Centurion University
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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 : Layer 2 Bridge – Explore Optimism/zkSync

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

ALGORITHM:

1. Initialize Environment
   - Set up Ethereum Testnet (e.g., Sepolia).
   - Add Layer 2 networks (Optimism and/or zkSync) in MetaMask.
   - Configure Hardhat or Remix IDE with both L1 and L2 network RPCs.
2. Deploy Smart Contract on L1
   - Write and deploy a simple ERC-20 token or message-passing contract on Ethereum Testnet.
   - Verify deployment success using Etherscan Testnet Explorer.
3. Bridge Configuration
   - Open the official Optimism Bridge (https://app.optimism.io/bridge) or zkSync Bridge (https://bridge.zksync.io/).
   - Connect your MetaMask wallet to the Ethereum network.
   - Approve the bridge to access your assets/tokens for transfer.
4. Asset Transfer (Deposit L1 → L2)
   - In the bridge interface, select the token or ETH amount to transfer from Ethereum (L1) to Optimism/zkSync (L2).
   - Confirm the transaction in MetaMask.
   - Wait for confirmation — observe the faster transaction time and lower gas fees on Layer 2.
   - Verify the received assets in the Layer 2 wallet.
5. Withdrawal Process (L2 → L1)
   - Initiate withdrawal from Layer 2 back to Ethereum.
   - Wait for:
     - Challenge/Finalization period in Optimism (~7 days on mainnet, shorter on testnet).
     - Validity proof confirmation in zkSync.
   - Check the balance update on Ethereum testnet after completion.
6. Verification & Output
   - Confirm the bridging success by comparing wallet balances on both layers.
   - Note the gas savings and transaction confirmation time.

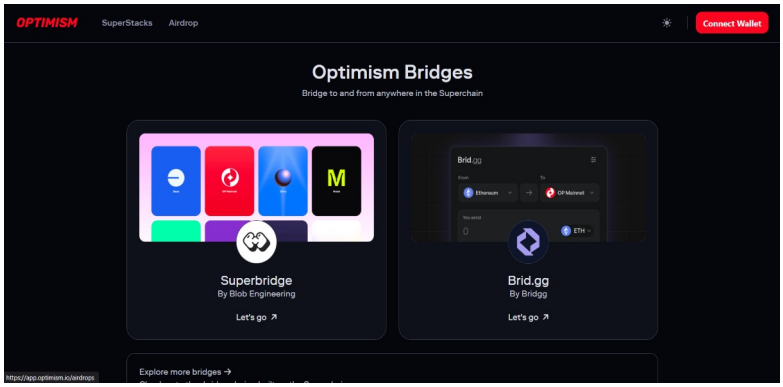
* Software used

1.MetaMask
2.Hardhat / Remix IDE
3.VS Code

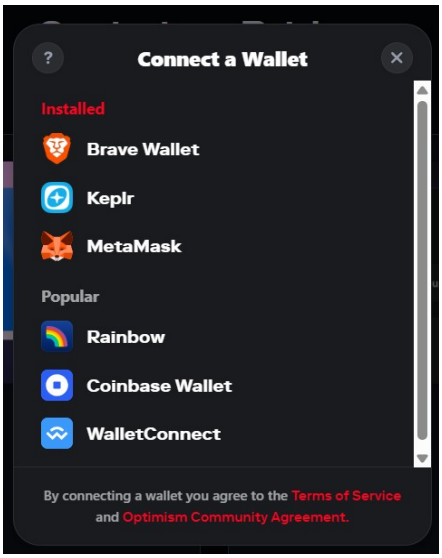
*As applicable according to the experiment.
Two sheets per experiment (10-20) to be used.

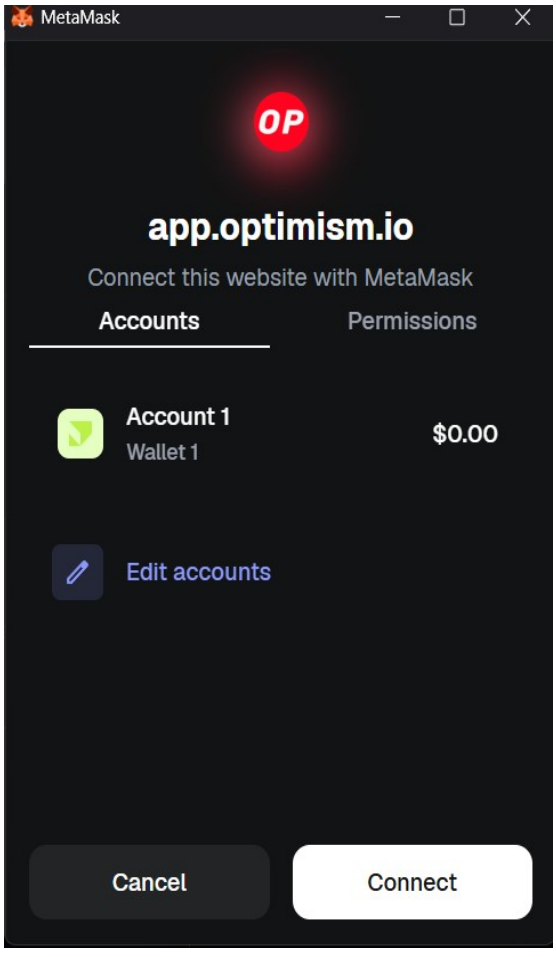
* Implementation Phase: Final Output (no error)

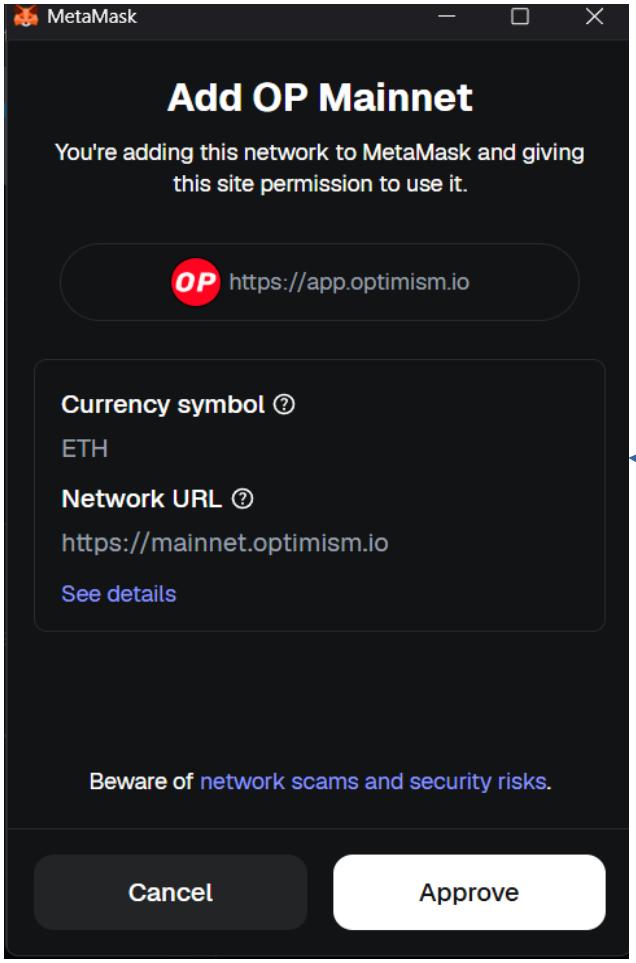
1.Open the Optimism Bridge App



2.Connect your MetaMask wallet.







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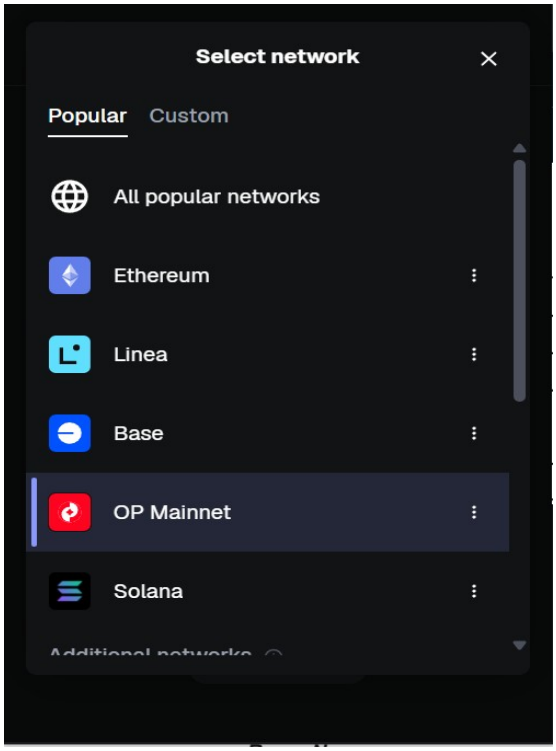
* Implementation Phase: Final Output (no error)

Select the network – "Ethereum → Optimism".



* Observations

1.Seamless Connectivity – Smooth transfer between Ethereum L1 and Layer 2 (Optimism / zkSync).
2.Performance Improvements – Transactions are faster (~1.5–2 sec) and cheaper on Layer 2.
3.Security & Reliability – Maintained Ethereum-level security with synchronized operations.

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:

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