

Writing Smart Contracts

04 Tokens

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Supported by the Algorand Foundation

Tokens

Token = entry in the blockchain that represents a claim.

Fungible Token

- All are the **same**
- Cryptocurrency, stock token

Implementation

- Algorand Standard Asset (ASA)

Non Fungible Token = NFT

- All are **different**
- Art, "Moment", ticket, real estate
- Next chapter

ASA as Fungible Token

Properties

- AssetName (long), UnitName (short)
- Total supply
- Decimals
- Asset index (obtained from blockchain at creation)

Transactions

- All transactions are denominated in “small” units
 - ▶ **Ex:** ASA with 3 decimals $\rightarrow 1 \text{ Coin} = 10^3 = 1000$ “small” units
 - ▶ Transfer 12 coins $\rightarrow \text{amt} = \text{int}(12 * 1E3)$

Opt-in

- Can only receive token after opt-in
 - ▶ Send 0 tokens to yourself
 - ▶ Idea: to reject spam transactions
 - ▶ Opt-in for each token separately

ASA as Fungible Token

Special addresses

- Manager*: can re-assign the special roles
- Reserve*: information only (store for not yet minted tokens)
- Freeze: can (un)freeze assets in a given address
- Clawback*: can undo a given transaction

*Discussion

- If Clawback or Reserve a nonzero, transactions may not be final
 - ▶ If Manager is nonzero, these rules may be changed

Opt-out

- “Leaving” a token is possible via a special *closeout* transaction

Destroy

- Manager can destroy an ASA, if the creator possesses all tokens

Fees and minimum balance

Standard transaction fee of 0.001 ALGO

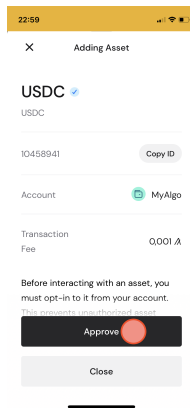
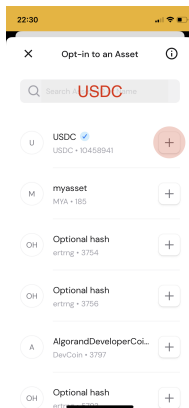
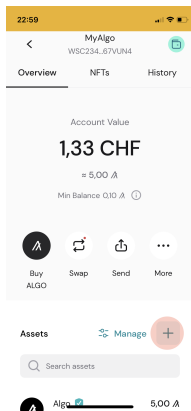
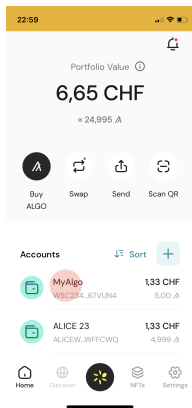
- Creation of ASA
- Opt-in (each user \times each asset)
- Asset transfer

Minimum balance of 0.1 ALGO

- Each account that holds ALGOs
- Additionally for each ASA created
- Additionally for each ASA opted-in
- Minimum balance can spent after
Closeout/Asset destroy/Opt-out

https://developer.algorand.org/docs/get-details/parameter_tables/

Opt-In with Pera Algo Wallet



- (1) Copy your address
- (2) Obtain free TestNet USDC from <https://usdcfaucet.com>