A
MINI PROJECT REPORT ON

"Develop a Blockchain based application for health-related medical records."

SUBMITTED TO THE SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

FOR
BLOCKCHAIN

BACHELOR OF ENGINEERING (COMPUTER ENGINEERING)

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CONTENTS

Sr. No	TITLE	Page no
1.	Introduction	**3**
2.	Problem Definition	**3**
3.	Objectives	**3**
4.	Hardware & Software Requirements	**4**
5.	Theory	**4**
6.	Coding with Analysed Output	**5**
7.	Conclusion	**8**
8.	References	**8**

1. Introduction

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. A blockchain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network."

- **Blockchain for payment processing and money transfers.** Transactions processed over a blockchain could be settled within a matter of seconds and reduce (or eliminate) banking transfer fees.
- **Blockchain for monitoring of supply chains.** Using blockchain, businesses could pinpoint inefficiencies within their supply chains quickly, as well as locate items in real time and see how products perform from a quality-control perspective as they travel from manufacturers to retailers.
- **Blockchain for digital IDs.** Microsoft is experimenting with blockchain technology to help people control their digital identities, while also giving users control over who accesses that data.
- **Blockchain for data sharing.** Blockchain could act as an intermediary to securely store and move enterprise data among industries.
- **Blockchain for copyright and royalties protection.** Blockchain could be used to create a decentralized database that ensures artists maintain their music rights and provides transparent and real-time royalty distributions to musicians. Blockchain could also do the same for open source developers.
- **Blockchain for Internet of Things network management.** Blockchain could become a regulator of IoT networks to "identify devices connected to a wireless network, monitor the activity of those devices, and determine how trustworthy those devices are" and to "automatically assess the trustworthiness of new devices being added to the network, such as cars and smartphones."
- **Blockchain for healthcare.** Blockchain could also play an important role in healthcare: "Healthcare payers and providers are using blockchain to manage clinical trials data and electronic medical records while maintaining regulatory compliance."

2. Problem Statement

Develop a Blockchain based application for health-related medical records

3. Objective

To develop a Blockchain based application for health-related medical records.

4. Hardware Requirements: -

- Windows 10
- Ram – 8 GB
- HDD– 256GB

Software Requirements: -

- Browser
- Remix IDE
- Solidity

5. Theory

A blockchain is a distributed system that generates and stores data records. It maintains a digital ledger of connected “blocks” of information that represent how data is shared, changed or accessed on its peer-to-peer network.

Blockchain is an emerging technology useful to provide innovative solutions in various sectors, including healthcare.

A Blockchain network is used in the healthcare system to preserve and exchange patient data through hospitals, diagnostic laboratories, pharmacy firms, and physicians. Blockchain applications can accurately identify severe mistakes and even dangerous ones in the medical field. Thus, it can improve the performance, security, and transparency of sharing medical data in the health care system. This technology is helpful to medical institutions to gain insight and enhance the analysis of medical records.

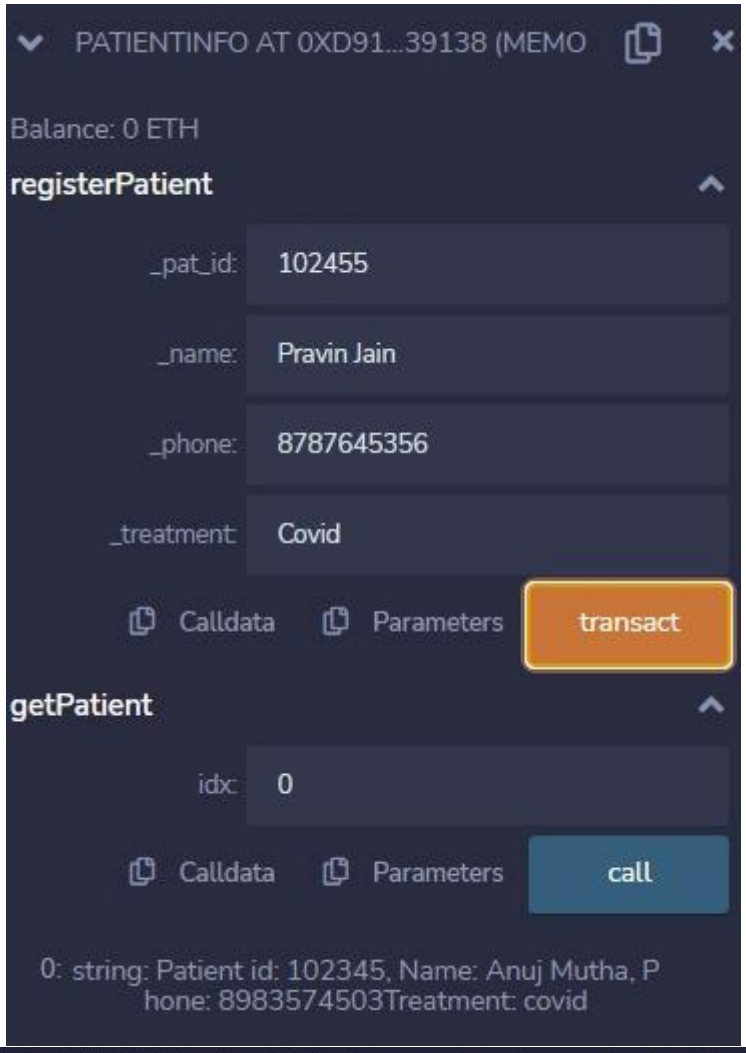
The medical industry has suffered greatly from the inability to securely share and access sensitive patient data. Blockchain, however, will facilitate finely customizable openness while upholding only the best security standards for true interoperability. In turn, this will allow health information systems to work together within and across organizational boundaries in order to advance the effective delivery of healthcare for individuals and communities.

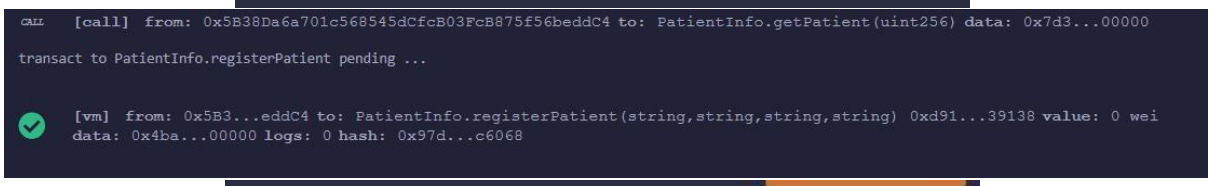
6. Coding with Analyzed Output:

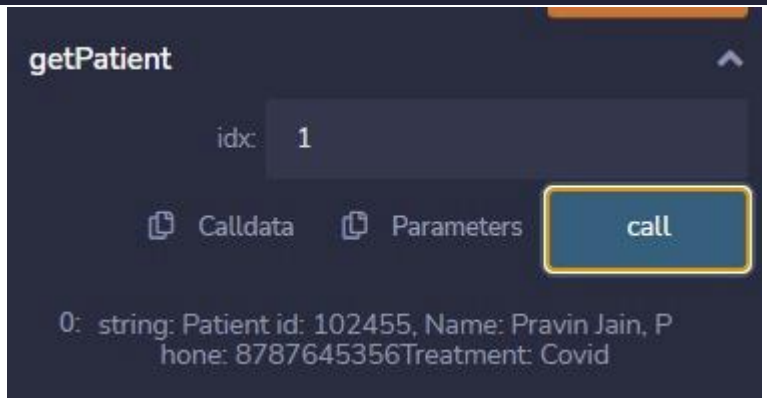
```
pragma solidity 0.8.7;

//SPDX-License-Identifier: MIT

contract PatientInfo {

    struct Patient {

        string id;

        string name;

        string phone;

        string treatment;

    }

    Patient[20] PatientInfoArray;

    uint i=0;

    // Function to register a patient

      function registerPatient(string memory _pat_id, string memory _name, string memory
_phone, string memory _treatment) public returns(string memory) {

        Patient memory patient = Patient(_pat_id, _name, _phone,
        _treatment); if(i > 20) {

            return "Limit reached";

        }

        else {
```

```
        PatientInfoArray[i] = patient;

        i += 1;

        return "Patient registered...";

    }

}


// Function to display patient data

function getPatient(uint idx) public view returns(string
    memory){ Patient memory patient = PatientInfoArray[idx];

            return string(bytes.concat("Patient id: ", bytes(patient.id), ", Name: ",
bytes(patient.name), ", Phone: ", bytes(patient.phone), "Treatment: ",
bytes(patient.treatment)));
```

//Output


PATIENTINFO AT 0XD91...39138 (MEMO
Balance: 0 ETH
registerPatient
_pat_id: 102455
_name: Pravin Jain
_phone: 8787645356
_treatment: Covid
Calldata
Parameters
transact
getPatient
idx: 0
Calldata
Parameters
call
0: string: Patient id: 102345, Name: Anuj Mutha, P
hone: 8983574503Treatment: covid


call [call] from: 0x5B38Da6a701c568545dCfcB03FcB875f56beddC4 to: PatientInfo.getPatient(uint256) data: 0x7d3...00000
transact to PatientInfo.registerPatient pending ...
[vm] from: 0x5B3...eddC4 to: PatientInfo.registerPatient(string,string,string,string) 0xd91...39138 value: 0 wei
data: 0x4ba...00000 logs: 0 hash: 0x97d...c6068


getPatient
idx: 1
Calldata
Parameters
call
0: string: Patient id: 102455, Name: Pravin Jain, P
hone: 8787645356Treatment: Covid

7. Conclusion

We have developed a Blockchain based application for health-related records and deployed it on Ethereum using the Remix IDE which performs different functions.

8. References

1. https://101blockchains.com/remix-ide-tutorials/

2. https://scholar.google.co.in/scholar?q=blockchain+in+health+care&hl=en&as_sdt=0&as_vis=1&oi=scholart