Group C

Mini Project

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

Motivation

Blockchain being the new and interesting emerging field has paved the path for many developers to create secure immutable applications in trustless environment. Hence as part of our curriculum we decided to create a Medical Health Record System that could be free from manipulation and facilitate easy data storage and recovery.

Objectives

1) To understand and explore the working of Blockchain technology and its applications.
2) To create a blockchain application to store health related medical records.

Theory

Blockchain works by creating decentralized distributed ledgers that are circulated over all devices participating in the system. It allows to share records based on peer-to-peer replication, and processing by all nodes in the network namely, transacting nodes and validating nodes. When records are placed in the ledger, all nodes in the network go through encryption procedures and are processed by all miners. The blockchain provides highly reliable storage of data and makes use of consensus strategy, digital signatures, and hash of each block.

Blockchain provides many features such as integrity, traceability, safety, and security for protection of data. Blockchain is applied in both private and government sectors. Applications of Blockchain technology in healthcare data security are EHRs, Drug and Medical Supply Chains and Medicine Development.

Emergency Healthcare Record(EHR)

Medical data is highly critical; safe and secure accessing and usage of these data is extremely important. A few authentication schemes are introduced in to enable efficient data accessibility, manageability and other key security issues are also presented.

Various usage of Blockchain in healthcare is presented in. Remote access of patient's information and protection of privacy of healthcare data are some of the important applications of Blockchain Technology.

Advantages of EHRs:-

1) Real-time, factual and complete details about the patient are fetched.
2) Data can be accessed from any place.
3) Patients have more autonomy over their personal data.
4) Data privacy and protection will be improved.
5) Coordination between patients and various healthcare departments is improved.
6) Money and time are saved.

Disadvantages of EHRs:-

1) It cannot accommodate multi-institutional complexities or maintain lifetime medical records.
2) Data is dispersed among various institution.
3) Data Manipulation
4) No easy accessibility of information in the case of multi-institutions.

Use Case of Blockchain in EHRs:-

MedRec proposed a decentralized method for utilizing blockchain technology to deal with the EHR/EMR and presented a use case of blockchain in healthcare. Healthcare records and queries require robust access control mechanism to reduce the threat of data hacking. Also, use of cryptographic algorithms in the frameworks may make encryption of medical records more complex.

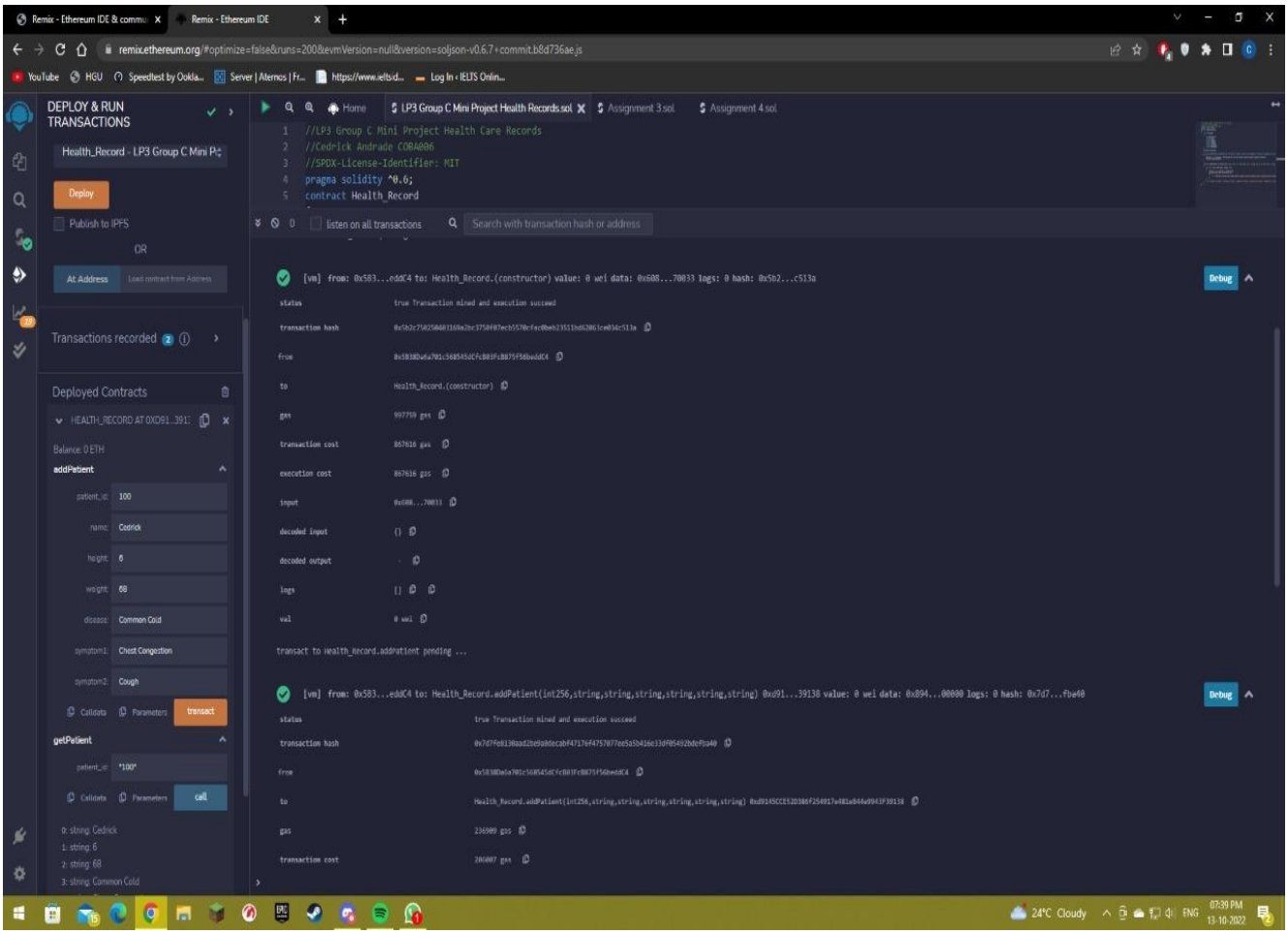
Code:-

```
//LP3 Group C Mini Project Health Care Records




//SPDX-License-Identifier: MIT
pragma solidity ^0.6;
contract Health_Record
{
    struct Patient
    {
        int patient_id;
        string name;
        string height;
        string weight;
        string disease;
        string symptom1;
        string symptom2;
    }
    Patient[] Patients;


    function addPatient(int patient_id, string memory name, string
memory height, string memory weight, string memory disease, string
memory symptom1, string memory symptom2) public
    {
```

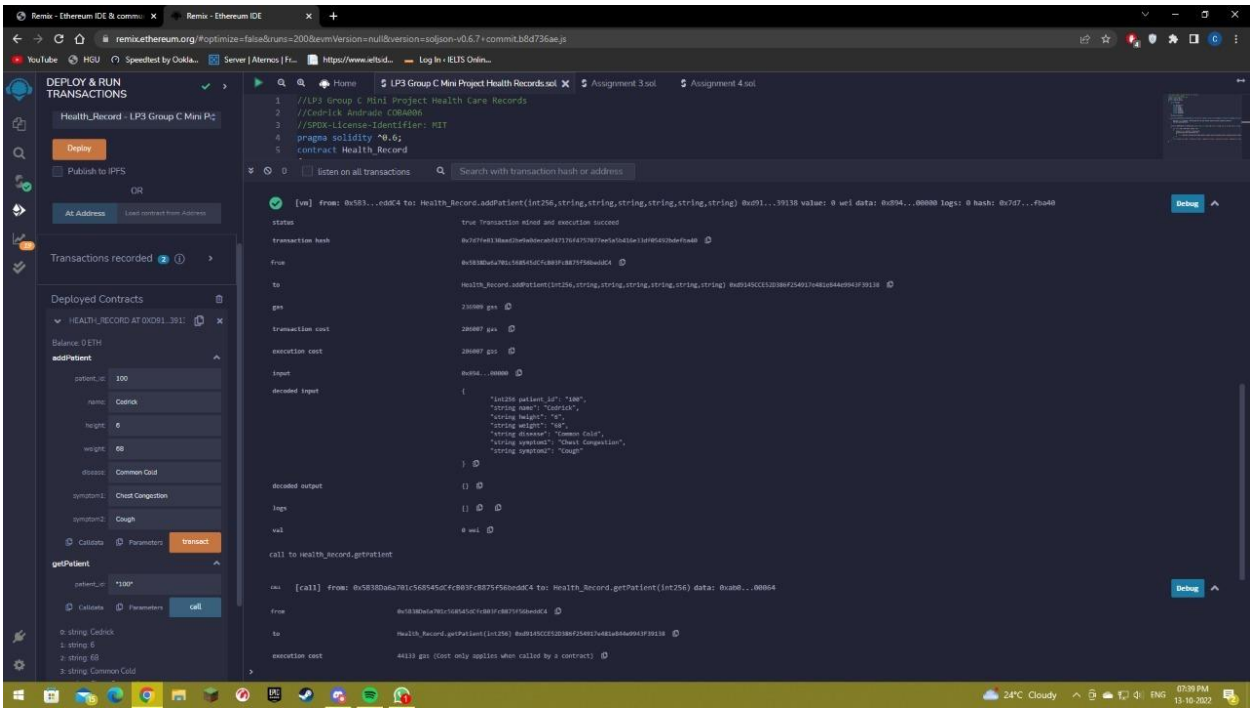
```
        Patient memory patient =
Patient(patient_id,name,height,weight,disease,symptom1,symptom2);

        Patients.push(patient);

    }


    function getPatient(int patient_id) public view returns(string
memory, string memory, string memory, string memory, string memory,
string memory)

    {

        for (uint i=0; i<Patients.length; i++)

        {

            Patient memory patient = Patients[i];

            if(patient.patient_id==patient_id)

            {

                return(patient.name,patient.height,patient.weight,pati
ent.disease,patient.symptom1,patient.symptom2);

            }

        }

        return("Name not Found", "Height not Found", "Weight not
Found", "Disease not Found", "Symptom1 not Found", "Symptom2 not
Found");

    }

}
```

Output:-

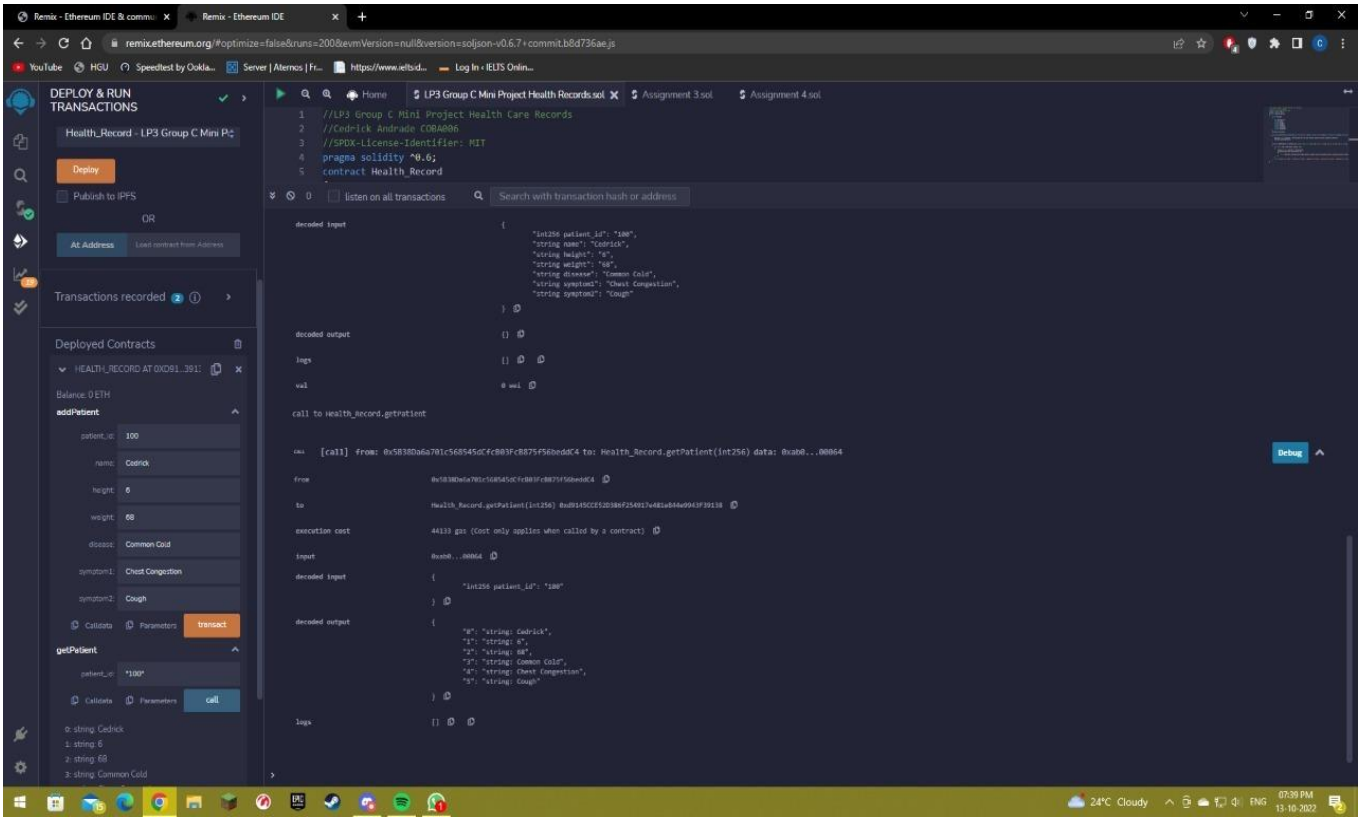
Deploying the Contract:



Adding Patient Data:-



Retrieving Patient Data:-



Conclusion

Thus, we have implemented a Health Related Medical Record System using Blockchain.