Centurion University
Shaping Lives... Empowering Communities...

School: ..... Campus: .....

Academic Year: ..... Subject Name: ..... Subject Code: .....

Semester: ..... Program: ..... Branch: ..... Specialization: .....

Date: .....

Applied and Action Learning

(Learning by Doing and Discovery)

Name of the Experiement : Build a Use Case – Tokenized Supply Chain Prototype

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

ALGORITHM:

1.Start
2.Define stakeholders of the supply chain — Manufacturer, Transporter, Retailer, and Customer.
3.Create a token smart contract to represent product ownership or shipment units.
4.Mint tokens when new products are created by the manufacturer.
5.Transfer tokens at each stage of the supply chain:
    Manufacturer → Transporter
    Transporter → Retailer
    Retailer → Customer
6.Each transfer is stored on the blockchain for transparency and proof of delivery.
7.Tokens represent both ownership and traceability of goods.
8.Verify token balances to confirm product movement.
9.End

* Software used

1.Remix IDE
2.MetaMask Wallet
3.Solidity
4.Ethereum Test Network (Sepolia)

*As applicable according to the experiment.
Two sheets per experiment (10-20) to be used.

* Testing Phase: Compilation of Code (error detection)

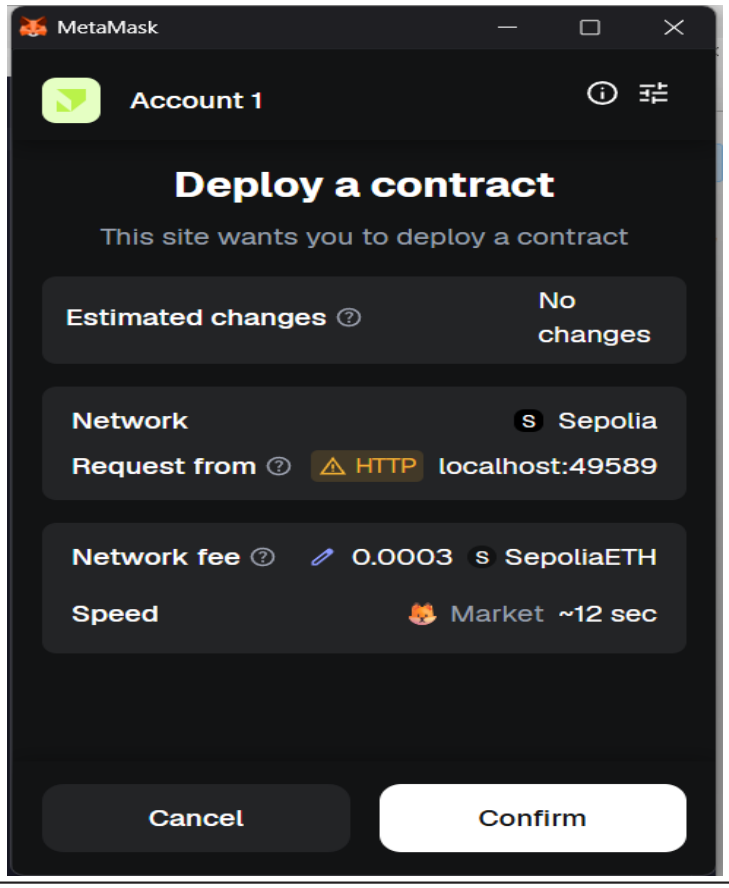
1.Smart Contract Creation

Created a Solidity file TokenizedSupplyChain.sol defining an ERC-20-like token for tracking products.

```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;

contract TokenizedSupplyChain {
    string public name = "SupplyChainToken";
    string public symbol = "SCT";
    uint8 public decimals = 0; // each token represents one product
    uint256 public totalSupply;

    address public manufacturer;

    mapping(address => uint256) public balanceOf;
    mapping(address => mapping(address => uint256)) public allowance;

    event Transfer(address indexed from, address indexed to, uint256 value);
    event TokensMinted(address indexed manufacturer, uint256 value);
    event OwnershipTransferred(address indexed from, address indexed to, uint256 value);

    modifier onlyManufacturer() {
        require(msg.sender == manufacturer, "Only manufacturer can perform this action");
        _;
    }

    constructor() {  infinite gas 657400 gas
        manufacturer = msg.sender;
    }

    // Mint tokens representing new product batches
    function mintTokens(uint256 _amount) public onlyManufacturer {  infinite gas
        balanceOf[manufacturer] += _amount;
        totalSupply += _amount;
        emit TokensMinted(manufacturer, _amount);
    }

    // Approve tokens to be transferred by another participant
    function approve(address _spender, uint256 _amount) public {  22931 gas
        allowance[msg.sender][_spender] = _amount;
    }

    // Transfer tokens (representing product ownership)
    function transfer(address _to, uint256 _amount) public returns (bool) {  infinite gas
        require(balanceOf[msg.sender] >= _amount, "Insufficient tokens");
        balanceOf[msg.sender] -= _amount;
        balanceOf[_to] += _amount;
        emit Transfer(msg.sender, _to, _amount);
        emit OwnershipTransferred(msg.sender, _to, _amount);
        return true;
    }

    // Check product ownership
    function verifyOwnership(address _owner) public view returns (uint256) {  2896 gas
        return balanceOf[_owner];
    }
}
```

2.Deployment

Deployed the contract on Remix VM / Sepolia Test Network using MetaMask.



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* Implementation Phase: Final Output (no error)

Test the Functions

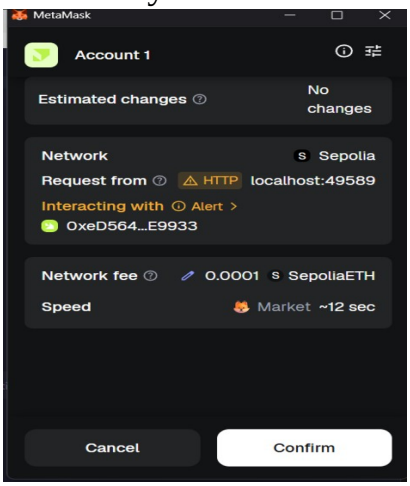
Call mintTokens(100) — manufacturer mints 100 tokens.

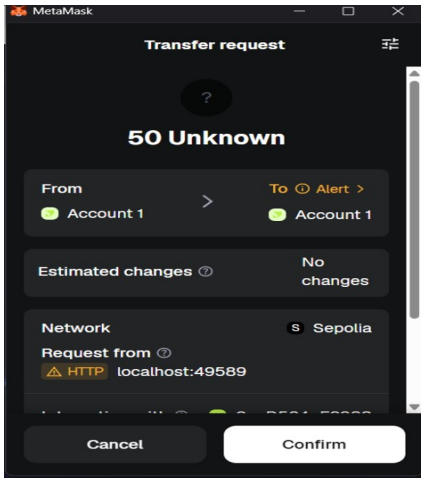
Check balanceOf(manufacturer_address) — verify token balance.

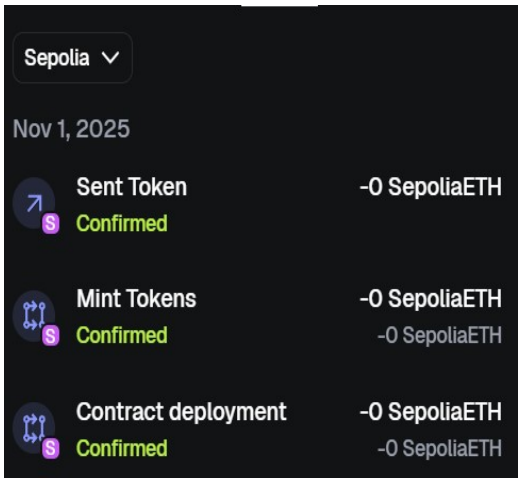
Call transfer(address_of_transporter, 50) — transfer 50 tokens to transporter.

Switch accounts in Remix → call transfer() again to simulate next steps (retailer, customer).

Finally, call verifyOwnership(address) for each participant to check who owns how many tokens.







* Observations

1.Tokenizing products enables transparent and verifiable transfer of goods in a supply chain.

2.Each blockchain transaction acts as proof of ownership, ensuring authenticity and accountability.

ASSESSMENT

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/ Practical Simulation/ Programming	10		
Result and Interpretation	10		
Record of Applied and Action Learning	10		
Viva	10		
Total	**50**		

Signature of the Student:

Name :

Regn. No. :

Signature of the Faculty:

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