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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 :** Frontend Connect – Web3.js Integration

## Coding Phase : Pseudo Code/Flow Chart/Algorithm

1. Start React project using `npx create-react-app`.
2. Install `web3` library.
3. Create `.env` file with:
4. In `app.js`:

- Import Web3 and connect to MetaMask.
- Load contract using ABI & address from `.env`.
- Fetch `storedData` using `contract.methods.get().call()`.
- Send transaction using `contract.methods.set(value).send()`.

5. Test the frontend by setting and getting values.

## Apparatus/Software Used:

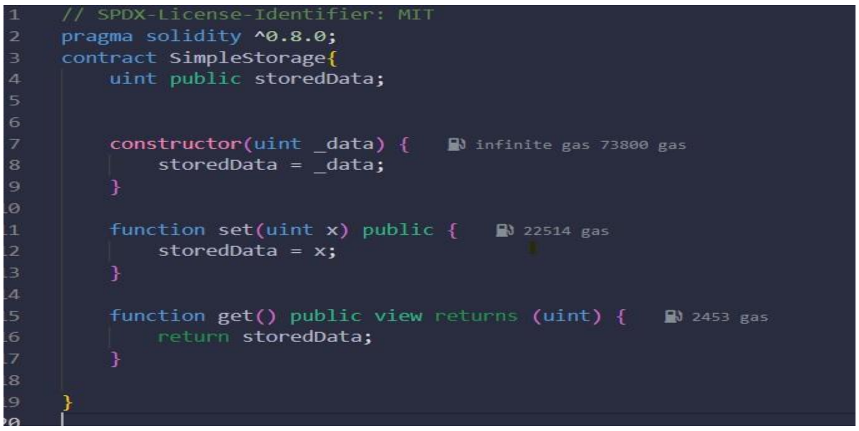
- Node.js & npm
- React.js
- Web3.js
- MetaMask
- **Network**: Sepolia Testnet

## Testing Phase:

- Deployed `SimpleStorage` contract to Sepolia using Remix.
- Noted the contract address & ABI.
- Created `.env` file to store sensitive data.
- Connected frontend to MetaMask.
- Verified:
- Reading stored value works.
- Writing new value updates blockchain data.

## Implementation Phase: Final Output (no error)

Step 1: Create a smart contract in remix IDE.



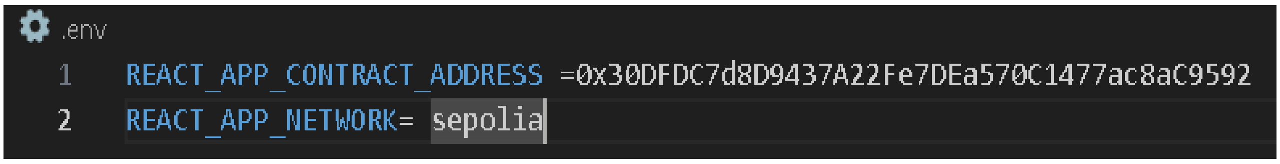
```
// SPDX-License-Identifier: MIT
pragma solidity ^0.8.0;
contract SimpleStorage{
    uint public storedData;


    constructor(uint _data) {    infinite gas 73800 gas
        storedData = _data;
    }

    function set(uint x) public {    22514 gas
        storedData = x;
    }

    function get() public view returns (uint) {    2453 gas
        return storedData;
    }

}
```

Step 2: Create a React app in VS Code.

- Open VS Code.
- Open a terminal inside of VS Code.
- Run this code (npx create-react-app simple-storage-web3).
- Then run cd simple-storage-web3.
- Then install web3 like run this code(npm install web3).

Step 3: Create a .env File.

- Write The deployed contract address from Remix or blockchain explorer.

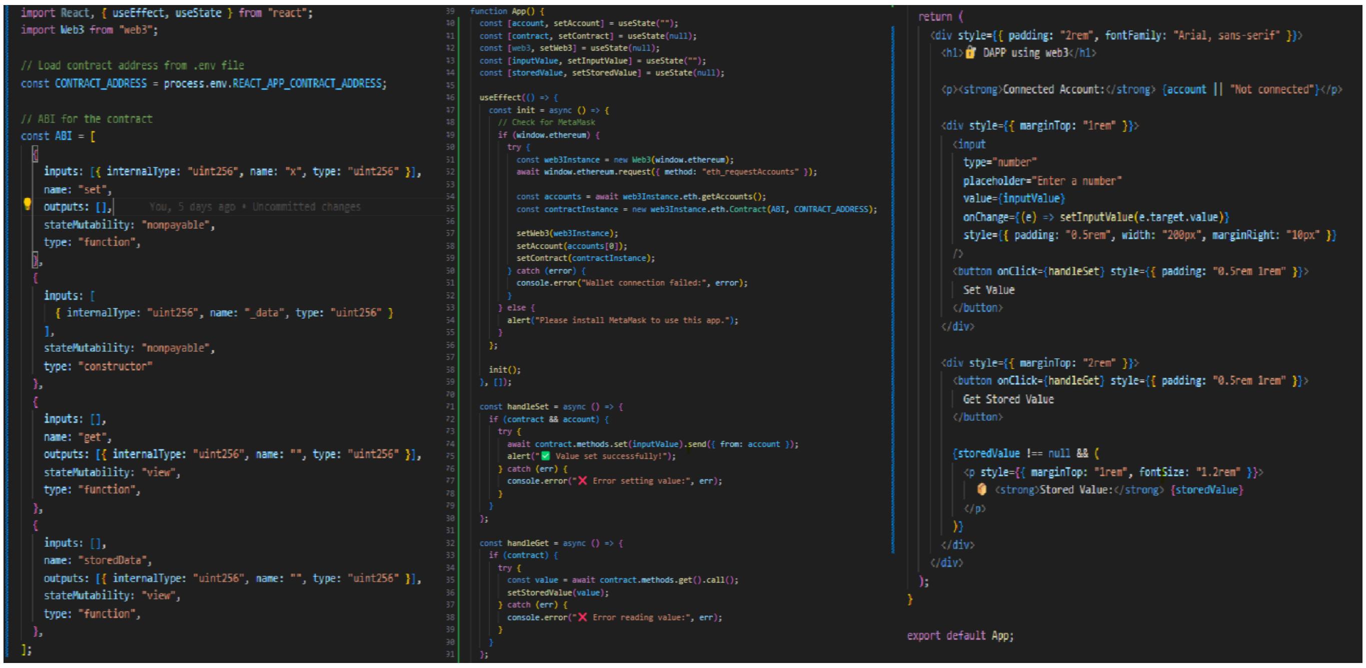


.env

```
REACT_APP_CONTRACT_ADDRESS =0x30DFDC7d8D9437A22Fe7DEa570C1477ac8aC9592
REACT_APP_NETWORK= sepolia
```

Step 4: Connect in src/App.js

- Replace App.js with something like:



```
import React, { useEffect, useState } from "react";
import Web3 from "web3";

// Load contract address from .env file
const CONTRACT_ADDRESS = process.env.REACT_APP_CONTRACT_ADDRESS;

// ABI for the contract
const ABI = [
  {
    inputs: [{ internalType: "uint256", name: "x", type: "uint256" }],
    name: "set",
    outputs: [],        You, 5 days ago • Uncommitted changes
    stateMutability: "nonpayable",
    type: "function",
  },
  {
    inputs: [
      { internalType: "uint256", name: "_data", type: "uint256" }
    ],
    stateMutability: "nonpayable",
    type: "constructor"
  },
  {
    inputs: [],
    name: "get",
    outputs: [{ internalType: "uint256", name: "", type: "uint256" }],
    stateMutability: "view",
    type: "function",
  },
  {
    inputs: [],
    name: "storedData",
    outputs: [{ internalType: "uint256", name: "", type: "uint256" }],
    stateMutability: "view",
    type: "function",
  },
];
```

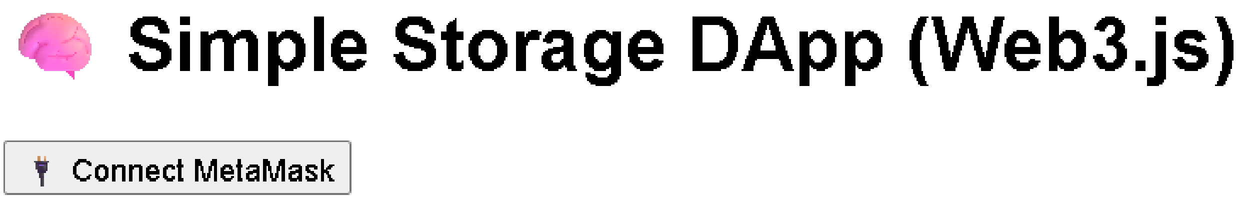
```
function App() {
  const [account, setAccount] = useState("");
  const [contract, setContract] = useState(null);
  const [web3, setWeb3] = useState(null);
  const [inputValue, setInputValue] = useState("");
  const [storedValue, setStoredValue] = useState(null);

  useEffect(() => {
    const init = async () => {
      // Check for MetaMask
      if (window.ethereum) {
        try {
          const web3Instance = new Web3(window.ethereum);
          await window.ethereum.request({ method: "eth_requestAccounts" });

          const accounts = await web3Instance.eth.getAccounts();
          const contractInstance = new web3Instance.eth.Contract(ABI, CONTRACT_ADDRESS);

          setWeb3(web3Instance);
          setAccount(accounts[0]);
          setContract(contractInstance);
        } catch (error) {
          console.error("Wallet connection failed:", error);
        }
      } else {
        alert("Please install MetaMask to use this app.");
      }
    };

    init();
  }, []);

  const handleSet = async () => {
    if (contract && account) {
      try {
        await contract.methods.set(inputValue).send({ from: account });
        alert("✅ Value set successfully!");
      } catch (err) {
        console.error("❌ Error setting value:", err);
      }
    }
  };

  const handleGet = async () => {
    if (contract) {
      try {
        const value = await contract.methods.get().call();
        setStoredValue(value);
      } catch (err) {
        console.error("❌ Error reading value:", err);
      }
    }
  };
```

```
  return (
    <div style={{ padding: "2rem", fontFamily: "Arial, sans-serif" }}>
      <h1>🔐 DAPP using web3</h1>

      <p><strong>Connected Account:</strong> {account || "Not connected"}</p>

      <div style={{ marginTop: "1rem" }}>
        <input
          type="number"
          placeholder="Enter a number"
          value={inputValue}
          onChange={(e) => setInputValue(e.target.value)}
          style={{ padding: "0.5rem", width: "200px", marginRight: "10px" }}
        />
        <button onClick={handleSet} style={{ padding: "0.5rem 1rem" }}>
          Set Value
        </button>
      </div>

      <div style={{ marginTop: "2rem" }}>
        <button onClick={handleGet} style={{ padding: "0.5rem 1rem" }}>
          Get Stored Value
        </button>

        {storedValue !== null && (
          <p style={{ marginTop: "1rem", fontSize: "1.2rem" }}>
            📦 <strong>Stored Value:</strong> {storedValue}
          </p>
        )}
      </div>
    </div>
  );
}

export default App;
```

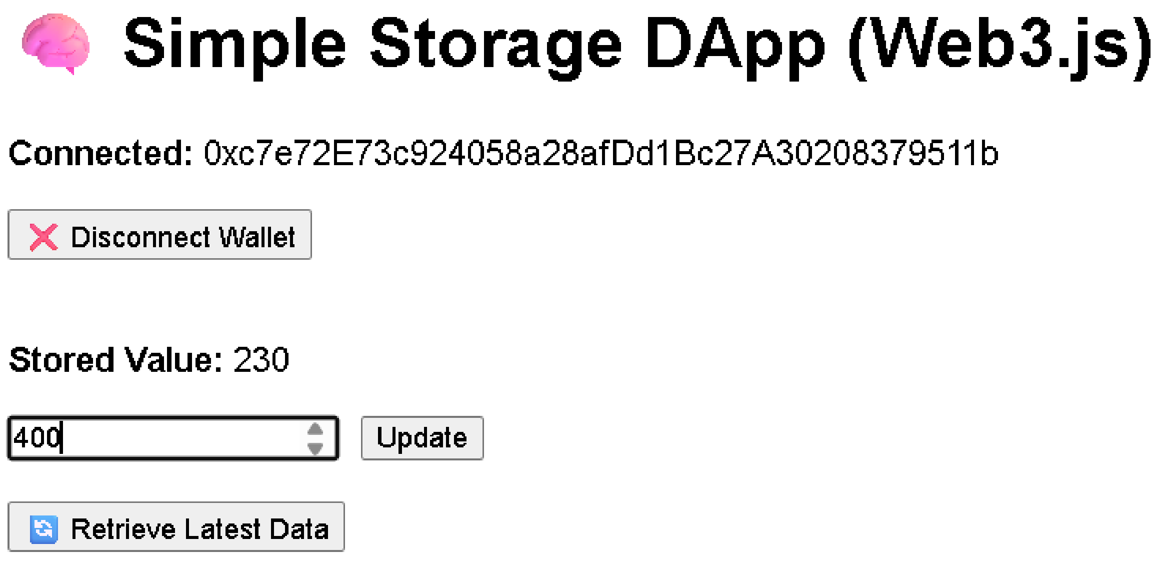
Step 5: Run the App

- In terminal: npm start

Step 6: After run this open React app at http://localhost:3000.



- Then connect the meta mask.
- Then Enter some value and set value .



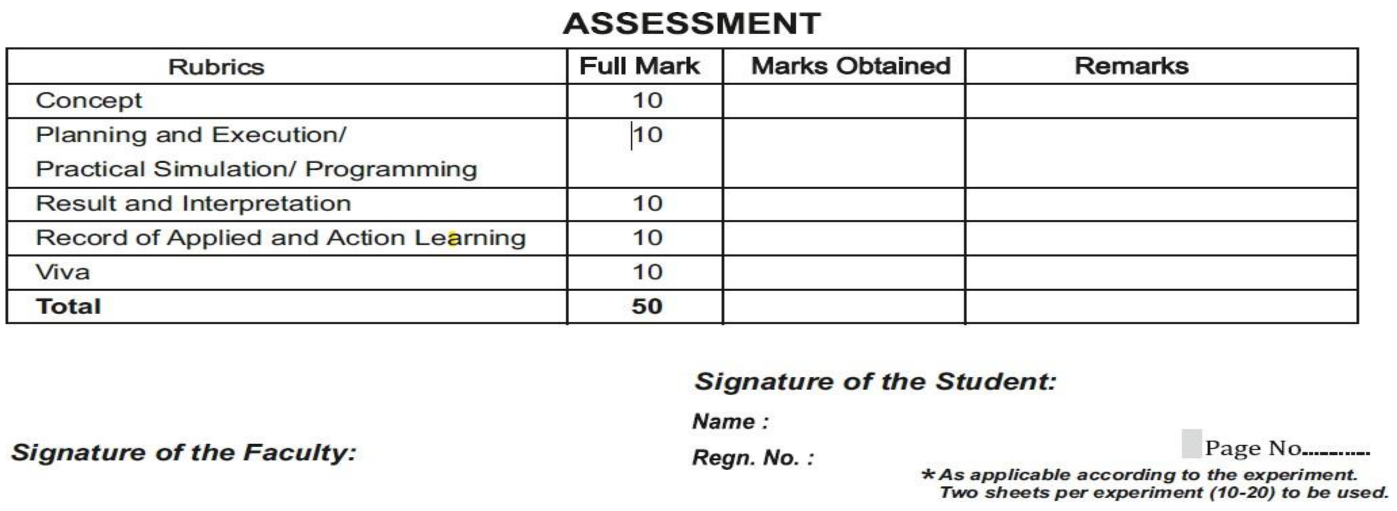
Connected: 0xc7e72E73c924058a28afDd1Bc27A30208379511b

Stored Value: 230

400

## Observations

- Web3.js successfully connected frontend to blockchain.
- MetaMask allowed account access and transaction confirmation.
- Updating values from frontend reflected immediately on blockchain



### 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. :***

Page No.........

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