Sipna College of Engineering & Technology, Amravati.
Department of Computer Science & Engineering
Session 2022-2023

Branch :- Computer Sci. & Engg. **Class :- Final Year**
Subject :-Block Chain Fundamentals Lab manual **Sem :- VII**

Teacher Manual

PRACTICAL NO 7

AIM: To Understand what is Smart Contract and design simple Smart contract

S/W REQUIRED: Remix IDE

A "smart contract" is simply a program that runs on the Ethereum blockchain. It's a collection of code (its functions) and data (its state) that resides at a specific address on the Ethereum blockchain.

Smart contracts are a type of Ethereum account. This means they have a balance and can be the target of transactions. However they're not controlled by a user, instead they are deployed to the network and run as programmed. User accounts can then interact with a smart contract by submitting transactions that execute a function defined on the smart contract. Smart contracts can define rules, like a regular contract, and automatically enforce them via the code. Smart contracts cannot be deleted by default, and interactions with them are irreversible.

Benefits of smart contracts

1. Speed, efficiency and accuracy: Once a condition is met, the contract is executed immediately. Because smart contracts are digital and automated, there's no paperwork to process and no time spent reconciling errors that often result from manually filling in documents.
2. Trust and transparency: Because there's no third party involved, and because encrypted records of transactions are shared across participants, there's no need to question whether information has been altered for personal benefit.
3. Security: Blockchain transaction records are encrypted, which makes them very hard to hack. Moreover, because each record is connected to the previous and subsequent records on a distributed ledger, hackers would have to alter the entire chain to change a single record.
4. Savings:Smart contracts remove the need for intermediaries to handle transactions and, by extension, their associated time delays and fees.

Ethereum has developer-friendly languages for writing smart contracts:

- Solidity
- Vyper

We will be using solidity

Solidity:

Solidity is one of the most popular languages used for building smart contracts on Ethereum Blockchain. It's also an object-oriented programming language. Solidity's code is encapsulated in contracts which means a contract in Solidity is a collection of code (its functions) and data (its state) that resides at a specific address on the Ethereum blockchain. A contract is a fundamental block of building an application on Ethereum.

Implementation:

```
// SPDX-License-Identifier: MIT
// compiler version must be greater than or equal to 0.8.13 and less than 0.9.0
pragma solidity ^0.8.13;

contract HelloWorld {
   string public greet = "Hello World!";
}
```

Output: Byte code generated as well as API generated

API code

```
[
	{
		"inputs": [],
		"name": "greet",
		"outputs": [
			{
				"internalType": "string",
				"name": "",
				"type": "string"
			}
		],
		"stateMutability": "view",
		"type": "function"
	}
]
```

CONCLUSION: Thus we have studied Smart Contract and created a simple Smart contract