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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 : Debugging Deep – Using Hardhat Console & Logs

Objective/Aim:

Use Hardhat's debugging tools—**console.log()** (via hardhat/console.sol) and **Hardhat console**—to inspect smart contract execution, identify issues, and observe variable values during testnet/local blockchain execution.

Apparatus/Software Used:

1. Hardhat Framework
2. Node.js & NPM
3. VS Code Editor
4. MetaMask Wallet (optional if deploying to a testnet)
5. Ethereum Sepolia Testnet (optional)
6. Hardhat Local Network

Theory/Concept:

Hardhat console.log()

Hardhat provides a special Solidity import:

```
import "hardhat/console.sol";
```

It allows printing values directly from inside Solidity, helping to debug:

- function parameters
- mapping values
- internal calculations
- conditions in control statements

Hardhat Console (npx hardhat console)

This opens an interactive JavaScript console connected to the Hardhat environment.
You can:

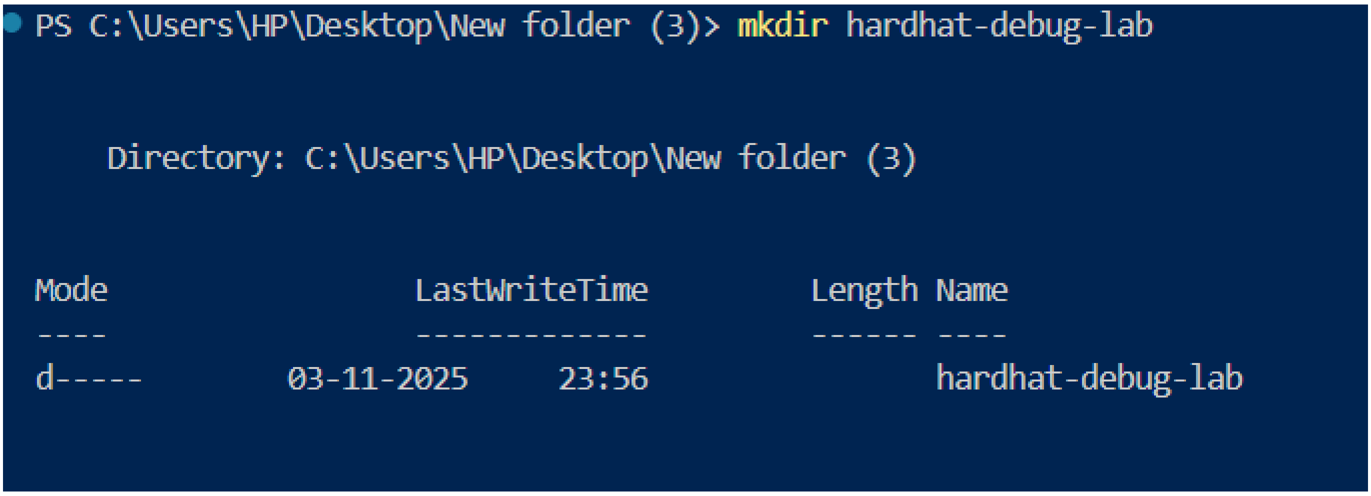
- call contract functions
- check state
- simulate interactions
- test logic without writing full scripts

Procedure:

1. Initialize Hardhat project
Open terminal →

- mkdir hardhat-debug-lab
- cd hardhat-debug-lab
- npx hardhat
    - **Add console.log() inside the Solidity contract**
      Example inside function:
- import "hardhat/console.sol";

- function deposit(uint amount) public {
- console.log("Depositing amount:", amount);
- console.log("Sender address:", msg.sender);
- }
    - **Compile the contract**
- npx hardhat compile
    - **Run Hardhat local node**
- npx hardhat node
    - **Deploy the contract to local network**
      In another terminal:
- npx hardhat run scripts/deploy.js --network localhost
- **Trigger the contract function to generate logs**
  Interaction can be done through:
- a script
- Hardhat console
- test file
    - **Open Hardhat Interactive Console**
- npx hardhat console --network localhost
    - **Load and call the contract**
      In the console:
- const Contract = await ethers.getContractFactory("DebugContract");
- const instance = await Contract.attach("<DEPLOYED_ADDRESS>");
- await instance.deposit(100);



```
PS C:\Users\HP\Desktop\New folder (3)> mkdir hardhat-debug-lab


    Directory: C:\Users\HP\Desktop\New folder (3)


Mode                 LastWriteTime         Length Name
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d-----        03-11-2025     23:56                hardhat-debug-lab
```

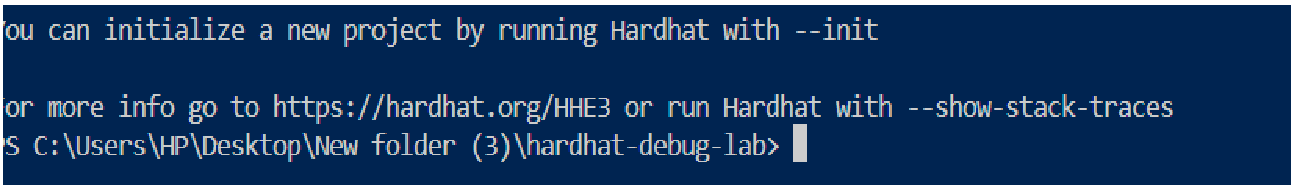

```
'ou can initialize a new project by running Hardhat with --init

'or more info go to https://hardhat.org/HHE3 or run Hardhat with --show-stack-traces
'S C:\Users\HP\Desktop\New folder (3)\hardhat-debug-lab>
```

Observation

Step	Observation
1	Hardhat project initializes successfully.
2	console.log statements inside Solidity compile correctly.
3	Compilation shows the console.sol import working.
4	Local Hardhat network starts and displays funded accounts.

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 Faculty: ***Signature of the Student:***

Name :