



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: Truffle vs Hardhat – Dev Environment Showdown

*Coding Phase: Pseudo Code / Flow Chart / Algorithm

- 1.Start
- 2.Install Node.js and npm
- 3.Install Truffle (npm install -g truffle)
- 4.Create a Truffle project (truffle init)
- 5.Compile and deploy a sample smart contract (truffle compile, truffle migrate)
- 6.Install Hardhat (npm install --save-dev hardhat)
- 7.Create a Hardhat project (npx hardhat)
- 8.Compile and deploy the same smart contract (npx hardhat compile, npx hardhat run scripts/deploy.js)
- 9.Record outputs and screenshots
- 10.End

*Software used :

- npm (Node Package Manager)
- Truffle Suite – Ethereum development framework
- Hardhat – Ethereum development environment
- VS Code – Code editor
- Ganache

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

* Testing Phase: Compilation of Code (error detection)

- Install Node.js and npm on your system.
- Install Truffle using npm install -g truffle.
- Create a Truffle project using truffle init.
- Write a simple Solidity contract and compile using truffle compile.
- Deploy locally using Ganache or Truffle's migration scripts.
- Next, install Hardhat using npm install --save-dev hardhat.
- Initialize a Hardhat project using npx hardhat.
- Compile and deploy the same contract using Hardhat commands.
- Compare gas usage, deployment speed, and error messages in both environments.
- Record your observations

* Implementation Phase: Final Output (no error)

- Both environments successfully compile and deploy the HelloWorld contract.
- Gas usage and execution speed differ slightly — Hardhat executes faster.
- Deployment logs and error traces are more detailed in Hardhat.
-

* Implementation Phase: Final Output (no error)

Steps to Deploy Smart Contract in Hardhat :

1.Create a new folder for project

mkdir hardhat-project

cd hardhat-project

2.Initialize npm

npm init -y

4.Install Hardhat

npm install --save-dev hardhat

Setup Hardhat project

5.npx hardhat

Select “Create a JavaScript project”, press Enter for defaults.

6.Write smart contract (contracts/SimpleStorage.sol)

7.Add deployment script (scripts/deploy.js)

8.Compile the contract

9.npx hardhat compile

10.Start local Hardhat blockchain

```
contracts > SimpleStorage.sol > ...
1 // SPDX-License-Identifier: MIT
2 pragma solidity ^0.8.0;
3
4 contract SimpleStorage {
5     uint256 private number;
6
7     function set(uint256 _num) public {
8         number = _num;
9     }
10
11    function get() public view returns (uint256) {
12        return number;
13    }
14 }
```

PROBLEMS POSTMAN CONSOLE OUTPUT TERMINAL PORTS

Compiling your contracts...

=====

✓ Fetching solc version list from solc-bin. Attempt #1

✓ Downloading compiler. Attempt #1.

> Compiling .\contracts\SimpleStorage.sol

> Artifacts written to C:\Users\HP\truffle-project\build\contracts

> Compiled successfully using:

- solc: 0.8.20+commit.a1b79de6.Emscripten.clang

```
C:\Users\HP\hardhat-project>> Block gas limit: 6721975 (0x6691b7)
'gas' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\HP\hardhat-project>
C:\Users\HP\hardhat-project>
C:\Users\HP\hardhat-project>1_initial_migration.js
'1_initial_migration.js' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\HP\hardhat-project>=====
C:\Users\HP\hardhat-project> Deploying 'Migrations'
'Deploying' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\HP\hardhat-project> -----
'-----' is not recognized as an internal or external command,
operable program or batch file.
```

* Observation :

It was observed that both Truffle and Hardhat provide efficient Ethereum development workflows. Truffle is simple and stable, best suited for beginners, while Hardhat offers better performance, advanced debugging, and flexible plugin support. Hardhat's real-time stack tracing and modern interface make it preferable for large and complex blockchain projects.

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. :

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