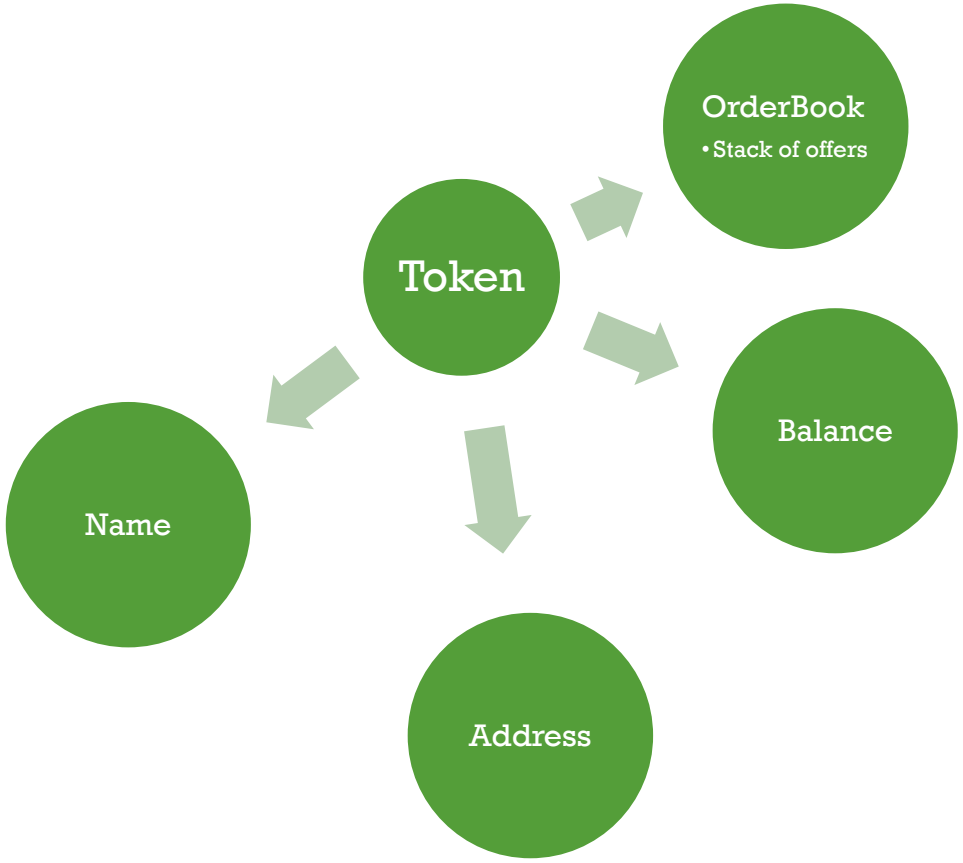
Data Types

Our contract will use

General Overview

- We need to hold symbolNames (tokens)
- We need to hold balances (both eth/tokens)
- We need an order-book for each token vs. ether
- And a reference to the Token-Address
- We need a way to determine who trades tokens for ether (or vv)

Tokens



Tokens

- Numeric lookup table
  - Token #1 => FIXED
  - Token #2 => ICO
  - Token #3 => GNO
  - …
- It should be possible to add new tokens
- Token-Structure
  - Has an orderBook (buy/sell)
  - Points to an address (erc20)
  - Has a name (symbolName)

Tokens with Lookup-Table

0 =>

- buyBook
- sellBook
- Address => 0x123…
- symbolName => FIXED

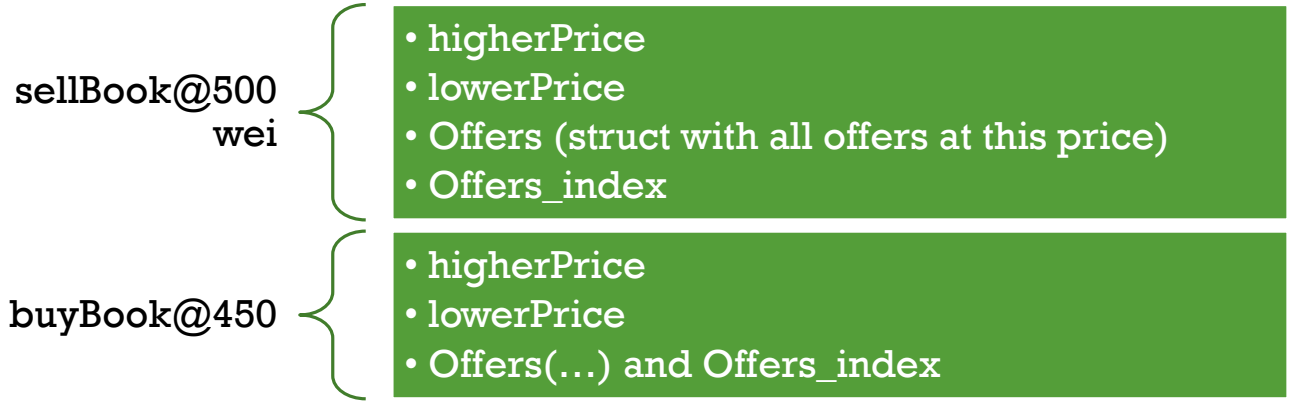
1 =>

- buyBook
- sellBook
- Address
- symbolName => ICN

OrderBook

- Lookup based on Price
  - Linked List
  - Points to higher price
  - Points to lower price
- Token -> buyBook (bid)
  - lowestBuyPrice (firstElement)
  - curBuyPrice (highest)
  - amountBuyPrices
- Token -> sellBook (ask)
  - highestSellPrice (lastElement)
  - curSellPrice (lowest)
  - amountSellPrices

Struct OrderBook



Offers

- A „stack“ of offers
- FIFO
- User1 wants to sell 10 token for 15 ether each
- User2 wants to sell 5 token for 15 ether each
- Total = 15 token

- User3 wants to buy 10 token for 15 ether each
  - Buy from User1 (First In First Out)

- Build up a stack

Offers Struct

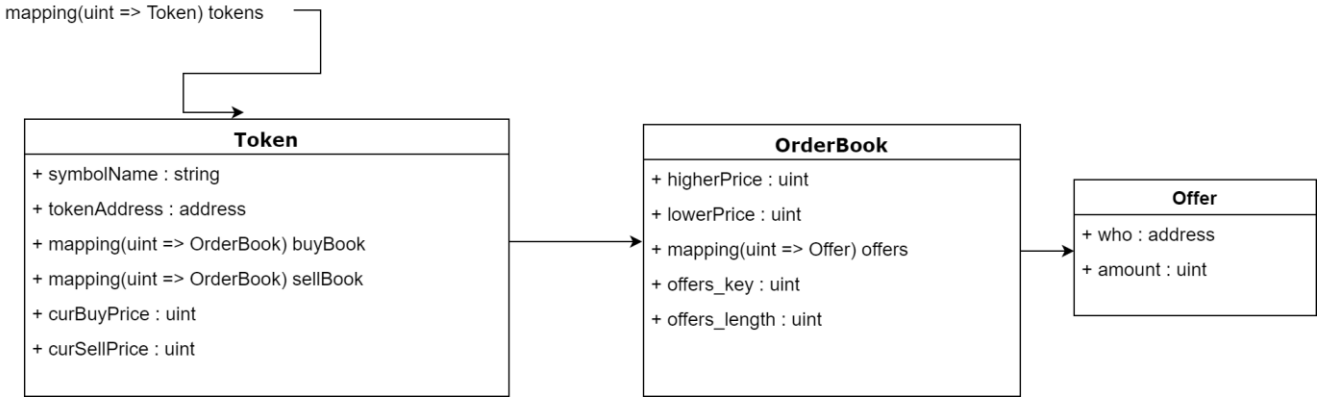
=> 1

- Amount (100 token)
- Who (address)

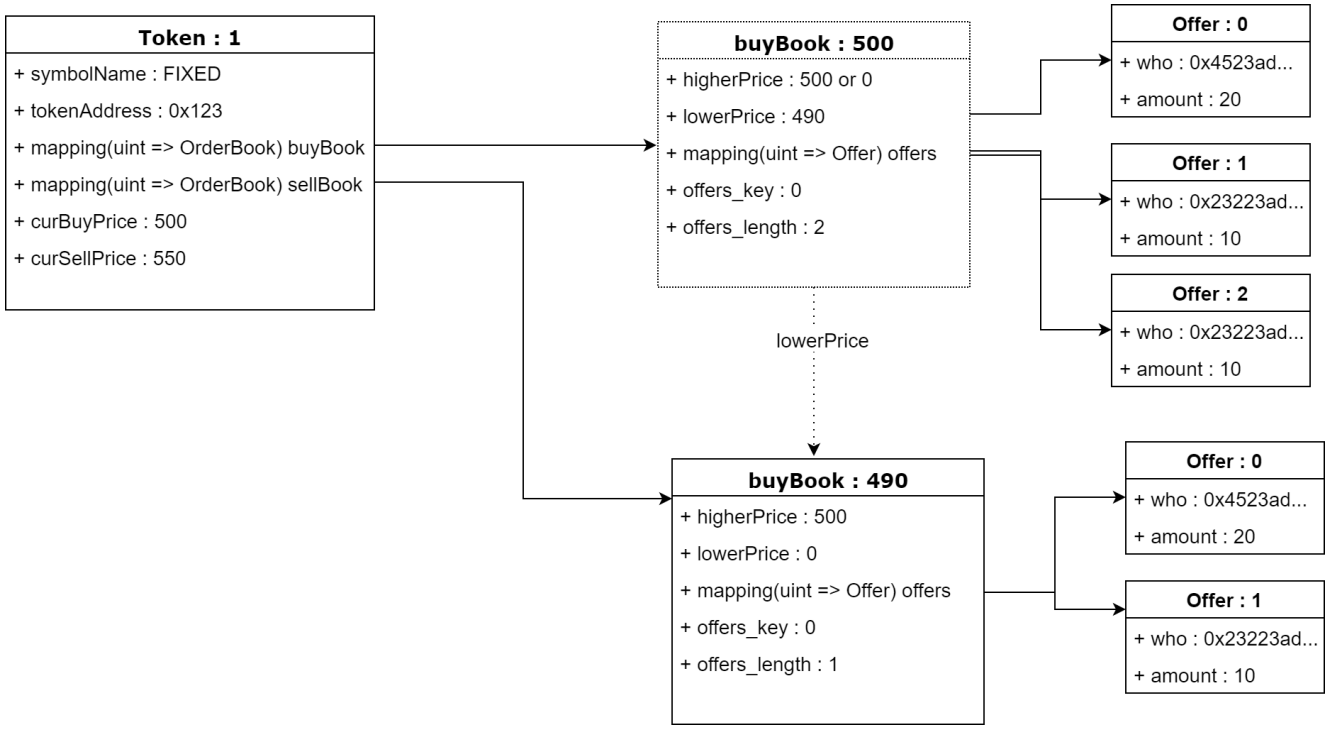
=> 2

- Amount (5 token)
- Who (address)

All together



Example


Token : 1
+ symbolName : FIXED
+ tokenAddress : 0x123
+ mapping(uint => OrderBook) buyBook
+ mapping(uint => OrderBook) sellBook
+ curBuyPrice : 500
+ curSellPrice : 550
buyBook : 500
+ higherPrice : 500 or 0
+ lowerPrice : 490
+ mapping(uint => Offer) offers
+ offers_key : 0
+ offers_length : 2
Offer : 0
+ who : 0x4523ad...
+ amount : 20
Offer : 1
+ who : 0x23223ad...
+ amount : 10
Offer : 2
+ who : 0x23223ad...
+ amount : 10
lowerPrice
buyBook : 490
+ higherPrice : 500
+ lowerPrice : 0
+ mapping(uint => Offer) offers
+ offers_key : 0
+ offers_length : 1
Offer : 0
+ who : 0x4523ad...
+ amount : 20
Offer : 1
+ who : 0x23223ad...
+ amount : 10

Summary

- Tokens have
  - A name
  - An address
  - And OrderBooks
- There is one OrderBook for each Price (in wei)
  - Bid/Ask OrderBooks are separate
- Each OrderBook has Offers
  - Which is a FIFO Stack