# SRI VENKATESWARAA
## COLLEGE OF TECHNOLOGY

## Ethereum block chain and smart contract

**Prepared by**

Rakshana.D
1st year CSE (cyber security)

---

# ETHEREUM BLOCK CHAIN AND SMART CONTRACT

Ethereum  •  ETHEREUM VIRTUAL MACHINE  •  GAS SMART CONTRACT AND FEES  •  STRUCTURE OF ETHEREUM AND SOLIDITY FEATURES

# ETHEREUM PLATFORM

eToro – Best Ethereum Exchange With Transparent Fees, Copy Trading And Smart Portfolios. eToro is a leading Ethereum exchange that offers a secure and transparent trading platformeToro is a leading Ethereum exchange that offers a secure and transparent trading platform. io.

# What is ether

Ether (ETH) is the native cryptocurrency of the Ethereum network. It serves as the fuel that powers the execution of smart contracts, enables transactions, and facilitates interactions within the Ethereum ecosystem.Ethereum is a decentralized blockchain platform that enables the development and execution of smart contracts and decentralized applications (DApps).It is used to pay for transaction fees and computational services.There are two types of accounts in Ethereum: Externally Owned Accounts (EOA) and Contract Accounts. An EOA is controlled by a private key, has no associated code, and can send transactions.A contract account has an associated code that executes when it receives a transaction from an EOA.

# ⌃ what is ethereum gas?

Ethereum gas refers to the computational resources needed to execute the code of the contract.Gas is a measure of the complexity and resources required to execute smart contracts and helps prevent abuse of the Ethereum network by limiting the amount of computation that can be done within a single transaction.
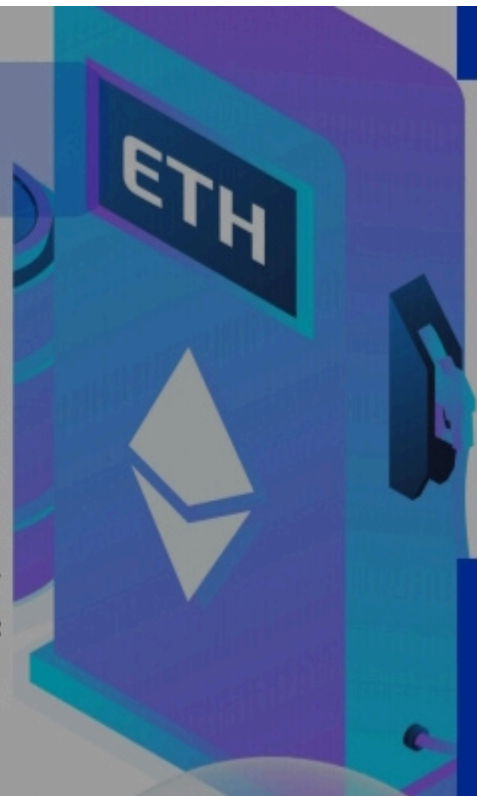
## ETHEREUM VIRTUAL MACHINE

The Ethereum Virtual Machine (EVM) is the computation engine for Ethereumthat manages the state of the blockchain and enables smart contract functionality. Ethereum Virtual Machine (EVM) is a program which executes scripts used to implement certain operations usually in Ethereum blockchain.

# GAS FEES

Gas fees work as a way to allocate resources on a blockchain network. They depend on the complexity of a transaction, network demand, and the capacity of the network. The fees go to network validators as payment for processing transactions and securing the blockchain.

## GAS LIMIT

The gas limit in blockchain technology refers to the maximum amount of computational effort a user is willing to expend on a transaction or smart contract execution. A transaction fails if the gas limit is too low, not completing its intended action, but still consuming the set gas..

## GAS REFUND

Gas refunds are a mechanism that returns unused gas fees to users who have executed transactions on the Ethereum network. When a user submits a transaction, they pay a fee in gas to miners who process the transaction. If the transaction fails or is canceled, the user is refunded the unused gas.

## GAS PRICE

The gas price defines the price per unit of computation a participant is willing to pay.

## CALCULATION OF GAS COST

Ethereum Gas is a section that calculates the quantity of calculation action that it takes to perform specific functions. Every function that carries position in Ethereum like transactions and smart contracts etc. performance needs some part of gas.
Total fee costs = Gas units (limit) * Gas price per unit

## GAS COST

The gas cost for executing a smart contract depends on the computational complexity of the contract code. More complex operations require more gas.

## GAS PRICE VOLATILITY

Gas prices can vary depending on network congestion and demand. During times of high activity, such as ICOs, popular DApps, or
network upgrades, gas prices may increase due to competition for block
space.

## GAS LIMIT AND OUT OF ERROR

Gas Limit and Out-of-Gas Errors: Transactions and smart contracts specify a gas limit, which represents the maximum amount of gas they are willing to consume. If an operation exceeds this limit, it runs out of gas and is reverted, resulting in an "out-of-gas" errro.

# Smart Contracts

['smärt 'kän-¸trakts]

A self-executing contract with the terms of the agreement between buyer and seller being directly written into lines of code.

# STRUCTURE OF SMART CONTRACT

## Contract code

Contract code, also known as smart contract code, is a set of instructions written in a programming language, such as Solidity for Ethereum or Chaincode for Hyperledger Fabric, that defines the behavior and rules of a smart contract. This code typically includes the logic for how the contract operates, conditions for executing transactions, data storage, and interactions with other contracts or external entities. It is deployed onto a blockchain platform, where it runs autonomously according to the predefined rules encoded within i

## Functions

Functions in a smart contract are pieces of executable code that define the behavior a actions the contract can perform. These functions can be called externally by users or oth contracts to interact with the smart contract's state, trigger specific actions, or retrie information that can be emitted during function execution to log important changes actions.

## State variables

State variables in a smart contract are variables that store data permanently on the blockchain. They represent the current state or condition of the smart contract and can be accessed and modified by the contract's functions. State variables maintain their values across function calls and transactions, persisting throughout the lifetime of the contract. State variables are declared at the contract level and are usually initialized with default values. They can be of various data types, including integers, strings, arrays, structs, and mapping.

## Events

Events in a smart contract are a way to log and notify external applications or users about specific actions or state changes that occur within the contract. They are used to provide transparency and allow interested parties to monitor the activities happening on the blockchain.Events are defined within the smart contract and are emitted during the execution of certain functions. They provide a way to capture and record important information without modifying the contract's state.

# STRUCTUE OF SMART CONTRACT

## Immutable

In Solidity, the immutable keyword is used to declare variables that can be assigned a value only once, either at compile time or during contract deployment. Once assigned, the value of an immutable variable cannot be changed or reassigned.

## Interoperability

Interoperability in the context of smart contracts refers to the ability of different blockchain platforms, networks, or decentralized protocols to interact and communicate with each other seamlessly.

## EVM compatibility

"EVM compatibilty" in the context of smart contracts refers to the ability of a smart contract to execute correctly on the Ethereum Virtual Machine (EVM). The EVM is the runtime environment for Ethereum smart contracts, responsible for executing code and processing transactions on the Ethereum blockchain.

# SOLIDITY

Solidity is the primary programming language used to write smart contracts on the Ethereum platform.It was developed specifically for creating decentralized applications (dApps) that run on blockchain networks.

## Solidity features modifier:

### access control

Modifiers can enforce access control by restricting the execution of certain functions to specific accounts or roles. For example, a modifier can be used to only allow the contract owner to execute a particular function.

### Code Reusability:

Modifiers allow developers to write reusable code snippets that can be applied to multiple functions within a contract. This promotes code efficiency and reduces redundancy.

### Gas Optimization:

Modifiers can help optimize gas usage by adding checks or optimizations that reduce the overall gas cost of executing functions. This can be particularly useful in scenarios where gas efficiency is critical.

## SOLIDITYB FEATURES

### error handling :

Add a littlError Handling: Modifiers can be used for error handling by reverting transactions or throwing exceptions when certain conditions are not met. This helps ensure the integrity and security of the contract's state.e bit of body text

# ETHEREUM WALLET

Add a little bit of bA Ethereum wallet is a digital tool that allows you to buy, store, and manage your Ethereum securely. It enables you to send and receive Ethereum, and access features like buying, selling,swapping, and more.

# Ethereum software

Wallet software allows users to store, send, and receive Ether (ETH) and other Ethereum-based tokens. Wallets can be categorized as software wallets (desktop, mobile, or web-based) or hardware wallets (physical devices).

## ETHEREUM PLATFORM

eToro – Best Ethereum Exchange With Transparent Fees, Copy Trading And Smart Portfolios. eToro is a leading Ethereum exchange that offers a secure and transparent trading platformeToro is a leading Ethereum exchange that offers a secure and transparent trading platform. io.

# THANK YOU