



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

Page No.....

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

## \* Testing Phase: Compilation of Code (error detection)

```
C:\Users\HP>npm install -g truffle
npm warn deprecated inflight@1.0.6: This module is not supported, and leaks memory. Do not use it. Check out lru-cache if
you want a good and tested way to coalesce async requests by a key value, which is much more comprehensive and powerfu
l.
npm warn deprecated rimraf@2.7.1: Rimraf versions prior to v4 are no longer supported
npm warn deprecated mkdirp-promise@5.0.1: This package is broken and no longer maintained. 'mkdirp' itself supports prom
ises now, please switch to that.
npm warn deprecated har-validator@5.1.5: this library is no longer supported
npm warn deprecated yaeti@0.0.6: Package no longer supported. Contact Support at https://www.npmjs.com/support for more
info.
npm warn deprecated memdown@1.4.1: Superseded by memory-level (https://github.com/Level/community#faq)
npm warn deprecated glob@7.2.0: Glob versions prior to v9 are no longer supported
npm warn deprecated level-errors@2.0.1: Superseded by abstract-level (https://github.com/Level/community#faq)
npm warn deprecated encoding-down@6.3.0: Superseded by abstract-level (https://github.com/Level/community#faq)
npm warn deprecated deferred-level-down@5.3.0: Superseded by abstract-level (https://github.com/Level/community#faq)
npm warn deprecated levelup@4.4.0: Superseded by abstract-level (https://github.com/Level/community#faq)
npm warn deprecated level-js@5.0.2: Superseded by browser-level (https://github.com/Level/community#faq)
npm warn deprecated level-packager@5.1.1: Superseded by abstract-level (https://github.com/Level/community#faq)
npm warn deprecated level-codec@9.0.2: Superseded by level-transcoder (https://github.com/Level/community#faq)
npm warn deprecated request@2.88.2: request has been deprecated, see https://github.com/request/request/issues/3142
npm warn deprecated multibase@0.6.1: This module has been superseded by the multiformats module
npm warn deprecated apollo-server-errors@3.3.1: The 'apollo-server-errors' package is part of Apollo Server v2 and v3, w
hich are now end-of-life (as of October 22nd 2023 and October 22nd 2024, respectively). This package's functionality is
now found in the 'apollo/server' package. See https://www.apollographql.com/docs/apollo-server/previous-versions/ for m
ore details.
```

```
C:\Users\HP>npm install -g ganache-cli
npm warn deprecated ganache-cli@6.12.2: ganache-cli is now ganache; visit https://trfl.io/g7 for details

added 1 package in 6s

2 packages are looking for funding
  run 'npm fund' for details
```

### Install Hardhat

```
C:\Users\HP>cd hardhat-project

C:\Users\HP\hardhat-project>npm init -y
Wrote to C:\Users\HP\hardhat-project\package.json:

{
  "name": "hardhat-project",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "description": ""
}
```

## \* Implementation Phase: Final Output (no error)

### Truffle project deployment process :

#### 1.Install Ganache CLI (for local blockchain)

➤ npm install -g ganache-cli

#### 2.Create a new Truffle project

➤ mkdir truffle-project

➤ cd truffle-project

➤ truffle init

#### 3.Write smart contract (contracts/SimpleStorage.sol)

#### 4.Configure network in truffle-config.js

#### 5.Start local blockchain

➤ npx ganache-cli

#### 6.Compile the contract

#### 7.truffle compile

#### 8.Deploy (migrate) the contract

#### 9.truffle migrate --network development

#### 10.Open Truffle console for check deploy successfully

## \* 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.

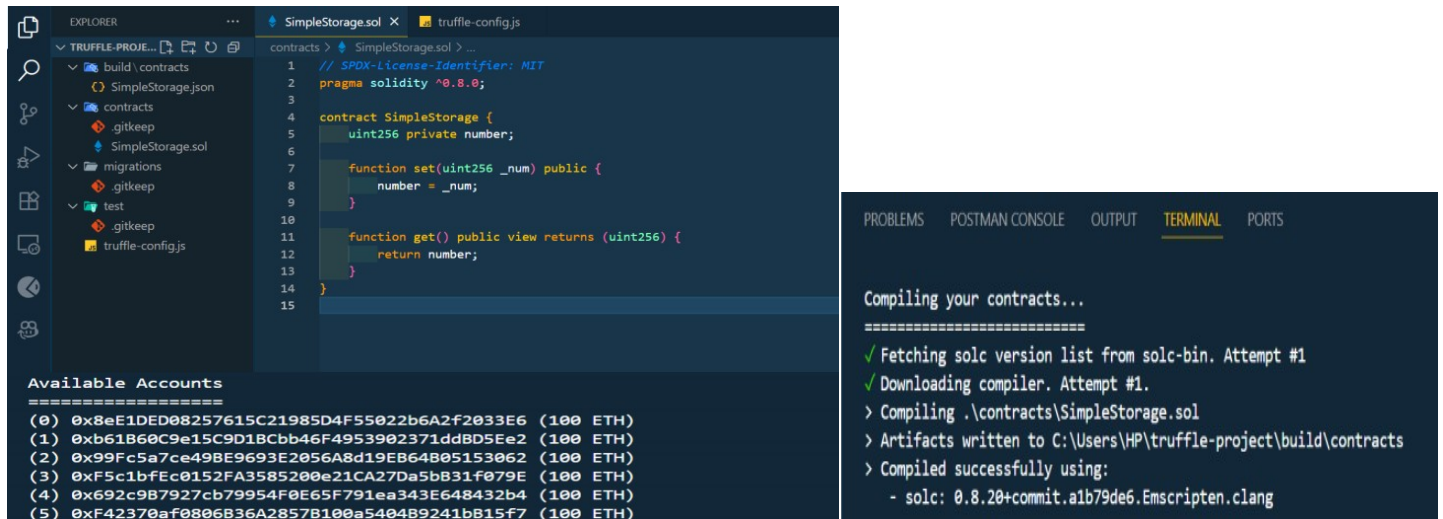
#### 6. Write smart contract (contracts/SimpleStorage.sol)

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

#### 8. Compile the contract

#### 9. npx hardhat compile

#### 10. Start local Hardhat blockchain



```
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 }
15
```

```
Available Accounts
=====
(0) 0x8eE1DED08257615C21985D4F55022b6A2f2033E6 (100 ETH)
(1) 0xb61860C9e15C9D18Cbb46F4953902371dd8D5Ee2 (100 ETH)
(2) 0x99Fc5a7ce498BE9693E2056A8d19E64805153062 (100 ETH)
(3) 0xF5c1bfEc0152FA3585200e21CA27Da5bB31f079E (100 ETH)
(4) 0x692c9B7927cb79954F0E65F791ea343E648432b4 (100 ETH)
(5) 0xF42370af0806B36A2857B100a540489241bB15f7 (100 ETH)
```

```
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
```

```
1 async function main() {
2     const SimpleStorage = await ethers.getContractFactory("SimpleStorage");
3     const simpleStorage = await SimpleStorage.deploy();
4     await simpleStorage.deployed();
5     console.log("SimpleStorage deployed at:", simpleStorage.address);
6
7     // Interact with contract
8     await simpleStorage.set(42);
9     const value = await simpleStorage.get();
10    console.log("Stored value:", value.toString());
11 }
12
13 main().catch((error) => {
14    console.error(error);
15    process.exitCode = 1;
16 });
17
```

```
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>l_initial_migration.js
'l_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 :

- Truffle provides a simple setup with migration scripts and is suitable for beginners, but it has slower compilation and limited debugging features.
- Hardhat offers faster compilation, detailed error stack traces, and better debugging tools, making it more developer-friendly for production projects.
- Both frameworks achieve the same goal of compiling, deploying, and testing smart contracts, but Hardhat is more modern and efficient, while Truffle is easier to start with.

## 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		
<b>Total</b>	<b>50</b>		

***Signature of the Student :***

***Name :***

***Regn. No. :***

***Signature of the Faculty :***

Page No.....

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