DRAFT: Clarity tokens

Part 7

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Abstract

Tokens represent things. They can represent physical or abstract things. Tokens play an important role in blockchains, hence Clarity makes token representation simple.

1 Introduction

Currency notes have different numbers. For example, each US dollar has its own index number. See Figure 1.

Figure 1: A US dollar from Wikipedia with index number **B 03542754 F**

The dollar in this figure is nothing more than a paper token representing value. Any two dollars with different index numbers are defined to have the same value.

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Definition 1 (Fungible tokens) Sets of tokens are fungible iff all tokens are fully substitutable for each other.

Sets of fungible tokens are fully substitutable for each other even if they have different index numbers.

Fungible tokens are common. For example stock certificates are numbered, though stock certificates of stock of the same class are fungible. Shares in a DAO are fungible. Printed currency notes are fungible. Currency coins are fungible.

Definition 2 (Non-fungible tokens) A set of tokens are non-fungible iff each token is unique. Hence two non-fungible tokens cannot be readily substitutable for each other.

Non-fungible tokens are common. For example, property deeds are non-fungible since each piece of land is unique. Traditional art is non-fungible since each piece of art in unique.

Clarity represents both fungible and non-fungible tokens. Indeed, since fungible tokens have common properties, `traits` help implement useful fungible attributes or methods.

The text-book example is from the Clarity Cookbook [1] and [2].

Listing 1: Non-fungible trait from [1]

```
(define-trait nft-trait
  (
    ;; Last token ID, limited to uint range
    (get-last-token-id () (response uint uint))

    ;; URI for metadata associated with the token
    (get-token-uri (uint) (response (optional (string-ascii
       256)) uint))

     ;; Owner of a given token identifier
    (get-owner (uint) (response (optional principal) uint))

    ;; Transfer from the sender to a new principal
    (transfer (uint principal principal) (response bool uint))
  )
)
;;
;;(impl-trait
   'SP2PABAF9FTAJYNFZH93XENAJ8FVY99RRM50D2JG9.nft-trait.nft-trait)
;;
```

2 Exercises

1. How can we
2.

References

[1] https://docs.stacks.co/docs/cookbook/creating-an-nft 2024-01-04.

[2] https://book.clarity-lang.org/ch10-01-sip009-nft-standard.html 2023-12-28.

[3] Clarity of Mind Book, https://book.clarity-lang.org/ 2023-04-11.

[4] Kenny Rogers: *Building an NFT with Stacks and Clarity*, https://blog.developerdao.com/building-an-nft-with-stacks-and-clarity, 2022-09-01.

[5] Kenny Roger, Joe Bender: Stacks developer workshop: *Web3 for Bitcoin: The What, Why, and How of Building on Stacks*. Web3 for Bitcoin. Wed, Jun 29, 2022.