMENT

Despite my efforts, the success of this project depends largely on the encouragement and guidance of my mentors. I would like to take this opportunity to express my gratitude to the people who are playing a vital role in the successful completion of this project.

My cordial thanks to my Project Supervisor **Prof. Dr. Mohammed Shakhawat Hossain**, Principal, DIIT for his valuable guidance and support to meet the successful completion of my project. My sincere thanks to **Md. Imran Hossain**, Head of the Computer Science & Engineering Department, DIIT for giving me an opportunity to undertake this project. My sincere thanks to **Saidur Rahman**, Senior Teacher of the Computer Science & Engineering Department, DIIT for giving me an opportunity to undertake this project.

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# ABSTRACT

The rapid evolution of digital coin transactions powered by blockchain technology is reshaping the global financial landscape. This study aims to provide a comprehensive overview of the current state of digital coin transactions, focusing on its potential benefits and challenges, with a special emphasis on its application in Bangladesh. The article employs a qualitative methodology, drawing insights from industry reports, peer-reviewed journals, and authoritative databases. Key findings reveal that digital coins offer the potential for decentralization, transparency, and reduced transaction costs, while also presenting challenges such as volatility, regulatory concerns, and potential misuse in illicit activities. The article also identifies target audiences who stand to benefit the most from digital coin adoption, including tech enthusiasts, overseas workers, e-commerce platforms, and young entrepreneurs. Recommendations for harnessing the potential of digital coin transactions include implementing robust security protocols, educational initiatives, clear regulatory guidelines, and exploring energy-efficient transaction validation methods. Overall, the article suggests that while digital coins hold vast potential, a harmonized regulatory framework, public awareness, and education are paramount for their safe and efficient integration into the financial ecosystem, particularly in developing economies like Bangladesh.

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## 1.1 Introduction

With the increasing popularity of cryptocurrencies in recent years, there has been a growing demand for secure and reliable cryptocurrency exchanges. These exchanges provide users with a platform to buy, sell, and trade cryptocurrencies, making them a critical component of the crypto ecosystem. However, many existing cryptocurrency exchanges suffer from security vulnerabilities, high fees, and slow transaction times, which can lead to a poor user experience and limit the adoption of cryptocurrencies.

To address these challenges, this project aims to build a cryptocurrency exchanger using the Ethereum blockchain. The Ethereum blockchain is a decentralized platform that allows developers to build decentralized applications (dApps) that can interact with the blockchain. By building a cryptocurrency exchanger on the Ethereum blockchain, we can leverage the security and transparency of the blockchain to create a more secure and reliable exchange.

The goals of this project are to design, develop, and deploy a cryptocurrency exchanger that provides users with a fast, secure, and low-cost platform to buy, sell, and trade cryptocurrencies. We will use the Agile software development methodology to ensure that the project is delivered on time and meets the requirements of its stakeholders. The exchanger will be designed to be user-friendly and accessible to users of all levels of technical expertise.

Overall, the development of a cryptocurrency exchanger using the Ethereum blockchain has the potential to address many of the challenges facing existing exchanges and provide a more secure and efficient platform for users to engage with cryptocurrencies.

## 1.2 Goals

The primary goal of this project is to provide a comprehensive and detailed analysis of digital coin transactions using blockchain technology, with a specific focus on the potentials and challenges faced by Bangladesh. The project aims to:

- 1. Analyze the Current Landscape:** Examine the present state of digital coin transactions globally and specifically in Bangladesh, exploring its classification, international dealings, and the pros and cons associated with it.

**2. Identify Key Stakeholders:** Determine the target audiences who can benefit most from the adoption of digital coin transactions, including tech enthusiasts, overseas workers, e-commerce platforms, and young entrepreneurs.

**3. Evaluate the Potentials and Challenges:** Analyze the potential benefits of digital coin transactions in Bangladesh, while also identifying the threats and challenges that could hinder its adoption and growth.

**4. Provide Recommendations:** Based on the findings, provide a set of strategic recommendations that can help stakeholders harness the potential of digital coin transactions while mitigating the associated challenges.

**5. Raise Awareness and Encourage Adoption:** Provide valuable insights and recommendations to the target audiences and stakeholders to raise awareness, educate, and encourage the adoption of digital coin transactions in a safe and secure manner.

Overall, the project aims to serve as a comprehensive guide for stakeholders in Bangladesh and other similar economies, helping them navigate the digital coin landscape, harness its potential benefits, and address its challenges for a more secure, efficient, and inclusive financial ecosystem.

## **1.3 Cryptocurrency market and the challenges**

The cryptocurrency market is a rapidly evolving and dynamic space. As of April 2021, the total market cap of cryptocurrencies has surpassed \$2 trillion. Despite the growth and popularity of cryptocurrencies, buying, selling, and trading them remains challenging due to the fragmented and complex nature of the market.

Existing cryptocurrency exchanges face a number of challenges, including issues with security, scalability, and accessibility. These challenges are further compounded by the decentralized and unregulated nature of the cryptocurrency market, which can create a lack of trust and transparency.

In recent years, there have been several high-profile incidents of cryptocurrency exchange hacks, resulting in the loss of millions of dollars' worth of cryptocurrencies. These security breaches have highlighted the need for improved security measures to protect user assets and ensure the long-term sustainability of cryptocurrency exchanges.

Scalability is another challenge facing existing cryptocurrency exchanges, as they struggle to keep up with the growing demand for cryptocurrency trading. Many exchanges have experienced downtime during periods of high trading activity, resulting in frustrated users and lost revenue.

Finally, accessibility remains a significant challenge for many cryptocurrency exchanges. Existing exchanges often have complex and confusing user interfaces, making it difficult for novice users to navigate the platform and engage with cryptocurrencies.

The development of a cryptocurrency exchange website using the Ethereum blockchain has the potential to address many of these challenges. By leveraging the security and transparency of the Ethereum blockchain, we aim to create a more secure, efficient, and user-friendly platform for buying, selling, and trading cryptocurrencies.

## **1.4 Specific Objectives**

The aim of this project is to develop a website for a cryptocurrency exchange using the Ethereum blockchain. The primary objective of the project is to create a secure, efficient, and user-friendly platform for buying, selling, and trading cryptocurrencies. In order to achieve this objective, the following specific objectives have been identified:

1. To develop a user-friendly and intuitive interface for the website that allows users to quickly and transaction cryptocurrencies.
2. To integrate the Ethereum blockchain into the website to improve security and transparency, ensuring that user assets are protected.
3. To implement a scalable architecture that can handle a large volume of transactions and traffic without compromising performance.
4. To ensure compliance with relevant regulations and laws governing the operation of cryptocurrency exchanges in the relevant jurisdictions.

By achieving these objectives, the website will be able to provide users with a secure, efficient, and user-friendly platform for buying, selling, and trading cryptocurrencies, while also leveraging the benefits of the Ethereum blockchain.

## **1.5 Why we choose this project**

The decision to pursue a project focused on developing a website for a cryptocurrency transaction using the Ethereum blockchain was motivated by several factors.

Firstly, the cryptocurrency market is a rapidly growing and dynamic space that presents a wealth of opportunities for innovation and disruption. Despite the growth and popularity of cryptocurrencies, existing cryptocurrency exchanges continue to face a number of challenges related to security, scalability, and accessibility

Secondly, the Ethereum blockchain offers several advantages over traditional blockchain technologies, including the ability to create smart contracts, execute decentralized applications, and provide enhanced security and transparency.

Thirdly, the development of a cryptocurrency exchange website using the Ethereum blockchain aligns with our interests and expertise in blockchain technology and software development.

By pursuing this project, we hope to address the challenges facing existing cryptocurrency exchanges and create a more secure, efficient, and user-friendly platform for buying, selling, and trading cryptocurrencies. Additionally, we believe that the use of the Ethereum blockchain will provide a unique and innovative solution to the challenges facing the cryptocurrency market.

## 2.1 Introduction

The rise of digital coins and blockchain technology has garnered significant attention from scholars, economists, technologists, and financial experts alike. This has resulted in a plethora of studies that analyze the promise, impact, challenges, and future implications of these innovations.

1. **Fundamental Texts:** The literature journey on digital coins invariably begins with Nakamoto's foundational whitepaper on Bitcoin, which laid the groundwork for decentralized cryptocurrencies. (Nakamoto, S. 2008)
2. **Decentralization and its Impact:** Tapscott and Tapscott's "Blockchain Revolution" (2016) is a seminal work that delves deep into how blockchain technology could change the way we record, verify, and transfer assets in various industries, not just finance (Tapscott, D. & Tapscott A. 2016). [Blockchain Revolution]
3. **Technical Deep Dive:** For those who wish to understand the intricacies of blockchain technology, Wood's Ethereum Yellow Paper offers a technical exploration of Ethereum's construction and the inner workings of its smart contracts. (Wood, G. (2014).
4. **Economic Implications:** Narayanan et al.'s "Bitcoin and Cryptocurrency Technologies" offers both a comprehensive introduction to the revolutionary technology behind Bitcoin and a thorough exploration of the broader economic, political, and social implications (Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016)
5. **Regulatory and Security Concerns:** Casey and Vigna's "The Truth Machine" is an enlightening read that tackles issues of trust, regulatory concerns, and the potential of blockchain to redefine the global financial system (Casey, M.J., & Vigna, P. 2018)
6. **Future Perspectives:** Cryptocurrencies and blockchain are dynamic fields, and the literature evolves rapidly. Periodicals, journals, and tech magazines regularly publish articles and papers, reflecting on the current state and forecasting future trends.

In conclusion, the body of literature on digital coins and blockchain is both vast and varied, offering lenses ranging from technical intricacies to profound societal implications. As the technology continues to mature and its adoption grows, this literature will remain an essential resource for understanding the trajectory and impact of these innovations.

### 3.1 Introduction

In order to develop a successful cryptocurrency exchange using the Ethereum blockchain, it is important to have a thorough understanding of the technology and concepts involved. This background section will provide an overview of the key technologies and concepts involved in the development of a cryptocurrency exchange on the Ethereum blockchain.

### 3.2 Background

Research methodology is pivotal in ensuring that the presented insights and conclusions are both rigorous and reliable. For this article on digital coin transactions using blockchain, a multi-faceted qualitative approach has been adopted, as delineated below:

- **Source Selection:** Key sources for this study were chosen based on their credibility, relevance, and comprehensiveness. The primary emphasis was on industry reports, peer-reviewed journals, and authoritative databases that offered in-depth analyses of digital coins and blockchain technologies.
- **Industry Reports:** Recognized industry reports, such as those from Deloitte, PwC, and the World Economic Forum, were consulted. These reports often provide insights into the latest trends, challenges, and future predictions about blockchain and digital coins, grounded in extensive market research. (World Economic Forum,2021)
- **Peer-reviewed Journals:** Academic journals and publications offer critical examinations of the subject matter. Journals such as the Journal of Cryptocurrency and Blockchain Technology were crucial in understanding the technological, economic, and sociopolitical dimensions of digital coins. (Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. 2016)
- **Authoritative Databases:** Databases like Google Scholar, IEEE Xplore, and the ACM Digital Library were instrumental in sourcing relevant papers, articles, and studies on blockchain and digital coins.(CoinMarketCap,2021).
- **Data Synthesis and Analysis:** After sourcing, the data was systematically reviewed, compared, and synthesized. Contradictory findings were analyzed to understand differing perspectives and to create a well-rounded view of the subject matter.
- **Limitations:** While every effort was made to ensure comprehensiveness, the rapidly evolving nature of the field means that newer developments post-2021 might not be reflected. Moreover, as this study is primarily qualitative, it focuses on descriptive and interpretative insights rather than quantitative metrics.

In conclusion, this qualitative methodology aims to provide readers with a comprehensive and nuanced understanding of digital coin transactions through blockchain, rooted in credible sources and rigorous analysis.

### 3.3 Benefits

Digital coins, with their revolutionary underpinnings and potential to reshape the monetary landscape, have seen both avid support and stern criticism. As with any emergent technology, they come with a range of benefits and challenges. Below, we elucidate the primary pros and cons, especially within the context of the international market.

#### **Decentralization:**

- **Description:** Unlike traditional fiat currencies managed by central banks and governments, digital coins operate on decentralized platforms.
- **Implication:** This ensures that no single entity has control over the currency, reducing the risk of manipulations and providing users with greater financial sovereignty. (Narayanan, A., & Clark, J. 2017)

#### **Transparency:**

- **Description:** Most digital coins operate on public blockchains, allowing for complete transparency in transactions
- **Implication:** This ensures a high level of accountability as all transactions are recorded on a public ledger, fostering trust among its users(Zohar, A.,2015).

#### **Reduced Transaction Costs:**

- **Description:** Eliminating or reducing the need for intermediaries, such as banks, digital coins often ensure lower transaction fees.
- **Implication:** Particularly for international transactions, users can save considerably on conversion fees and bank charges, making cross-border transactions more affordable. (Catalini, C., & Gans, J. S. 2016).

### 3.4 Limitations

#### **Volatility:**

- **Description:** Prices of digital coins, especially popular ones like Bitcoin, can be highly volatile.
- **Implication:** This unpredictable price fluctuation can deter users from treating digital coins as a stable store of value, making it challenging for businesses to set consistent pricing. (Gandal, N., Hamrick, J. T., Moore, T., & Oberman, T. 2018)

**Regulatory Concerns:**

- Description: The regulatory landscape for digital coins is still in its infancy and varies considerably from one country to another.
- Implication: This leads to uncertainties for investors, traders, and businesses that might face sudden regulatory changes, which can impact their operations or the value of their holdings (Library of Congress).

**Potential Misuse in Illicit Activities:**

- Description: The pseudonymous nature of digital coin transactions makes them an attractive tool for illicit activities.
- Implication: Concerns range from money laundering to financing terrorism, which further fuels regulatory apprehensions and sometimes cast a negative shadow over the entire ecosystem. (Foley, S., Karlsen, J. R., & Putniņš, T. J. 2019)

### 3.5 Comparison Between Traditional & Blockchain Technology

Parameters	Traditional	Blockchain (Potential Solution)
<b>Type of System</b>	It is a Centralized System	It is a Decentralized System
<b>Fraud Cases</b>	Huge cases of claimers posing as the seller of land or property. Thus increasing the chances of fraud cases.	The digital land registration platform could serve as proof of land ownership, record existence, exchange, and transaction by keeping immutable records of the transactions. Hence reducing fraud cases.
<b>Middlemen Brokers</b>	Middlemen/ Brokers are involved.	No need for middlemen or Brokers.
<b>Time</b>	It is an expensive time process	This system accelerates the Process.

Table: 3.6 Comparison Between Traditional & Blockchain Technology



### 3.6 Centralized vs Decentralized Architecture (Diagram)

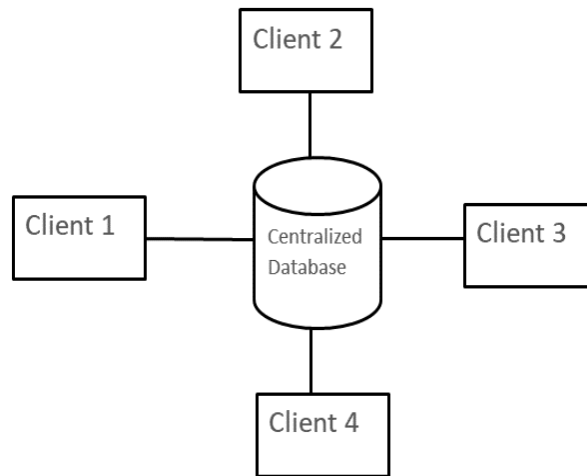


Fig: 3.6.1 Centralized vs Decentralized Diagram

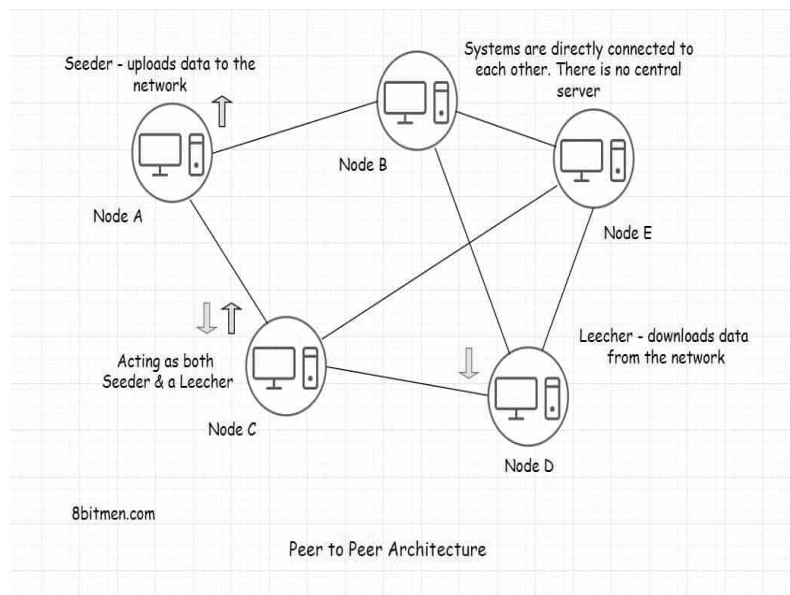


Fig: 3.6.2 Peer to Peer Diagram

## 4.1 Introduction

The development of a cryptocurrency exchanger using the Ethereum blockchain requires a structured approach that includes several key steps. In this section, we will provide an overview of the methodology we will use to develop our website, including the tools, technologies, and processes involved.

## 4.2 Our Used Methodology

Research methodology is pivotal in ensuring that the presented insights and conclusions are both rigorous and reliable. For this article on digital coin transactions using blockchain, a multi-faceted qualitative approach has been adopted, as delineated below:

- **Source Selection:** Key sources for this study were chosen based on their credibility, relevance, and comprehensiveness. The primary emphasis was on industry reports, peer-reviewed journals, and authoritative databases that offered in-depth analyses of digital coins and blockchain technologies.
- **Industry Reports:** Recognized industry reports, such as those from Deloitte, PwC, and the World Economic Forum, were consulted. These reports often provide insights into the latest trends, challenges, and future predictions about blockchain and digital coins, grounded in extensive market research. (World Economic Forum,2021)
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- **Data Synthesis and Analysis:** After sourcing, the data was systematically reviewed, compared, and synthesized. Contradictory findings were analyzed to understand differing perspectives and to create a well-rounded view of the subject matter.
- **Limitations:** While every effort was made to ensure comprehensiveness, the rapidly evolving nature of the field means that newer developments post-2021 might not be reflected. Moreover, as this study is primarily qualitative, it focuses on descriptive and interpretative insights rather than quantitative metrics.

In conclusion, this qualitative methodology aims to provide readers with a comprehensive and nuanced understanding of digital coin transactions through blockchain, rooted in credible sources and rigorous analysis.

### **4.3 Agile Method**

The Agile methodology is based on the principles outlined in the Agile Manifesto, which prioritize customer satisfaction, working software, and responding to change over rigid processes and documentation

The development team will work in sprints, typically two-week periods during which they will focus on specific goals and deliverables. At the end of each sprint, the team will review their progress and make any necessary adjustments to the project plan

### **4.4 Advantages of Agile Method**

- Customer satisfaction by rapid, continuous delivery of useful software.
- Can accommodate changes at any time.
- Effective for the dynamic development environment.
- Close, daily cooperation between business people and developers.
- Continuous attention to technical excellence and good design.
- Regular adaptation to changing circumstances.
- Even late changes in requirements are welcomed.

### **4.5 Blockchain Technology**

Blockchain is a digital and distributed ledger of transactions or decentralized database that holds continuously updated digital records in real-time through a network of computers. A Google Doc is a basic analogy for blockchain comprehension. But a blockchain provides a decentralized distribution chain that allows everyone to read the text simultaneously. Of course, it is more complicated than Google Docs, but the analogy is fair since three significant technological concepts are highlighted

## 5.1 Introduction

In this chapter, we will discuss the tools we have used to complete this project. We have divided the tools into several sections. Such as hardware, software, platform, etc.

## 5.2 Hardware Requirements

- ✓ Computer (Desktop/Laptop)
- ✓ Processor: Intel Core i3 or upper
- ✓ Minimum RAM: 4GB
- ✓ Minimum Space 10GB

## 5.3 Software Requirements

- ✓ Operating System:
  - Windows, Linux, macOS (For PC)
  - Android, iOS (For Mobile)
- ✓ Frontend:
  - Javascript
  - CSS
  - HTML 5
- ✓ Backend:
  - Solidity
  - Ethereum Blockchain
  - Ganache
- ✓ Web3.js
- ✓ Wallet Any
- ✓ IDE: VS Code
- ✓ Web Browser: Google Chrome, Firefox, Safari, or any other HTML5-supported browsers

## 5.4 Web Application

A Web application (Web app) is an application program that is stored on a remote server and delivered over the Internet through a browser interface. Web services are Web apps by definition and many, although not all, websites contain Web apps. According to

Web.AppStorm editor Jarel Remick, any website component that performs some function for the user qualifies as a Web app. Web applications can be designed for a wide variety of uses and can be used by anyone; from an organization to an individual for numerous reasons. Commonly used Web applications can include webmail, online calculators, or e-commerce shops. Some Web apps can be only accessed by a specific browser; however, most are available no matter the browser.

Web applications have many different uses, and with those uses, come many potential benefits. Some common benefits of Web apps include:

- Allowing multiple users access to the same version of an application.
- Web apps don't need to be installed.
- Web apps can be accessed through various platforms such as a desktop, laptop, or mobile.
- Can be accessed through multiple browsers.

## **5.5 Google Colab (Google Collaboratory)**

Colab is a free Jupyter notebook environment that runs entirely in the cloud. Most importantly, it does not require a setup and the notebooks that you create can be simultaneously edited by your team members - just the way you edit documents in Google Docs. Colab supports many popular machine learning libraries which can be easily loaded in your notebook.

## **5.6 Visual Studio Code**

Visual Studio Code is a lightweight but powerful source code editor which runs on your desktop and is available for Windows, macOS, and Linux. It comes with built-in support for JavaScript, TypeScript, and Node.js and has a rich ecosystem of extensions for other languages (such as C++, C#, Java, Python, PHP, and Go) and run times (such as .NET and Unity).

## **5.7 Javascript**

JavaScript is a dynamic computer programming language. It is lightweight and most commonly used as a part of web pages, whose implementations allow client-side scripts to interact with the user and make dynamic pages. It is an interpreted programming language with object-oriented capabilities.

JavaScript was first known as LiveScript, but Netscape changed its name to JavaScript,

possibly because of the excitement being generated by Java. JavaScript made its first appearance in Netscape 2.0 in 1995 with the name LiveScript. The general-purpose core of the language has been embedded in Netscape, Internet Explorer, and other web browsers. The ECMA-262 Specification defined a standard version of the core JavaScript language.

## **5.8 HTML**

HTML (Hypertext Markup Language) is a computer language devised to allow website creation. Anyone else connected to the Internet can then view these websites. It is relatively easy to learn, with the basics being accessible to most people in one sitting: and quite powerful in what it allows you to create. As told earlier, HTML is a markup language and makes use of various tags to format the content.

## **5.9 CSS**

CSS stands for Cascading Style Sheets. CSS describes how HTML elements that are to be displayed on the screen, paper, or in other media CSS saves a lot of work It can control the layout of multiple web pages all at once External style sheets are stored in CSS files.CSS are utilized to organize the format of web pages CSS helps web engineers make a uniform look over a few pages of a website. Once the style is in CSS, it can be utilized by any page that references the CSS record. CSS can be a language with regard to specifying exactly how documents tend to be presented in order to users - how they are usually styled, organized, etc.

## **5.10 Solidity**

Solidity is an object-oriented programming language created specifically by the Ethereum Network team for constructing and designing smart contracts on Blockchain platforms. • It's used to create smart contracts that implement business logic and generate a chain of transaction records in the blockchain system.

- It acts as a tool for creating machine-level code and compiling it on the Ethereum Virtual Machine (EVM).
- It has a lot of similarities with C and C++ and is pretty simple to learn and understand. For example, a “main” in C is equivalent to a “contract” in Solidity.

## 5.11 Classification of Digital Coin

Digital coins, often interchangeably termed cryptocurrencies, have experienced rapid diversification as the technology matured and found varied applications in the digital realm. While many people are familiar with the general concept of cryptocurrencies like Bitcoin or Ethereum, the broader ecosystem is more complex. Here's a closer look at the primary classifications of digital coins:

### **Cryptocurrencies:**

- **Definition:** These are digital or virtual currencies that use cryptography for security and operate on decentralized platforms, typically blockchain.
- **Examples:** Bitcoin (BTC), Ethereum (ETH), and Litecoin (LTC).
- **Primary Use:** Cryptocurrencies primarily serve as a medium of exchange, store of value, and unit of account. They aim to be decentralized alternatives to traditional fiat currencies.

### **Tokens:**

- **Definition:** Unlike standalone cryptocurrencies, tokens are created on existing blockchains. They represent assets or utility and can be used for a broader range of purposes than just a medium of exchange.
- **Types:**
  - **Utility Tokens:** Offer holders future access to a product or service. For example, Filecoin offers storage space in exchange for tokens.
  - **Security Tokens:** Represent ownership in a real-world asset, such as shares in a company or real estate.
- **Examples:** Chainlink (LINK), Binance Coin (BNB), and Filecoin (FIL).
- **Primary Use:** Tokens can be used for a diverse range of applications, from facilitating specific functionalities within a platform to representing real-world assets.

## 5.12 Ethereum

At its core, Ethereum is a decentralized global software platform powered by blockchain technology. It is most commonly known for its native cryptocurrency, ether (ETH).

Ethereum can be used by anyone to create any secured digital technology. It has a token designed to pay for work done supporting the blockchain, but participants can also use it to pay for tangible goods and services if accepted. Ethereum is designed to be scalable, programmable, secure, and decentralized. It is the blockchain of choice for developers and

enterprises creating technology based upon it to change how many industries operate and how we go about our daily lives. It natively supports smart contracts, an essential tool behind decentralized applications.

## **5.13 Smart Contracts**

A smart contract is a self-executing contract with the terms of the agreement between buyer and seller being directly written into lines of code. The code and the agreements contained therein exist across a distributed, decentralized blockchain network. The code controls the execution, and transactions are trackable and irreversible.

Smart contracts permit trusted transactions and agreements to be carried out among disparate, anonymous parties without the need for a central authority, legal system, or external enforcement mechanism.

Bloomberg.



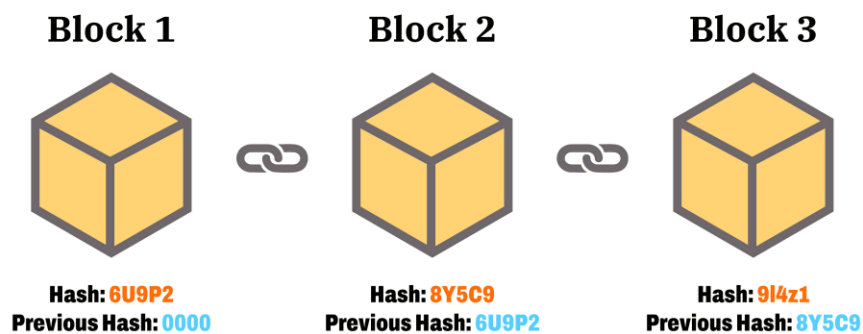
## 6.1 Introduction

In this chapter, we will discuss the design and details architecture of our project.

## 6.2 Blockchain Technology

Blockchain is a digital and distributed ledger of transactions or decentralized database that holds continuously updated digital records in real-time through a network of computers. A Google Doc is a basic analogy for blockchain comprehension. But a blockchain provides a decentralized distribution chain that allows everyone to read the text simultaneously. Of course, it is more complicated than Google Docs, but the analogy is fair since three significant technological concepts are highlighted. A quick overview of blockchain:

- Digital properties are stored rather than copied or moved
- The asset is decentralized, providing direct access to the property in real-time
- A straightforward ledger of modifications maintains the credibility of the record, ensuring confidence in the asset



## 6.3 Classification of Blockchain

A blockchain is “a distributed database that maintains a continuously growing list of ordered records, called blocks.” These blocks “are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. Blockchains are primarily classified into public, private, and consortium types: (Simplilearn, 2023)

### 1. Public Blockchains:

- **Definition:** These are decentralized and open-source blockchains where any individual can participate as a user, miner, or developer. Every transaction on this type of blockchain is transparently recorded on a shared ledger.
- **Examples:** Bitcoin, Ethereum, and Litecoin are renowned examples of public blockchains.
- **Key Features:**
  - Decentralization: Operated in a decentralized manner without a central authority.
  - Transparency: All transactions are public.
  - Security: Maintained by proof-of-work (PoW) or proof-of-stake (PoS) consensus mechanisms.
- **Use-Cases:** Suited for cryptocurrencies and decentralized applications (DApps) where transparency and security are paramount.

### 2. Private Blockchains:

- **Definition:** These are blockchains where participation is restricted. A single organization has authority over the network, deciding who can join, executing a consensus protocol, and maintaining the shared ledger.
- **Examples:** Hyperledger Fabric and Corda are instances of platforms that can support private blockchains
- **Key Features:**
  - Control: One entity or organization oversees the network.
  - Speed: Typically faster than public blockchains due to reduced consensus complexities.
  - Privacy: Transaction details are confidential and known only to participating parties.
- **Use-Cases:** Suited for businesses and enterprises that need to maintain transaction privacy and control over their blockchain.

### 3. Consortium Blockchains (or Federated Blockchains):

- **Definition:** These are semi-private blockchains where control over the network is in the hands of several pre-selected entities. A group (or consortium) decides who can participate in the consensus process.
- **Examples:** Quorum, developed by J.P. Morgan, is a common example of a consortium blockchain.
- **Key Features:**
  - **Collaborative:** Multiple organizations run the network collaboratively.
  - **Efficiency:** Faster than public blockchains due to a limited number of participating nodes.
  - **Controlled Accessibility:** While the consortium controls the consensus process, they can choose to make the ledger public or restricted.
- **Use-Cases:** Often chosen for business solutions where multiple organizations wish to participate without centralizing control under one entity. Common in banking, supply chains, and inter-business collaborations.

## 6.4 Proposed Blockchain System Architecture

The proposed blockchain system architecture for a smart contract application will be designed based on the specific requirements of the use case. However, here is a general overview of the components that may be included in a typical blockchain system architecture:

- 6.1.1 **User Interface:** This component provides the user interface for interacting with the smart contract application. It can be a mobile application, web application or desktop application.
- 6.1.2 **Client:** This component interacts with the blockchain network and sends transactions to execute the smart contract. It can be a lightweight client or a full node.
- 6.1.3 **Smart Contract:** This component contains the code that implements the business logic of the application and is executed on the blockchain network.
- 6.1.4 **Blockchain Network:** This component is the underlying infrastructure that provides the distributed ledger for the smart contract application. It can be a public blockchain such as Ethereum or a private blockchain such as Hyperledger Fabric.
- 6.1.5 **Consensus Protocol:** This component ensures that the blockchain network is secure and that all nodes agree on the state of the ledger.
- 6.1.6 **Smart Contract Storage:** This component stores the state of the smart contract

on the blockchain network. It can be implemented as a key-value store or a relational database.

6.1.7 **External Data Sources:** This component provides external data to the smart contract, which can be used to trigger the execution of the contract or to update its state.

6.1.8 **Wallet:** This component provides the means for users to manage their digital assets and interact with the blockchain network.

6.1.9 **APIs:** This component provides an interface for external systems to interact with the smart contract application.

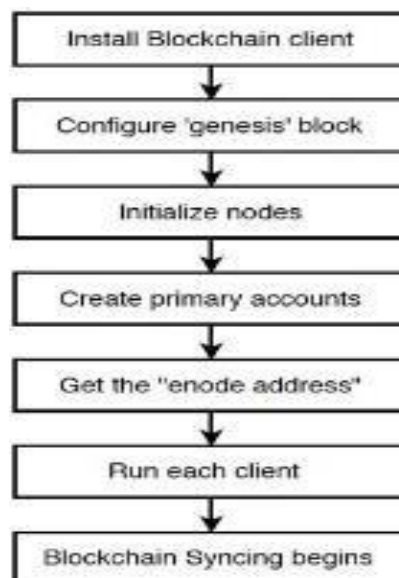
6.1.10 **Oracles:** This component provides trusted external data to the smart contract, which can be used to trigger the execution of the contract or to update its state.

6.1.11 **Escrow Service:** This component ensures that funds or assets are securely held in escrow until certain conditions of the smart contract are met.

6.1.12 **Security and Auditing:** This component ensures that the smart contract application is secure and that all transactions are auditable.

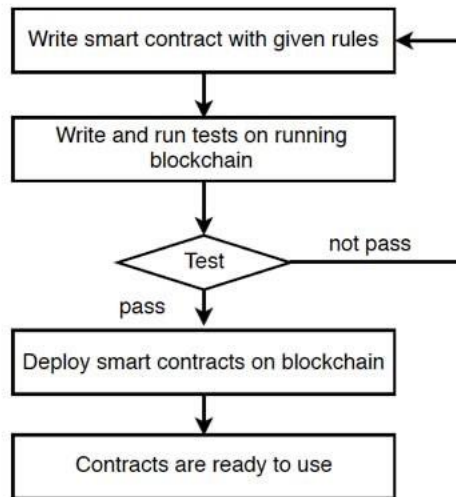
The proposed blockchain system architecture for a smart contract application will be designed with the aim of achieving the desired functionality, performance, and security of the application while maintaining the reliability and scalability of the underlying blockchain network.

## 6.5 Blockchain implementation workflow



**Fig: 6.4 Blockchain implementation workflow**

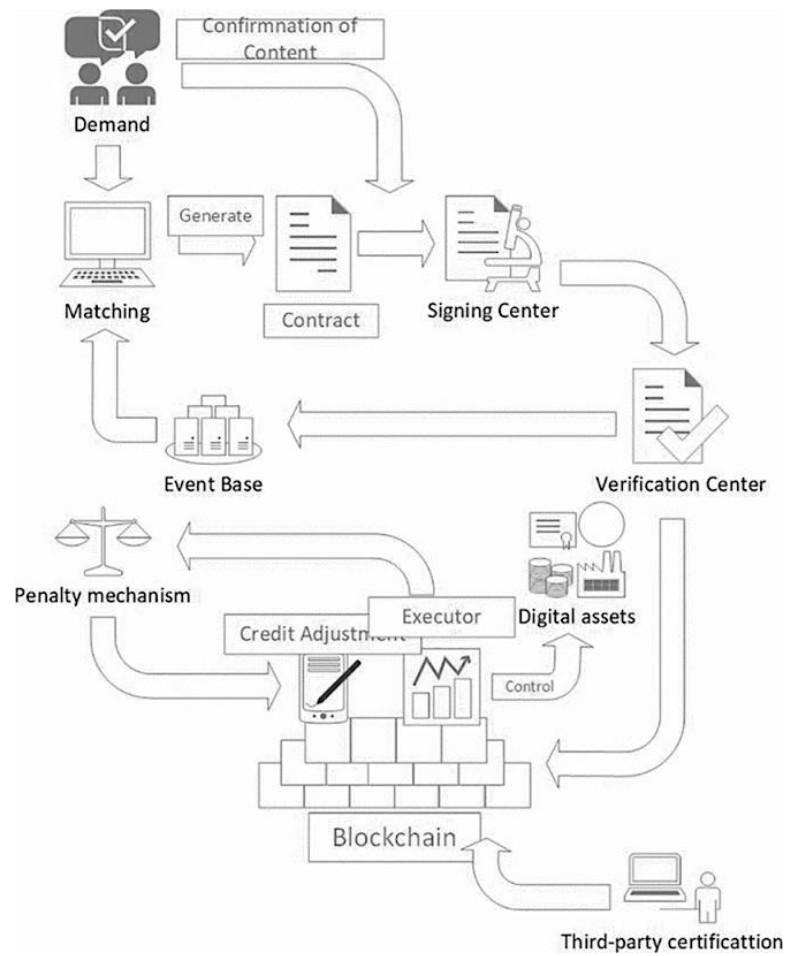
## 6.6 Smart contracts implementation workflow



**Fig: 6.5 Smart contracts implementation workflow**

## 6.7 Execution Model

The execution of smart contracts can be divided into four stages: signing, deploying, executing and ending. The execution model of smart contracts is shown in Figure 6.6 After the user makes a request, the contract text is automatically generated. After the two parties sign the confirmation, the contract needs to be verified by the verification . tool to be deployed to the contract executor on the blockchain to start running. If it is a new contract, it is saved in the contract event library as a backup. During the operation of the contract, various digital assets are manipulated according to the contract content. If there is a breach of contract, the penalty is imposed according to the contract, and the credit situation is updated; if there is a dispute, the third party (usually the authority) is involved in the forensics.



**Fig.6.6 Execution model of smart contract**

## 6.8 Structural Model

Analogous to the relationship between the main contract and the subordinate contract existing in the traditional contract, we divide the model design of the smart contract into control contract and based contract, in which the based contract can be divided into logical contract and data contract in the end. The method of contract splitting will be instructed in the next section. The logical contract does not store the state, focus on the running function and running state; the data contract provides the data structure definition; stores the interface for reading and writing data; saves the assets, status, user and other data to the blockchain; and can be from the blockchain

# How does a Smart Contract Work?

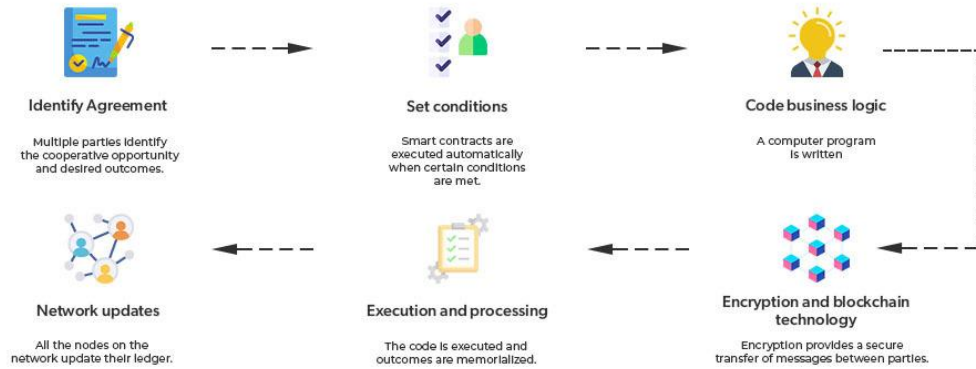


Fig.6.7 Structural model of smart contract

## 6.9 State Model

According to the possible situations during the contract operation, we divide the contract into five states: deployment, execution, failure, default and cancellation, as shown in Figure 6. Inside, deployment is pre-run state. The system needs to ensure that no deadlock is found in the contract.

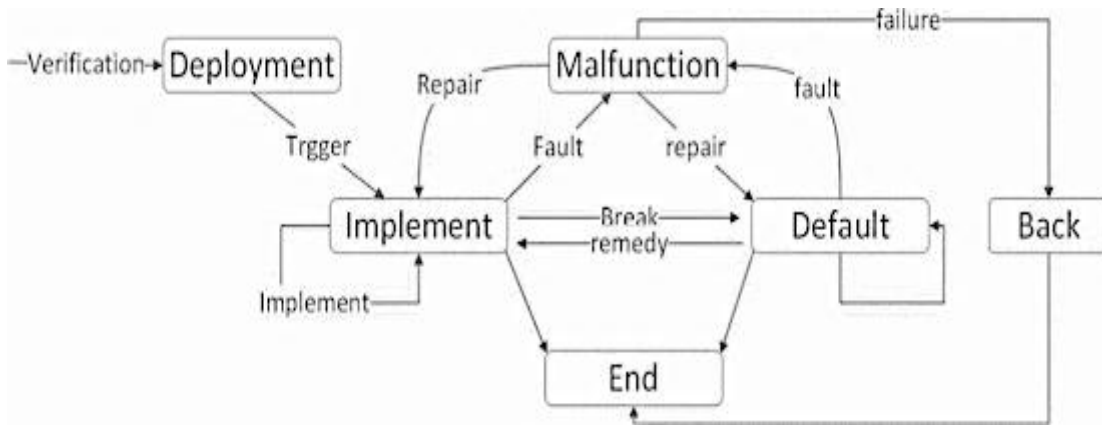


Fig:6.8 State model of smart contract

## 6.10 Device Registration on Blockchain

Registration is the first step to engage the Iot device to be manages and monitored in the smart contract system.

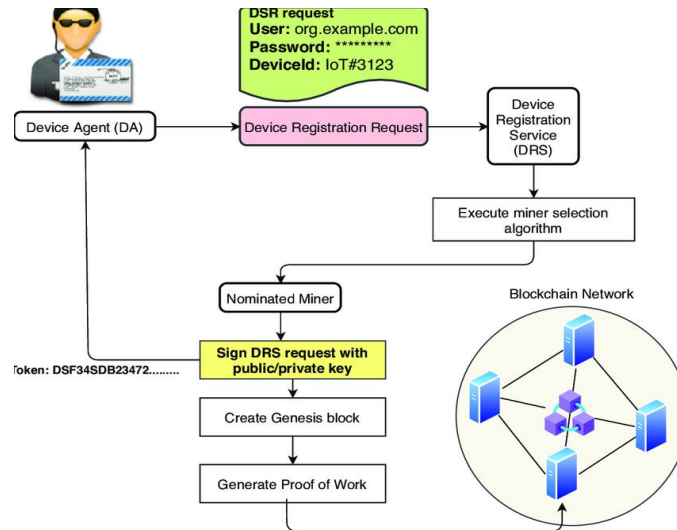


Fig. 6.9 Devices registration workflow

## 6.11 Flow chart

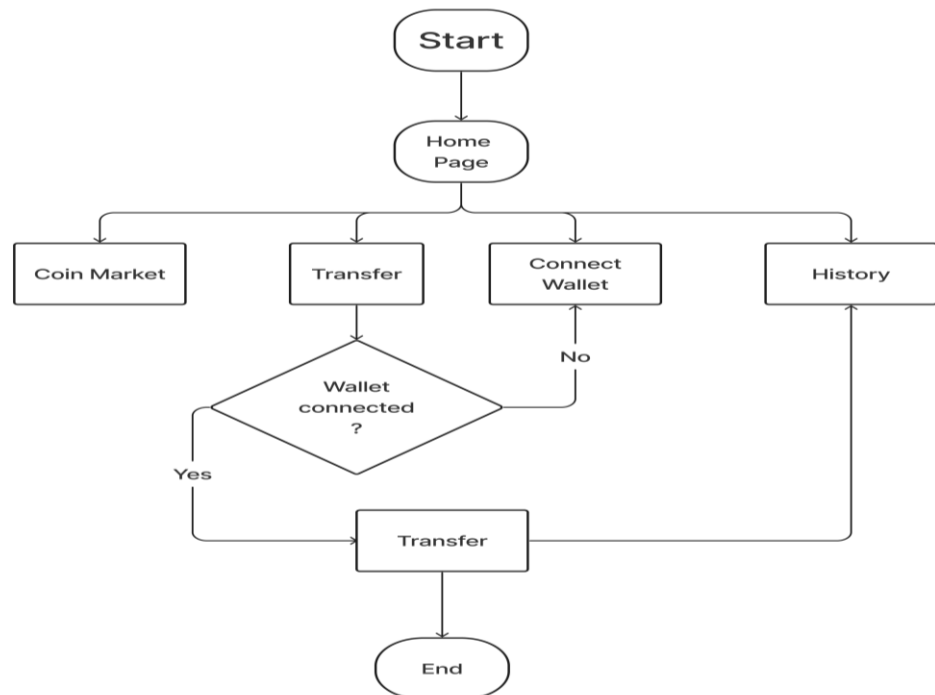
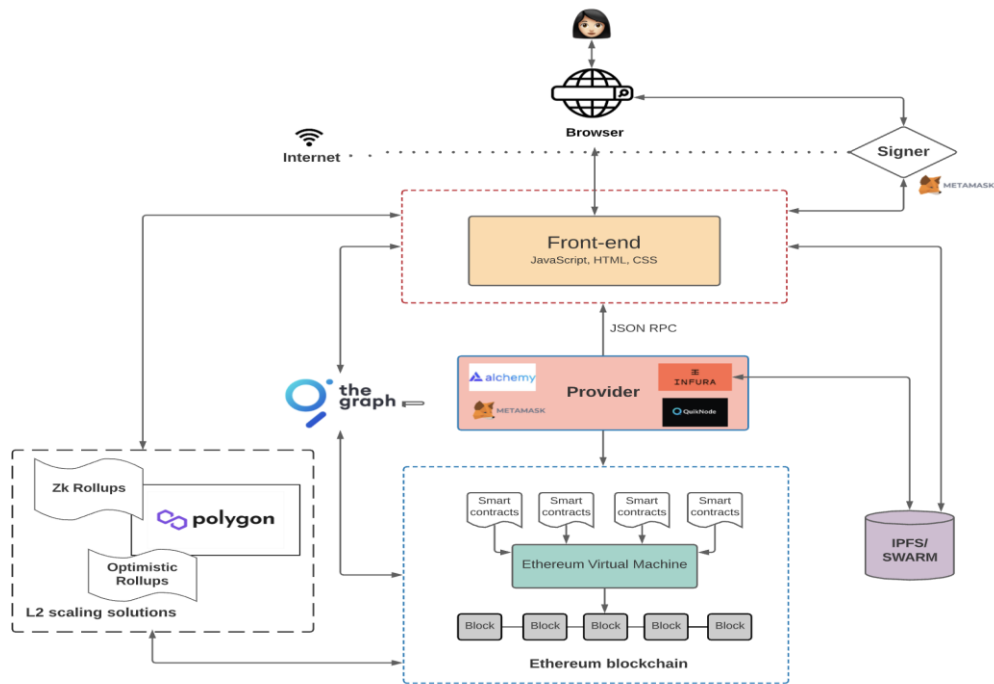


Fig:6.10 Flow chart

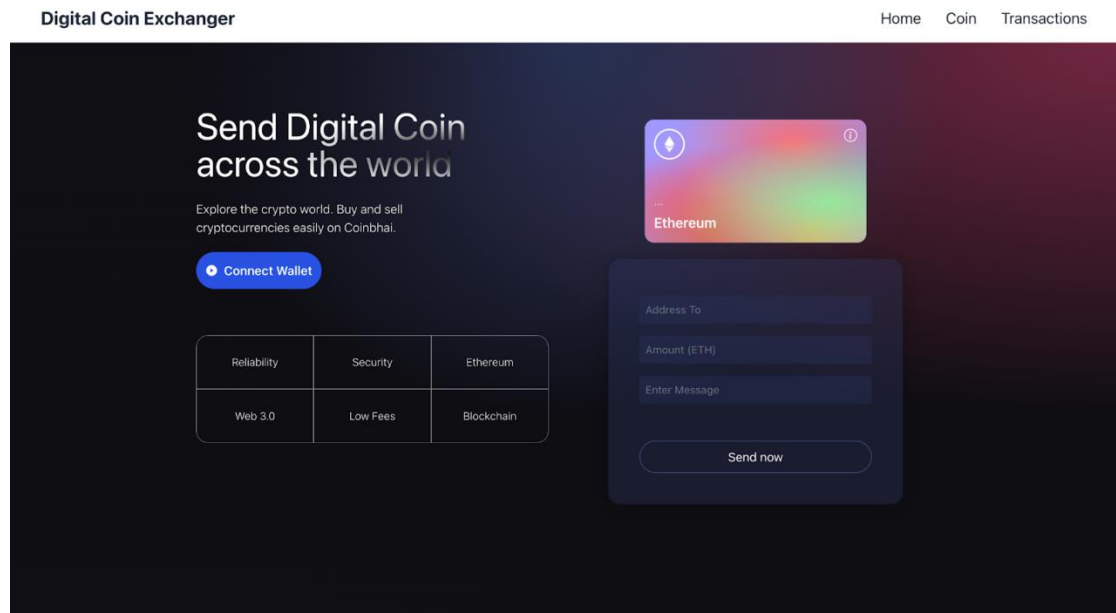


## 6.12 App Structure



### 6.12.1 UI Design

- **Home Page**



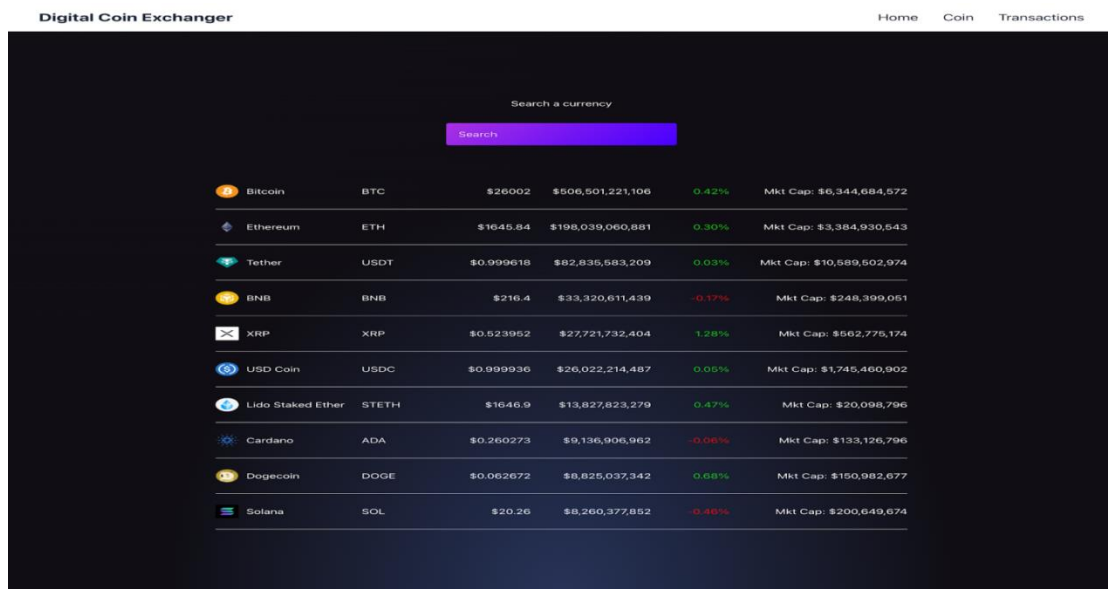
The homepage consists of one option –

User can connect their wallet by tab “connect Wallet button”. After that user transfer coin by transfer option their user needs to fill

1. Address to account
2. Coin Amount
3. Enter Message

After that user can Transfer their Digital coin

- **Live Coin Update Page**













Digital Coin Exchanger

Home Coin Transactions

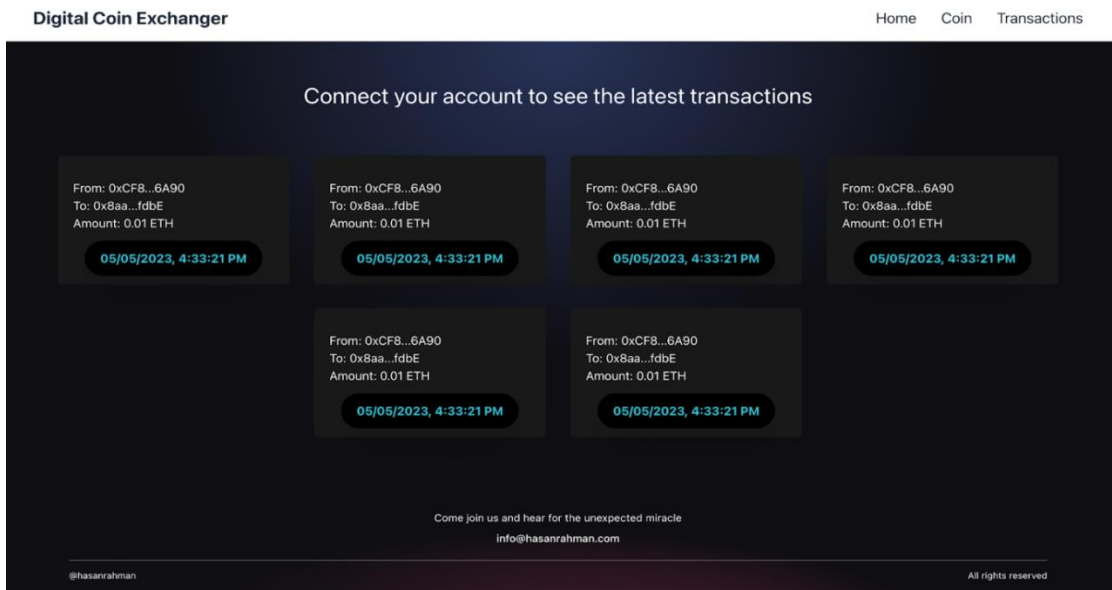
Search a currency

Search

 Bitcoin	BTC	\$26002	\$506,501,221,106	0.42%	Mkt Cap: \$6,344,684,572
 Ethereum	ETH	\$1645.84	\$198,039,060,881	0.30%	Mkt Cap: \$3,384,930,543
 Tether	USDT	\$0.999618	\$82,835,583,209	0.03%	Mkt Cap: \$10,589,602,974
 BNB	BNB	\$216.4	\$33,320,611,439	-0.17%	Mkt Cap: \$248,399,061
 XRP	XRP	\$0.523952	\$27,721,732,404	1.28%	Mkt Cap: \$662,775,174
 USD Coin	USDC	\$0.999936	\$26,022,214,487	0.05%	Mkt Cap: \$1,745,460,902
 Lido Staked Ether	STETH	\$1646.9	\$13,827,823,279	0.47%	Mkt Cap: \$20,098,796
 Cardano	ADA	\$0.260273	\$9,136,906,962	-0.06%	Mkt Cap: \$133,126,796
 Dogecoin	DOGE	\$0.062672	\$8,825,037,342	0.68%	Mkt Cap: \$150,982,677
 Solana	SOL	\$20.26	\$8,260,377,852	-0.48%	Mkt Cap: \$200,649,674

In this Page user can see updated Digital coin price by price ranking .and also show share price ,market cap etc.

- **Transactions Page**



In this page user can see their transaction history .whom to send their Digital coin and who send him /her Digital coin.

## 7.1 Introduction

The primary purpose of the website is to provide a secure and user-friendly platform for buying, selling, and trading cryptocurrencies using the Ethereum blockchain. The website will target cryptocurrency investors and traders who are looking for a reliable and trustworthy exchange that offers a wide range of cryptocurrencies and competitive fees.

## 7.2 Target Audiences Who Can Start Using Digital Coin

The integration of digital coins into the fabric of modern commerce is undeniable. As digital currencies permeate various sectors, certain demographics and professional groups stand to benefit immensely from their adoption. Let's delve into these potential target audiences:

### 1. Tech Enthusiasts:

- **Why They Matter:** These individuals are typically early adopters of new technologies. Their endorsement and adoption can set trends for the broader public.
- **Benefits:** A hands-on experience with the latest in blockchain and digital coin tech, potential investment opportunities, and leading community discussions.( Antonopoulos, A. M. ,2014).

### 2. Overseas Workers:

- **Why They Matter:** Remittances play a crucial role in many economies. Digital coins can offer a more efficient and cost-effective solution compared to traditional banking systems.
- **Benefits:** Reduced transaction fees, faster transfer times, and the elimination of intermediary banks or agents.( World Bank,2019)

### 3. E-commerce Platforms:

- **Why They Matter:** The e-commerce sector is booming globally. Integrating digital coin payment options can offer more flexibility and potentially attract a niche market segment.
- **Benefits:** Enhanced security, access to a global customer base without currency conversion concerns, and potentially lower transaction fees. (Swan, M. 2015).

### 4. Young Entrepreneurs:

- **Why They Matter:** Startups and young entrepreneurs are always looking for innovative solutions to traditional problems. Digital coins can offer various business advantages.
- **Benefits:** Raising capital through Initial Coin Offerings (ICOs) or Token Sales, creating decentralized business models, and tapping into a tech-savvy customer base.( Tapscott, D., & Tapscott, A. 2016)

## 7.3 Revenue Streams

Our website's primary revenue stream will be transaction fees. For each buy, sell, or trade transaction made on our platform, we will charge a small fee. The fee will be calculated as a percentage of the transaction value, and it will be deducted automatically from the user's account balance. We will keep our transaction fees competitive to attract more users to our platform, while also generating sufficient revenue to sustain our operations and invest in further development.

In addition to transaction fees, we will also explore other monetization strategies to diversify our revenue streams. Some potential strategies include

1. **Advertising revenue:** We will offer advertising space to relevant companies that are interested in targeting our user base. We will ensure that the advertisements are not intrusive or disruptive to the user experience, while still generating revenue for our platform
2. **Premium services:** We may offer premium services to users, such as advanced trading tools, market analysis, and research reports. These services will be available for a fee, and they will provide additional value to users who require more in-depth information and analysis
3. **Partnerships and collaborations:** We will explore partnerships and collaborations with other companies in the cryptocurrency industry, such as wallet providers, payment processors, and other exchanges. These collaborations may involve revenue-sharing arrangements, cross-promotions, or other mutually beneficial strategies

Our revenue streams will be designed to ensure the long-term sustainability and growth of our platform. We will prioritize user satisfaction and security, while also generating sufficient revenue to cover our operational costs and invest in further development

## 7.4 Digital Coin in the International Market

In less than two decades, digital coins have evolved from being a niche concept understood and embraced by only a handful of tech enthusiasts to becoming a significant player in the global financial arena. Their infiltration into the international market has been marked by a unique combination of innovation, speculation, adaptation, and regulation

### 1. Historical Context:

Bitcoin, the pioneer digital coin, was launched in 2009 as a decentralized peer-to-peer currency, introducing the revolutionary concept of blockchain technology (Nakamoto, S.

2008). Since then, thousands of digital coins, or cryptocurrencies, have emerged, each promising unique features, utilities, or governance structures.

## **2. Market Evolution:**

- **Value Growth:** The combined market capitalization of digital coins saw exponential growth, especially during specific bullish cycles in 2013, 2017, and 2020-2021 [CoinMarketCap]. Bitcoin, as the premier digital coin, maintains a dominant position, but others like Ethereum, Binance Coin, and Cardano have also gained significant market share
- **Adoption by Institutional Investors:** Previously skeptical, many institutional investors and major banks have started integrating digital coins into their portfolios and service offerings. Companies like Tesla have even considered Bitcoin as a form of payment (Tesla's Bitcoin Adventure, 2021)
- **Integration in Payment Systems:** Payment processing giants like PayPal and Square have incorporated cryptocurrency transactions into their platforms, enabling millions of merchants globally to accept digital coins (PayPal Newsroom, 2020)

## **3. Regulatory Landscape:**

- **Varied Responses:** While some countries have fully embraced digital coins, offering tax incentives and fostering crypto-businesses, others have opted for stringent regulations or outright bans. The regulatory diversity stems from concerns about financial stability, consumer protection, and potential misuse for illicit activities
- **Standardization Efforts:** International bodies, such as the Financial Action Task Force (FATF), have been working towards establishing global standards for digital coin regulations to address the challenges of money laundering and terrorist financing

## **4. Challenges & Criticisms:**

- **Volatility:** One of the most significant challenges has been the high price volatility of digital coins. Rapid price swings can pose challenges for those viewing these coins as a stable store of value. [Library of Congress]

## 8.1 Introduction

A digital coin, also known as a cryptocurrency or digital currency, is a type of virtual or digital asset that uses cryptography for secure financial transactions. Unlike traditional forms of currency issued by governments, digital coins operate on decentralized networks based on blockchain technology.

## 8.2 Threats of Using Digital Coins in Bangladesh

While the advantages of integrating digital coins into Bangladesh's financial and economic landscape are numerous, the associated threats cannot be ignored. Digital coins, with their inherent decentralized and pseudo-anonymous nature, bring forth a unique set of challenges, especially in a developing country like Bangladesh. Here's a closer look at the potential threats:

### **Regulatory Ambiguities:**

- **Explanation:** Currently, Bangladesh's stance on digital coins is cautious, with a ban on their use and trading in place since 2017( Dhaka Tribune. 2017).
- **Implications:** Without clear regulatory guidelines, the unofficial use of digital coins can flourish, bypassing the scrutiny of financial institutions. This not only poses a risk to users but can also result in lost revenue for the state in the form of taxes.

### **Money Laundering and Other Illicit Activities:**

- **Explanation:** The semi-anonymous nature of digital coin transactions makes them susceptible to misuse in money laundering schemes, especially if proper monitoring mechanisms aren't in place.
- **Implications:** With Bangladesh striving to improve its image on the global stage regarding financial transparency, unregulated and unchecked use of digital coins might tarnish these efforts and expose the country to international criticisms and sanctions(Financial Action Task Force).

### **Lack of Robust Digital Infrastructure:**

- **Explanation:** While Bangladesh has made significant strides in digitalization, there's still a considerable population without reliable access to the internet or digital literacy.
- **Implications:** Volatility can result in significant financial losses for investors, especially those who are not well-versed in the market dynamics of cryptocurrencies(Gandal, N., Hamrick, J. T., Moore, T., & Oberman, T. 2018)

**Price Volatility:**

- **Explanation:** Like many other countries, potential users in Bangladesh might be deterred by the extreme price volatility associated with digital coins
- **Implications:** Volatility can result in significant financial losses for investors, especially those who are not well-versed with the market dynamics of cryptocurrencies(Gandal, N., Hamrick, J. T., Moore, T., & Oberman, T. 2018).

**Dependence on Foreign Platforms:**

- **Explanation:** Without homegrown digital coin exchanges and platforms, Bangladeshis might rely on foreign platforms for trading and storing their digital coins.
- **Implications:** This dependence can expose them to risks associated with the regulatory environments of other countries and the security measures of these platforms(Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. 2016)

In conclusion, while the potential of digital coins in Bangladesh is significant, a careful and well-considered approach is crucial. Addressing these threats would involve the combined efforts of policymakers, technologists, and the public to ensure that the adoption of digital coins aligns with the nation's broader economic and security interests.

## 8.3 Findings on Digital Coins in Bangladesh

The rise of digital coins presents both an array of opportunities and challenges, not only on a global scale but also at the national level, particularly for countries like Bangladesh. Here's a synthesis of the findings from our comprehensive review, followed by actionable recommendations.

**Findings:****1. Digital Transformation:**

Bangladesh is undergoing a digital revolution, evidenced by its booming tech industry and increased internet penetration. This transformation indicates a potential fertile ground for the acceptance and adoption of digital coins.

**2. Economic Implications:**

Remittances play a pivotal role in Bangladesh's economy. The decentralized and efficient nature of digital coins could revolutionize this sector, cutting down transfer fees and transaction times.



### **3. Regulatory Hesitance:**

While there is an evident interest in digital coins, Bangladesh has exhibited a cautious approach to their regulation. Current guidelines, though not definitive, lean towards restrictions, which may impede potential growth in this domain.

### **4. Public Perception and Awareness:**

There's a palpable gap between the tech-savvy urban population and the rural majority in their awareness and understanding of digital coins. This disparity could affect the even dissemination and adoption of the technology.

In conclusion, the potential of digital coins in Bangladesh is vast, but realizing this potential requires careful planning, a progressive approach, and a collaborative spirit. With the right steps, Bangladesh can position itself as a front-runner in the digital coin realm in the South Asian region

## **8.4 Potentials of Using Digital Coins in Bangladesh**

Bangladesh, characterized by its youthful population, rapid technological adoption, and strong diaspora, stands at an exciting juncture when it comes to the adoption of digital coins. While the country has been historically cautious about cryptocurrencies, the potential benefits they offer cannot be overlooked. Here's a deeper look at how digital coins could transform various facets of the Bangladeshi economy:

### **Remittances:**

- **Current Landscape:** Bangladesh is one of the largest recipients of remittances in the world. In 2019, it received over \$18 billion in remittances, accounting for nearly 6% of its GDP(The Financial Express, 2020)
- **Potential with Digital Coins:** Digital coins can facilitate faster, cheaper, and more efficient cross-border transfers. By utilizing digital coins, Bangladeshi workers abroad could send money home with minimal fees and almost instantaneous transaction times(World Bank Blogs. 2018)

### **E-Commerce:**

- **Current Landscape:** The e-commerce market in Bangladesh has been witnessing rapid growth, with a surge in online businesses and digital transactions.
- **Potential with Digital Coins:** Digital coins offer an alternative mode of payment that's secure and transparent. For businesses, it could mean reduced transaction fees and protection against fraud. For consumers, it ensures quick transactions and potentially more secure and private online shopping experiences. (kim, Y. B., Kim, J. G., Kim, W., Im, J. H., & Kim, T. H. 2016).

**Financial Inclusion:**

- **Current Landscape:** Despite significant improvements in recent years, a considerable portion of the Bangladeshi population remains unbanked or underbanked(The Daily Star. 2019).
- **Potential with Digital Coins:** Digital coins can serve as a bridge to financial inclusion. With a smartphone and internet connection, people can access digital wallets, sidestepping traditional banking barriers. This can empower a large segment of the population, offering them an entry point into the formal financial ecosystem and boosting savings, investments, and financial literacy.(Tapscott, D., & Tapscott, A. 2016)

**Innovation and Tech Startups:**

- **Current Landscape:** Bangladesh's IT sector is booming, with Dhaka becoming a hub for tech startups and innovations.
- **Potential with Digital Coins:** Embracing digital coins could position Bangladesh at the forefront of fintech innovation in South Asia. By developing a supportive ecosystem – from blockchain incubators to educational initiatives – the country could attract investments and talent in the burgeoning field of digital finance(Fintech Singapore. 2019)

# CONCLUSION

The advent of digital coins and blockchain technology has ushered in a new era of financial transactions, offering numerous potential benefits such as decentralization, transparency, and reduced transaction costs. However, these advantages are accompanied by several challenges, including volatility, regulatory concerns, and potential misuse in illicit activities. This project aimed to provide a comprehensive analysis of digital coin transactions using blockchain technology, with a specific focus on the potential benefits and challenges faced by Bangladesh. The findings revealed that digital coins hold vast potential for various applications in Bangladesh, including remittances, e-commerce, and financial inclusion. Key target audiences identified include tech enthusiasts, overseas workers, e-commerce platforms, and young entrepreneurs.

However, the adoption and integration of digital coins into the financial ecosystem of Bangladesh are not without challenges. Regulatory ambiguities, potential for money laundering, and lack of a robust digital infrastructure pose significant hurdles. To harness the potential of digital coins while mitigating the associated challenges, this project recommends implementing a harmonized regulatory framework, promoting public awareness and education, and encouraging the adoption of secure and user-friendly digital coin wallets.

Ultimately, the success of digital coin transactions in Bangladesh and similar economies will depend on a coordinated effort among all stakeholders, including governments, financial institutions, tech companies, and the public. By fostering a supportive regulatory environment, raising awareness, and promoting education, Bangladesh can harness the potential of digital coins to contribute to its economic development and financial inclusion, thereby building a more secure, efficient, and inclusive financial ecosystem for all.

## REFERENCES

- Antonopoulos, A. M. (2014). "Mastering Bitcoin: Unlocking Digital Cryptocurrencies." O'Reilly Media.
- Bangladesh: Record remittance in 2019." The Financial Express. 2020. <https://thefinancialexpress.com.bd/>
- Buterin, V. (2013). Ethereum Whitepaper: A Next-Generation Smart Contract and Decentralized Application Platform. Ethereum.org. <https://ethereum.org/en/whitepaper/>
- Bangladesh Bank warns against the transaction in 'illegal' Bitcoin, other cryptocurrencies." Dhaka Tribune. 2017
- Casey, M.J., & Vigna, P. (2018). The Truth Machine: The Blockchain and the Future of Everything
- Cryptocurrency Historical Data." CoinMarketCap. <https://coinmarketcap.com/>
- Catalini, C., & Gans, J. S. (2016). "Some Simple Economics of the Blockchain." NBER.
- Cryptocurrency Historical Data." CoinMarketCap. <https://coinmarketcap.com/>
- Financial Inclusion in Bangladesh." The Daily Star. 2019. <https://www.thedailystar.net/>
- Foley, S., Karlsen, J. R., & Putniņš, T. J. (2019). "Sex, Drugs, and Bitcoin: How Much Illegal Activity Is Financed Through Cryptocurrencies?" Review of Financial Studies.
- FATF. (2020). "Guidance on Digital Identity." Financial Action Task Force.
- Gandal, N., Hamrick, J. T., Moore, T., & Oberman, T. (2018). "Price Manipulation in the Bitcoin Ecosystem." Journal of Monetary Economics.
- Guidance for a Risk-Based Approach to Virtual Assets and VASPs." FATF. 2019. <https://www.fatf-gafi.org/>
- Gandal, N., Hamrick, J. T., Moore, T., & Oberman, T. (2018). "Price Manipulation in the Bitcoin Ecosystem." Journal of Monetary Economics.
- Gandal, N., Hamrick, J. T., Moore, T., & Oberman, T. (2018). "Price Manipulation in the Bitcoin Ecosystem." Journal of Monetary Economics.
- How Cryptocurrencies Can Influence the Future of Remittances." World Bank Blogs. 2018.
- kim, Y. B., Kim, J. G., Kim, W., Im, J. H., & Kim, T. H. (2016). "Toward an understanding of cryptocurrency: An empirical analysis of Bitcoin and altcoin." Electronic Commerce Research and Applications.
- Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System
- Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). "Bitcoin and Cryptocurrency Technologies." Princeton University Press.

Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). Bitcoin and Cryptocurrency Technologies

Narayanan, A., & Clark, J. (2017). "Bitcoin's Academic Pedigree." ACM Queue. <https://queue.acm.org/>

Narayanan, A., Bonneau, J., Felten, E., Miller, A., & Goldfeder, S. (2016). "Bitcoin and Cryptocurrency Technologies." Princeton University Press.

PayPal Launches New Cryptocurrency Service." PayPal Newsroom. 2020.

Regulation of Cryptocurrency Around the World." Library of Congress.

Regulation of Cryptocurrency Around the World." Library of Congress.

simplilearn-<https://www.simplilearn.com/tutorials/blockchain-tutorial/blockchain-technology>

Swan, M. (2015). "Blockchain: Blueprint for a New Economy." O'Reilly Media.

Tapscott, D., & Tapscott, A. (2016). "Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World

The Rising Fintech Scene in Bangladesh." Fintech Singapore. 2019.

Tapscott, D., & Tapscott, A. (2016). "Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World

Tapscott, D., & Tapscott, A. (2016). "Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World." Penguin.

Tesla's Bitcoin Adventure." Reuters. 2021. <https://www.reuters.com/>

Wood, G. (2014). Ethereum: A Secure Decentralised Generalised Transaction Ledger

World Economic Forum. (2021). "Digital Currency Governance Consortium: Insights and Key Findings. <https://www.weforum.org/>

Zohar, A. (2015). "Bitcoin: Under the Hood." Communications of the ACM. <https://cacm.acm.org/>

## SOURCE CODE

- **HomePage.jsx**

```
import { Welcome, Services, Transactions } from ".";
```

```
const HomePage = () => (  
  <div className="min-h-screen">  
    <div className="gradient-bg-welcome">  
      <Welcome />  
    </div>  
    <Services />  
    <Transactions />  
  </div>  
);
```

```
export default HomePage;
```

- **Welcome Component**

```
import React, { useContext } from "react";  
import { AiFillPlayCircle } from "react-icons/ai";  
import { SiEthereum } from "react-icons/si";  
import { BsInfoCircle } from "react-icons/bs";
```

```
import { TransactionContext } from "../context/TransactionContext";  
import { shortenAddress } from "../utils/shortenAddress";  
import { Loader } from ".";
```

```
const companyCommonStyles = "min-h-[70px] sm:px-0 px-2 sm:min-w-[120px] flex justify-center items-center border-[0.5px] border-gray-400 text-sm font-light text-white";
```

```
const Input = ({ placeholder, name, type, value, handleChange }) => (  
  <input  
    placeholder={placeholder}  
    type={type}  
    step="0.0001"  
    value={value}  
    onChange={(e) => handleChange(e, name)}  
    className="my-2 w-full rounded-sm p-2 outline-none bg-transparent text-white border-none text-sm white-glassmorphism"  
  />  
);
```

```
const Welcome = () => {  
  const { currentAccount, connectWallet, handleChange, sendTransaction, formData, isLoading } = useContext(TransactionContext);
```

```
  const handleSubmit = (e) => {  
    const { addressTo, amount, message } = formData;
```

```
    e.preventDefault();
```

```

if (!addressTo || !amount || !message) return;

sendTransaction();
};

return (
<div className="flex w-full justify-center items-center">
<div className="flex mf:flex-row flex-col items-start justify-between md:p-20 py-12 px-4">
<div className="flex flex-1 justify-start items-start flex-col mf:mr-10">
<h1 className="text-3xl sm:text-5xl text-white text-gradient py-1">
Send Digital Coin <br /> across the world
</h1>
<p className="text-left mt-5 text-white font-light md:w-9/12 w-11/12 text-base">
Explore the crypto world. Buy and sell cryptocurrencies easily on Coinbhai.
</p>
{!currentAccount && (
<button
type="button"
onClick={connectWallet}
className="flex flex-row justify-center items-center my-5 bg-[#2952e3] p-3 rounded-full
cursor-pointer hover:bg-[#2546bd]"
>
<AiFillPlayCircle className="text-white mr-2" />
<p className="text-white text-base font-semibold">
Connect Wallet
</p>
</button>
)}

<div className="grid sm:grid-cols-3 grid-cols-2 w-full mt-10">
<div className={`rounded-tl-2xl ${companyCommonStyles}`}>
Reliability
</div>
<div className={companyCommonStyles}>Security</div>
<div className={`sm:rounded-tr-2xl ${companyCommonStyles}`}>
Ethereum
</div>
<div className={`sm:rounded-bl-2xl ${companyCommonStyles}`}>
Web 3.0
</div>
<div className={companyCommonStyles}>Low Fees</div>
<div className={`rounded-br-2xl ${companyCommonStyles}`}>
Blockchain
</div>
</div>
</div>
</div>

<div className="flex flex-col flex-1 items-center justify-start w-full mf:mt-0 mt-10">
<div className="p-3 flex justify-end items-start flex-col rounded-xl h-40 sm:w-72 w-full
my-5 eth-card .white-glassmorphism ">
<div className="flex justify-between flex-col w-full h-full">
<div className="flex justify-between items-start">
<div className="w-10 h-10 rounded-full border-2 border-white flex justify-center items-
center">
<SiEthereum fontSize={21} color="#fff" />

```

```

</div>
<BsInfoCircle fontSize={17} color="#fff" />
</div>
<div>
<p className="text-white font-light text-sm">
{shortenAddress(currentAccount)}
</p>
<p className="text-white font-semibold text-lg mt-1">
Ethereum
</p>
</div>
</div>
</div>
<div className="p-10 sm:w-96 w-full flex flex-col justify-start items-center blue-
glassmorphism">
<Input placeholder="Address To" name="addressTo" type="text"
handleChange={handleChange} />
<Input placeholder="Amount (ETH)" name="amount" type="number"
handleChange={handleChange} />
<Input placeholder="Enter Message" name="message" type="text"
handleChange={handleChange} />
{isLoading
? <Loader />
: (
<button
type="button"
onClick={handleSubmit}
className="text-white w-full mt-10 border-[1px] p-2 border-[#3d4f7c] hover:bg-[#3d4f7c]
rounded-full cursor-pointer"
>
Send now
</button>
)}
</div>
</div>
</div>
</div>
);
};

```

```
export default Welcome;
```

- **Service Component**

```

import React from "react";
import { BsShieldFillCheck } from "react-icons/bs";
import { BiSearchAlt } from "react-icons/bi";
import { RiHeart2Fill } from "react-icons/ri";

const ServiceCard = ({ color, title, icon, subtitle }) => (
<div className="flex flex-row justify-start items-start white-glassmorphism p-3 m-2 cursor-
pointer hover:shadow-xl">
<div className={`w-10 h-10 rounded-full flex justify-center items-center ${color}`}>
{icon}
</div>

```



```

<div className="ml-5 flex flex-col flex-1">
<h3 className="mt-2 text-white text-lg">{title}</h3>
<p className="mt-1 text-white text-sm md:w-9/12">
{subtitle}
</p>
</div>
</div>
);

const Services = () => (
<div className="flex w-full justify-center items-center gradient-bg-services">
<div className="flex mf:flex-row flex-col items-center justify-between md:p-20 py-12 px-4">
<div className="flex-1 flex flex-col justify-start items-start">
<h1 className="text-white text-3xl sm:text-5xl py-2 text-gradient ">
Services that we
<br />
continue to improve
</h1>
<p className="text-left my-2 text-white font-light md:w-9/12 w-11/12 text-base">
The best choice for buying and selling your crypto assets, with the
various super friendly services we offer
</p>
</div>

<div className="flex-1 flex flex-col justify-start items-center">
<ServiceCard
color="bg-[#2952E3]"
title="Security gurantee"
icon={<BsShieldFillCheck fontSize={21} className="text-white" />}
subtitle="Security is guaranteed. We always maintain privacy and maintain the quality of our
products"
/>
<ServiceCard
color="bg-[#8945F8]"
title="Best exchange rates"
icon={<BiSearchAlt fontSize={21} className="text-white" />}
subtitle="Security is guaranteed. We always maintain privacy and maintain the quality of our
products"
/>
<ServiceCard
color="bg-[#F84550]"
title="Fastest transactions"
icon={<RiHeart2Fill fontSize={21} className="text-white" />}
subtitle="Security is guranteed. We always maintain privacy and maintain the quality of our
products"
/>
</div>
</div>
</div>
);

export default Services;

```

- **Transaction Component**

```

import React, { useContext } from "react";

import { TransactionContext } from "../context/TransactionContext";

import dummyData from "../utils/dummyData";
import { shortenAddress } from "../utils/shortenAddress";
import Footer from "../Footer";

const TransactionsCard = ({
  addressTo,
  addressFrom,
  timestamp,
  message,
  amount,
}) => (
  <div
    className="bg-[#181918] m-4 flex flex-1
    2xl:min-w-[450px]
    2xl:max-w-[500px]
    sm:min-w-[270px]
    sm:max-w-[300px]
    min-w-full
    flex-col p-3 rounded-md hover:shadow-2xl"
  >
    <div className="flex flex-col items-center w-full mt-3">
      <div className="display-flex justify-start w-full mb-6 p-2">
        <a
          href={`https://ropsten.etherscan.io/address/${addressFrom}`}
          target="_blank"
          rel="noreferrer"
        >
          <p className="text-white text-base">
            From: {shortenAddress(addressFrom)}
          </p>
        </a>
        <a
          href={`https://ropsten.etherscan.io/address/${addressTo}`}
          target="_blank"
          rel="noreferrer"
        >
          <p className="text-white text-base">
            To: {shortenAddress(addressTo)}
          </p>
        </a>
        <p className="text-white text-base">Amount: {amount} ETH</p>
        {message && (
          <div style="display: flex; align-items: center; gap: 10px;">
            <div style="border: 1px solid #ccc; padding: 2px 5px; border-radius: 4px; font-size: 0.8em; font-weight: bold; color: #181918; background-color: #fff;">
              {timestamp}
            </div>
            <div style="font-size: 0.8em; color: #ccc;">
              {message}
            </div>
          </div>
        )}
      </div>
    </div>
  </div>
)

```

```

<div className="bg-black p-3 px-5 w-max rounded-3xl -mt-5 shadow-2xl">
<p className="text-[#37c7da] font-bold">{timestamp}</p>
</div>
</div>
</div>
);
const Transactions = () => {
const { transactions, currentAccount } = useContext(TransactionContext);

return (
<>
<div className="flex w-full justify-center items-center 2xl:px-20 gradient-bg-transactions">
<div className="flex flex-col md:p-12 py-12 px-4">
{currentAccount ? (
<h3 className="text-white text-3xl text-center my-2">
Latest Transactions
</h3>
): (
<h3 className="text-white text-3xl text-center my-2">
Connect your account to see the latest transactions
</h3>
)}
</div>
</div>
</div>
</div>

<Footer />
</>
);
};

export default Transactions;

```

- **Coin Page**

```

import React, { useState, useEffect } from "react";
import axios from "axios";
import Coin from "./Coin";

function CoinPage() {
const [coins, setCoins] = useState([]);
const [search, setSearch] = useState("");

const handleChange = (e) => {
setSearch(e.target.value);
};

const filteredCoins = coins.filter((coin) =>
coin.name.toLowerCase().includes(search.toLowerCase()));

```

```

return (

<div className="coin-app">
<div className="coin-search">
<h1 className="coin-text">Search a currency</h1>
<form>
<input
className="coin-input"
type="text"
onChange={handleChange}
placeholder="Search"
/>
</form>
</div>
{filteredCoins.map((coin) => (
<Coin
key={coin.id}
name={coin.name}
price={coin.current_price}
symbol={coin.symbol}
marketcap={coin.total_volume}
volume={coin.market_cap}
image={coin.image}
priceChange={coin.price_change_percentage_24h}
/>
))}
</div>
);
}

export default CoinPage;

```

- **Transaction Context Component**

```

import React, { useEffect, useState } from "react";
import { ethers } from "ethers";

import { contractABI, contractAddress } from "../utils/constants";

export const TransactionContext = React.createContext();

const { ethereum } = window;

const createEthereumContract = () => {
const provider = new ethers.providers.Web3Provider(ethereum);
const signer = provider.getSigner();
const transactionsContract = new ethers.Contract(contractAddress, contractABI, signer);

return transactionsContract;
};

export const TransactionsProvider = ({ children }) => {

```

```

const [formData, setformData] = useState({ addressTo: "", amount: "", keyword: "", message:
"" });
const [currentAccount, setCurrentAccount] = useState("");
const [isLoading, setIsLoading] = useState(false);
const [transactionCount, setTransactionCount] =
useState(localStorage.getItem("transactionCount"));
const [transactions, setTransactions] = useState([]);

const handleChange = (e, name) => {
setformData((prevState) => ({ ...prevState, [name]: e.target.value }));
};

const getAllTransactions = async () => {
try {
if (ethereum) {
const transactionsContract = createEthereumContract();

const availableTransactions = await transactionsContract.getAllTransactions();

const structuredTransactions = availableTransactions.map((transaction) => ({
addressTo: transaction.receiver,
addressFrom: transaction.sender,
timestamp: new Date(transaction.timestamp.toNumber() * 1000).toLocaleString(),
message: transaction.message,
keyword: transaction.keyword,
amount: parseInt(transaction.amount._hex) / (10 ** 18)
})));

console.log(structuredTransactions);

setTransactions(structuredTransactions);
} else {
console.log("Ethereum is not present");
}
} catch (error) {
console.log(error);
}
};

const checkIfWalletIsConnect = async () => {
try {
if (!ethereum) return alert("Please install MetaMask.");

const accounts = await ethereum.request({ method: "eth_accounts" });

if (accounts.length) {
setCurrentAccount(accounts[0]);

getAllTransactions();
} else {
console.log("No accounts found");
}
} catch (error) {
console.log(error);
}
}

```

```

};

const checkIfTransactionsExists = async () => {
  try {
    if (ethereum) {
      const transactionsContract = createEthereumContract();
      const currentTransactionCount = await transactionsContract.getTransactionCount();

      window.localStorage.setItem("transactionCount", currentTransactionCount);
    }
  } catch (error) {
    console.log(error);

    throw new Error("No ethereum object");
  }
};

const connectWallet = async () => {
  try {
    if (!ethereum) return alert("Please install MetaMask.");

    const accounts = await ethereum.request({ method: "eth_requestAccounts", });

    setCurrentAccount(accounts[0]);
    window.location.reload();
  } catch (error) {
    console.log(error);

    throw new Error("No ethereum object");
  }
};

const sendTransaction = async () => {
  try {
    if (ethereum) {
      const { addressTo, amount, keyword, message } = formData;
      const transactionsContract = createEthereumContract();
      const parsedAmount = ethers.utils.parseEther(amount);

      await ethereum.request({
        method: "eth_sendTransaction",
        params: [{
          from: currentAccount,
          to: addressTo,
          gas: "0x5208",
          value: parsedAmount._hex,
        }],
      });

      const transactionHash = await transactionsContract.addToBlockchain(addressTo,
        parsedAmount, message, keyword);

      setIsLoading(true);
      console.log(`Loading - ${transactionHash.hash}`);
      await transactionHash.wait();
    }
  }
};

```

```

console.log(`Success - ${transactionHash.hash}`);
setIsLoading(false);

const transactionsCount = await transactionsContract.getTransactionCount();

setTransactionCount(transactionsCount.toNumber());
window.location.reload();
} else {
console.log("No ethereum object");
}
} catch (error) {
console.log(error);

throw new Error("No ethereum object");
}
};

useEffect(() => {
checkIfWalletIsConnect();
checkIfTransactionsExists();
}, [transactionCount]);

return (
<TransactionContext.Provider
value={{
transactionCount,
connectWallet,
transactions,
currentAccount,
isLoading,
sendTransaction,
handleChange,
formData,
}}
>
{children}
</TransactionContext.Provider>
);
};

```

- **Smart\_Contract Transactions**

```

// SPDX-License-Identifier: UNLICENSED

pragma solidity ^0.8.0;

import "hardhat/console.sol";

contract Transactions {
uint256 transactionCount;

event Transfer(address from, address receiver, uint amount, string message, uint256
timestamp, string keyword);
struct TransferStruct {

```

```

address sender;
address receiver;
uint amount;
string message;
uint256 timestamp;
string keyword;
}

```

```

TransferStruct[] transactions;

```

```

function addToBlockchain(address payable receiver, uint amount, string memory message,
string memory keyword) public {
transactionCount += 1;
transactions.push(TransferStruct(msg.sender, receiver, amount, message, block.timestamp,
keyword));

```

```

emit Transfer(msg.sender, receiver, amount, message, block.timestamp, keyword);
}

```

```

function getAllTransactions() public view returns (TransferStruct[] memory) {
return transactions;
}

```

```

function getTransactionCount() public view returns (uint256) {
return transactionCount;
}
}

```

- **Deploy**

```

const main = async () => {
const transactionsFactory = await hre.ethers.getContractFactory("Transactions");
const transactionsContract = await transactionsFactory.deploy();

```

```

await transactionsContract.deployed();

```

```

console.log("Transactions address: ", transactionsContract.address);
};

```

```

const runMain = async () => {
try {
await main();
process.exit(0);
} catch (error) {
console.error(error);
process.exit(1);
}
};

```

```

runMain();

```



