Decentralized Hostel Booking

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ABSTRACT—The hospitality industry plays a significant role in employment generation and economic growth, particularly in smaller towns, villages, and tier-3 cities in India. Hostel management is an integral part of this industry, and with the increasing penetration of broadband and mobile devices, real-time room booking has become feasible even in remote locations. Blockchain, which is considered as web3.0 technology, has shown potential in various real-time applications. Therefore, a blockchain-based booking system can provide a fair and transparent solution for hostel room booking, which is crucial for many organizations and institutions. This paper aims to explore the potential of blockchain technology in the hospitality industry and proposes a basic contract for a booking system that can be implemented.
KEYWORDS – HOSTEL BOOKING, BLOCKCHAIN, SMART CONTRACTS

I. INTRODUCTION

The hospitality industry is an emerging service sector in several economies and is closely linked with the tourism industry. With the evolution of the hospitality industry from traditional hostels and hotels to modern-day services like Airbnb and Oyo rooms, there has been a shift towards personalized, app-based experiences at an affordable price. Start-ups in the hospitality sector focus on providing the best localized and personalized experiences to their customers. Augmented and virtual reality tours of rooms are becoming increasingly common. The blockchain technology, which was introduced in 2009 with the launch of Bitcoin, has attractive features such as transparency, immutability, and distributed ledger-based consensus algorithms that eliminate the need for third-party verification.

Previous research has explored the potential of blockchain in various industries, including hospitality. In this paper, we propose a basic blockchain-based contract for hostel management, which provides a fair and transparent solution for room booking. We will explore the potential of blockchain in the hospitality industry and its applicability to the hostel management system.

Smart contracts are self-executing contracts with the terms of the agreement between parties being directly written into code. These contracts are implemented on blockchain platforms, allowing for decentralized and automated execution of agreements without the need for intermediaries or middlemen. Smart contracts have numerous use cases, including finance, supply chain management, and real estate. The smart contract discussed in this paper is an example of how smart contracts can be used in the real estate industry. The smart contract hereis designed for a hostel, allowing tenants to pay their rent in Ether (ETH) directly to the landlord's wallet without involving a middleman. The smart contract uses a decentralized platform to execute agreements automatically, ensuring that transactions are secure and transparent. With the implementation of appropriate checks and balances, the smart contract ensures that the agreement is executed as intended and provides an efficient solution to the rental payment process. Overall, smart contracts are a powerful tool that can revolutionize the way agreements are executed across various industries. The hostel rental payment smart contract is an example of how this technology can be utilized in the real estate industry, making the rental process more efficient, secure, and transparent.

II. LITERATURE REVIEW

1. **"Smart Contracts for Real Estate Transactions: A Comparative Analysis" by Mauro Conti et al. (IEEE Access, 2018)**

This paper provides a comparative analysis of different smart contract platforms and their use in real estate transactions. It discusses the benefits and challenges of using smart contracts in real estate and identifies several use cases such as property title transfers, property management, and lease agreements.

2.   "Smart Contracts for Secure Sharing of Medical Data in a Consortium Blockchain" by Liang Li et al. (IEEE Transactions on Industrial Informatics, 2020)

This paper discusses the use of smart contracts in a consortium blockchain for secure sharing of medical data. It highlights the importance of privacy and security in medical data sharing and presents a smart contract-based approach for ensuring secure data sharing among healthcare providers.

3.   "A Smart Contract-based Car Rental System" by Shu-Yuan Lin et al. (IEEE International Conference on Industrial Engineering and Engineering Management, 2019)

This paper presents a smart contract-based car rental system that allows customers to rent a car without the need for intermediaries. The system uses smart contracts to manage rental agreements, payments, and car usage, thus reducing transaction costs and increasing efficiency.

4.   "Blockchain-based Smart Contracts for Supply Chain Management: A Survey" by Muhammad Junaid Farooq et al. (IEEE Access, 2019)

This paper provides a survey of the use of blockchain-based smart contracts in supply chain management. It discusses the benefits of using smart contracts in supply chain management, such as increased transparency and reduced costs, and presents several use cases such as product tracking, inventory management, and payment processing.

5.   "Smart Contracts for IoT-enabled Supply Chain Management: A Review" by PradnyaNikam et al. (IEEE Internet of Things Journal, 2020)

This paper presents a review of the use of smart contracts in IoT-enabled supply chain management. It discusses the benefits and challenges of using smart contracts in supply chain management and presents several use cases such as inventory management, logistics, and payment processing.

III.   METHODOLOGY
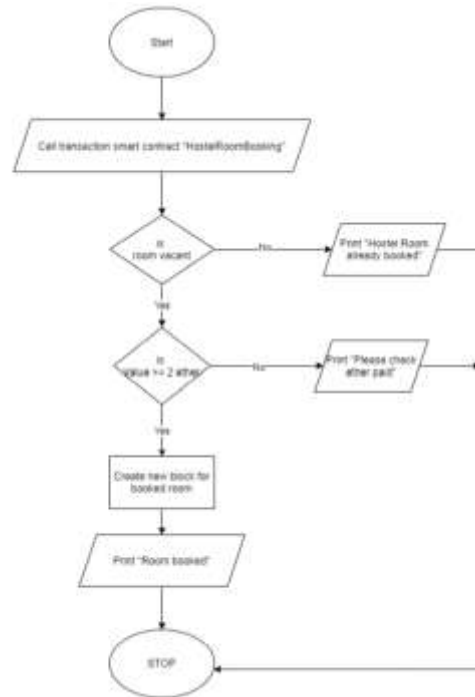The flowchart for room-booking logic is shown in figure
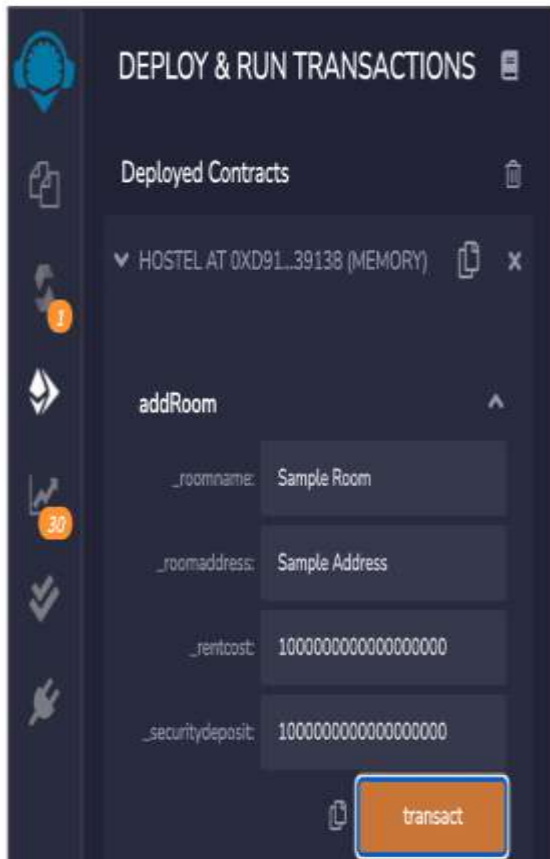

Figure 1: Flowchart for hostel room booking

The code for Blockchain-based hostel room booking is provided with the GitHub link - https://github.com/apooravvyas/PG-Booking-Smart-Contract
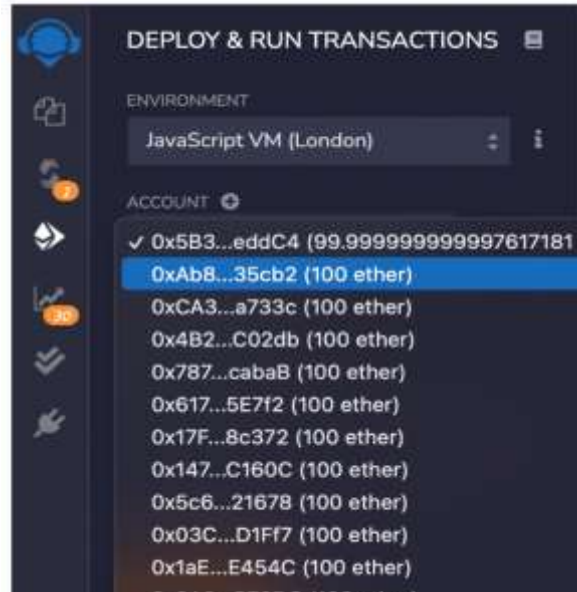
STEPS:
1. Create a structure to store details of each Hostel room like Hostel no., Hostel name, Hostel address, No of total agreements, Monthly rent, One-time security deposit, Last agreement sign time, Vacancy, Landlord address, and Current Tenant Address.
2. Create some modifiers that will help you verify a few things before running a function. Here require(...); means that if the given condition is not satisfied, the function won't execute, and the given string will appear as an error code.
3. Write the conditional statements for examplecheck whether the room is vacant or not, check whether the tenant has enough Ether in his wallet to pay the rent etc.
4. Now, create a function to sign the rental agreement for a hostel room between the landlord and a tenant. Before creating the signAgreement function, remember the following:
- The function will only execute if the user is Tenant, meaning that the user's address and the landlord's address don't match.
- The function will only execute if the user has enough ether (payable 'ether') in their Ethereum

wallet.(Enough ether means = one-time security deposit + 1st month's rent)

5. Now, create a function that the tenant will use to pay the monthly rent to the landlord. Before creating the payRent function, remember the following:

- The function will only execute if the user's address and previous tenant's address both are the same, meaning that the user can only pay rent if he/she has signed an agreement with the landlord within the last 365 days.

- The function will only execute if the tenant had paid his/her previous rent more than a month ago.

- The function will only execute if the user has enough ether (payable 'ether') in his/her Ethereum wallet. (enough ether = enough room rent).

6. Create a function that the landlord will use to mark or terminate an agreement complete. Before creating agreementCompleted function, remember the following:

- The function will only execute if the user's address and the landlord's address are the same

- The function will only execute if the tenant had signed that agreement more than a year ago.
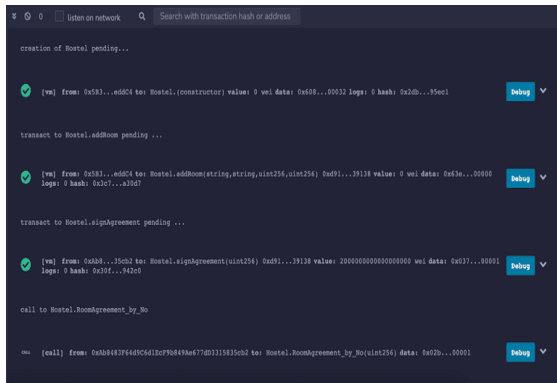

DEPLOYMENT OF SMART CONTRACT

COMPILATION OF SMART CONTRACT
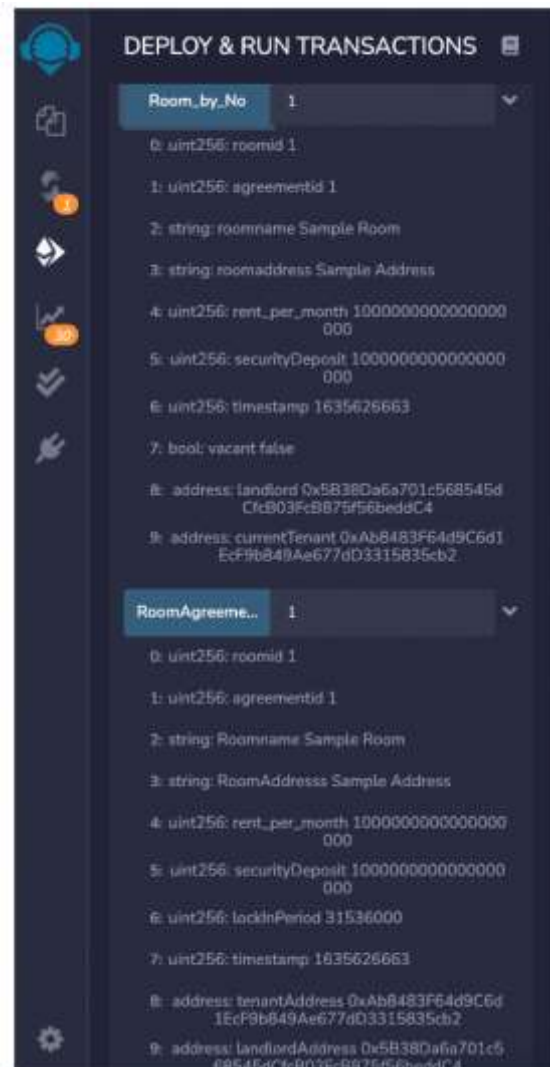
AGREEMENT OF SMART CONTRACT

All your transactions are shown in the terminal ,you can cross verify this by checking your ether account address.

The Solidity Compiler version 0.6.4 is used for the room booking system in Remix IDE. This contract could easily integrate with any front-end program. This compiled contract is deployed using Ethereum and is dubbed as a "smart contract". The frontend can be developed using JSON RPC and web3 library. Basic architecture shall be JavaScript program would invoke EVM client using JSON RPC within Web3 Interface. Further, EVM client shall update the local Blockchain copy. The local copy would spread the updating on Ethereum blockchain network using a pre-defined mechanism.

IV.   RESULTS:

Advantages Of Booking System Based On Blockchain

The blockchain-based booking system is easy to use and transparent with errorless auditable records in real-time. This type of booking system is fixed price. This type of booking system can be done with mobile via mobile application. The hostel booking system is implemented with Ethereum crypto currency with a smart contract on solidity language. It is easy to find the status of room availability in a hostel with blockchain-based booking.

Disadvantages Of Booking System Based On Blockchain

Blockchain-based booking system being distributed ledger record is electricity consuming maintenance. This type of booking system is not negotiable rather fixed price room booking. It requires 24hours x 7days internet connectivity.

V.   CONCLUSION:

The Hostel room booking system based on Blockchain is transparent and is real-time with immutable records. This Blockchain booking system will be improving the quality of Housekeeping in the Hostel environment in small cities and villages in developing countries.

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