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 :

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

1	Initialize source and destination blockchains.
2	Connect wallet and select bridge network.
3	Lock tokens on source chain via bridge contract.
4	Verify minting or unlocking on destination chain.
5	Confirm transaction hashes on both networks.
6	Display result — successful cross-chain transfer.

* Softwares used

1.Remix IDE
2.Solidity ^0.8.x
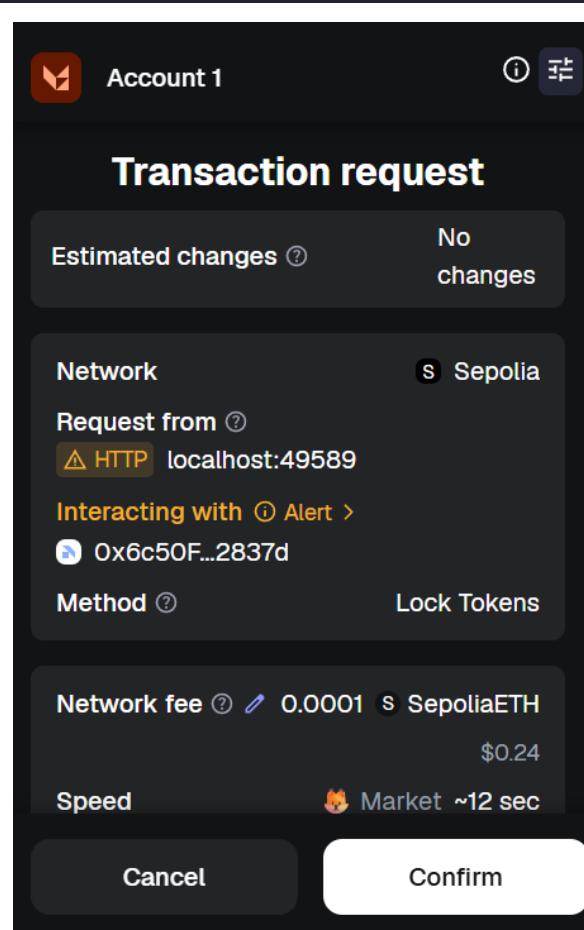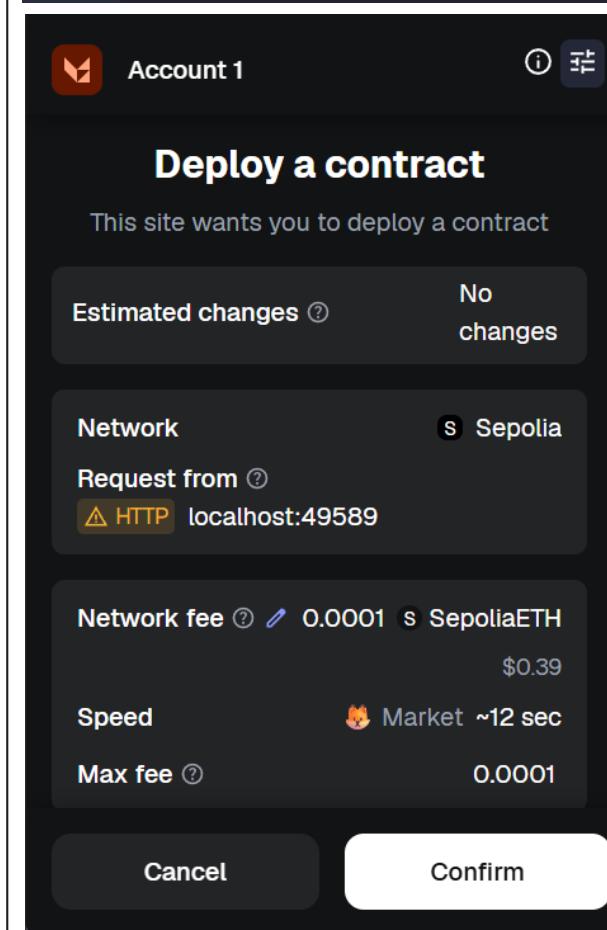3.MetaMask Wallet (for multi-chain testing)
4.JavaScript VM for simulation.

* Testing Phase: Compilation of Code (error detection)

```solidity
1    // SPDX-License-Identifier: MIT
2    pragma solidity ^0.8.7;
3
4    contract TokenBridge {
5        mapping(address => uint256) public lockedBalance;
6
7        // Lock tokens on source chain
8        function lockTokens(uint256 _amount) public {        ⛽ infinite gas
9            lockedBalance[msg.sender] += _amount;
10       }
11
12       // Unlock tokens on destination chain
13       function unlockTokens(address _to, uint256 _amount) public {        ⛽ infinite gas
14           require(lockedBalance[_to] >= _amount, "Insufficient locked tokens");
15           lockedBalance[_to] -= _amount;
16           // Mint or transfer equivalent tokens on destination
17       }
18
19       // View locked balance
20       function getLockedTokens(address _user) public view returns (uint256) {        ⛽ 2806 gas
21           return lockedBalance[_user];
22       }
23   }
24
```

Account 1   ⓘ ⚙

Deploy a contract

This site wants you to deploy a contract

Estimated changes ⑦   No changes

Network   ⓢ Sepolia

Request from ⑦
⚠ HTTP localhost:49589

Network fee ⑦ ✎ 0.0001 ⓢ SepoliaETH
                                              $0.39

Speed   🦊 Market ~12 sec

Max fee ⑦   0.0001

Cancel | Confirm

Account 1   ⓘ ⚙

Transaction request

Estimated changes ⑦   No changes

Network   ⓢ Sepolia

Request from ⑦
⚠ HTTP localhost:49589

Interacting with ⓘ Alert ›
🔹 0x6c50F…2837d

Method ⑦   Lock Tokens

Network fee ⑦ ✎ 0.0001 ⓢ SepoliaETH
                                              $0.24

Speed   🦊 Market ~12 sec

Cancel | Confirm

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

* Implementation Phase: Final Output (no error)

```
creation of TokenBridge pending...

    ✓    [block:9553273 txIndex:4] from: 0xe4a...ca52e to: TokenBridge.(constructor)
         value: 0 wei data: 0x608...e0033 logs: 0 hash: 0xd54...4973f
    view on Etherscan    view on Blockscout
    transact to TokenBridge.lockTokens pending ...

    view on Etherscan    view on Blockscout

    ✓    [block:9553279 txIndex:26] from: 0xe4a...ca52e
         to: TokenBridge.lockTokens(uint256) 0x6c5...2837d value: 0 wei
         data: 0x6e2...00001 logs: 0 hash: 0x144...5d747
```
Debug ⌄

Debug ⌄

* Observations

It was observed that cross-chain bridges enable secure asset transfers between different blockchains.

Tokens are locked on the source chain and equivalent assets are minted on the destination chain. This

proves interoperability and allows blockchain networks to work together efficiently.

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 :

Signature of the Faculty:

Regn. No. :

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