PROJECT REPORT

Date	29/10/2023
Team ID	NM2023TMID04071
Project Name	SMART REAL ESTATE MANAGEMENT

SMART REAL ESTATE MANAGEMENT

1.Introduction

1.1Project overview

Real Estate Development is a process that involves the purchase of raw land, rezoning, construction and renovation of buildings,and sale or lease of the finished protect and user. Block chain process is easy to transmit the information from owner to user.

1.2 Purpose

Real Estate Management system is an online real estate software application that manage the overall activities and process. Starting from the management of the property,to the management of real estate agencies ,agents,client and financial transaction.

2.Literature survey

2.1 Existing problem

The future for smart real estate management on the blockchain is promising, and there are several areas of hope and potential developments:

Wider Adoption:

As blockchain technology matures and becomes more accessible, it is likely to see wider adoption in the real estate industry. This will lead to more robust and established practices, making blockchain a standard tool for property transactions.

Regulatory Adaptation:

Governments and regulatory bodies are increasingly recognizing the potential of blockchain in real estate. They may adapt and create supportive legal frameworks that promote its use while addressing concerns regarding privacy and security.

Improved User Interfaces:

User-friendly interfaces and applications for blockchain-based real estate management will make it more accessible to a broader audience. This will reduce the learning curve and technical barriers that currently exist.

Interoperability:

As blockchain projects and platforms become more interoperable, it will be easier to integrate blockchain solutions into existing real estate systems. This will facilitate a smoother transition and encourage more stakeholders to embrace the technology.

Advanced Smart Contracts:

The development of more sophisticated smart contract templates will allow for a broader range of real estate transactions to be automated, reducing the need for intermediaries and streamlining processes further.

Enhanced Security:

Continuous improvements in blockchain security will make it even more difficult for unauthorized parties to tamper with property records. This will help instill greater trust in the system.

2.2 Problem Statement Definition

- ***In the real estate industry, the lack of transparency, inefficient processes, and susceptibility to fraud and errors continue to be significant challenges. Current real estate management systems are often fragmented, paper-intensive, and lack a secure and transparent way to verify property ownership and transaction history. To address these issues, the development and implementation of a smart real estate management system based on blockchain technology*** *is essential.*

Lack of Transparency:

The current real estate industry lacks transparency in property ownership records and transaction history. This opacity can lead to disputes, fraud, and inefficiencies in property transactions.

Inefficient Processes:

Real estate transactions involve multiple intermediaries and paperwork, making the process time-consuming and expensive. Reducing administrative overhead and speeding up the transaction process is crucial.

Fraud and Security Risks:

Real estate transactions are susceptible to fraud, including property title fraud and misrepresentations. There is a need for a secure system to verify property ownership and transaction history to prevent fraud.

Limited Access to Information:

Property information is often scattered across various databases and organizations, making it challenging for individuals to access and verify critical information about properties.

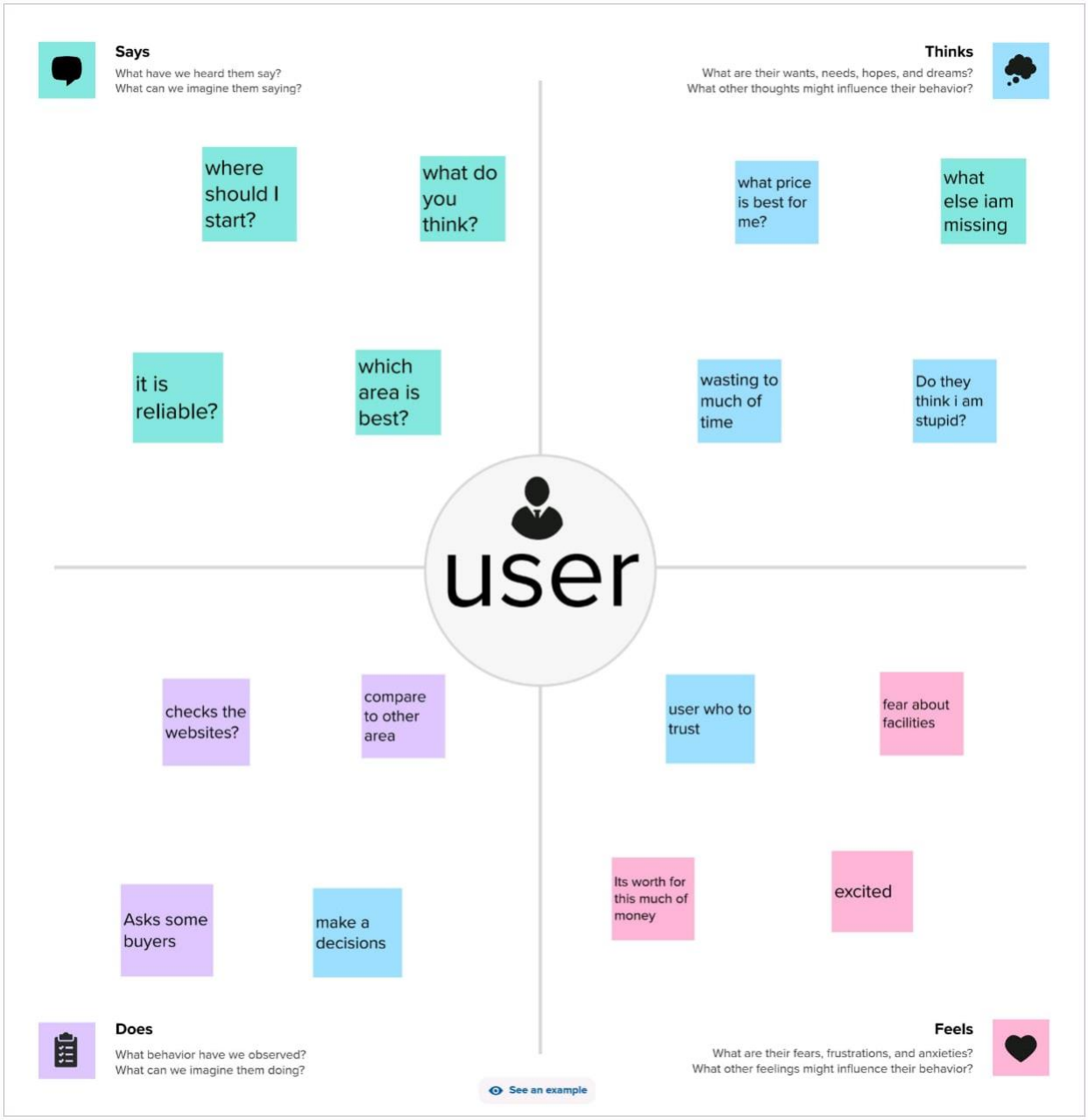
Interoperability and Standardization:

The real estate industry lacks standardization in data and transaction processes. This leads to compatibility issues between different systems and hinders the smooth transfer of property.

3.Ideation and Proposed Solution

3.1 Empathy Map Canvas

An empathy map is a collaborative tool teams can use to gain a deeper insight into their customers. Much like a user persona, an empathy map can represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has gained much popularity within the agile community.


Says
What have we heard them say?
What can we imagine them saying?
where should I start?
what do you think?
it is reliable?
which area is best?
Thinks
What are their wants, needs, hopes, and dreams?
What other thoughts might influence their behavior?
what price is best for me?
what else iam missing
wasting to much of time
Do they think i am stupid?
user
checks the websites?
compare to other area
Asks some buyers
make a decisions
user who to trust
fear about facilities
Its worth for this much of money
excited
Does
What behavior have we observed?
What can we imagine them doing?
Feels
What are their fears, frustrations, and anxieties?
What other feelings might influence their behavior?
See an example

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

10 minutes

Team gathering
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

Set the goal
Think about the problem you'll be focusing on solving in the brainstorming session.

Learn how to use the facilitation tools
Use the Facilitation Superpowers to run a happy and productive session.

Open article →

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

5 minutes

As the commercial real estate industry faces an unprecedented era of uncertainty

Key rules of brainstorming

To run an smooth and productive session

- Stay in topic.
- Encourage wild ideas.
- Defer judgment.
- Listen to others.
- Go for volume.
- If possible, be visual.

3

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

TIP

Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

Passive income,stable cash flow,tax advantage

The economy expected to grow at a rate and demand for the housing expected to increase

commercial properties are consider safe and secure investment

compared to other investment real estate is the best one

2

Brainstorm

rite down any ideas that come to mind
at address your problem statement.

10 minutes

TIP

You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

Person 1

- Investing in real estate would be the best decision ever made
- compared to other investment real estate is the best one
- The economy expected to grow at a rate and demand for the housing expected to increase

Person 2

- commercial properties are consider safe and secure investment
- Higher rental yield than residential developments
- Passive income,stable cash flow,tax advantage

Person 3

- Inflation and interest rate
- significant cost and management intensity
- High capital requirement

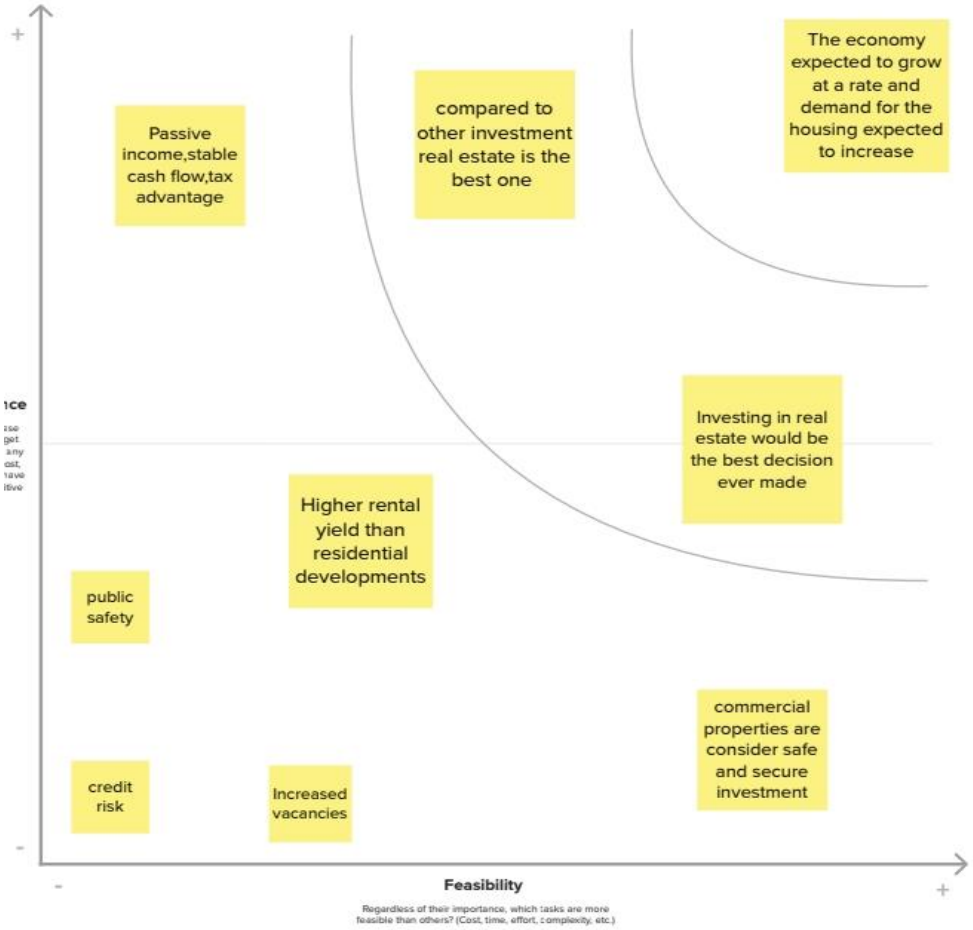
Person 4

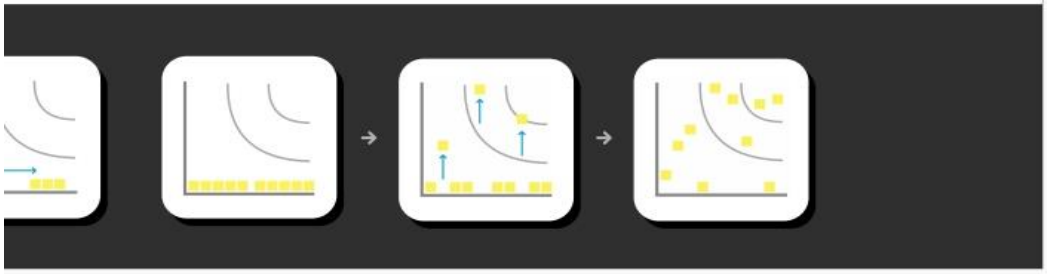
- Increased vacancies
- credit risk
- public safety

hould all be on the same page about what's important
ard. Place your ideas on this grid to determine which
portant and which are feasible.

TIP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the **H key** on the keyboard.





4.Requirement Analysis

4.1 Functional Requirements

Users should be able to register and authenticate securely.

User roles (e.g., buyers, sellers, agents, administrators) must be defined.

1.Property Listing:

Property owners should be able to list their properties on the platform.

Detailed property information, including location, size, price, and media (photos, videos), should be supported.

2.Property Search and Filter:

Users should be able to search for properties based on various criteria (e.g., location, price range, property type).

Advanced filtering options should be available to refine search results.

3.Property Ownership Verification:

Property ownership records should be stored on the blockchain to ensure transparency and immutability.

Users should be able to verify property ownership using blockchain records.

4.Transaction Management:

Implement smart contracts to facilitate property transactions, including buying, selling, and renting.

Automated contract execution upon meeting predefined conditions (e.g., payment confirmation, property transfer).

5.Document Management:

Allow users to upload and store property-related documents (e.g., deeds, titles) securely on the blockchain.

Enable easy retrieval and sharing of documents with involved parties.

6.Identity Verification:

Implement a secure identity verification process for users involved in transactions.

Integration with government and legal entities for identity validation may be required.

7.Payment Processing:

Provide options for secure and transparent payment processing, including support for cryptocurrencies or digital tokens.

Facilitate escrow services for holding funds until transaction completion.

8.Real-time Notifications:

Send notifications to users about property listings, transaction updates, and important deadlines.

9.User Messaging:

Implement a secure messaging system for communication between buyers, sellers, agents, and other involved parties.

10.Review and Rating System:

Allow users to leave reviews and ratings for properties, agents, and other participants in the real estate transactions.

4.2 Non Functional Requirements

Non-functional requirements for a smart real estate management system based on blockchain technology are essential to ensure the system's performance, security, and usability. These requirements often pertain to aspects other than specific functionalities. Here are some non-functional requirements for such a system:

1.Scalability:

The system should be able to handle a growing number of real estate transactions and property records without compromising performance. It must scale to accommodate an expanding user base.

2.Performance:

The system should provide fast response times for property transactions, queries, and data retrieval. It should be able to handle peak loads efficiently.

3.Security:

Ensure robust security measures to protect sensitive property data and transactions. This includes data encryption, access control, and resistance to various types of cyberattacks.

4.Reliability:

The system must be highly available and reliable, with minimal downtime. This is critical in the real estate industry where transactions are time-sensitive.

5.Privacy:

Implement strong privacy controls to safeguard the personal and financial information of users involved in real estate transactions.

6.Compliance:

Adhere to legal and regulatory requirements specific to the real estate industry, such as Know Your Customer (KYC) and Anti-Money Laundering (AML) regulations.

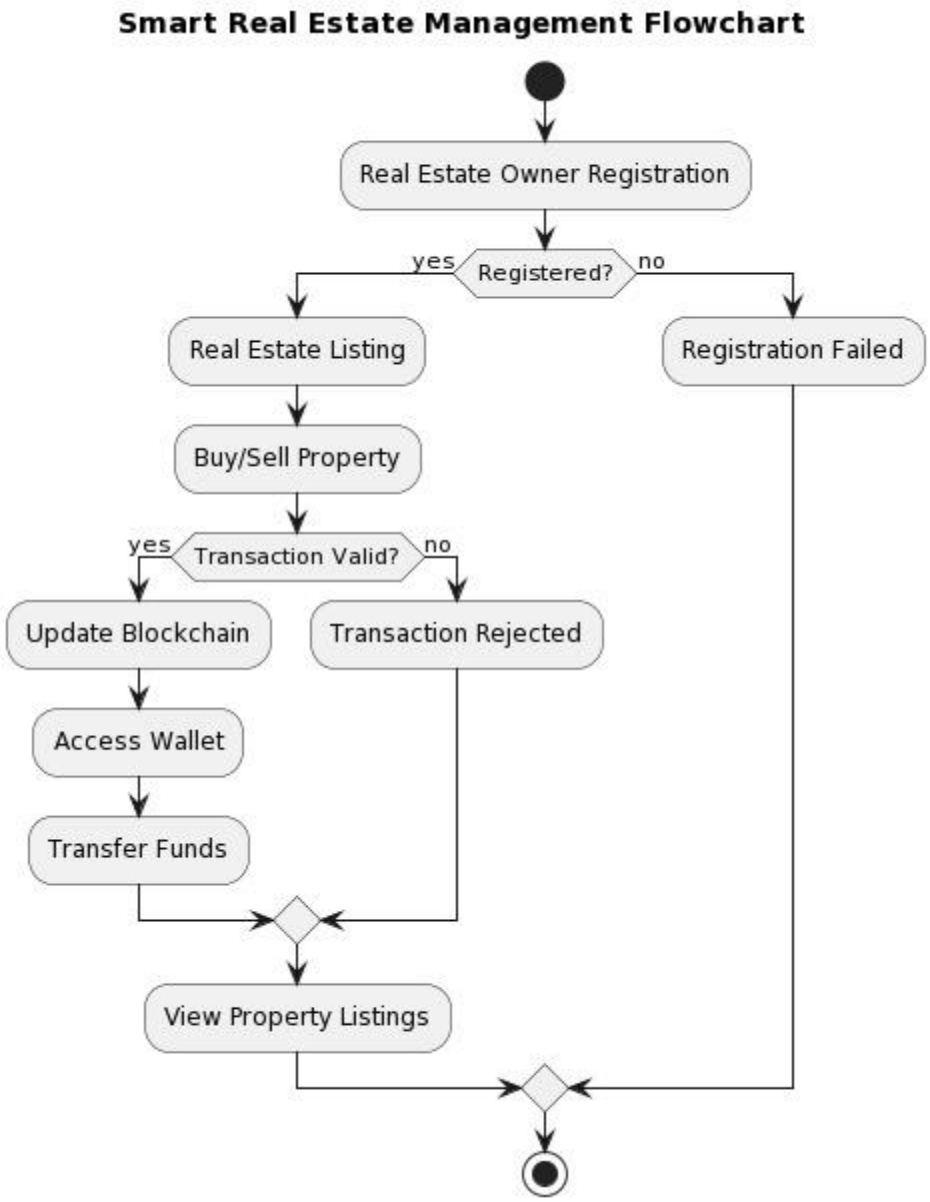
7.Interoperability:

Ensure the system can interact with external systems and databases, allowing for data sharing and integration with other real estate and financial services platforms.

5.Project Design

5.1 Data Flow Diagrams & User Stories

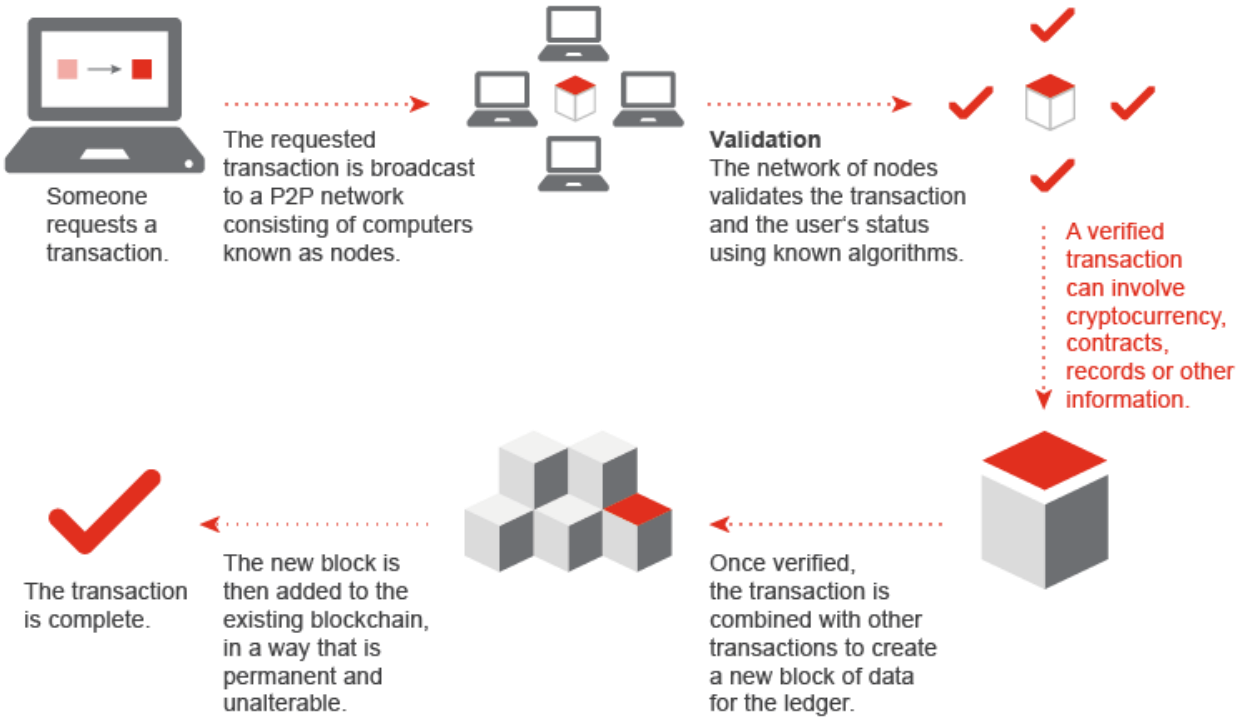
Data flow diagram



User Type	NO.of USER	User TASKS	Priority

Smart real estate technique	USN-1 USN-2	Transparency in all deal Effective and timely communication is vital	Good
	USN-3	Responsible and reliable	More
	USN-4	Maintain and manage	Effectively
	USN-5	Quality and security	Standard
	USN-1	Property taxes and costs	Medium
CUSTOMER	USN-2	Current value of property	High
	USN-3	Repair activities on the property	High
	USN-4	Features of the property	Very Much
	USN-5	Safety for buying Property	High

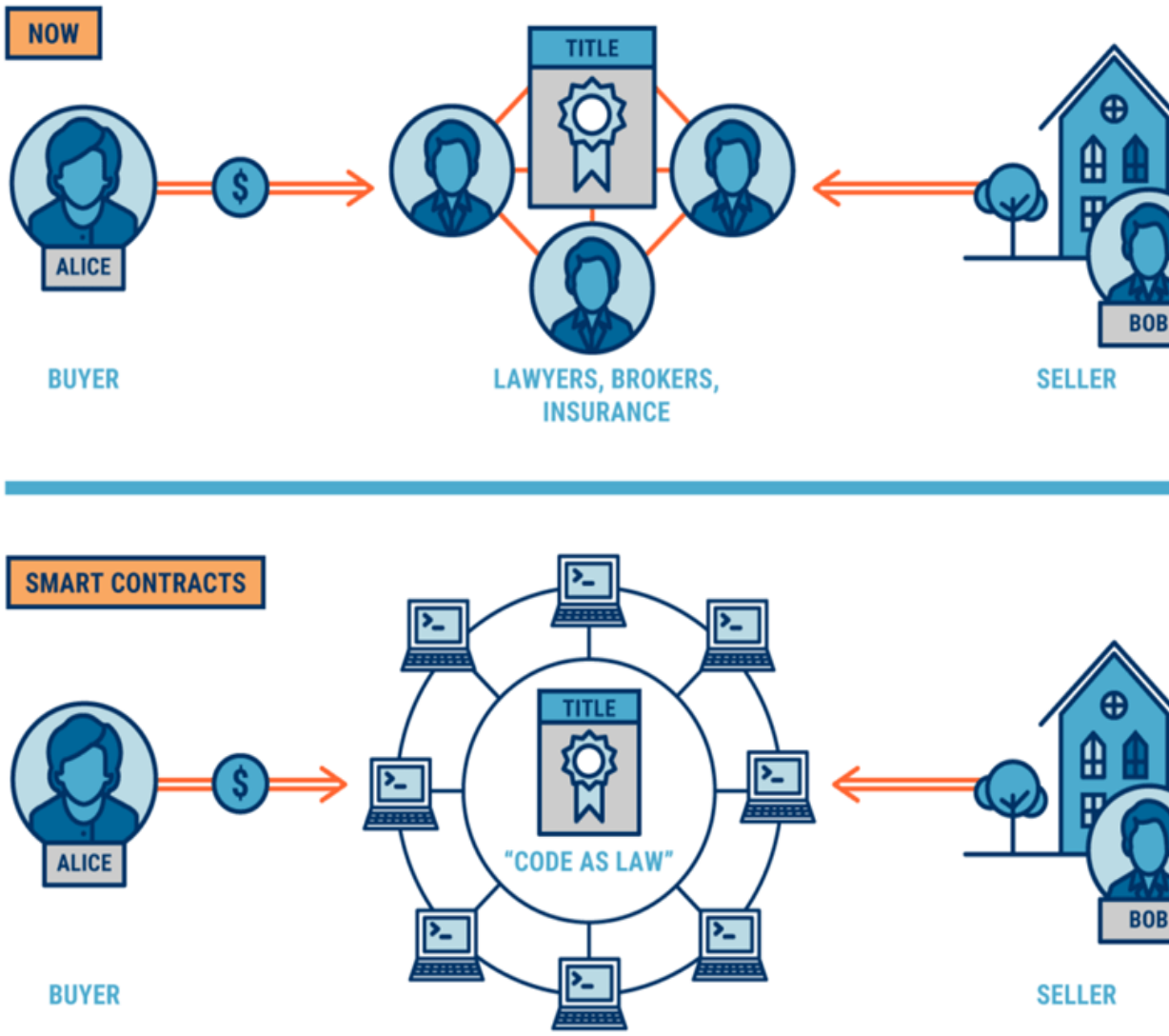
5.2 Solution Architecture



6.Project Planning & Scheduling

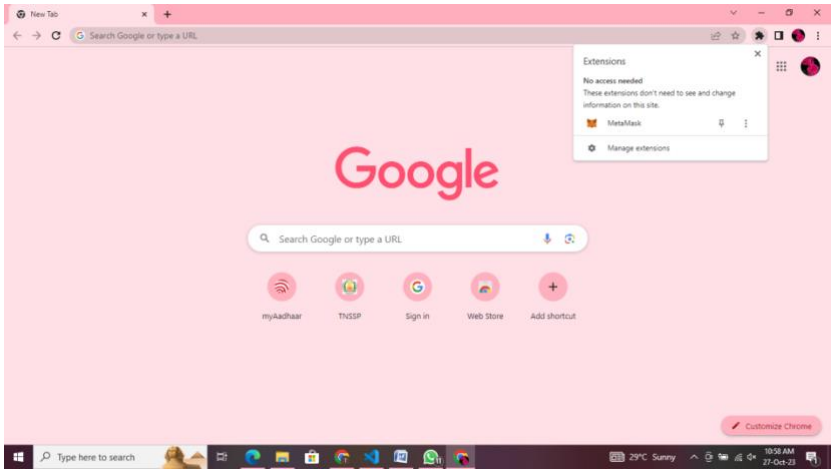
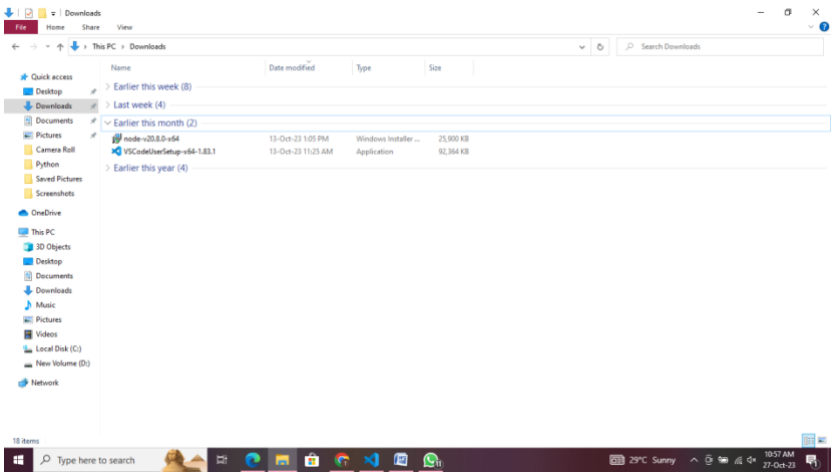
6.1 Technical Architecture

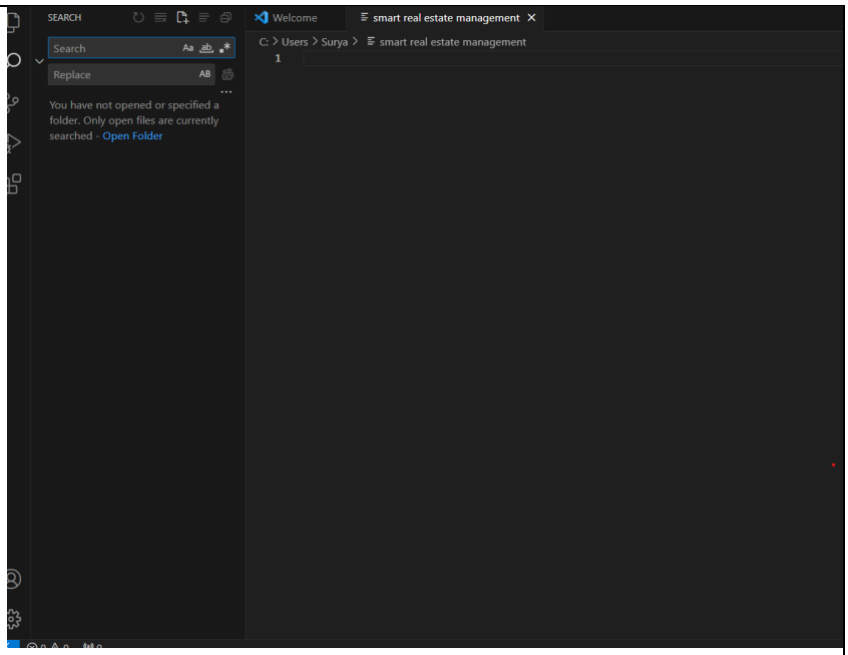
Buying a house on Ethereum

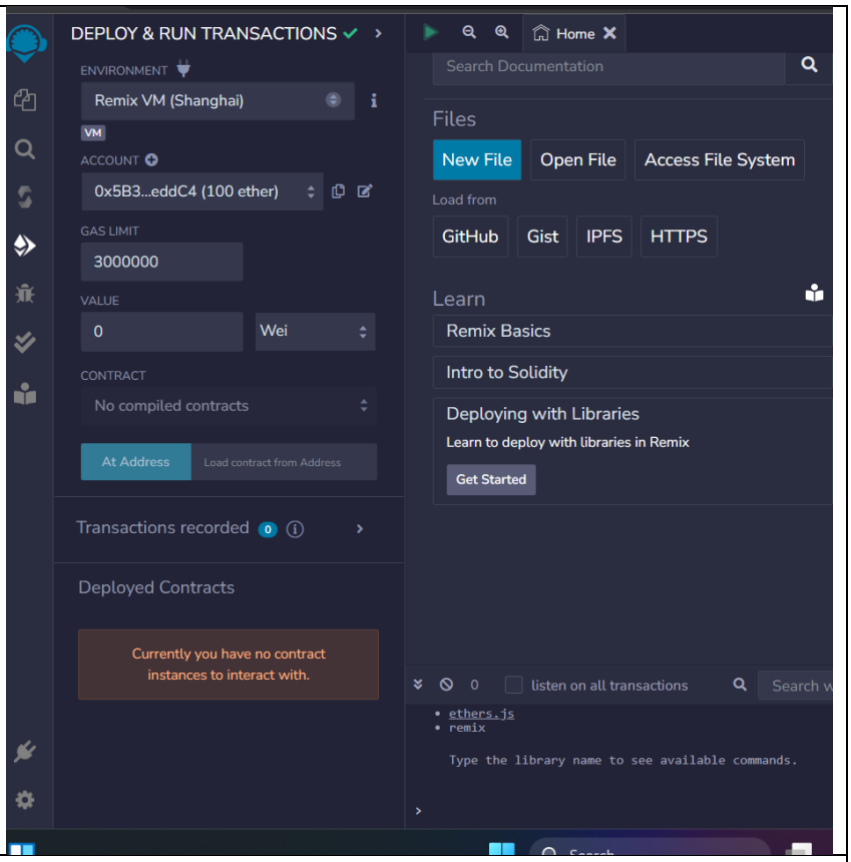
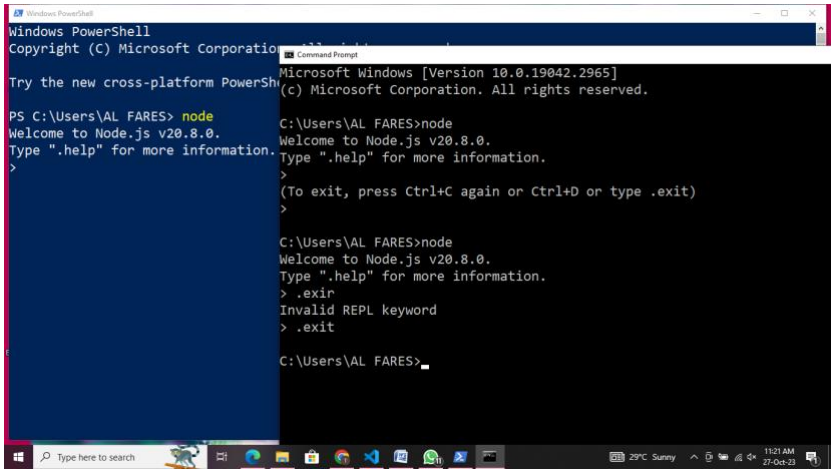


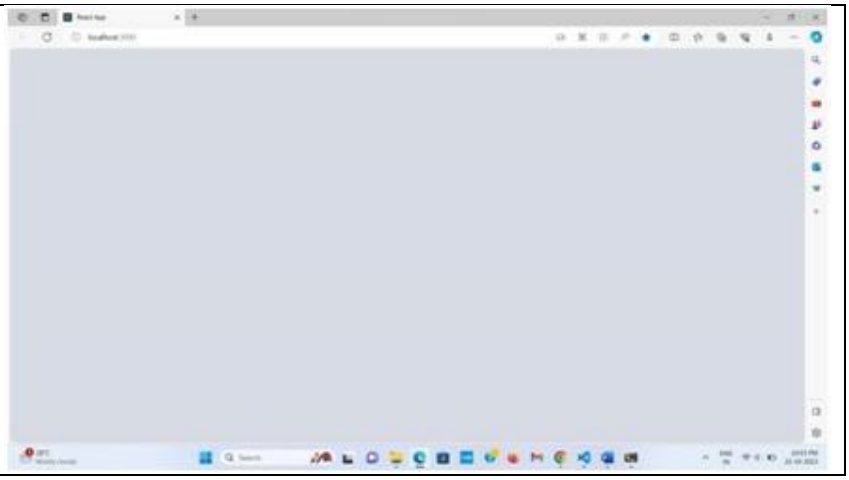
7.Performance Testing

7.1 Performance Metrics

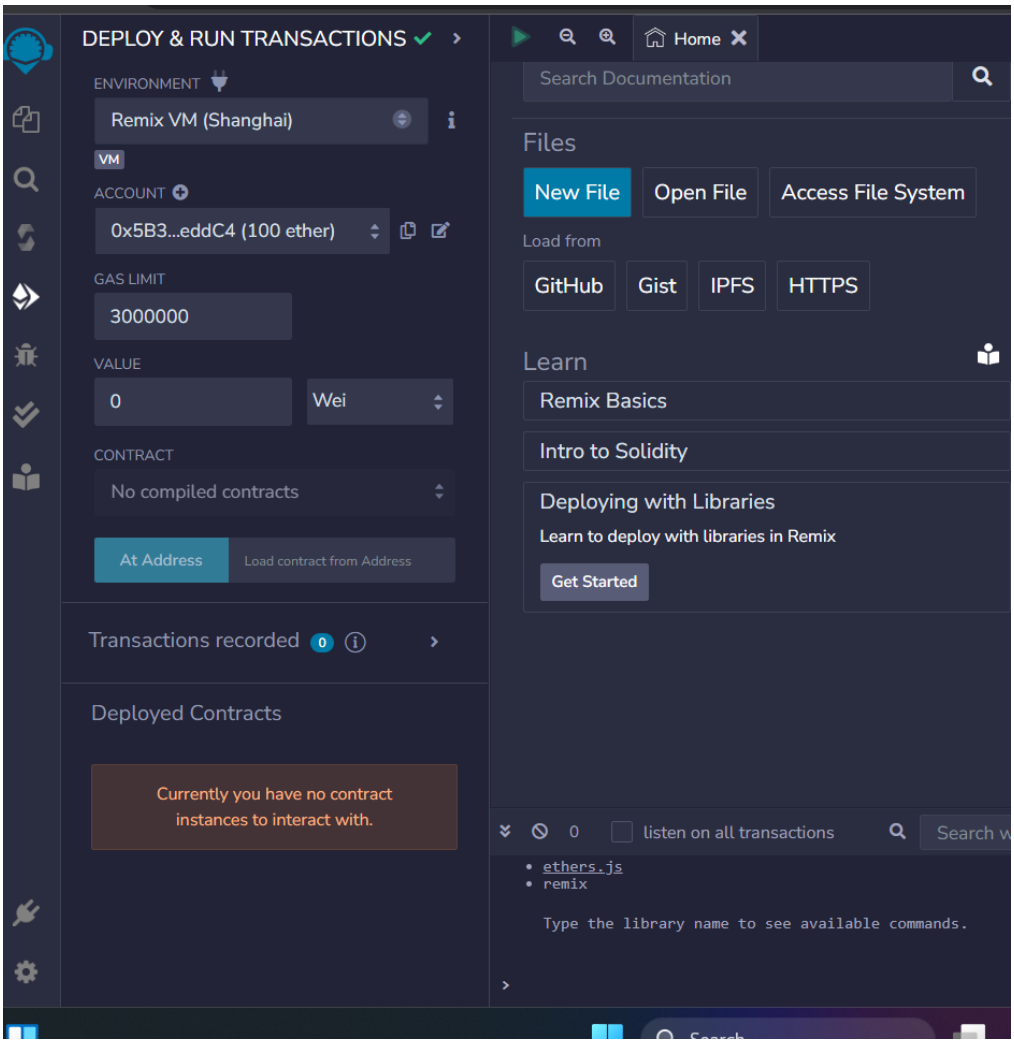
S.No	Parameter	Values	Screenshot
1	Information Gathering	Setup all the prerequisite	 Metamask  VS code & node js

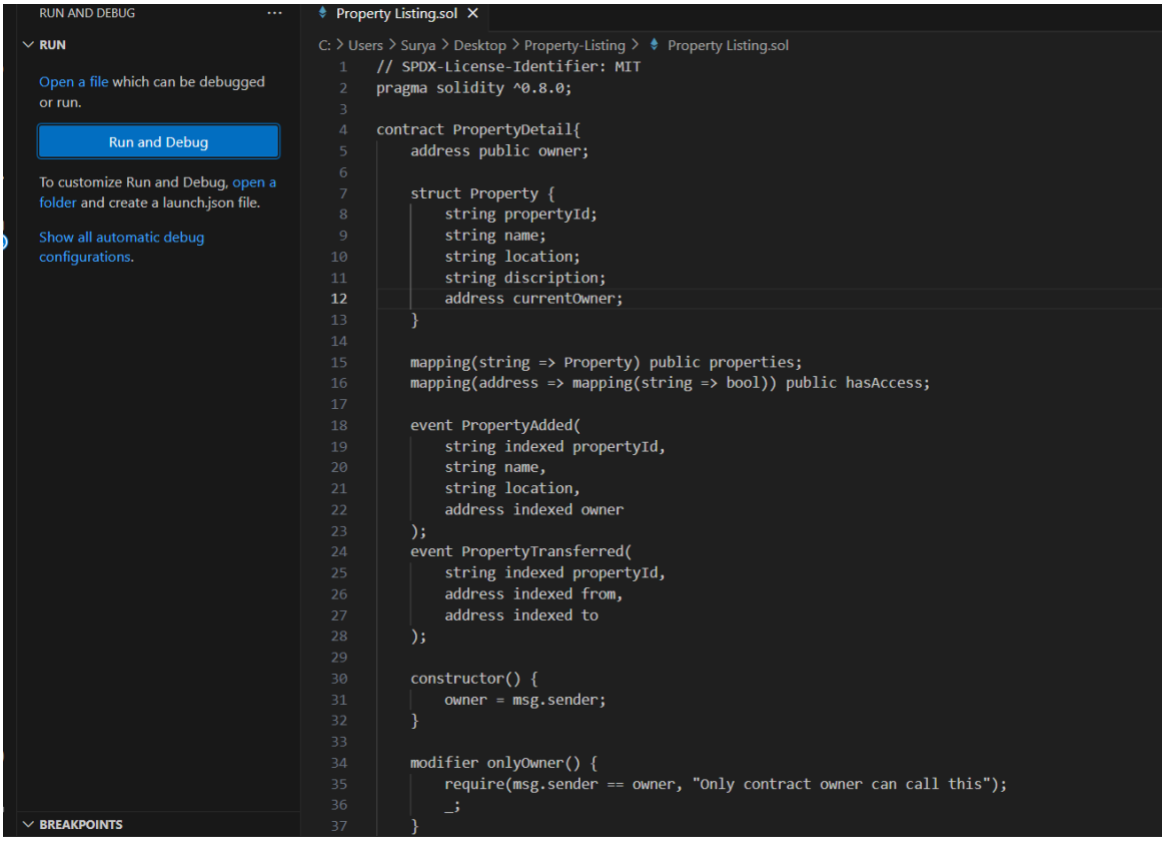
2	Extract the zip file	Open to vs code	
3.	Remix ide platform explorating	Deploy the smart contract code Deploy and run the transaction. By selecting the environment - inject the MetaMask.	

			
4	Open file explorer	Open the extracted file and click on the folder. Open src, and search for utiles. Open cmd enter commands 1.npm install 2.npm bootstrap 3. npm start	

5	Local host IP address	Copy the address and open it to chrome so you can see the front end of your project	

8.1 Output screenshots





9.Advantages & Disadvantages

Advantages:

Blockchain provides a transparent and immutable ledger, making it easier to track property ownership and transaction history. This can reduce fraud and increase trust among stakeholders.

Reduced Intermediaries:

.By eliminating intermediaries such as brokers and title companies, block chain can reduce transaction costs and streamline the buying and selling process.

Increased Efficiency:

.Smart contracts can automate various processes, such as property transfers, rental agreements, and maintenance requests, leading to faster and more efficient real estate management.Improved Security**.**

.Accessible Ownership:

.Fractional ownership of real estate can become more accessible through block chain, allowing investors to own a portion of a property and potentially lower barriers to entry.

Global Accessibility:

.Block chain-based real estate platforms can facilitate international investments and transactions, making it easier for foreign investors to participate in local real estate markets

Disadvantages:

Implementing block chain technology in the real estate industry may require significant time and resources. Existing legacy systems and regulations may need to be adapted or replaced.

Privacy Concerns:

.While block chain offers transparency, it can also raise concerns about privacy. Property owners may not want all details of their real estate transactions to be publicly available.

Legal and Regulatory Challenges:

.The legal and regulatory framework for real estate transactions may not be well-suited for block chain technology. Adapting the legal system to accommodate block chain can be a complex and lengthy process.

Technical Challenges:

. technology is still evolving, and there can be technical challenges, such as scalability and network congestion, that need to be addressed for widespread adoption.

Smart Contract Vulnerabilities:

.Smart contracts, while efficient, are not immune to bugs or vulnerabilities. Flaws in the code can lead to unexpected consequences, including financial losses.

10.Conclusion

smart real estate management on the block chain holds great promise for transforming the real estate industry by increasing transparency, reducing intermediaries, and improving efficiency and security. However, it is not without its challenges, including issues related to adoption, privacy, legal and regulatory hurdles, technical limitations, and the need for user education. The successful integration of block chain technology into real estate will require a concerted effort to address these challenges and create a supportive ecosystem. As the

technology continues to evolve and mature, the advantages of block chain in real estate management have the potential to outweigh the disadvantages, leading to a more accessible, efficient, and secure real estate market in the future

11.Future Scope

The future for smart real estate management on the blockchain is promising, and there are several areas of hope and potential developments:

Wider Adoption:

.As block chain technology matures and becomes more accessible, it is likely to see wider adoption in the real estate industry. This will lead to more robust and established practices, making block chain a standard tool for property transactions.

Regulatory Adaptation:

.Governments and regulatory bodies are increasingly recognizing the potential of blockchain in real estate. They may adapt and create supportive legal frameworks that promote its use while addressing concerns regarding privacy and security.

Improved User Interfaces:

User-friendly interfaces and applications for block chain-based real estate management will make it more accessible to a broader audience. This will reduce the learning curve and technical barriers that currently exist.

Interoperability:

.As block chain projects and platforms become more interoperable, it will be easier to integrate block chain solutions into existing real estate systems. This will facilitate a smoother transition and encourage more stakeholders to embrace the technology.

Advanced Smart Contracts:

.The development of more sophisticated smart contract templates will allow for a broader range of real estate transactions to be automated, reducing the need for intermediaries and streamlining processes further.

Enhanced Security:

.Continuous improvements in block chain security will make it even more difficult for unauthorized parties to tamper with property records. This will help instill greater trust in the system.

12.Appendix

Source code

```
// SPDX-License-Identifier: MIT

pragma solidity ^0.8.0;


contract PropertyDetail{

    address public owner;
```

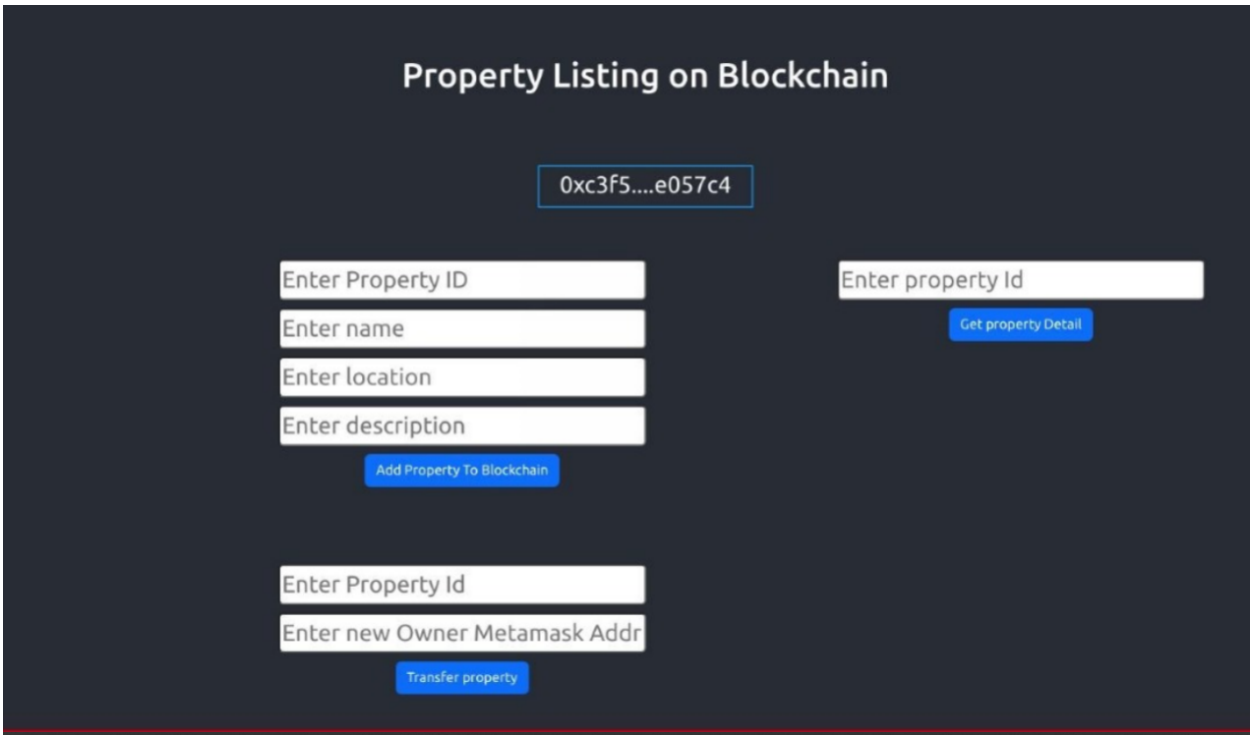
```
struct Property {
    string propertyId;
    string name;
    string location;
    string discription;
    address currentOwner;
}

mapping(string => Property) public properties;
mapping(address => mapping(string => bool)) public hasAccess;

event PropertyAdded(
    string indexed propertyId,
    string name,
    string location,
    address indexed owner
);
event PropertyTransferred(
    string indexed propertyId,
    address indexed from,
```

```
    address indexed to
);

constructor() {
    owner = msg.sender;
}

modifier onlyOwner() {
    require(msg.sender == owner, "Only contract owner can call this");
    _;
}

modifier hasPropertyAccess(string memory propertyId) {
    require(
        hasAccess[msg.sender][propertyId],
        "You don't have access to this property"
    );
    _;
}

function addProperty(
```

```
    string memory propertyId,
    string memory name,
    string memory location,
    string memory _description
) external  onlyOwner {
    require(
        bytes(properties[propertyId].propertyId).length == 0,
        "Property already exists"
    );

    Properties [propertyId] = Property({
        propertyId: propertyId,
        name: name,
        location: location,
        discription : _description,
        currentOwner: owner
    });

    hasAccess[owner][propertyId] = true;

    emit PropertyAdded(propertyId, name, location, owner);
```

```
}

function transferProperty(
    string memory propertyId,
    address new  Owner
) external has Property Access(propertyId) {
    Require (newOwner != address(0), "Invalid new owner");

    Address   currentOwner  = properties[propertyId].currentOwner;
    properties  [propertyId].currentOwner = newOwner;

    has Access [currentOwner][propertyId] = false;
    has Access [newOwner][propertyId] = true;

    emit Property  Transferred  (propertyId,  currentOwner,  newOwner);
}

function getPropertyDetails(
    string memory propertyId
) external view returns (string memory, string memory, address) {
    Property memory prop = properties [propertyId];
```

```
        return (prop.name, prop.location, prop.currentOwner);
    }
}
```



GitHup Link

https://github.com/MUTHUSURYA-A/Real-Estate.git

Project Video Link

https://drive.google.com/file/d/1lycOj37DoG5PsDrZ-2JW6u5Akr88x3gv/view?usp=drive_link