Tutorial 3:

Metamask, Faucets, ERC721 & ERC20

CSCD71: Blockchains & Decentralized Applications

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Installing a Metamask Wallet

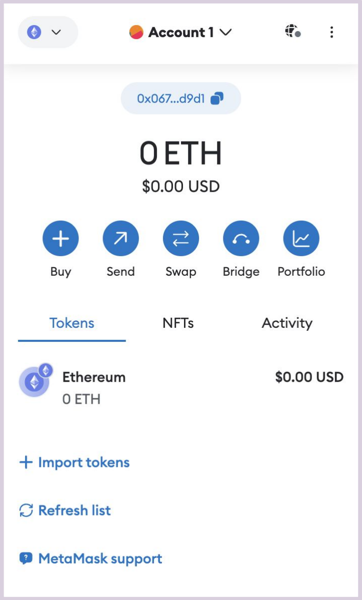
✔ open-source wallet, compatible with many dApps

✔ ethereum-focused, non-custodial wallet

🔗 https://metamask.io/

Create an account

1. Create a new wallet
2. Create a password
3. Secure my wallet
4. Write down your seed phrase
5. Verify your seed phrase



Account 1

0x067...d9d1

0 ETH

$0.00 USD

Ethereum 0 ETH $0.00 USD

Getting **testnet funds**

Retrieve test ethereum from a **faucet,**
paste your copied ethereum address, and send!

Faucets:

Goerli:
1. https://goerlifaucet.com/
2. https://goerli-faucet.pk910.de/

Sepolia:
1. https://sepoliafaucet.com/
2. https://sepolia-faucet.pk910.de/

Sepolia vs **Goerli** Faucets

When to use **Goerli**?

- Goerli is a **cross-client testnet**, and is the first Ethereum testnet, and can function with a range of node clients, such as Geth, Nethermind, etc.

When to use **Sepolia**?

- Sepolia is a native **proof-of-stake (PoS)** testnet created in October 2021 by Ethereum core developers, and is recommended as the default.

NFTs

What is **ERC-721**?

ERC-721 is a **non-fungible token** standard (NFT). This means that each token is **unique** and has its own value, are not tradable / interchangeable on a like-to-like value basis.

Purpose: Certify ownership and authenticity, tokenizing real-world assets: art, real estate, etc.

ERC-721 Objectives

1. Review an ERC-721.sol contract from OpenZeppelin
2. Deploy our ERC-721 smart contract
3. Upload an image and metadata to IPFS.
4. Mint a token from our contract, and let it store the IPFS URL to the metadata we constructed.
5. Find our newly minted token on OpenSea.
6. Explore, Buy, Sell, Auction and Bid on OpenSea.

Altcoins

What is **ERC-20**?

ERC-20 is a fungible token standard. This means that each token is identical to every other token; they are not unique and are tradable on a like-to-like basis.

Purpose: Primarily used for value exchange, representing assets such as stablecoins (like USDT, DAI), utility tokens, and even other cryptocurrencies (eg: Polygon).

ERC-20 Functions

6 Mandatory Functions by the EIP guidelines:

function **transfer**(address _to, uint256 _value) external returns (bool);
function **transferFrom**(address _from, address _to, uint256 _value) external returns (bool);
function **approve**(address _spender, uint256 _value) external returns (bool);
function **totalSupply**() external view returns (uint256);
function **balanceOf**(address _owner) external view returns (uint256);
function **allowance**(address _owner, address _spender) external view returns (uint256);

🔗:https://ethereum.org/en/developers/tutorials/understand-the-erc-20-token-smart-contract/#a-basic-implementation-of-erc-20-tokens

ERC-20 **Objectives**

1. Review an ERC-20.sol smart contract from OpenZeppelin.
2. Deploy our own ERC-20 token.
3. Mint tokens and distribute it to those in the class.
4. Add our token to our Metamask wallet.

DEMO: AMMs & Uniswap

Automated Market Makers (AMMs) are a type of decentralized exchange (DEX) protocol that allows users to trade digital assets in a permissionless and automatic way. They use liquidity pools rather than a traditional market of buyers and sellers. This means that instead of matching individual buy and sell orders, trades are executed directly against a pool of assets.

Uniswap is a popular example of an AMM. It is a decentralized trading protocol known for facilitating automated trading of decentralized finance (DeFi) tokens.

External Resources Used

Stanford CS251:

- https://cs251.stanford.edu/lectures/lecture9.pdf
- https://cs251.stanford.edu/lectures/lecture10.pdf
- https://cs251.stanford.edu/lectures/lecture11.pdf

Thanks!

Do you have any questions?

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