**CrowdSale Functions** (yellow shadows are the added ones)**:**

**Token.sol** (main contract: **AssetToken**):

1. **AssetToken ()**: total supply, administrator, token name, symbol and decimal units are set up.
2. **transfer ()**: transfer tokens from your address to another.
3. **balance\_fun ()**: check the balance of specific address.
4. **approve ()**: allow another contract to spend some tokens from your address.
5. **buy ()**: buy tokens from the original token contracts. *\*need to run* ***setPrice\_onlyAdmin ()*** *first.*
6. **sell ()**: sell tokens to the original token contracts. *\*need to run* ***setPrice\_onlyAdmin ()*** *first.*
7. **transferFrom ()**: use contracts to transfer tokens from one account to another. *\*need to run* ***approve ()*** *first.*

Following functions need administrator’s allowance to execute:

1. **transferAdminship\_onlyAdmin** (): change administrator to another address.
2. **mintToken** **\_onlyAdmin ()**: mint a fixed number of tokens to the total supply and also to target address.
3. **freezeAccount** **\_onlyAdmin ()**: freeze typical users’ accounts. (who then can’t run functions of **transfer()**, **buy()**, **sell()**, **transferFrom()**)
4. **setPrices\_onlyAdmin ()**: set tokens' buying and selling prices.
5. **liquidate\_onlyAdmin ()**: liquidate ether to administrator’s address.
6. **selfdestruct\_onlyAdmin()**: self destruct the tokens.

**Crowdsale-stage-4.sol** (main contract: **CrowdSale**):

1. **CrowdSale ()**: set up parameters of lasting time, campaign URL, beneficiary address, token address, token’s value by ether, minimum and maximum of funding.
2. **contribute ()**: let investor send ether to contract address to get tokens. And check if ICO expires.
3. **checkIfFundingCompleteOrExpired ()**: check if ICO completes or expires.
4. **payOut ()**: send ethers and remaining tokens to beneficiary address.
5. **getRefund ()**: if the ICO fails, investors trigger this function to get refunds.

Following functions need contract creator’s allowance to execute:

1. **removeContract ()**: self-destroy contract and send remaining tokens and ether to the creator.

**Flow Diagram:**

: Manually Connect

: Sequentially Connect

Crowd Sale: Set up

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Successful

Failed

Pay out

Status

Get Refund

(Individually)

Contribute

Remove Contract

(Creator Only)