BISTEC GLOBAL

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second part

Road to Web3.0

Let’s build an eKYC application using blockchain.

Gayashan Wagachchige

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HEARTS ACADEMY

Help our Hearts to improve their skills.

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First part

Core Concepts of Blockchain

Second part

Ethereum Development

Third part

Build eKYC Application using blockchain

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In the previous session,

- Web 3.0
- Cryptocurrency & Crypto wallets
- Core Concepts of Blockchain
- How to write a smart contract with Remix IDE

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What will you learn ?

- Ethereum
- Smart Contracts & EVM
- Gas fees
- Let’s build a dApp on Ethereum blockchain

Ethereum

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Ethereum

Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform.

- Ethereum white paper published in 2014 by **Vitalik Butarin**.
- Ethereum launched on 30 July 2015.
- Native currency is **Ether (ETH)**.
- A **second generation** blockchain.
- General purpose programmable blockchain.
- Utilize **smart contracts**.
- Enables to develop **dApps**. (Decentralized Applications)

Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform.
By Vitalik Buterin (2014).

When Satoshi Nakamoto first set the Bitcoin blockchain into motion in January 2009, he was simultaneously introducing two radical and untested concepts. The first is the "bitcoin", a decentralized peer-to-peer online currency that maintains a value without any backing, intrinsic value or central issuer. So far, the "bitcoin" as a currency unit has taken up the bulk of the public attention, both in terms of the political aspects of a currency without a central bank and its extreme upward and downward volatility in price. However, there is also another, equally important, part to Satoshi's grand experiment: the concept of a proof of work-based blockchain to allow for public agreement on the order of transactions. Bitcoin as an application can be described as a first-to-file system: if one entity has 50 BTC, and simultaneously sends the same 50 BTC to A and to B, only the transaction that gets confirmed first will process. There is no intrinsic way of determining from two transactions which came earlier, and for decades this stymied the development of decentralized digital currency. Satoshi's blockchain was the first credible decentralized solution. And now, attention is rapidly starting to shift toward this second part of Bitcoin's technology, and how the blockchain concept can be used for more than just money.

Bitcoin to Ethereum

Why Ethereum?

- Bitcoin was solely focused on cryptocurrency.
- Ethereum is a general purpose blockchain.
- Ethereum enables developer to do any implementation on blockchain.
- Ethereum does this by Smart Contracts.

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TRADITIONAL CONTRACT

SMART CONTRACT

Smart Contracts

- Computer programs run on Ethereum
- Written in Solidity
- Backend code for dApps
- Once deployed, can not be altered.

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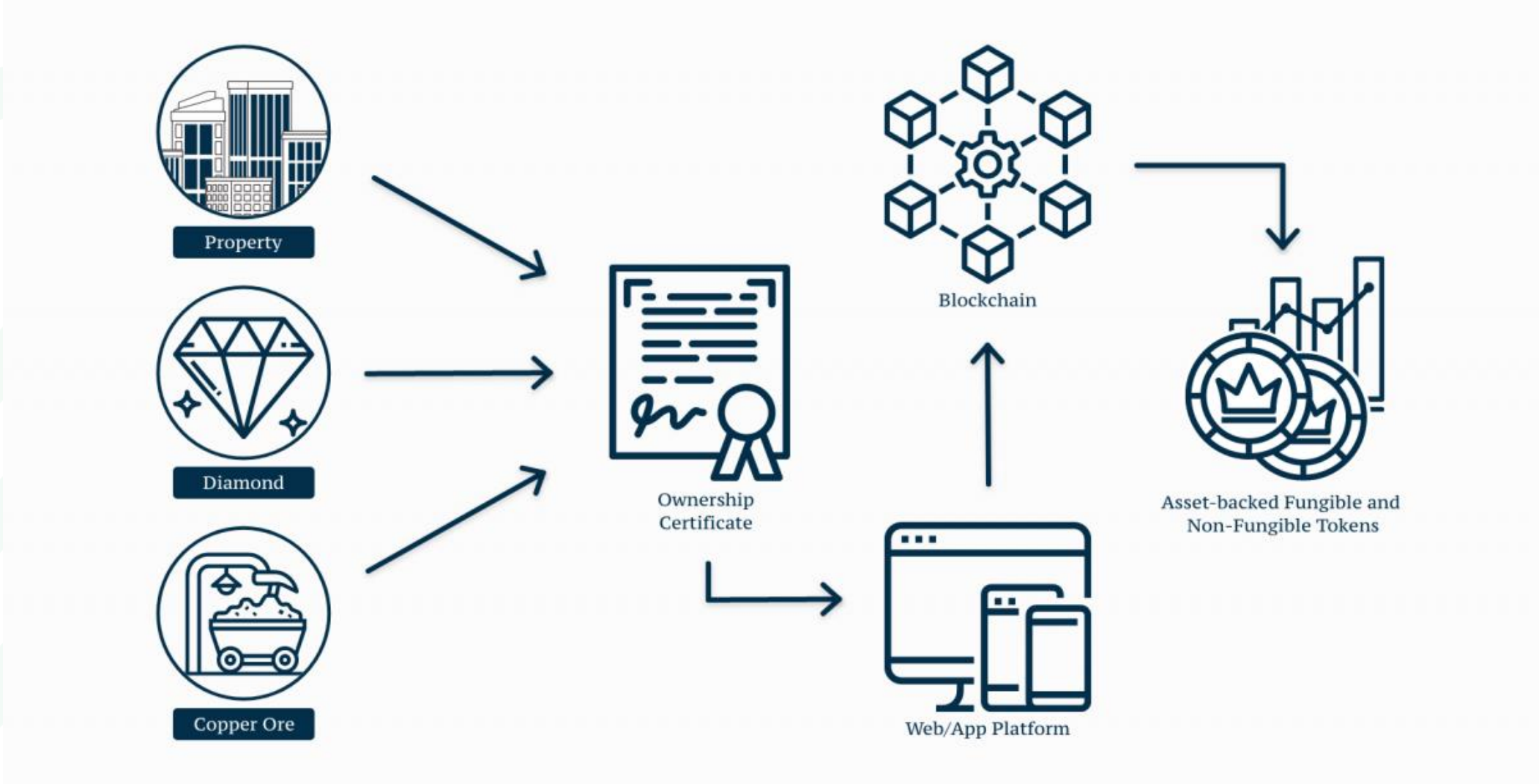
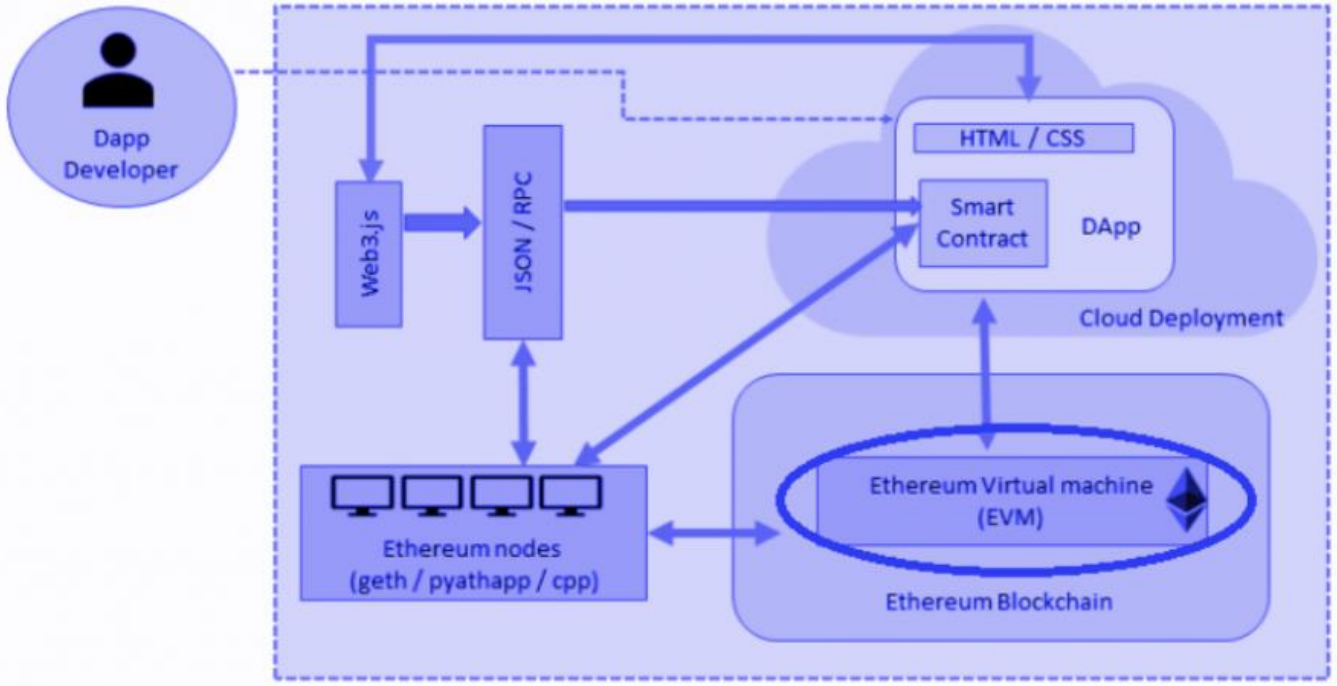
How is value created on blockchain? - Tokens

The connection between cryptocurrency and smart contracts

- Tokenization is possible using smart contracts.
- A token is a representation of assets.
- Verifiable tokens are created on the blockchain.
- Any asset ‘Digital’ or ‘Physical’ can be represented by digital tokens.
- Cryptocurrency, NFT
- Any other custom-made tokens.


Property
Diamond
Copper Ore
Ownership
Certificate
Blockchain
Web/App Platform
Asset-backed Fungible and
Non-Fungible Tokens



EVM – Ethereum Virtual Machine

- Smart contracts run inside of EVM
- Creates a closed environment to execute smart contracts.
- Turing-complete.

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Cost of Accessing Blockchain

What is Gas?

- Bitcoin blockchain – Transaction fee
- Ethereum blockchain – Gas fee

Mining and Gas

- Incentive based system

Why Gas? Importance of Gas.

- Gas powers the entire Ethereum ecosystem.
- Prevents DDoS attacks.
- Developers are encouraged to write efficient smart contract code.

Gas Costs from Yellow Paper -- EIP-150 Revision (1e18248 - 2017-04-12) - Google Sheets

Paid in **Ether (ETH)**, measured in **Wei**.

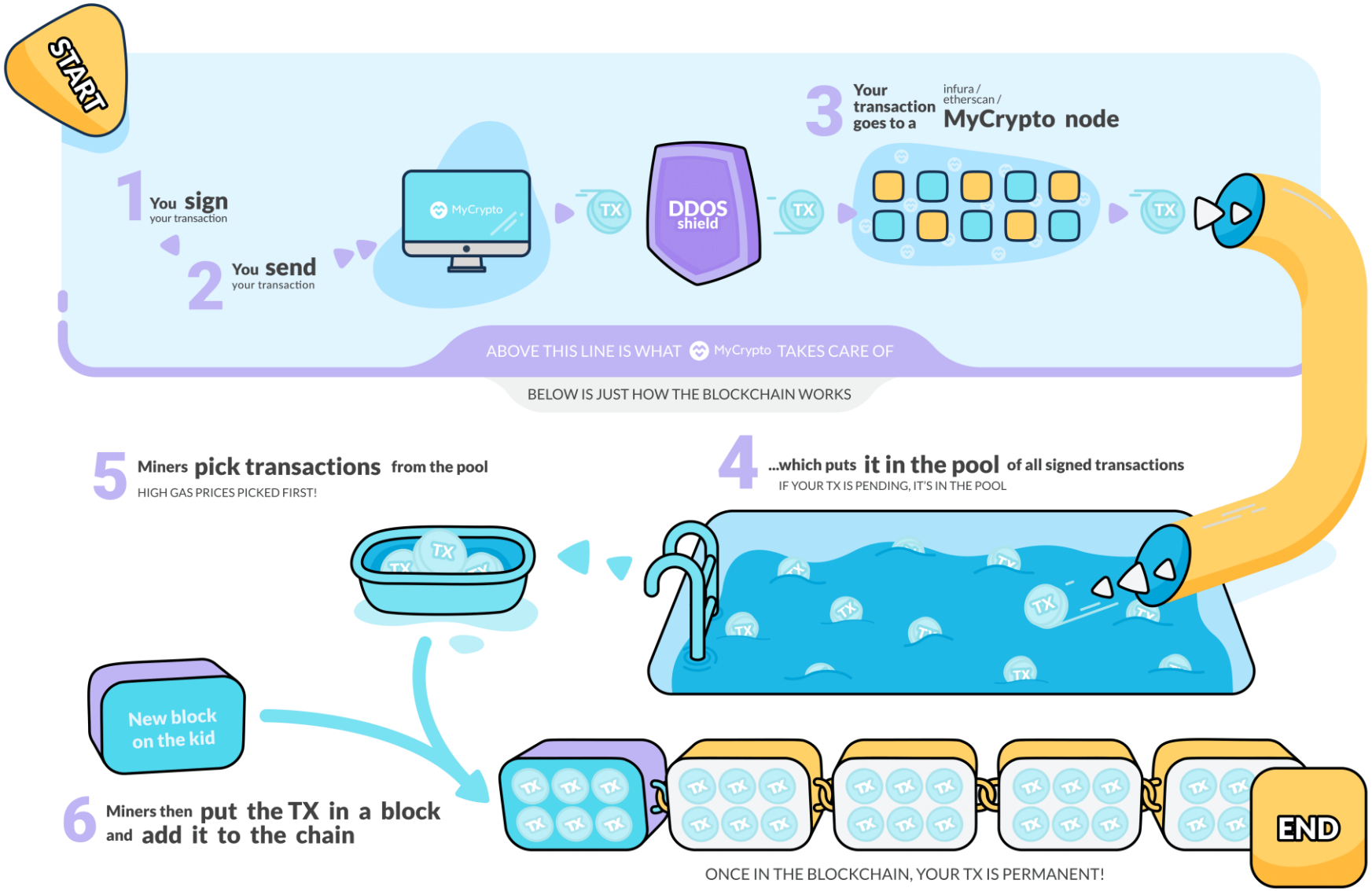
Gas price **fluctuates** based of **supply and demand for the computational power** needed to process smart contracts and other transactions.

Gas fee = Gas Units * Gas Price per unit

1 ETH = 10^{18} Wei **1 Wei = 10^{-18} ETH**

1 GWei = 10^{9} Wei **1 GWei = 10^{-9} ETH**

Gas fee = 21000 * 200 Gwei = 4’200’000 Gwei = 0.0042 ETH



Orginally created by @veenspace updated by MyCrypto in 2020

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dApps – Decentralized Applications

Smart Contract + Front-end = dApp

Decentralized.

Open Source.

Operates autonomously.

Back-end

Smart Contract written in solidity.

Run on a blockchain.

Front-end

Any frontend technology.

Ideally hosted on a decentralized storage.

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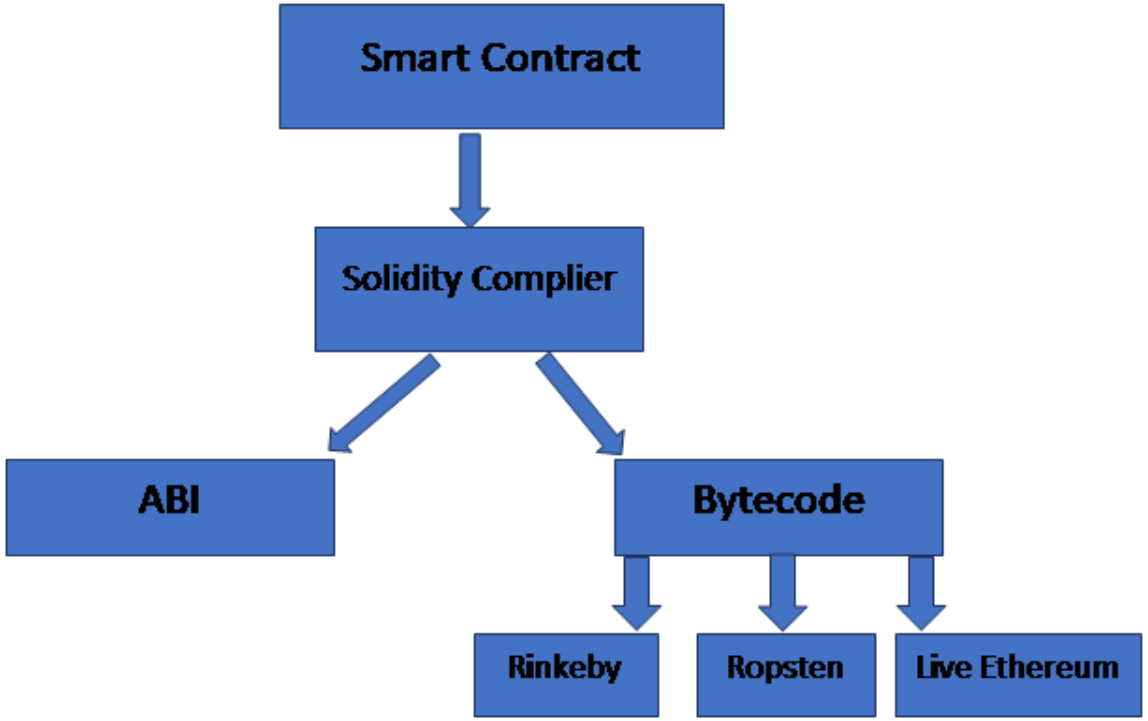
Solidity Compiler



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Ethereum Development Suites

trufflesuite.com

hardhat.org

infura.io

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Testing Smart Contracts

Writing tests for smart contract functions

Mocha

Chai

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Deploying Smart Contracts

Local Blockchains

Ganache

Hardhat local blockchain

Testnets

Rinkeby Testnet

Goerli Testnet

Mainnet

Ethereum

Network

*** Need real money!**

Building the Front-end

React.Js

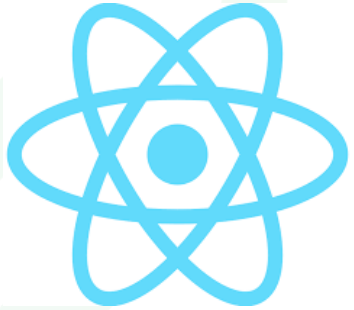
Next.Js

Ethers.Js

Web3.Js

Moralis.Js

Web3uikit.Js



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Let’s build a dApp.

gayashan4lk/solidity-first-contract (github.com)

The Web 3.0 Developer Road Map.

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Web 2.0 Skills

Fundamentals of Blockchain

Ethereum & Smart Contracts

Solidity & Web3 Development Tools

Dapps (Decentralized Applications)

Enterprise blockchain solutions

First mile

Second mile

Third mile

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Thank You.