

1=>A Smart Contract is a piece of code deployed in the Blockchain node. Execution of a smart contract is initiated by a message embedded in a transaction .

Smart contracts allows the execution of code in the Ethereum Blockchain, enhancing the basic value transfer capability of the Bitcoin Blockchain.

2=> Solidity has data, functions or methods with modifiers, along with getter and setter functions.

3=>There are two types of Accounts:

=>Externally Owned Accounts=> controlled by private keys

=> Contract Accounts=> controlled by code and can be activated by only eoa

4=>The accounts can send transactions for ether transfer or they can send transactions to invoke a smart contract code.

5=> The smallest denomination of cryptocurrency on Ethereum is wei.

1 ether =  $10^{18}$  wei

6=> a transaction in ethereum includes:

=>recipient of the message

=>signature of sender authorizing transfer

=>amount of wei

=>message to a contract

=>STARTGAS(max no of computational steps)

=>GASPRICE(fee for computations)

7=> ethereum block structure:

=>header

=>transactions

=>runner-up-headers

8=> difference between bitcoin stack and ethereum stack:

bitcoin stack=>

1-wallet/exchange application

2-bitcoin blockchain protocol/operations

3-peer-to-peer network and operating systems

4-hardware

ethereum stack=>

1-verticals:end user applications

2-application framework: smart contracts

3-ethereum blockchain and ethereum virtual machine

4-peer-to-peer network and operating systems

5- hardware

9=> A smart contract written on high level language like solidity is translated into evm white code and then deployed on ethereum virtual machine.

10=>Ethereum full node hosts the software needed for:

transaction initiation,

validation,

mining,

block creation,  
smart contract execution  
and ethereum virtual machine(evm).

11=> Miner (used to secure the transaction) nodes are :

receive transactions,  
verify transactions,  
gather transaction,  
and execute transactions.

12=> Any changes to the value of a state variable in a smart contract are stored on the blockchain.

13=> If value(ethers) transfer from sender's account to receiver's account

then another fees(gas points) transfer from sender's account to miner's account to complete the transaction.

14=> The consensus protocol used as a memory based rather than a cpu based proof of work.

15=> Ethereum uses incentive model for block creation just like miners.

16=> Miners who solved the puzzle but didn't win the block creation called ommers. Ommers blocks are side block to the main chain . Ommers miners also get a small percentage of the total gaspoints as a consolation and for network security.

17=> Miner of a block is paid fees for the creation of block.

18=> Gaslimit is the amount of gas points available for a block to spent.

for example => If  $\text{gaslimit} = a$  units

$\text{ether transaction fee} = b$  units

total no of ether can be transact =>  $c = a/b$  ethers

19=> Gasspent is the actual amount spent at completion of block creation.

20=>Miners incentive model=> the proof-of-work puzzle winner miner that creates the new block is incentivized with base fees of three ethers and the transaction fees in ethereum blockchain.

The winning miners get the fees gaspoints for execution of smart contracts transaction. there may be other miners who solve the puzzles , but do not own the block (ommers).