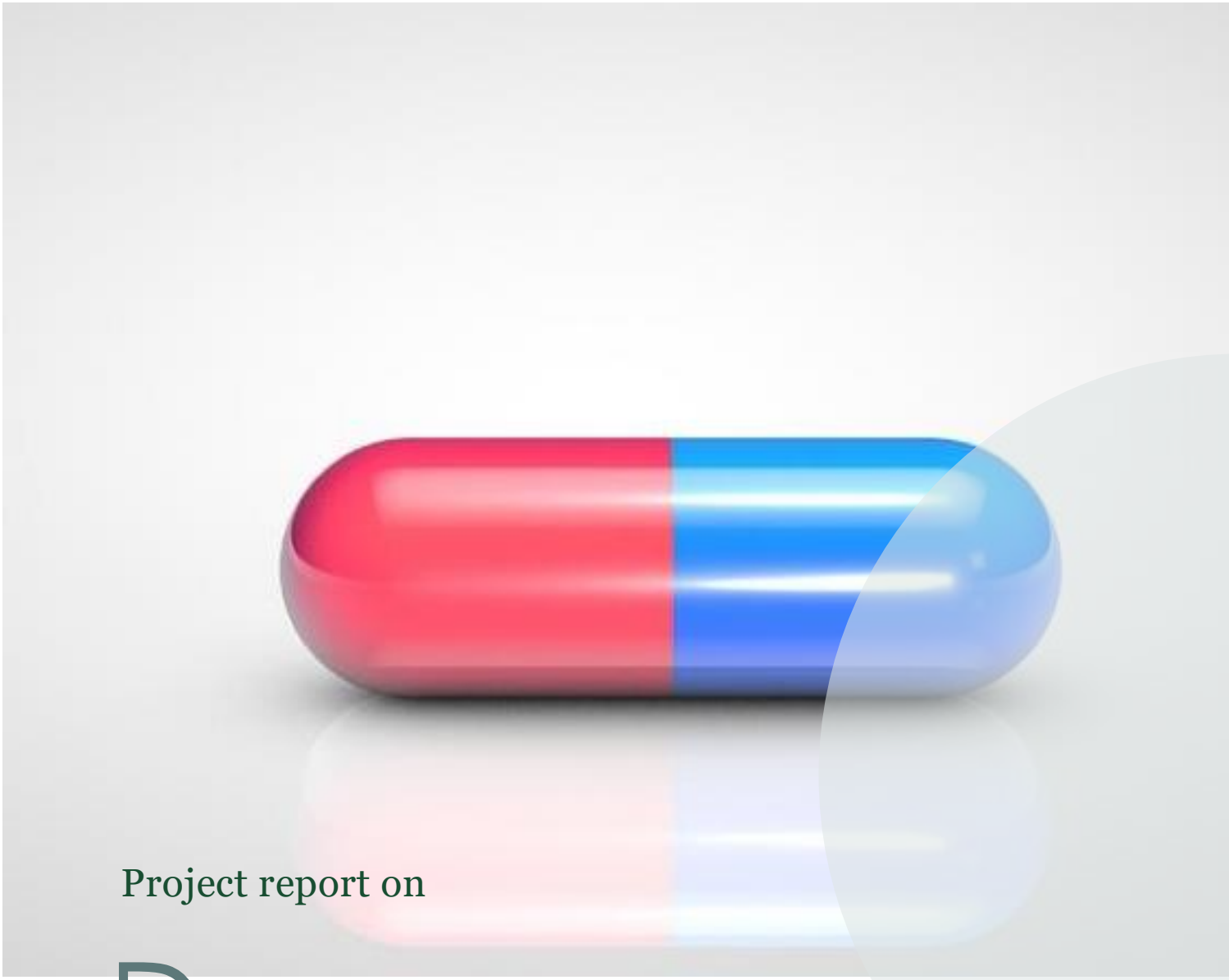

Project report on

Drug Traceability

Using Blockchain technology

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TABLE OF CONTENTS

TABLE OF FIGURES 2
1. INTRODUCTION 3
1.1 PROJECT OVERVIEW 3
1.2 PUPROSE 3
2. LITERATURE SURVEY 4
2.1 EXISTING PROBLEM 4
2.2 PROBLEM STATEMENT DEFINITION 4
3.IDEATION AND PROPOSED SOLUTION 5
3.1 EMPATHY MAP 5
3.2 BRAINSTORMING AND IDEATION 6
4. PROJECT DESIGN 7
4.1 SOLUTION ARCHITECTURE 7
4.2 DATA FLOW DIAGRAM 8
5. CODING AND SOLUTIONING 9
5.1 CODE 9
6. RESULT 12
7. ADVANTAGES AND DISADVANTAGES 12
7.1 ADVANTAGES 12
7.2 DISADVANTAGES 13
8. CONCLUSION 13

TABLE OF FIGURES

FIGURE 1: EMPATHY MAP 5

FIGURE 2: BRAINSTORMING AND IDEATION MAP 6

FIGURE 3: SOLUTION ARCHITECTURE FOR THE PROBLEM 7

FIGURE 4: DATA FLOW DIAGRAM 8

FIGURE 5: SOLIDITY CODE 1 9

FIGURE 6: SOLIDITY CODE 2 10

FIGURE 7: DEPLOYMENT OF THE CONTRACT USING REMIX 11

FIGURE 8: PROJECT FRONTEND 12

1. INTRODUCTION

1.1 PROJECT OVERVIEW

Blockchain technology is a decentralized, distributed ledger system that provides an efficient and trusted solution for product traceability. Blockchain technology powers the crypto currencies and has been applied to variety of industries such as banking, supply chain, energy, commodities trading, healthcare and many businesses involving transaction processing. To deal with the issue of counterfeit drugs, blockchain technology has the potential to provide pragmatic solution for drug traceability and provenance in a secure and immutable manner. counterfeiting of drugs is increasing globally, pharmaceutical companies are adapting blockchain technology to prevent counterfeiting. The supply of medicines is from manufactures to wholesalers, distributors, and pharmacy stores before it is purchased by customers; the counterfeiters come in between this supply chain and thus fake medicines get supplied and distributed. This project is a blockchain-based solution “Drug-chain” to improve on the end the end transparency of the drug in supply chain.

1.2 PURPOSE

The purpose of this project is to enable real-time visibility into the movement of drugs across the supply chain. All authorized parties, including manufacturers, distributors, pharmacies, and regulatory authorities, can access the blockchain to track the journey of drugs from production to consumption. This transparency helps in quickly identifying and addressing issues such as counterfeiting or diversion.

2. LITERATURE SURVEY

2.1 EXISTING PROBLEM

The pharmaceutical industry faces a significant challenge in ensuring the authenticity and safety of drugs throughout the supply chain. Despite regulatory efforts and advancements in traceability technologies, the global market still grapples with the infiltration of counterfeit drugs. These counterfeit drugs pose serious threats to patient safety, erode public trust in the healthcare system, and create substantial financial losses for pharmaceutical companies. The problem is exacerbated in developing countries with weaker regulatory infrastructures, making it easier for counterfeit drugs to enter the market undetected. Current traceability systems lack uniform standards, interoperability, and real-time information sharing, hindering the industry's ability to promptly identify, track, and remove counterfeit drugs from circulation.

2.2 PROBLEM STATEMENT DEFINITION

Counterfeit drugs are a significant concern in many regions. These fake medications can enter the supply chain, posing serious risks to patients' health. Tracking counterfeit drugs back to their source is difficult due to the complexity of global supply chains. Pharmaceutical supply chains are often extensive and involve multiple stakeholders, including manufacturers, distributors, wholesalers, pharmacies, and healthcare providers. Managing the flow of drugs across these diverse entities can be complex and challenging.

3.IDEATION AND PROPOSED SOLUTION

3.1 EMPATHY MAP

An empathy map is created with a sample consumer and is attached below

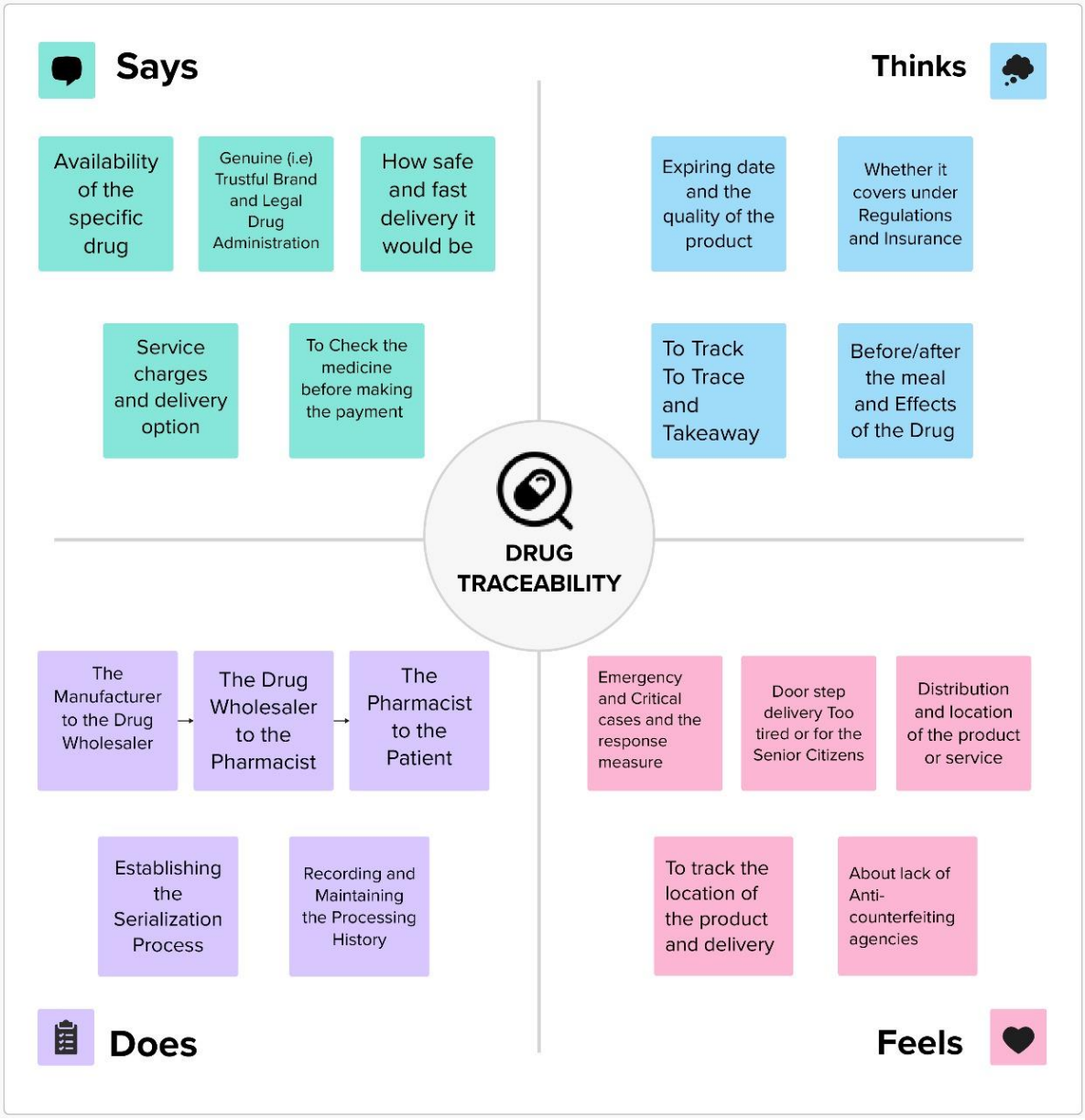

Fig 1: Empathy map

3.2 BRAINSTORMING AND IDEATION

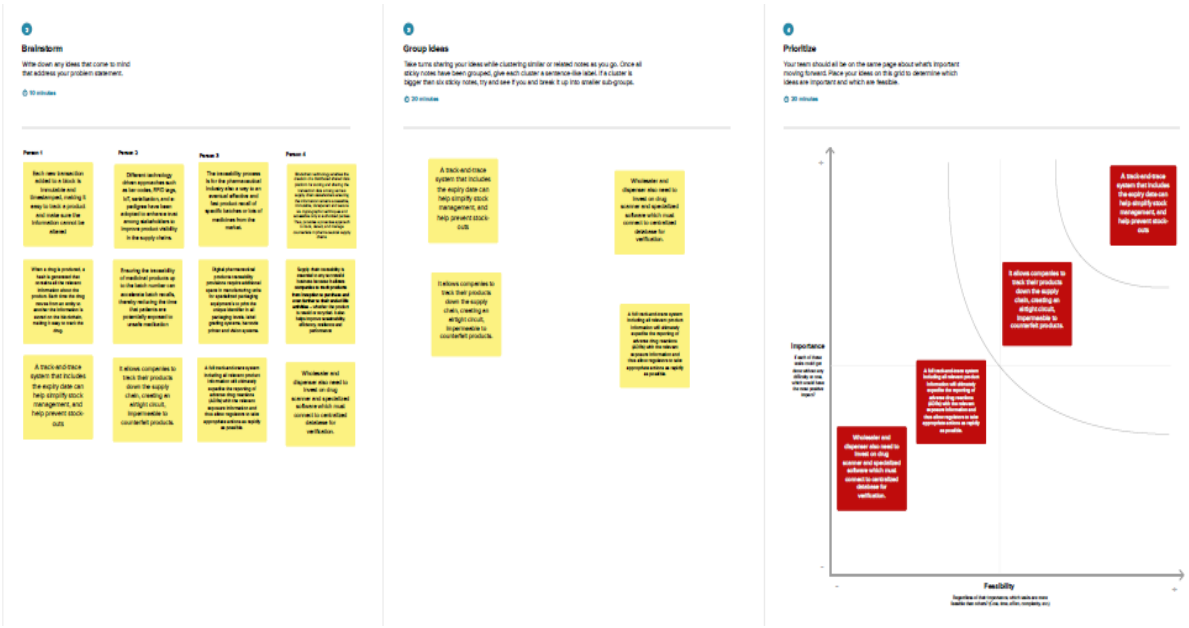

Fig 2: Brainstorming and ideation

4. PROJECT DESIGN

4.1 SOLUTION ARCHITECTURE

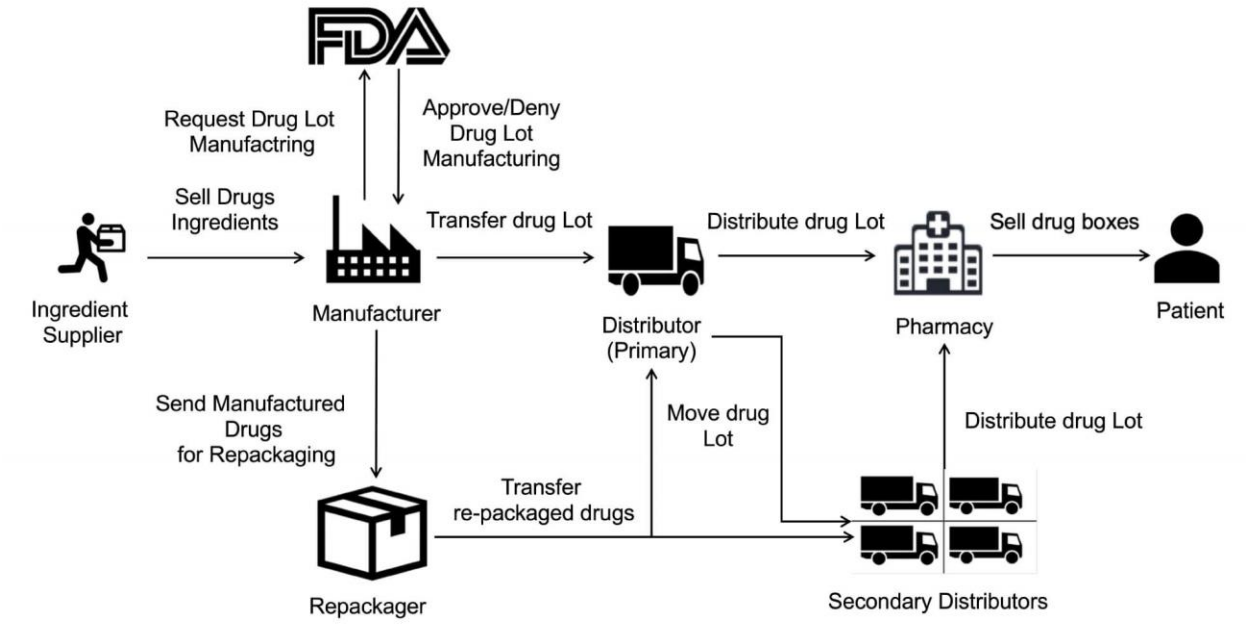

Fig 3: Solution architecture for the problem

4.2 DATA FLOW DIAGRAM

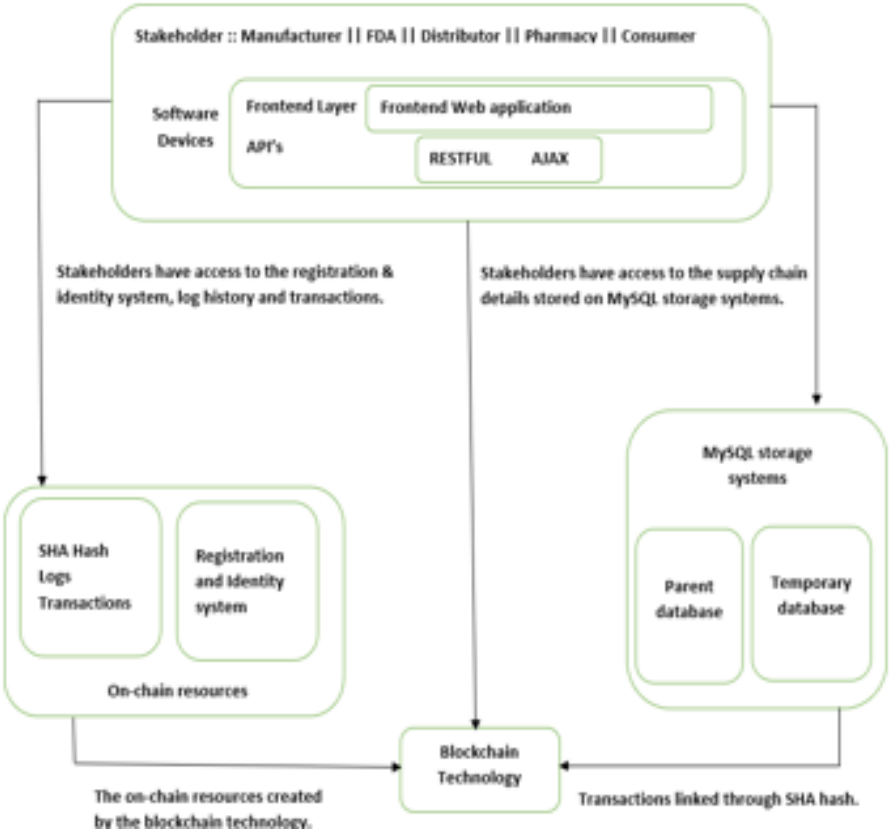

Fig 4: Data flow diagram

5. CODING AND SOLUTIONING

5.1 CODE

Home drug_tracing.sol 1

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract Drug{
    address public owner;

    constructor() {    939414 gas 914200 gas
        owner = msg.sender;
    }

    modifier onlyOwner() {
        require(msg.sender == owner, "Only the owner can perform this action");
        _;
    }

    struct Drug {
        string drugName;
        string manufacturer;
        uint256 manufacturingDate;
        address trackingHistory;
    }

    mapping(uint256 => Drug) public drugs;
    uint256 public drugCount;

    event DrugManufactured(uint256 indexed drugId, string drugName, string manufacturer, uint256 manufacturingDate);
    event DrugTransferred(uint256 indexed drugId, address indexed from, address indexed to, uint256 transferDate);
```

Fig 5: Solidity code 1

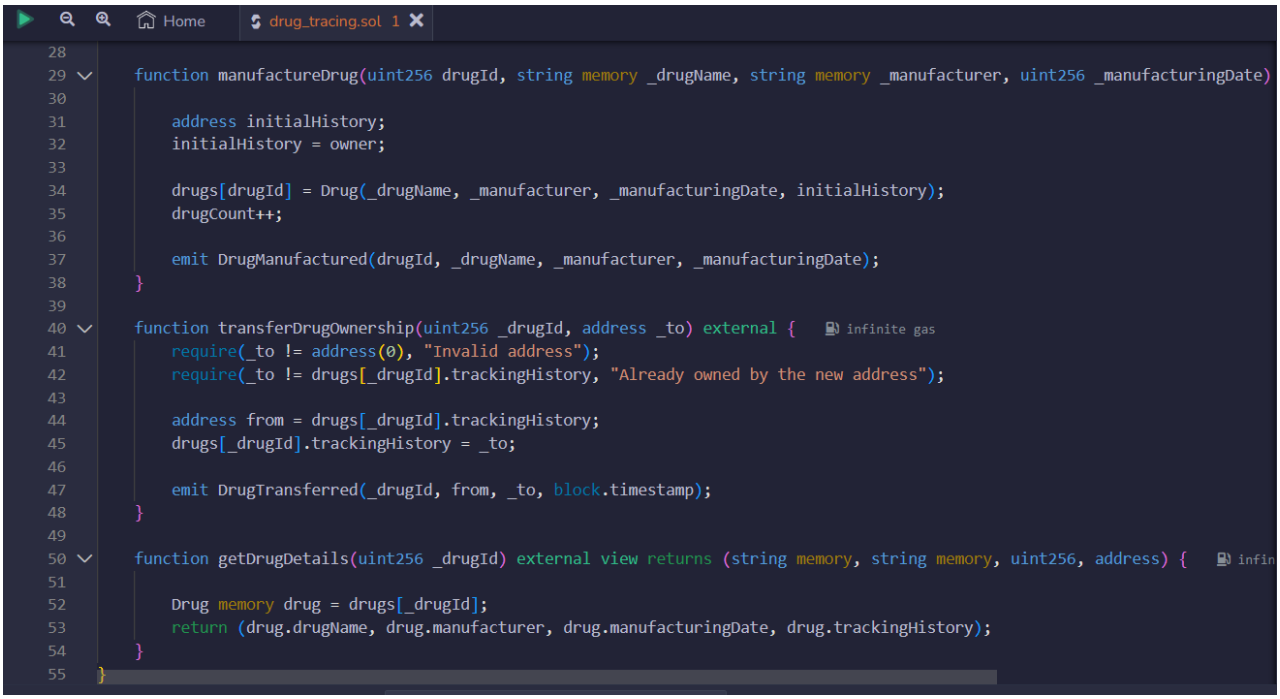

Fig 6: Solidity code 2

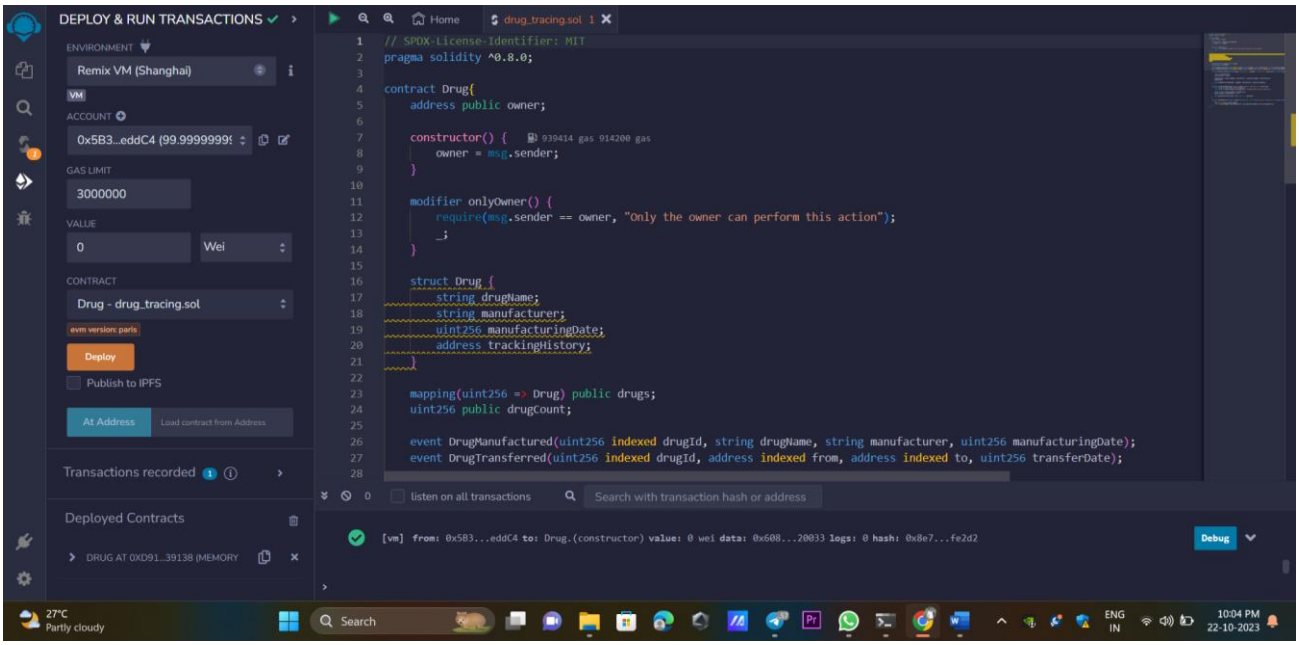

Fig 7: Deployment of contract using Remix

6. RESULT

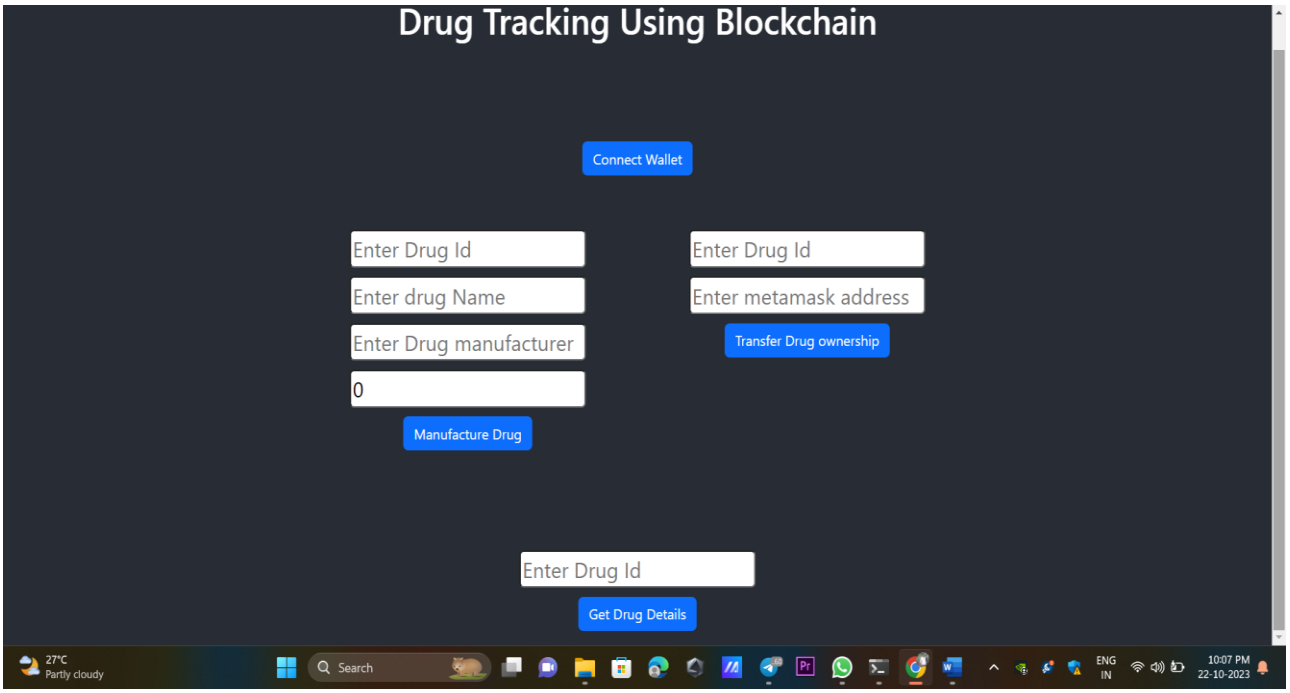

Fig 8: Project frontend

7. ADVANTAGES AND DISADVANTAGES

7.1 ADVANTAGES

- increased protection of patients from falsified medicines
- reduction of operational cost and time
- Increased accountability
- Enhanced Traceability
- Improved Transparency

7.1 DISADVANTAGES

- Implementation cost
- Scalability
- Standardisation
- User adoption

8. CONCLUSION

Drug traceability, especially when implemented using advanced technologies like blockchain, plays a pivotal role in ensuring the safety, authenticity, and efficiency of pharmaceutical supply chains. The challenges associated with counterfeit drugs, supply chain complexities, regulatory compliance, and data accuracy are met with innovative solutions through traceability systems.