**Decentralized Manufacturing Unit**

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Description:

The ERC20 token we propose will be used to address the shortcomings of traditional transaction systems. We have a manager who will be deploying the smart contract and also approving retailers and manufacturing plant agents into the network in order to carry out the transactions through the smart contract. Once the smart contract is deployed, retailers and manufacturing plant agents can use the register function to register themselves into the network. After registration, the manager provides the approval to the retailers and the manufacturing agents and also gives them tokens to spend on the network. The retailers can use the smart contract to return product if they find it faulty and also find availability at a particular manufacturing plant by specifying address of the manufacturing plant agent. For every transaction, manufacturing plants through their agents can reward retailers 10 tokens for every 1000 tokens of purchase.

**Parameters:**

Name: Decentralized Manufacturing Unit

Symbol: DMU

Decimals: 2

Total Supply: 90,000 DMU

We have chosen the symbol as DMU as it is the acronym of the name of our smart contract and also short, precise and easy to remember. We did not find anything offensive related to the symbol that could hurt the sentiments of anyone.

We have chosen the decimal places to be 2 as we are considering it to be synonymous with the different currencies of the world and majority of the currencies have decimal places to be 2.

The total supply of our tokens is decided by the manager and it is in a way dependent on the scale of the manufacturing unit, as an example we are considering the tokens to be 90,000 DMU.

**Architecture Diagrams:**

Diagram

Description automatically generated

**Use case diagram:**

Diagram

Description automatically generatedDiagram

Description automatically generated

Diagram

Description automatically generated

**Contract diagram:**

Table

Description automatically generated

**Sequence diagram:**

Self-register

Process Transaction and Reward

Self-register

Deploy Contract

Retailer

Manufacturing Agent

DMU Smart Contract

DMU Manager

constructor (total)

register ()

register ()

approvalTo ()

approvalTo ()

availabilityAt(add)

transfer(add, tokens)

reward(add)

returnProduct(add, tokens)

balanceOf(add) Time

balanceOf(add) Progress

balanceOf(add)

**Description of ERC20 functions:**

totalSupply: Returns the total supply of tokens by the deployer.

balanceOf: Returns the balance of tokens with the specified address. It can also be used by manager, retailer, and manufacturing agents to check anyone’s balance just by specifying a valid address.

allowance: This function returns the approved tokens that can be withdrawn by the specified address.

transfer: This function is used to transfer tokens by specifying an address and number of tokens.

approve: This function is used to allow another user to withdraw tokens.

transferFrom: This function is used to transfer tokens by an approved amount by specifying the addresses of the owner and the and the one to whom the tokens must be sent.

**Description of special functions:**

register: This function is used by the retailers and manufacturing agents to register to the ropsten network to carry out the transactions in the network. Retailers enter input 2 and the manufacturers enter input 1 to create separate mapping for both.

reward: This function is used to reward the retailers by the manufacturing agents by giving 10 tokens for every 1000 tokens spent by the retailer.

availabitlityAt: This function is used by the retailers to find the availability of the products at a particular manufacturing agent by specifying their address. He can place the order accordingly.

returnProduct: This function is used by retailers to return the product as he/she is not satisfied with the product quality. So he uses this function to return the product to a specific manufacturer.

approveTo: This function is used by the manager to provide some tokens to specific addresses. The manager specifies the address of either retailer or manufacturer to provide him with a 1000 DMU token.