

**Electronic Health Records Application (EHRs)  
With Implementation of Blockchain Technology**

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## **ABSTRACT**

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**My project aims to address the current challenges faced by the healthcare industry, such as inadequate data security, limited data accessibility, and low efficiency, by leveraging the decentralized and secure nature of blockchain technology.**

**The use of blockchain technology would not only provide better data security and integrity, but it would also improve the efficiency of data sharing between healthcare providers, leading to better patient outcomes.**

**With a decentralized and easily accessible database of medical records, healthcare providers would have real-time access to a patient's medical history, allowing for more informed decision-making and can provide better patient care and improve the overall patient experience..**

**In conclusion, the proposed blockchain application for managing health records has the potential to revolutionize the healthcare industry and improve the overall experience.**

## **ACKNOWLEDGEMENT**

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**I would like to express my gratitude to all those who have contributed to the success of this project.**

**I'm also grateful to Graphic Era Hill University Dehradun, by provided the opportunity and support to make this project a reality.**

**I would also like to acknowledge the support and encouragement from my friends and family, who believed in me and my vision for this project.**

**Finally, I would like to thank all the individuals and groups who participated in the testing and implementation of this blockchain application for managing health records.**

**Your collaboration and feedback were crucial in making this project a success.**

**Thank you to everyone who made this project possible.**

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# **1. INTRODUCTION**

Healthcare is an industry that holds critical and sensitive information about individuals, and secure management of this information is of utmost importance. Traditional methods of storing and managing medical records have faced challenges such as data breaches, limited accessibility, and inefficiency. In response to these challenges, this project proposes a solution to revolutionize the way medical records are managed, a blockchain application for managing health records.

The use of blockchain technology in healthcare provides several benefits, including improved security, better data integrity, increased efficiency, and improved interoperability. This project aims to create a decentralized network where medical records can be securely stored and managed by authorized healthcare providers. The centralized and easily accessible database of medical records would allow healthcare providers to make faster and more informed decisions.

The proposed blockchain application for managing health records has the potential to transform the healthcare industry and provide a secure, efficient, and interoperable solution for managing medical records. In this project, you will explore the benefits and solutions offered by this technology and its potential to improve the overall patient experience.

I believe that this project has the potential to make a significant impact on the healthcare industry and look forward to the positive outcomes that it will bring.

## **2. TECHNOLOGY USED**

The technology used in the blockchain application for managing health records includes the following components:

### **Blockchain Platform**

blockchain is a data structure made of blocks where each block is connected to the previous block using cryptographic hash.

data is appended to block as transactions once added to a block and validated by the network, data becomes immutable.

The blockchain platform provides the underlying technology for the decentralized network and allows for the secure storage and management of medical records.

Examples of blockchain platforms that could be used include Ethereum, Hyperledger, etc...

### **Cryptography**

Cryptography is used to encrypt and secure medical records stored on the blockchain network.

This ensures that data cannot be altered or deleted without the consent of all parties involved and reduces the risk of unauthorized access or data breaches.

### **Smart Contracts**

Smart contracts are self-executing contracts with the terms of the agreement written directly into the code using solidity programming language.

{Solidity is an object-oriented, high-level language for implementing smart contracts. which govern the behaviour of accounts within the Ethereum state. It is designed to target the Ethereum Virtual Machine (EVM). It is influenced by C++, Python and JavaScript}

In this application, smart contracts “HealthRecord.sol” is used to manage the flow of information and ensure that only authorized parties have access to medical records.

## **Front-end Interface**

A user-friendly front-end interface is necessary to allow healthcare providers to easily access and manage medical records.

I designed a web-based interface, but the interface can be a web-based or mobile-based and should be designed to provide an intuitive and seamless experience for users.

## **Connect To Blockchain**

To enable communication between front-end and blockchain and ensure that medical records can be easily access and shared between healthcare providers.

I used “**Ethers**” for this project, ether.js is a library for interacting with the Ethereum Blockchain and its ecosystem.

## **Dependencies**

This dependency arises when the second element requires the first later in development.

In other words “The state of relying on or needing someone or something for aid, support”.

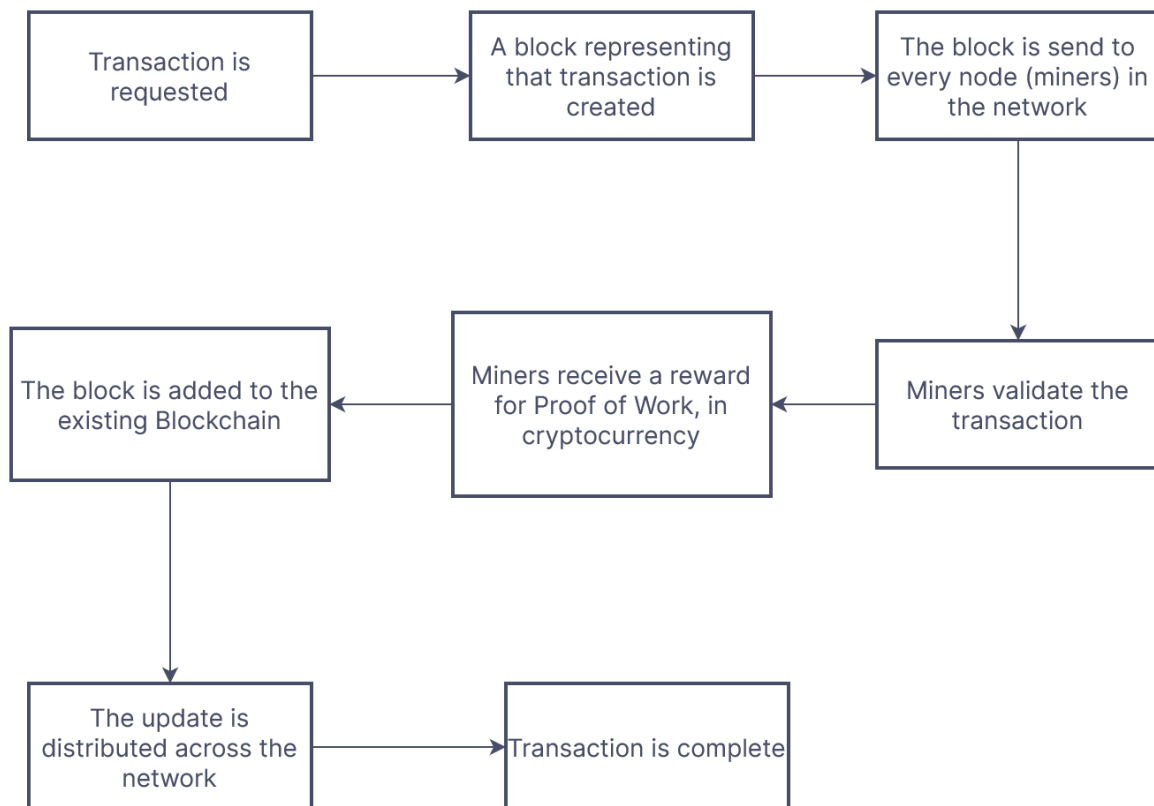
I used “**Truffle Suit, Remix IDE and Ganache**” for developing, compiling and deploying smart contract.

**Truffle Suit** is the most comprehensive suite of tools for smart contract development and

**Remix IDE** is a no-setup tool with a GUI for writing, testing smart contracts before deploying it in main ethereum network.

**Ganache** is component of the Truffle Suite framework. It has truffle serves as the development environment, testing framework and asset pipeline based on the Ethereum Virtual Machine.

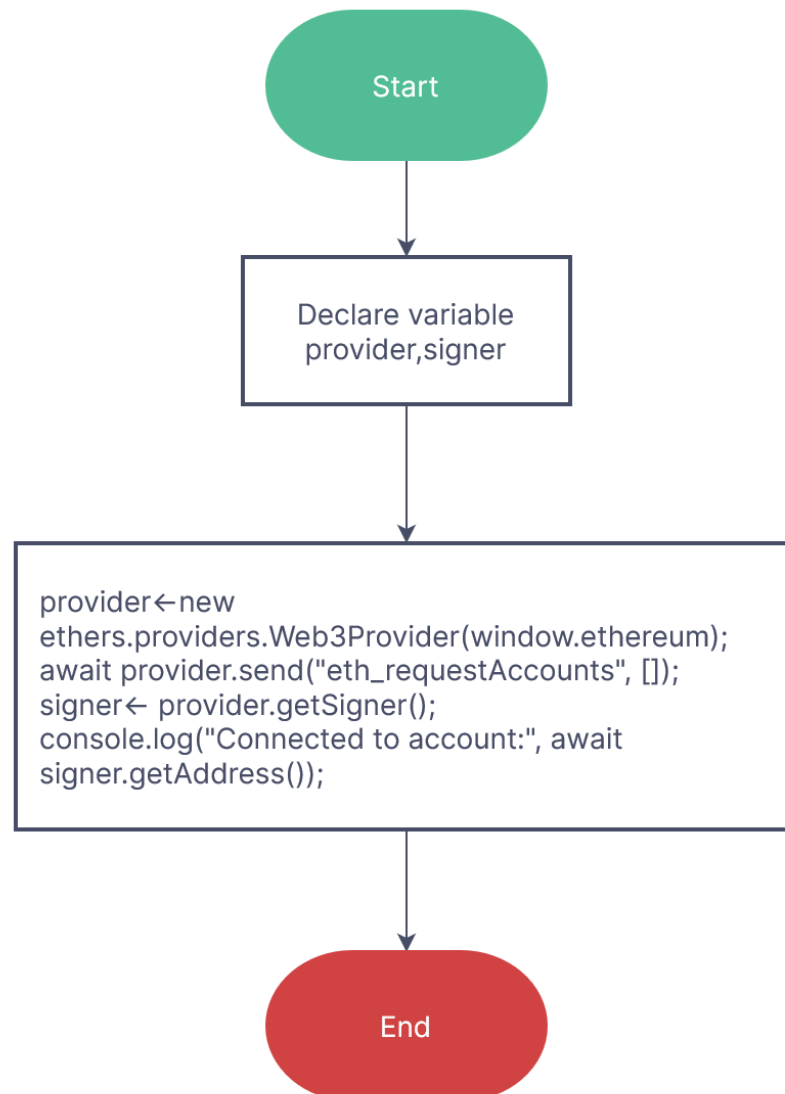
### 3. DATA FLOW IN BLOCKCHAIN NETWORK



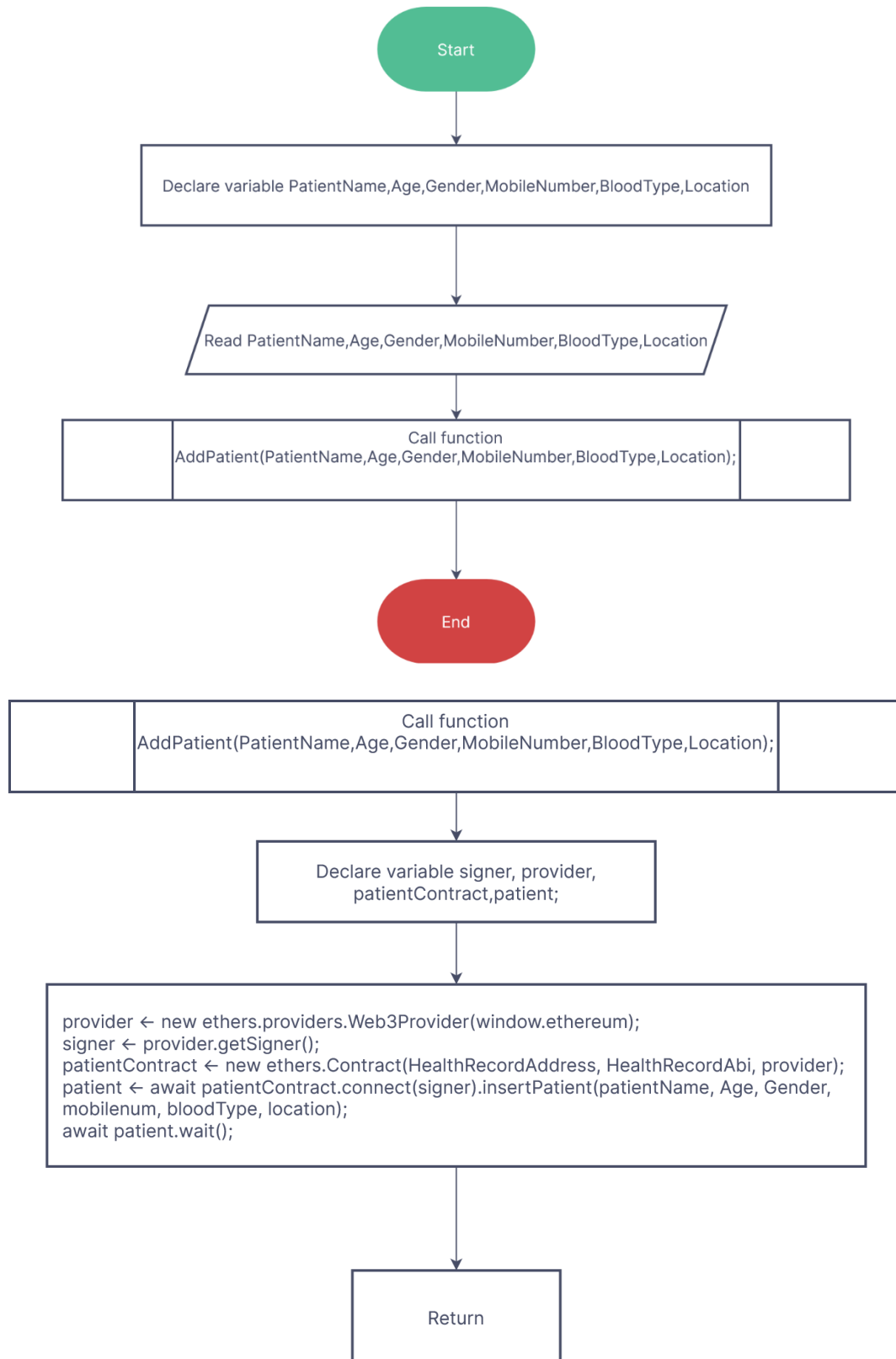


## 4. FLOWCHARTS

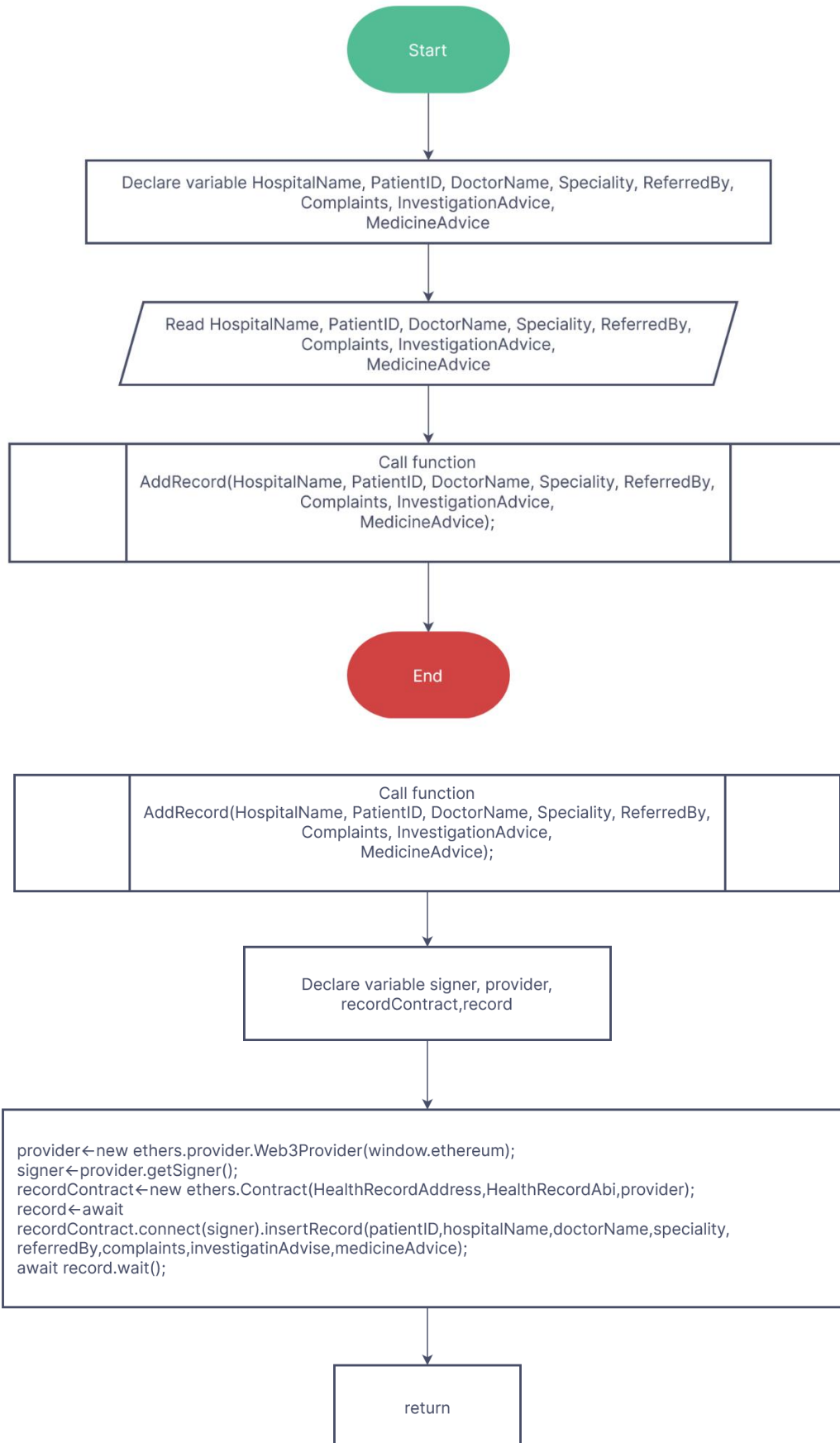
- Flowchart for connecting wallet to web-application.



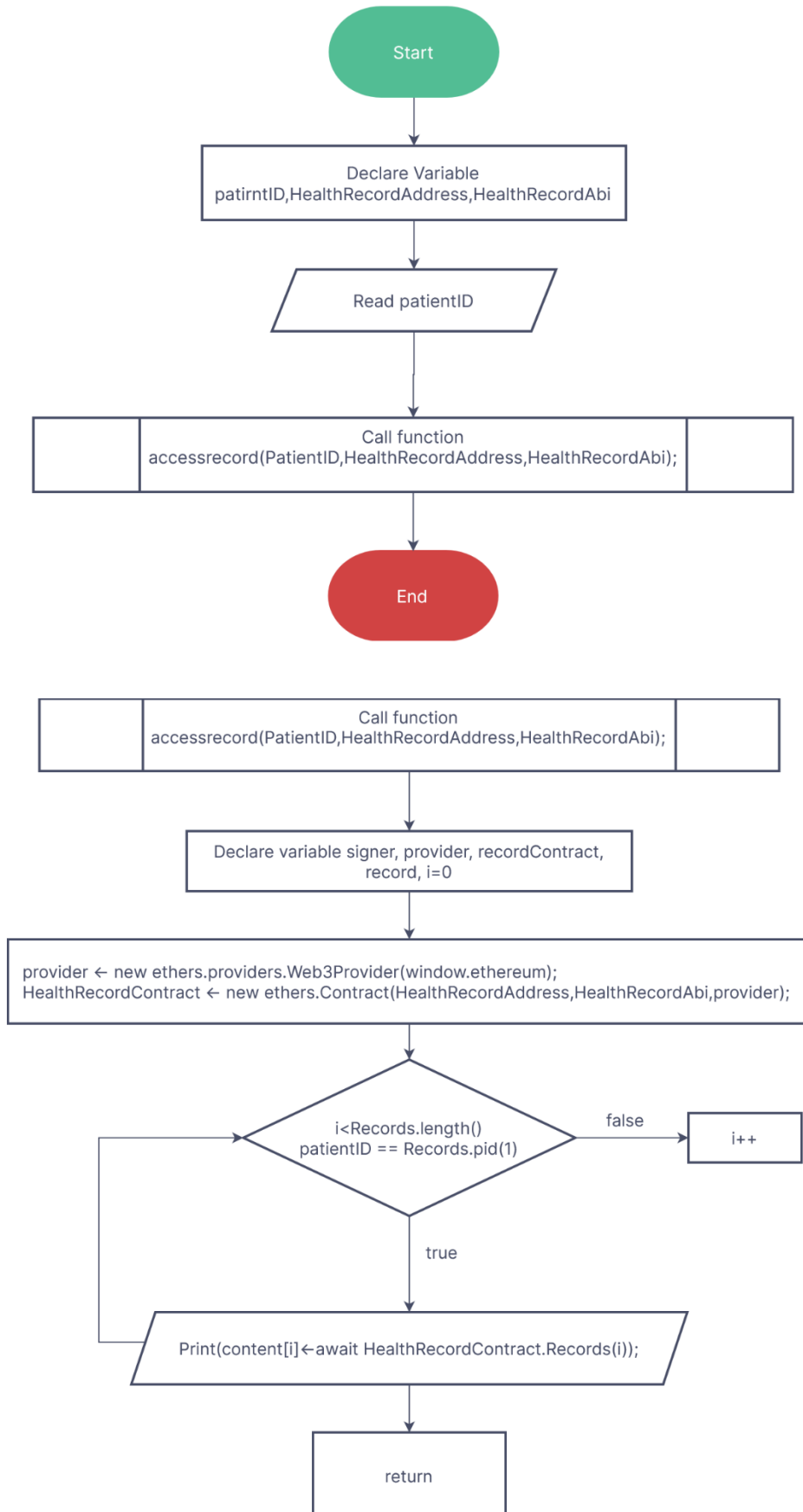
- Flowchart for deploying patient details in blockchain.



- Flowchart for deploying patient Records in blockchain.



- Flowchart for accessing patient Records from blockchain.



## 5. ALGORITHMS

- Algorithm for connecting wallet to application

1. START
2. Declare provide, signer
3. provider<-new  
ethers.providers.Web3Provider(window.ethereum);
4. provider.send("eth\_requestAccounts", []);
5. signer = provider.getSigner();
6. print "Connected to account address:", await  
signer.getAddress();
7. STOP

- Algorithm for deploying patient details in blockchain.

1. START
2. declare variable  
PatientName, Age, Gender, MobileNumber, BloodType,  
Location, provider, signer
3. provider<-new ethers.Contract(abi, address, provider);
4. signer<-provider.getSigner();
5. patient<-await patient  
Contract.connect(signer).insertpatient(PatientName, Age, Ge  
nder, MobileNumber, BloodType, Location);
6. await patient.wait();
7. STOP

- Algorithm for deploying patient records in blockchain.

1. START
2. declare variable hospitalName, patientID,  
doctorname, Specility,  
ReferredBy, Complaints, InvestigationAdvice, medicineAdvi  
ce, provider, signer, record, recordcontract
3. provider<-new ethers.Contract(abi, address, provider);
4. signer<-provider.getSigner();

5. recordContract <- new  
ethers.Contract(HealthRecordAddress, HealthRecordAbi, provider);
6. record <- await  
recordContract.connect(signer).insertRecord(patientID, hospitalName, doctorName, speciality, referredBy, complaints, investigationAdvice, medicineAdvice);
7. await record.wait();
8. STOP

- Algorithm for accessing patient details from blockchain.

1. START
2. Declare variable  
PatientID, HealthRecordAddress, HealthRecordAbi, provider, signer.
3. provider <- new  
ethers.providers.Web3Provider(window.ethereum);
4. HealthRecordContract <- new  
ethers.Contract(HealthRecordAddress, HealthRecordAbi, provider);
5. For i to records.length  
    If patientid == records.id;  
        Print records;  
        i++;  
    else i++;
6. STOP

## 6. RESULT

- **Improved Data Security:** Blockchain technology offers a secure and decentralized method of storing and sharing medical records. By using cryptographic algorithms, it makes it virtually impossible for unauthorized users to alter or access sensitive information, providing a high level of data security.
- **Increased Data Accuracy:** Blockchain's immutable ledger ensures that once data is entered into the system, it cannot be altered without proper authorization. This helps to maintain the accuracy of medical records and ensures that patients receive the right treatment based on the most up-to-date information.
- **Better Data Accessibility:** By using blockchain technology, medical records can be stored in a decentralized network and accessed from anywhere, at any time. This makes it easier for healthcare providers to access and update patient information, improving the speed and efficiency of healthcare processes.
- **Increased Patient Control:** Patients can have more control over their health information as they can decide who has access to it and can authorize its use. This gives patients more control over their health data and helps to ensure that it is used for the right purposes.
- **Interoperability:** With different healthcare providers using different systems to store medical records, it can be challenging to exchange information between different systems. However, a blockchain application for health records management has the potential to provide a standardization that could improve interoperability and make it easier to exchange information between different systems.

## **7.CONCLUSION**

The conclusion of a blockchain application for health records management is that it has the potential to bring numerous benefits to the healthcare industry. By providing secure, accurate, and accessible medical records, it can improve data security, reduce the risk of data breaches, increase efficiency, and give patients more control over their health information.

However, it is important to note that blockchain technology is still relatively new and its full potential in the healthcare industry has yet to be fully realized.

As with any new technology, there will likely be challenges and obstacles to overcome, such as the need for standardization and interoperability between different systems.

While there are still challenges that need to be addressed, the potential benefits are significant and make it a promising solution for healthcare organizations.



## **7.BILIOGRAPHY**

[Truffle suite](#)

[RemixIDE](#)

[Ethers](#)