

CRYP-COIN

Submitted in partial fulfillment of the requirements for the degree of

Bachelor of Computer Engineering

by

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A. P. SHAH INSTITUTE OF TECHNOLOGY

CERTIFICATE

This is to certify that the Mini Project 2B entitled "**Cryp-Coin**" is a bonafide work of "**Aditi Raut**" (20102182), "**Dhananjay Shinde**"(20102200), "**Pranay Patil**" (20102185), "**Raj Rehpade**" (20102053) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **Bachelor of Engineering in Computer Engineering**.

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Project Report Approval Sheet

This Mini Project Report entitled “Cryp-Coin” Submitted by “Aditi Raut” (20102182), “Dhananjay Shinde”(20102200), “Pranay Patil” (20102185), “Raj Rehpade” (20102053) is approved for the degree of Bachelor of Engineering in Department of Computer Engineering, 2021-22.

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Declaration

We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Chapter 1

Introduction

There is no doubt that the era of information and communication technologies has created many golden opportunities in several aspects. One of the fields that benefit from these technologies and online connections is the financial and business sector. A growing number of online users has activated virtual world concepts and created a new business phenomenon. Thus, new types of trading, transactions, and currencies have been arising. One of the remarkable financial forms that have emerged in the past few years is Cryptocurrency. Cryptocurrency (CC) can be defined as any medium of exchange, apart from real-world money, that can be used in many financial transactions whether they are virtual or real transactions. Cryptocurrencies represent valuable and intangible objects which can be used electronically or virtually in different applications and networks such as online social networks, online social games, virtual worlds, and peer-to-peer networks.

Virtual currency is basically used to exchange a commodity. It is extremely better than FIAT currency and this gives an opportunity to even invest in the world of cryptocurrency. These currencies do not have a fixed value so there has to be a real-time record and update the whole chart which would be compared among the leading cryptocurrencies all over the world. Virtual currency can be well-defined as a digital illustration of value that is issued and controlled by its developers and used and accepted among the members of a definite (virtual) communal. Unlike FIAT currency, it depends on a system of conviction and is not issued by a central bank or other banking authority also these decentralized currencies don't even have a server in the middle, this whole process works on a PEER-PEER connection which is quite risky, and connection which is quite risky and safe both at the same time.

This system creates awareness for those who don't know about these virtual currencies that would start making a change from level 0. For those who already are working on these VCs for them, the system would manage the watch list and keep giving real-time updates about the interested VC. This system creates awareness for those who don't know about these virtual currencies that would start making a change from level 0. For those who already are working on these VCs for them, the system would manage the watch list and keep giving real-time updates about the interested VC.

Chapter 2

Literature Review

The creation of a new data trading business has been propelled by data, a crucial resource in our data-driven economy. However, due to the presence of dishonest buyers and data brokers, there are a number of constraints in traditional data trading platforms. We argue the significance of a data processing-as-a-service paradigm as a complement to the traditional data hosting/exchange-as-a-service approach in order to reduce these restrictions. In this work, we provide a new blockchain-based data trading environment as well as a secure data trading ecosystem (hereafter referred to as SDTE). Due to the ecosystem, neither the buyer nor the data broker has access to the seller's raw data; instead, they only have access to the analytical results that they need. To put it another way, we scale down the difficulty of protecting the dataset. Financial institutions are increasingly including cryptocurrencies in their portfolios, as seen in recent years. The first completely digital assets that asset managers have included are cryptocurrencies. Although they share some characteristics with more conventional assets, they have their own unique nature, and our understanding of how they behave as assets is constantly developing. It is crucial to summarize the findings of the study that has already been done on cryptocurrency trading, including the trading platforms that are available, the trading signals, the research on trading strategies, and risk management.[1]

The concept of "smart contracts," or computer protocols intended to automatically facilitate, verify, and enforce the negotiation and implementation of digital contracts without the need for centralized authorities, has been revived by the rapid development of cryptocurrencies and the blockchain technology that underpins them, in recent years. Smart contracts have been incorporated into popular blockchain-based development platforms like Ethereum and Hyperledger. They have a wide range of potential application scenarios in the digital economy and intelligent industries, including financial services, management, healthcare, and the Internet of Things, among others. But smart contracts are still in their infancy, and more research is still needed to address important technical problems like security and privacy concerns. For instance, "The DAO Attack" in June may be the most well-known instance.[2]

The use of blockchain technology for the implementation of a decentralized electricity market is currently being studied. In recent years, there has been a growing interest to study the scenarios of the creation of a decentralized and local Energy Market (LEM) by using blockchain technology to enable the development of intelligent energy networks and the advancement of measurement and control systems. There are many possible scenarios for self-produced energy from prosumers resident in European territories, as reported by Bitcoin Magazine. In their paper,

the prosumers in the smart grid trade locally produced renewable energy by using NRGcoins. Moreover, energy market projects, based on blockchain and smart grids, should take into consideration the issue of sustainability. We consider blockchain technology that enabled the existence of digital currency and we investigate Bitcoin cryptocurrency applications. Today's technology is a new feature that adds many extra capabilities, including high availability, resistance to change, fault tolerance, and cost reduction, to existing client-server core systems on top of some distributed systems. After briefly describing how such technology operates, we highlight the needs and advantages associated with security, databases, and networks. We primarily concentrate on responding to the most frequent questions about Bitcoin, such as those around double spending and privacy. Additionally, given that blockchain has potential uses far beyond bitcoin, we draw conclusions for the future in which blockchain-based apps are made available on the market in order to be fully or partially independent of centralized systems.[3]

We gave a comprehensive review and analysis of the studies on trading in cryptocurrencies. The terminology of the definitions and the state of the art were reported in this survey. This report offers a thorough analysis of 146 papers on cryptocurrency trading and examines the research distribution that defines the field's literature. In this survey, the distribution of research across categories and technologies is examined. We also summarized the experimental datasets and examined the research trends and trade opportunities in cryptocurrencies. In the section under "Opportunities in bitcoin trading," future research areas and opportunities are covered. We expect that both academics (such as finance scholars) and quantitative traders will profit from this survey. The survey offers a rapid orientation to the literature on cryptocurrency trading.[4]

The ability to efficiently manage and analyze huge amounts of data is essential because doing so can help public and private sector decision-makers make better decisions, which benefits society by boosting productivity and reducing red tape. Data trading systems, also known as data exchange, have exploded recently to make the trade of datasets easier. Examples of such platforms include Data Trading, Terbine, GXS, and INFOCHIMPS, which serve as a conduit between buyers and sellers. Three parties typically make up a traditional data trading ecosystem, the condensed version, the seller, the data exchange (i.e., a middleman), and the buyer. To be more precise, the vendor transmits the dataset to a reliable data exchange platform and sets a realistic list price. Similar to other e-commerce transactions, the buyer will choose a data product that captivates the interest and submit an online order. The data exchange platform will provide the acquired data to the buyer after receiving the buyer's payment and paying the seller (less any administrative fees or commission). If the buyer cannot use the raw dataset right away, the buyer will need to reprocess the dataset in order to get the necessary results that meet the buyer's needs.[5]

In other words, blockchain is a technology that offers a scalable, safe, immutable, and searchable distributed record of transactions on a network. It consists of several data blocks, each of which contains a set of transactions, and is spread over a network of users. An electronic chain connecting the blocks and a cryptographic lock secures them, and a public record of each transaction is created. The likelihood of blocks can be altered decreases as there are more blocks available. Bitcoin, created by Satoshi Nakamoto in 2008, is the well-known cryptocurrency for which blockchain technology was first developed. To create the bitcoin cryptocurrency, Nakamoto cleverly combines the earlier security innovations of Hashcash, asymmetric cryptography, consensus, and the Merkle tree.[6]

In compliance with official data, the first block (generation) was launched in 2009. Since then, the chain has increased consistently every few minutes, reaching 52k blocks in 2018 while the price of one bitcoin has risen to \$8,000. Technologists began to consider and study decentralization as a result of bitcoin's success. Bitcoin is a digital currency that may be used to pay for goods and services by rewarding participating nodes (miners), validating transactions, and maintaining network stability to the greatest extent possible. Blockchain is the underlying technology that allows the Bitcoin network to function in a transparent, independent, and decentralized manner, where trust is upheld through cryptography rather than by its users. In principle, there wouldn't be bitcoin without a blockchain, but a blockchain can be without bitcoin. Because blockchain technology has applications outside of financial development, this distinction is important. This essay examines the use of the Cryptocurrency bitcoin and blockchain technology. We bring focus on the overall functionality of cryptocurrency as well as its unique issues and solutions.[7]

The term Szabo, a computer scientist and cryptographer, used the word "smart contract" in the middle of the 1990s. He defined it as "a set of promises, specified in digital form, including mechanisms within which the parties fulfill these promises." In his well-known example, Szabo linked smart contracts to vending machines, that accept coins and dispense change and goods in accordance with the prices using a basic mechanism (such as a finite automaton). By proposing to embed contracts in all different types of properties digitally, contracts go beyond the vending machine. Szabo also predicted that smart contracts will be much more useful than their inert paper-based predecessors due to their clear logic, cryptographic protocol verification, and enforcement. However, the concept of intelligent contracts was not fulfilled until the advent of blockchain technology, where the consensus process and public and append-only distributed ledger technology (DLT) allow for the implementation of smart contracts in their truest sense. The computer algorithms that electronically facilitate, verify and enforce contracts formed between two or more parties on the blockchain are known as smart contracts. Since blockchain is often used to deploy and secure smart contracts, these contract terms have some special features.[8]

A smart contract will first have its program code verified and stored on the blockchain, making it tamper-resistant. Second, without centralized control or the cooperation of outside authorities, a smart contract is implemented among anonymous, trustless nodes. The Bitcoin scripting language is limited to simple arithmetic, it is impossible to develop a blockchain network with complex logic. The runtime for EVM is every node in the Ethereum network, smart contracts, and runs an EVM implementation while performing the same commands. Several advanced coding languages include One can create Ethereum smart contracts using Serpent and Solidity 3.contracts and the code for the contracts is reduced to an EVM executed using bytecode deployed on the blockchain. The most widely used cryptographic protocol creation platform at the moment is Ethereum, which may be used to create a variety of applications that are decentralized, such as digital rights management, crowdsourcing, gaming, etc.[9]

A renowned reality is that in June 2016, The DAO, a decentralized, investor-directed, Ethereum bitcoin venture capital fund, was attacked by taking full advantage of a major smart contract vulnerability dubbed repeatedly And over \$50 million was stolen by an assailant. Ether into a "child DAO" with The DAO's organizational structure. An Ethereum soft fork was conducted to recoup the money from the assailant. Nevertheless, this hard fork was contentious because it disregards the rule of law in line with blockchain technology's principles. It continued to face multiple challenges in recent years. a renowned reality that in June 2016, The DAO, a decentralized, investor-directed, Ethereum bitcoin venture capital fund, was attacked by taking full advantage of a major smart contract vulnerability dubbed repeatedly And over \$50 million was stolen by the assailant. Ether into a "child DAO" with The DAO's organizational structure.DAO. Nevertheless, this hard fork was contentious because it disregards the rule of law in line with blockchain technology's principles. Other difficulties, in addition to the security issue, include performance, privacy, questions of law, etc. This paper's main objective is to present a comprehensive overview of smart contract research, encompassing the functioning, directly enhance, and use of applications, issues, latest events, potential trends, etc. The chapter introduces smart contracts in a systematic way, including windows vista, common project platforms, and a basic research framework using a six-layer design is proposed.[10]

Chapter 3

Problem Statement

Despite the pandemic, crypto trading is invariably booming, there are many platforms to trade and learn about cryptocurrency but there is no centralized platform where both coexist together. Existing platforms provide similar services but they ask for paid subscriptions which are not feasible for everyone. We aim to provide the services with a simple UI and easy-to-use system.

Objectives

- To provide a one-stop platform for learning cryptocurrency.
- To manage cryptocurrency transactions efficiently.
- The user would be able to work on their profits by viewing the asset's worth.
- To have a clear understanding of cryptocurrency transactions.

Scope

- User will be able to analyze the real-time worth of his/her assets with the user-friendly GUI.
- One can also share their knowledge of cryptocurrency by writing blogs.

Chapter 4

Proposed System

4.1 Architecture Diagram

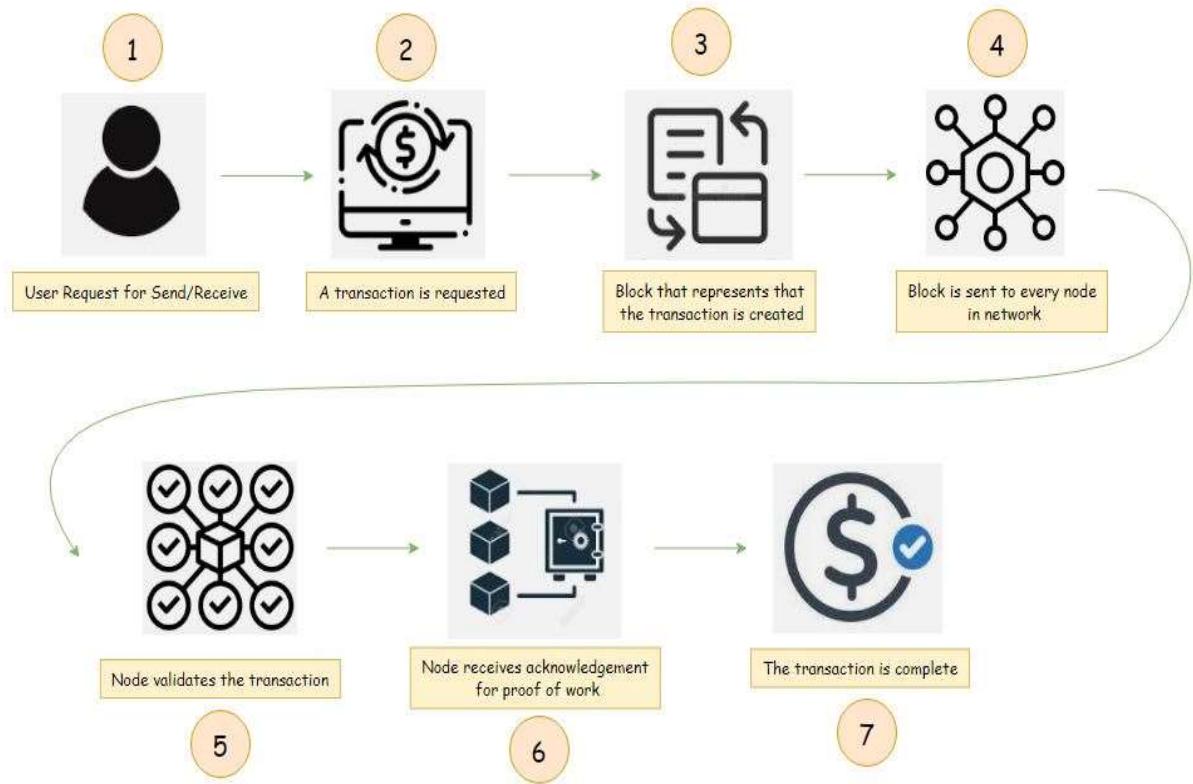


Fig 4.1 Architectural Diagram

This is a proposed design in which the user first needs to request to send/receive tokens. After that, a transaction is requested. After that, a block that represents the transaction is created. Block is sent to every node in the network. The node then validates the transaction and it then approves the proof of work after that, the transaction is considered complete.

4.2 UML Diagrams

4.2.1 DFD Diagram

Level 0

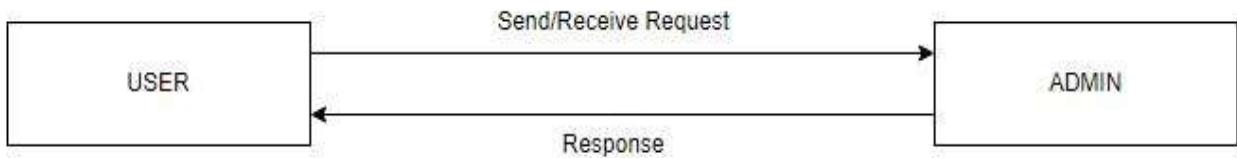


Fig 4.2 DFD Level 0

This represents Level-0 DFD Diagram which contains two entities, the User and the Admin. The user sends/receives Requests while the Admin responds to them.

Level 1

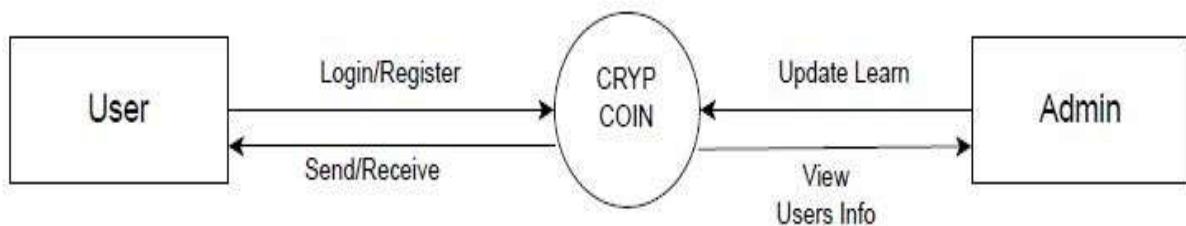


Fig 4.3 DFD Level 1

A bit advanced DFD diagram with crypto in the middle, which handles Login/Register and updating of the learning section. It can also send/receive tokens as well as view users' information.

Level 2

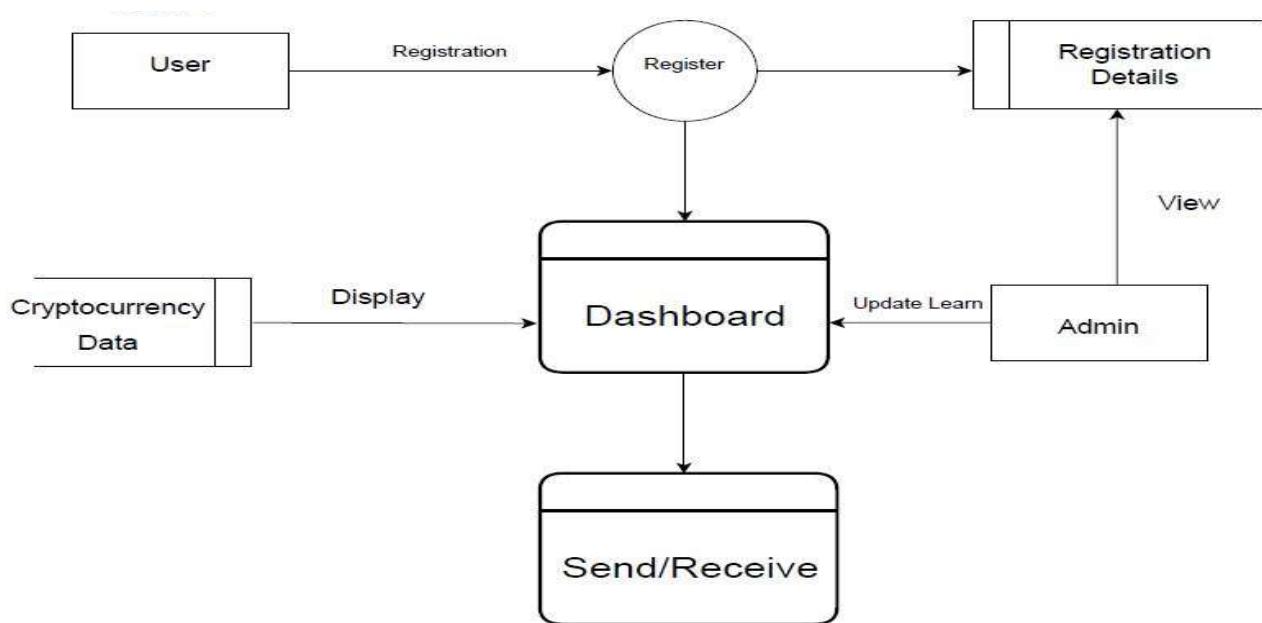


Fig 4.4 DFD Level 2

The advanced DFD module contains many components like Databases and validations. Firstly the user needs to register himself and he will be directed to the register module. Then it goes to the Dashboard which contains the cryptocurrency data and can send/receive tokens. The Admin can update the learn section in the dashboard while it can view the registration details in the database provided for the same.

4.2.2 Use Case Diagram

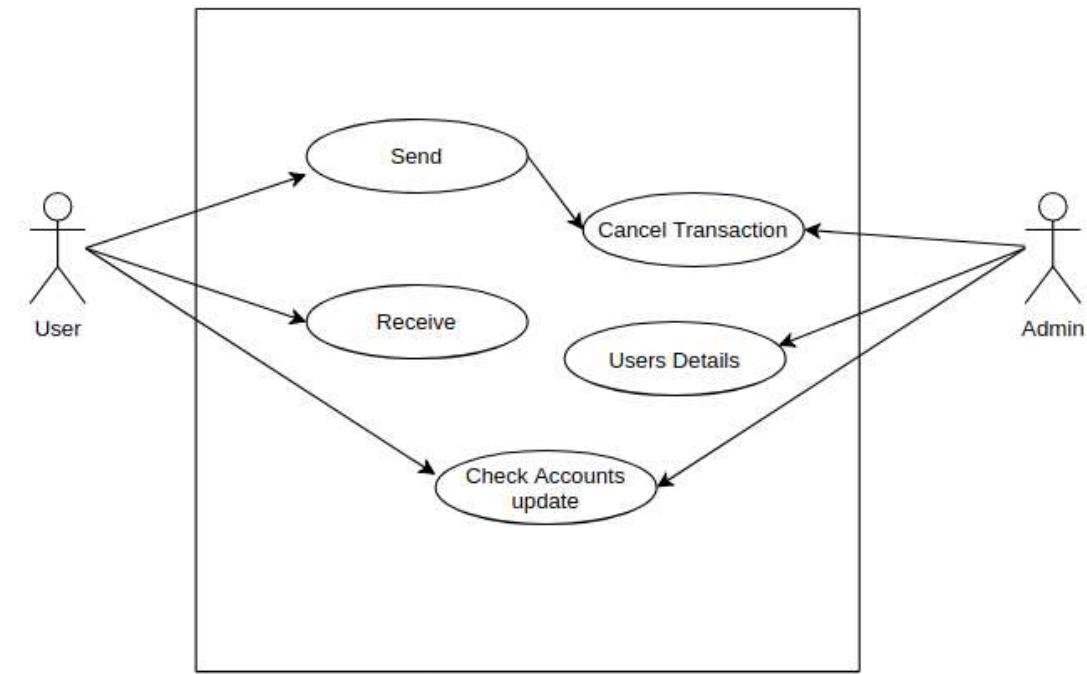


Fig 4.5 Use Case Diagram

Following is the use case diagram of the project it shows the action performed by the particular actor User and Admin. The user can send, receive and check Accounts updates while the Admin can cancel the transaction and can view users' details.

4.2.3 Sequence Diagram

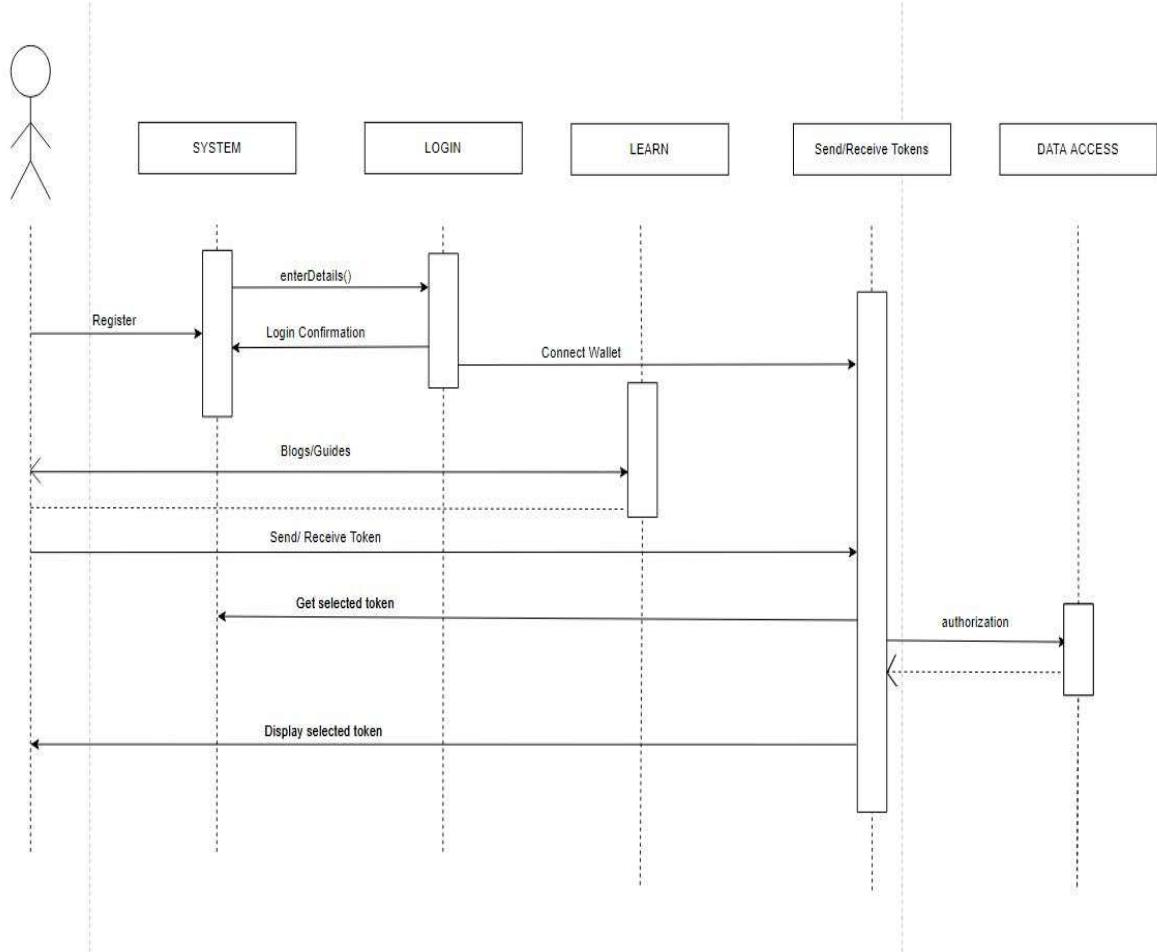


Fig 4.6 Sequence Diagram

Following is the Sequence Diagram of the project. The actor will first register in the system. He then would enter the details accordingly and would get a login confirmation. Then he has to connect a wallet for sending and receiving tokens. Learn section would contain the blogs and Guides. The actor could send/receive tokens and he would have the requested tokens displayed respectively. Through Data Access the data can be authorized.

4.2.4 Activity Diagram

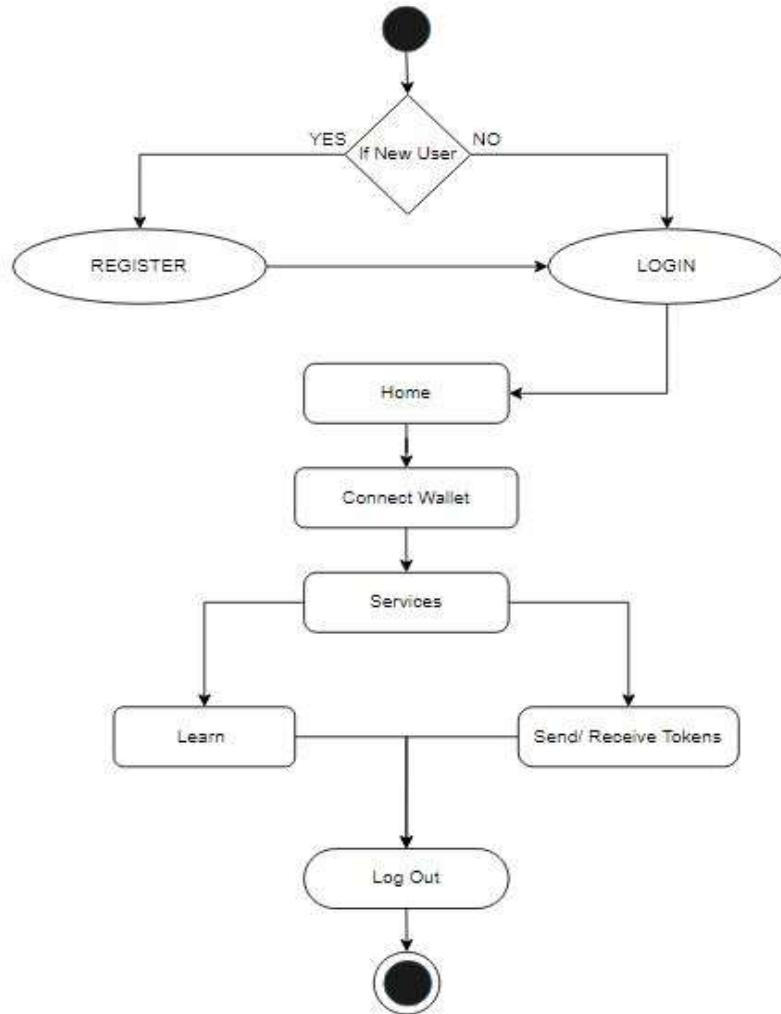


Fig 4.7 Activity Diagram

Following is the activity diagram. So if a user is a new user, he needs to register himself first, and then he could log in. He could then be redirected to the home page, wherein he could connect his wallet for the services which contain learn and send/receive tokens.

Chapter 5

Experimental Setup

5.1 Hardware Requirements

Basic 64-bit windows 10 Laptop with i3 core Processor. Windows 10 (8u51 and above)

RAM: 128 MB

Disk space: 5 gigabytes or more.

Processor: Minimum Pentium 2 266 MHz Processor Output device: Monitor

5.2 Software Requirements

> Next.js

Next.js is a React framework that gives you building blocks to create web applications. By framework, we mean Next.js handles the tooling and configuration needed for React and provides additional structure, features, and optimizations for your application.

> Sanity

Sanity.io is the platform for structured content. With Sanity.io you can manage your text, images, and other media with APIs. You can also use the open-source single-page application Sanity Studio to set up an editing environment that you can customize quickly.

5.3 Technology Stack

➤ HTML:

HTML (HyperText Markup Language) is the most basic building block of the Web. It defines the meaning and structure of web content.

➤ CSS:

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML or XML (including XML dialects such as SVG, MathML or XHTML). CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript.

➤ Java Script:

Javascript (JS) is a scripting language, primarily used on the Web. It is used to enhance HTML pages and is commonly found embedded in HTML code.

➤ Next.js:

Next.js is a React framework that enables several extra features, including server-side rendering and generating static websites. React is a JavaScript library that is traditionally used to build web applications rendered in the client's browser with JavaScript.

➤ MetaMask:

MetaMask is a software cryptocurrency wallet used to interact with the Ethereum blockchain. It allows users to access their Ethereum wallet through a browser extension or mobile app, which can then be used to interact with decentralized applications.

➤ **Sanity:**

Sanity.io is a software company developing a content management system (CMS). Sanity.io uses APIs to structure a company's content, including photos, text, video, and other media forms. The software acts as a back end for content management and provides access to various APIs, libraries, and tooling that allows users to access previously developed content.

Chapter 6

Modules of System

6.1 Admin Module

- The admin is a user with special privileges.
- Adding or deleting a user, and adding a new admin are the activities carried out by the admin.
- Update and edit the database.

6.2 Home page module

- The ‘Home page’ displays the signup and login modules.
- The navigation bar consists of send/receive coins, my profile, and the logout tab.
- All signed-up users can make transactions, learn, and check the dashboard.

6.3 Registration and Login module

- Registration page consists of fields like username, email, enter a password, and repeat password.
- By creating an account users agree to our terms and policy.
- After registration the user will be directed to the login page.
- User will log in with the credentials after registration.
- Login page will consist of two input fields i.e., Username and password.
- Shows error if
 - Username not found in the user database.
 - The entered password is wrong.

6.4 Send/Receive module

- Users can send and receive the token.
- Users also can gift the token to another user.

Chapter 7

7.1 Project Implementation:

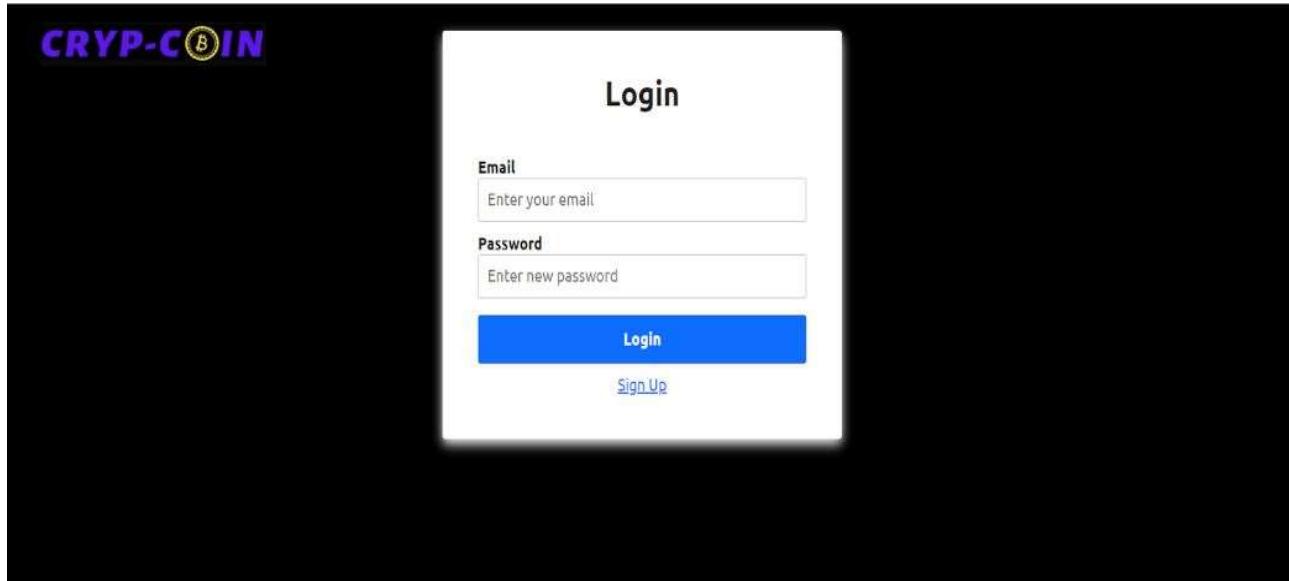


Fig 7.1 Login Page

The login module will ask you for your registered email id and password to login into the website and if you are a new user you will have to register yourself first by clicking on Sign Up.

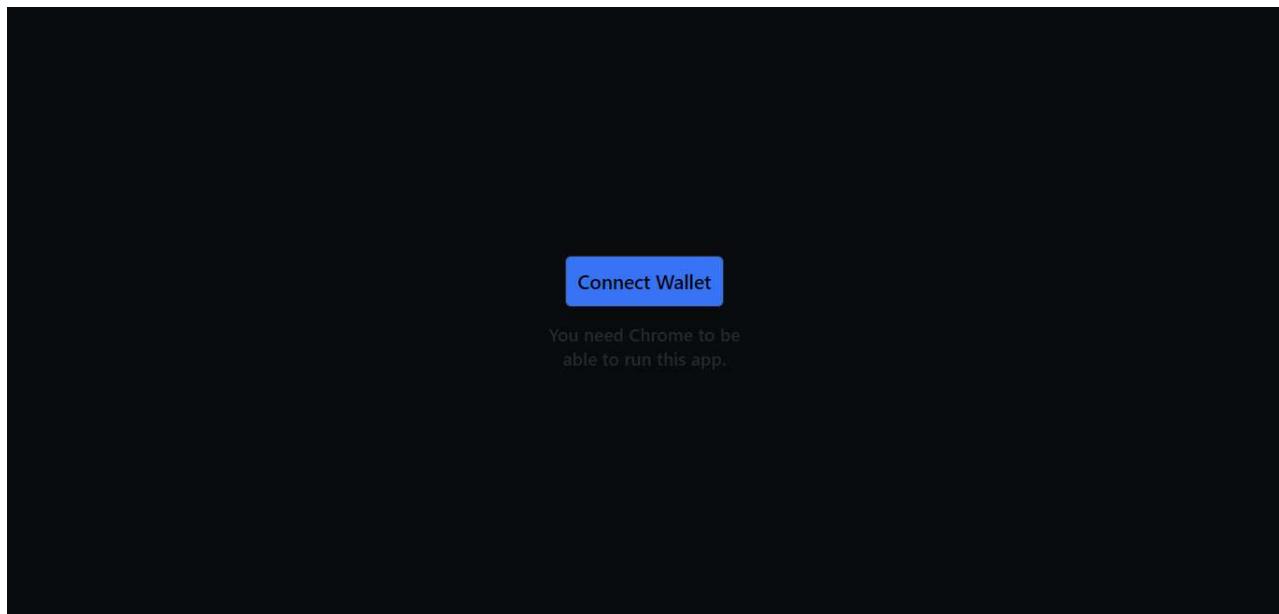


Fig 7.2 Connect Wallet

After logging in the user has to connect his wallet to view his assets.



Fig 7.3 Dashboard

After connecting the wallet to your Metamask wallet you can enter the website. This is the dashboard, it will contain all the details of Assets.

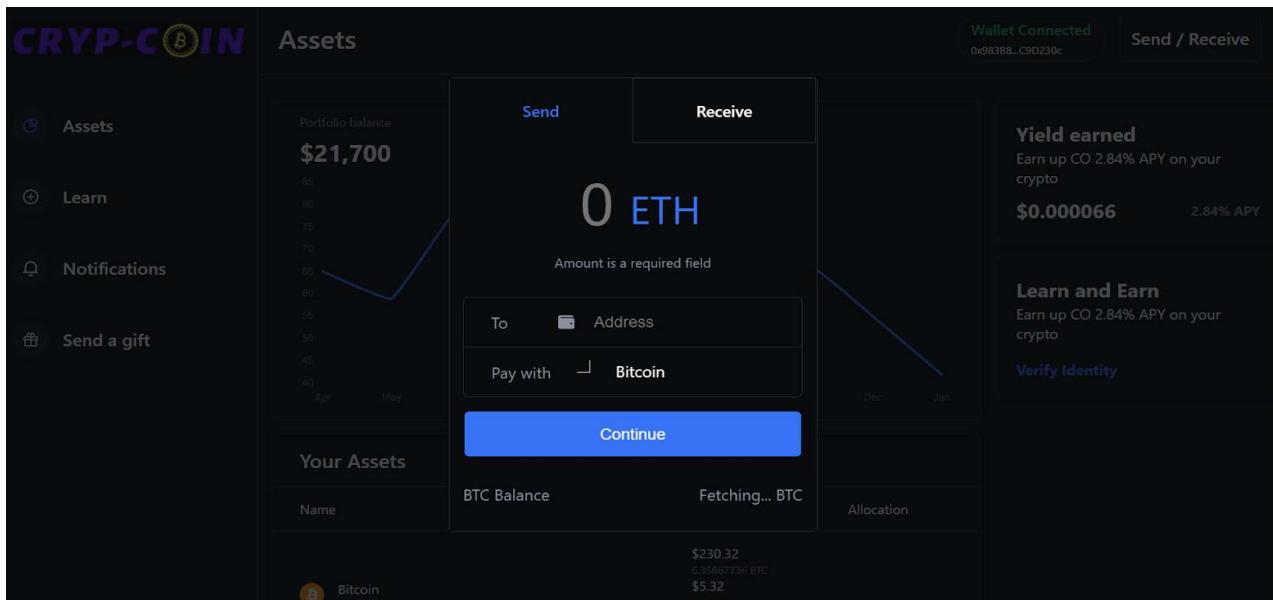


Fig 7.4 Send/Receive Module

This is the Send/Receive Module of our project. Users can Send And Receive Tokens from this module. It will fetch the data from the MetaMask Wallet.

7.2 Pseudo Code:

7.2.1 Function for Wallet connectivity with Metamask.

```
pages > JS index.js > ⚙ Home
1 import styled from 'styled-components'
2 import { useWeb3 } from '@3rdweb/hooks'
3 import Dashboard from './Dashboard'
4 import BalanceChart from '../components/BalanceChart'
5 import Signin from './signin'
6 import Image from 'next/image'
7 import { useRouter } from 'next/router'
8
9
10 export default function Home() {
11   const { address, connectWallet } = useWeb3()
12
13   const router = useRouter()
14
15   return (
16     <Wrapper>
17       {address ? [
18         <Dashboard address={address} />
19       ] : (
20         <WalletConnect>
21           /* <Button onClick={() => router.push('./signin')}>Sign In</Button> */
22           <Button onClick={() => connectWallet('injected')}>
23             Connect Wallet
24           </Button>
25           <Details>
26             You need Chrome to be
27             <br /> able to run this app.
28           </Details>
29           </WalletConnect>
30       )}
31     </Wrapper>
32   )
33 }
```

This snippet demonstrates the wallet connection code.

7.2.2 Function for calculating the total number of tokens.

```
28 |     useEffect(() => {
29 |       const calculateTotalBalance = async() => {
30 |         const totalBalance = await Promise.all(
31 |           thirdWebTokens.map(async token => {
32 |             const balance = await token.balanceOf(walletAddress)
33 |             return Number(balance.displayValue) * tokenToUSD[token.address]
34 |           })
35 |         )
36 |
37 |         setWalletBalance(totalBalance.reduce((acc, curr) => acc + curr, 0))
38 |       }
39 |
40 |       return calculateTotalBalance()
41 |     }, [thirdWebTokens, sanityTokens])
```

This part shows the total of all Tokens through MetaMask.

7.2.3 Portfolio Balance Graph

```
48 |   <Chart>
49 |     <div>
50 |       <Balance>
51 |         <BalanceTitle> Portfolio balance</BalanceTitle>
52 |         <BalanceValue>
53 |           {'$'}
54 |           {walletBalance.toLocaleString('US')}
55 |         </BalanceValue>
56 |       </Balance>
57 |     </div>
58 |     <BalanceChart />
59 |   </Chart>
```

This part shows the Asset Graph. It shows the Portfolio Balance of our system by calculating the total number of tokens from the wallet.

7.2.4 Database Connectivity and Validation

```
1  <%- include('header',{
2  |   title:'Login'
3  }); -%>
4  <!--  -->
5  <div class="container">
6      <h1>Login</h1>
7      <form action="" method="POST">
8          <label for="user_email">Email</label>
9          <input type="email" class="input" name="_email" id="user_email" placeholder="Enter your email">
10         <label for="user_pass">Password</label>
11         <input type="password" class="input" name="_password" id="user_pass" placeholder="Enter new password">
12         <% if(typeof error !== 'undefined') { %>
13             <div class="err-msg"><%= error %></div><% } %>
14         <input type="submit" value="Login">
15         <div class="link"><a href="./signup">Sign Up</a></div>
16     </form>
17 </div>
```

This Section contains SQL Database Connectivity.

Chapter 8

Result

The proposed system displays the Login page first. Users could navigate through this page and view his/her assets. First, the user needs to complete the registration process after doing that the users can log in with their credentials and carry out the transactions. The logged-in users can see. They can search blogs regarding a particular topic they want by visiting the blog page. On the Home Page, the user can see wallet statistics which include the total number of currency present till the date of the user, the total number of users registered on the forum, and many more. If the user forgets their login credentials, they can go to the Forgot Password page and generate new login credentials. Financial institutions, major corporations, venture capitalists, start-up companies, and influential figures in nearly every area are implementing the skills. Potential applications for blockchain technology and cryptocurrencies that make use of modern technology while negotiating the complex webs of legislation and judicial oversight. Although there are exciting prospects, it is predicted that the changes will be distressing. Although no one wants to be first, a failure to understand the technology and rapid followers might result in a memorable moment and profitable enterprises at the mercy of those who swiftly reversed course. We have particularly emphasized the significance of blockchain technology and cryptocurrency education. The robot adviser offered by Crypto-Trading in particular will assist consumers in maximizing energy trading.

Chapter 9

Conclusion

The capabilities are being adopted by financial institutions, large organizations, venture capitalists, startup businesses, and key players in almost every industry. Potential uses for blockchain technology and cryptocurrency utilizing technologies and navigating the intricate realms of regulation and judicial control. The possibilities include exhilarating, yet it is anticipated that the changes will be upsetting. Despite the fact that nobody wants to come in first, an incapacity to grasp that technology, and quick followers could lead to a Memorable moment and successful businesses at the whims of those who promptly changed direction. In particular, we have highlighted the key role of blockchain technology and cryptocurrency learning. In particular, Crypto-Trading will provide a robot advisor which will help the users to optimize energy trading. The project will face several challenges. These include the immaturity of blockchain technology, privacy issues, and the sustainability of the whole system.

In this project, we have tried to implement a website that will help users to learn blockchain-based Crypto-Currency transactions. The user is able to successfully learn and transact the currency with accurate information by analyzing the assets. It is concluded that the application works well and satisfies the registered users' needs. The application is tested very well and errors are properly debugged. The site is simultaneously accessed from more than one system.

Future Scope

Every application has its own merits and demerits. The project has covered almost all the requirements. Further requirements and improvements can be done easily since the coding is mainly structured and modular in nature.

The proposed system, for now, is made only considering engineering students, it can be expanded and made available for other streams as well.

For now, users can only learn the Cryptocurrency transactions and do it using the website. But in the future, we can add trading and AI bots for predictions and studying the structure of currency.

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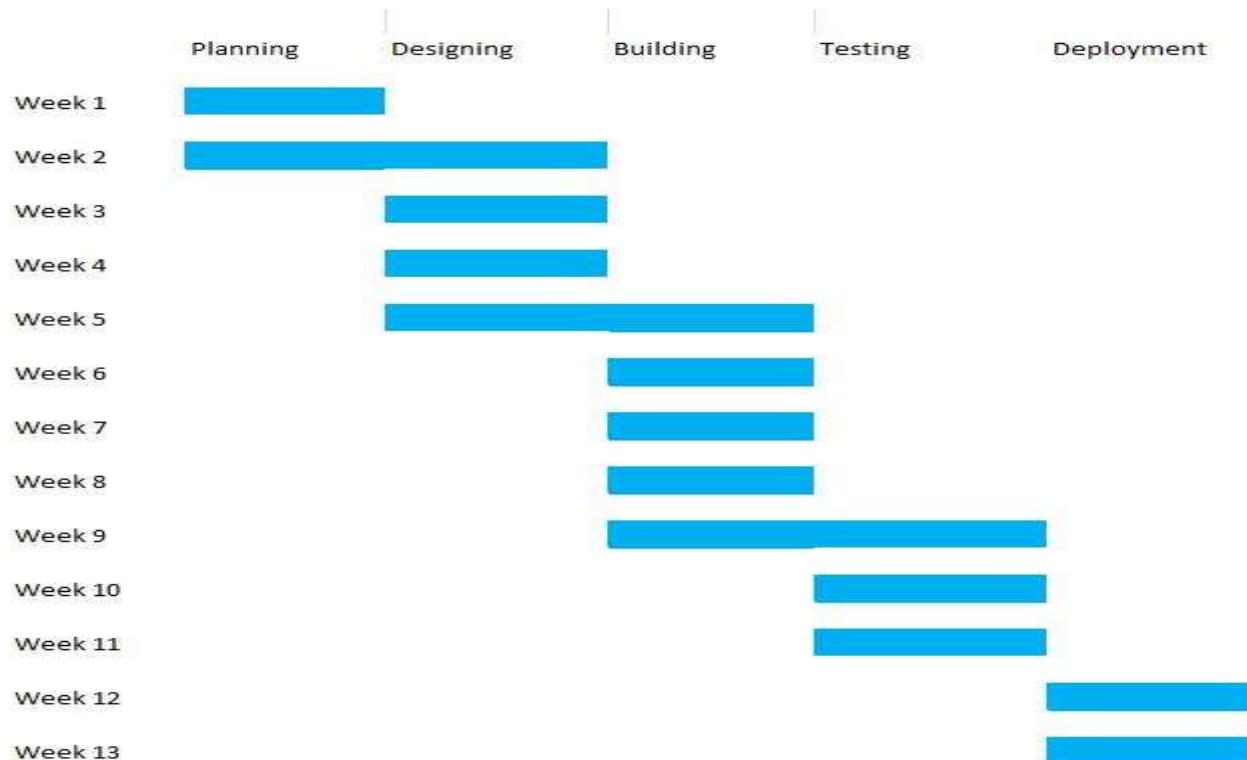
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Project Plan: Gantt Chart

Gantt Chart is a chart in which a series of horizontal lines show the amount of work done or production completed in certain periods of time in relation to the amount planned for those periods.



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