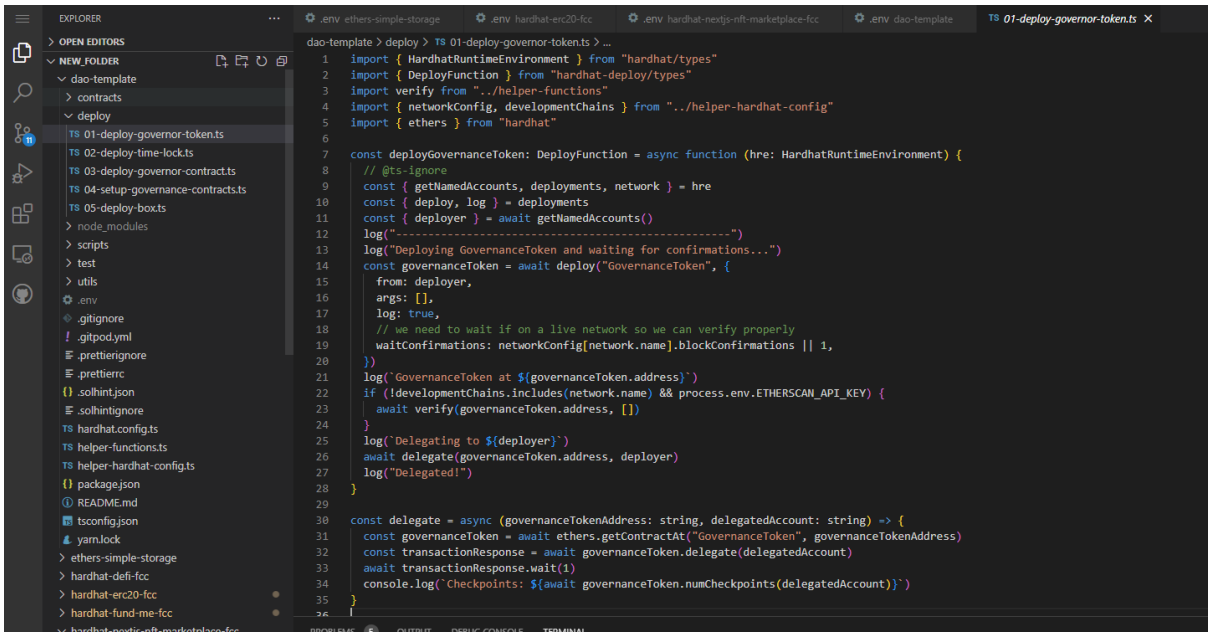
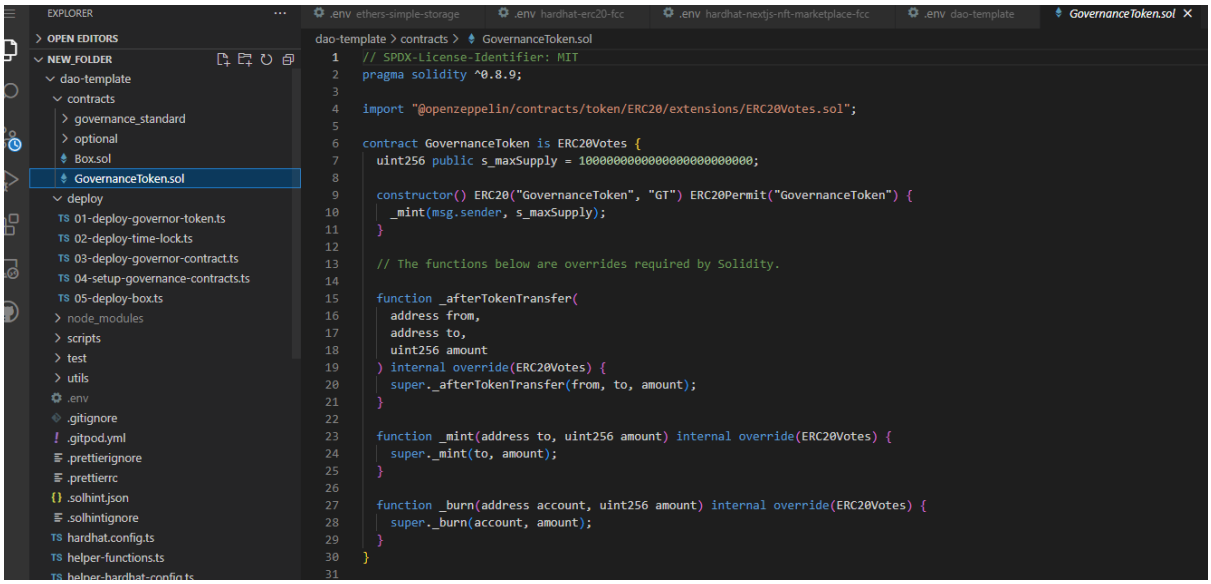
Hardhat DAOs :

Persiapan kode untuk governor token



```ts
import { HardhatRuntimeEnvironment } from "hardhat/types"
import { DeployFunction } from "hardhat-deploy/types"
import verify from "../helper-functions"
import { networkConfig, developmentChains } from "../helper-hardhat-config"
import { ethers } from "hardhat"

const deployGovernanceToken: DeployFunction = async function (hre: HardhatRuntimeEnvironment) {
  // @ts-ignore
  const { getNamedAccounts, deployments, network } = hre
  const { deploy, log } = deployments
  const { deployer } = await getNamedAccounts()
  log("----------------------------------------------------")
  log("Deploying GovernanceToken and waiting for confirmations...")
  const governanceToken = await deploy("GovernanceToken", {
    from: deployer,
    args: [],
    log: true,
    // we need to wait if on a live network so we can verify properly
    waitConfirmations: networkConfig[network.name].blockConfirmations || 1,
  })
  log(`GovernanceToken at ${governanceToken.address}`)
  if (!developmentChains.includes(network.name) && process.env.ETHERSCAN_API_KEY) {
    await verify(governanceToken.address, [])
  }
  log(`Delegating to ${deployer}`)
  await delegate(governanceToken.address, deployer)
  log("Delegated!")
}

const delegate = async (governanceTokenAddress: string, delegatedAccount: string) => {
  const governanceToken = await ethers.getContractAt("GovernanceToken", governanceTokenAddress)
  const transactionResponse = await governanceToken.delegate(delegatedAccount)
  await transactionResponse.wait(1)
  console.log(`Checkpoints: ${await governanceToken.numCheckpoints(delegatedAccount)}`)
}
```

Contract juga menggunakan openzeppelin

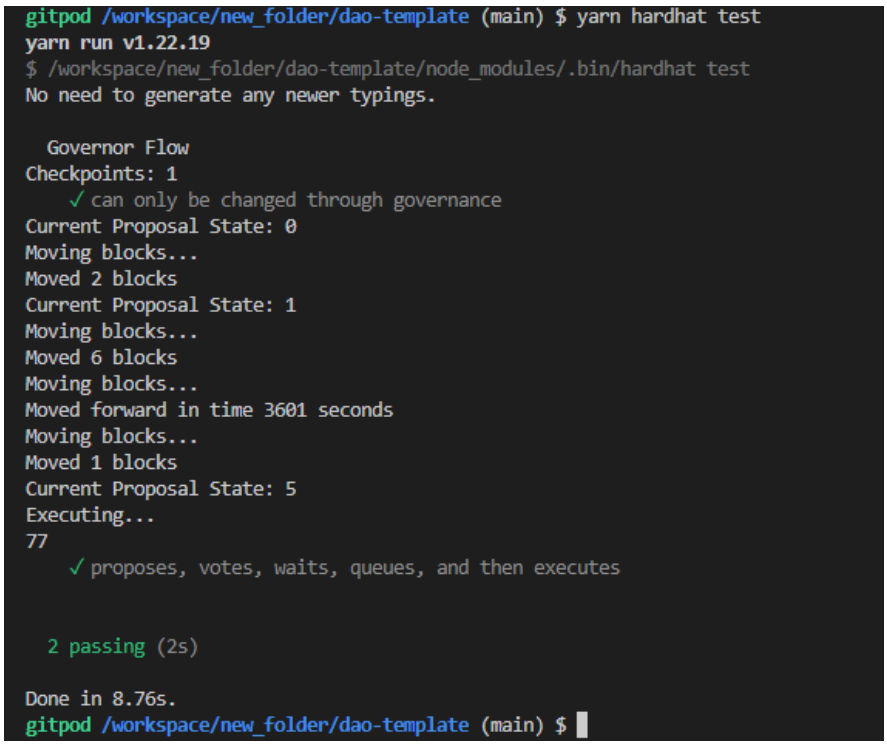


```sol
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.9;

import "@openzeppelin/contracts/token/ERC20/extensions/ERC20Votes.sol";

contract GovernanceToken is ERC20Votes {
  uint256 public s_maxSupply = 1000000000000000000000000;

  constructor() ERC20("GovernanceToken", "GT") ERC20Permit("GovernanceToken") {
    _mint(msg.sender, s_maxSupply);
  }

  // The functions below are overrides required by Solidity.

  function _afterTokenTransfer(
    address from,
    address to,
    uint256 amount
  ) internal override(ERC20Votes) {
    super._afterTokenTransfer(from, to, amount);
  }

  function _mint(address to, uint256 amount) internal override(ERC20Votes) {
    super._mint(to, amount);
  }

  function _burn(address account, uint256 amount) internal override(ERC20Votes) {
    super._burn(account, amount);
  }
}
```

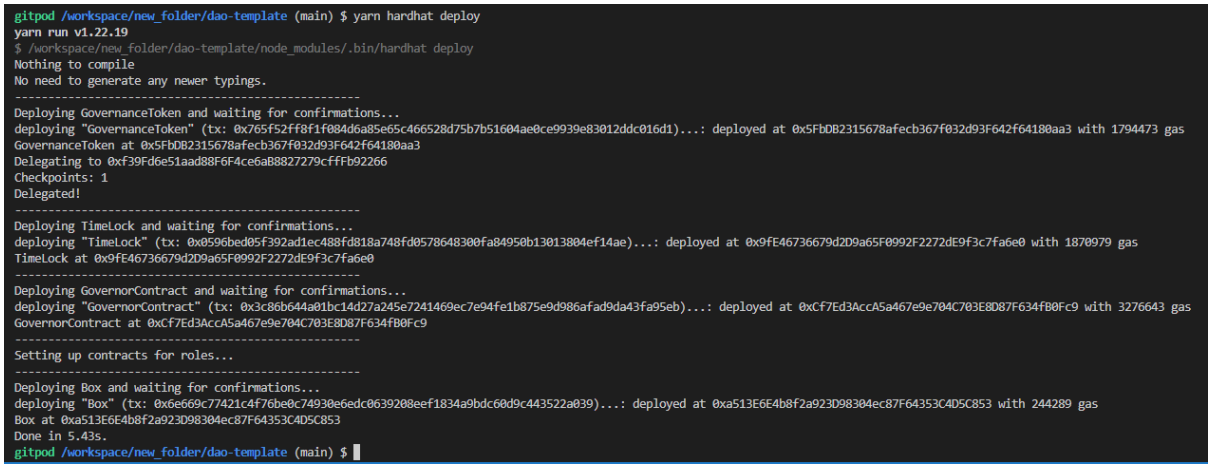
Jangan lupa untuk menjalankan perintah yarn untuk pengatur dependensi workspace

```
gitpod /workspace/new_folder/dao-template (main) $ yarn
yarn install v1.22.19
[1/4] Resolving packages...
[2/4] Fetching packages...
[3/4] Linking dependencies...
warning " > @nomiclabs/hardhat-waffle@2.0.2" has incorrect peer dependency "@nomiclabs/hardhat-ethers@^2.0.0".
warning " > @typechain/ethers-v5@9.0.0" has unmet peer dependency "@ethersproject/bytes@^5.0.0".
warning " > @typechain/ethers-v5@9.0.0" has unmet peer dependency "@ethersproject/providers@^5.0.0".
warning " > @typechain/ethers-v5@9.0.0" has unmet peer dependency "@ethersproject/abi@^5.0.0".
warning " > @typechain/hardhat@4.0.0" has unmet peer dependency "lodash@^4.17.15".
warning " > hardhat-deploy@0.10.4" has unmet peer dependency "@ethersproject/hardware-wallets@^5.0.14".
[4/4] Building fresh packages...
Done in 23.25s.
gitpod /workspace/new_folder/dao-template (main) $
```

Kita dapat mencoba untuk menjalankan hardhat test untuk mengeksekusi perintah untuk mengetes fungsionalitas contract



Bila semuanya sudah aman, maka kita dapat mendeploy contract yang akan mendeploy GovernanceToken, TimeLock, GovernorContract, dan Box beserta alamatnya.



Jalankan hardhat node pada smart contract di terminal baru

```
gitpod /workspace/new_folder/dao-template (main) $ yarn hardhat node
yarn run v1.22.19
$ /workspace/new_folder/dao-template/node_modules/.bin/hardhat node
Nothing to compile
No need to generate any newer typings.
-----------------------------------------------------
Deploying GovernanceToken and waiting for confirmations...
deploying "GovernanceToken" (tx: 0x765f52ff8f1f084d6a85e65c466528d75b7b51604ae0ce9939e83012ddc016d1)...: deployed at 0x5FbDB2315678afecb367f032d93F642f64180aa3 with 1794473 gas
GovernanceToken at 0x5FbDB2315678afecb367f032d93F642f64180aa3
Delegating to 0xf39Fd6e51aad88F6F4ce6aB8827279cfffb92266
Checkpoints: 1
Delegated!
-----------------------------------------------------
Deploying TimeLock and waiting for confirmations...
deploying "TimeLock" (tx: 0x0596bed05f392ad1ec488fd818a748fd0578648300fa84950b13013804ef14ae)...: deployed at 0x9fE46736679d2D9a65F0992F2272dE9f3c7fa6e0 with 1870979 gas
TimeLock at 0x9fE46736679d2D9a65F0992F2272dE9f3c7fa6e0
-----------------------------------------------------
Deploying GovernorContract and waiting for confirmations...
deploying "GovernorContract" (tx: 0x3c86b644a01bc14d27a245e7241469ec7e94fe1b875e9d986afad9da43fa95eb)...: deployed at 0xCf7Ed3AccA5a467e9e704C703E8D87F634fB0Fc9 with 3276643 gas
GovernorContract at 0xCf7Ed3AccA5a467e9e704C703E8D87F634fB0Fc9
-----------------------------------------------------
Setting up contracts for roles...
-----------------------------------------------------
Deploying Box and waiting for confirmations...
deploying "Box" (tx: 0x6e669c77421c4f76be0c74930e6edc0639208eef1834a9bdc60d9c443522a039)...: deployed at 0xa513E6E4b8f2a923D98304ec87F64353C4D5C853 with 244289 gas
Box at 0xa513E6E4b8f2a923D98304ec87F64353C4D5C853
Started HTTP and WebSocket JSON-RPC server at http://127.0.0.1:8545/
```

Dan jalankan script proposal pada jaringan localhost dengan perintah yarn hardhat run scripts/propose.ts --network localhost

```
gitpod /workspace/new_folder/dao-template (main) $ yarn hardhat run scripts/propose.ts --network localhost
yarn run v1.22.19
$ /workspace/new_folder/dao-template/node_modules/.bin/hardhat run scripts/propose.ts --network localhost
No need to generate any newer typings.
Proposing store on 0xa513E6E4b8f2a923D98304ec87F64353C4D5C853 with 77
Proposal Description:
  Proposal #1 77 in the Box!
Moving blocks...
Moved 2 blocks
Proposed with proposal ID:
  51508501457481436077634888669578781761098444908194579718864424217340756472817
Error: ENOENT: no such file or directory, open 'proposals.json'
```

Interaksi dapat dilihat dari terminal yang sebelumnya

```
web3_clientVersion
  Contract deployment: GovernanceToken
  Contract address:    0x5fbdb2315678afecb367f032d93f642f64180aa3
  Transaction:         0x765f52ff8f1f084d6a85e65c466528d75b7b51604ae0ce9939e83012ddc016d1
  From:                0xf39fd6e51aad88f6f4ce6ab8827279cfffb92266
  Value:               0 ETH
  Gas used:            1794473 of 1794473
  Block #1:            0xc27f8828368cf5222dbc1db9db9b5f04f0baa40728db82d3dd3f45a5f4669470
  Contract call:       GovernanceToken#delegate
  Transaction:         0xfc023226cc16bf3374d937955f276d257bd15ccd6a24af22abcfbb20c83288f7
  From:                0xf39fd6e51aad88f6f4ce6ab8827279cfffb92266
  To:                  0x5fbdb2315678afecb367f032d93f642f64180aa3
  Value:               0 ETH
  Gas used:            95244 of 29022680
  Block #2:            0x8f9ea3fef2a8b3f663ca32c24b54e95ca6a9793e1c9576a906747c424e32a7f6
  Contract call:       GovernanceToken#numCheckpoints
  From:                0xf39fd6e51aad88f6f4ce6ab8827279cfffb92266
  To:                  0x5fbdb2315678afecb367f032d93f642f64180aa3
  Contract deployment: TimeLock
  Contract address:    0x9fe46736679d2d9a65f0992f2272de9f3c7fa6e0
  Transaction:         0x0596bed05f392ad1ec488fd818a748fd0578648300fa84950b13013804ef14ae
  From:                0xf39fd6e51aad88f6f4ce6ab8827279cfffb92266
  Value:               0 ETH
  Gas used:            1870979 of 1870979
  Block #3:            0xeb709db5cb030d6291f4360e1841f1591a6798576a1eb11a760acf52462a1ce6
  Contract deployment: GovernorContract
  Contract address:    0xcf7ed3acca5a467e9e704c703e8d87f634fb0fc9
```