



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 Experiment :

* Coding Phase: Pseudo Code / Flow Chart / Algorithm

ALGORITHM:

1. Install Node.js (which also installs npm) for running JavaScript-based blockchain frameworks.
2. Install MetaMask browser extension for wallet and blockchain interactions.
3. Open Remix IDE in the browser for smart contract development and testing.
4. Install Truffle or Hardhat (using npm) for advanced smart contract compilation and deployment.
5. Compile, deploy, and interact with a smart contract locally.
6. Verify the contract execution by checking transactions in Ganache GUI or MetaMask activity.

* Software used

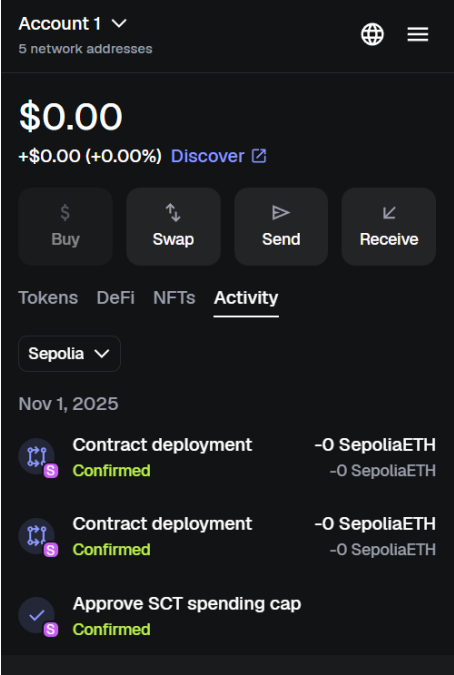
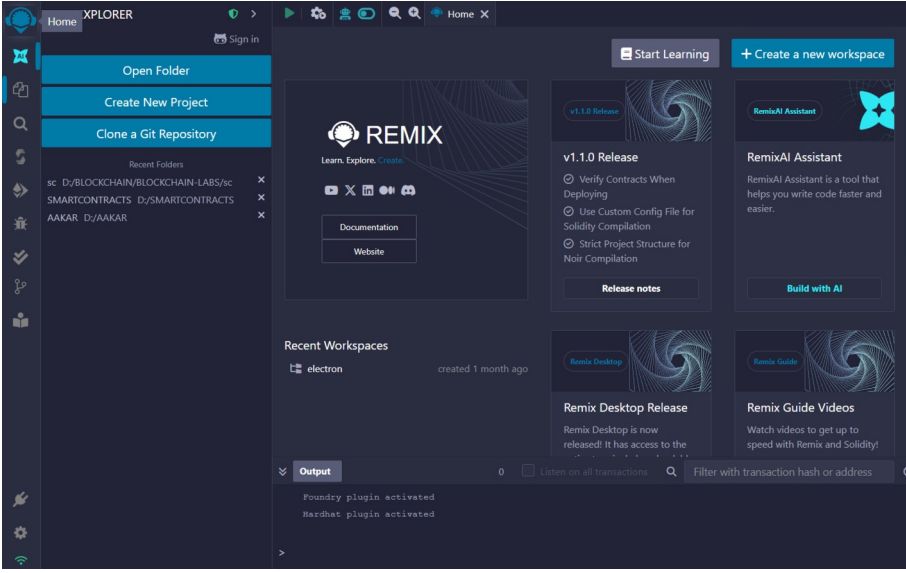
1. Node.js
2. MetaMask Wallet (Browser Extension)
3. Remix IDE (web-based)
4. Truffle / Hardhat, Ganache.

* Testing Phase: Compilation of Code (error detection)

- 1.Verified Node.js installation by running node -v and npm -v in the terminal.
- 2.Successfully installed MetaMask extension and created a test wallet.
- 3.Successfully accessed Remix IDE and compiled a sample Solidity smart contract.
- 4.Installed Truffle using npm install -g truffle and confirmed installation with truffle version.
- 5.Installed and launched Ganache UI, and verified it created 10 test accounts with balances.
- 6.Connected MetaMask to Ganache by importing private keys and switching to custom RPC.
- 7.Deployed a simple smart contract using Remix and verified the transaction in Ganache logs.

*Implementation Phase: Final Output (no error)

- 1.Successfully set up complete blockchain development environment.
- 2.Node.js, npm, Git, VS Code and MetaMask, all working correctly.
- 3.Web3.js able to connect to local blockchain and fetch accounts.

```

C:\Users\HP>npm install --save-dev hardhat
added 57 packages, and audited 139 packages in 1m
33 packages are looking for funding
run 'npm fund' for details
found 0 vulnerabilities
C:\Users\HP>
  
```

* Implementation Phase: Final Output (no error)

Applied and Action Learning

```

C:\Users\HP>node -v
v22.20.0

C:\Users\HP>npm -v
10.9.3

C:\Users\HP>

```

```

C:\Users\HP>npm install -g ganache

added 336 packages in 31s

6 packages are looking for funding
run 'npm fund' for details

C:\Users\HP>

```

* Observations

- 1.Tools like Ganache and MetaMask allow for complete blockchain interaction without requiring real networks.
- 2.Node.js and npm serve as the foundation for installing blockchain frameworks like Truffle and Hardhat.
- 3.Remix IDE is a powerful online tool for smart contract development with zero configuration.
- 4.After environment setup, blockchain apps can be built, tested, and debugged easily using this local setup.

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:

Page No.....

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