Practical 2

AIM : To create a blockchain and implement replay attacks on blockchain.

Code :

```
const SHA256 = require("crypto-js/sha256");

class Block {
  constructor(id, data, previousHash = "") {
    this.id = id;
    this.timestamp = new Date();
    this.data = data;
    this.previousHash = previousHash;
    this.hash = this.calculateHash();
  }

  calculateHash() {
    return SHA256(
      this.id + this.timestamp + this.previousHash
+ JSON.stringify(this.data)
    ).toString();
  }
}

class Blockchain {
  constructor() {
    this.chain = [this.createGenesisBlock()];
  }

  createGenesisBlock() {
    return new Block(0, "Genesis Block", "0");
  }

  getLatestBlock() {
```

```
    return this.chain[this.chain.length - 1];
  }

  addBlock(newBlock) {
    newBlock.previousHash =
this.getLatestBlock().hash;
    newBlock.hash = newBlock.calculateHash();
    this.chain.push(newBlock);
  }
}

// Example usage:
const myBlockchain = new Blockchain();
myBlockchain.addBlock(new Block(1, { amount: 4 }));
myBlockchain.addBlock(new Block(2, { amount: 10
}));

console.log(JSON.stringify(myBlockchain, null, 4));
```

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-
width, initial-scale=1.0" />
    <title>Blockchain Demo</title>
    <link rel="stylesheet"
href="./styles/style.css" />
  </head>
  <body>
    <div class="container">
      <h1>Blockchain Demo</h1>
```

```
      <div id="blockchain"></div>
      <button id="addBlockBtn">Add Block</button>
    </div>
    <script
src="https://cdn.jsdelivr.net/npm/crypto-js@3.1.9-
1/crypto-js.js"></script>
    <script src="js/blockchain.js"></script>
    <script src="js/main.js"></script>
  </body>
</html>
```

```
const express = require("express");
const app = express();
const path = require("path");

app.use(express.static(path.join(__dirname,
"public")));

app.get("/", (req, res) => {
  res.sendFile(path.join(__dirname, "",
"index.html"));
});

const PORT = process.env.PORT || 3000;
app.listen(PORT, () => {
  console.log(`Server is running on
http://localhost:${PORT}`);
});
```

```css
body {
  font-family: Arial, sans-serif;
  background-color: #f4f4f4;
  margin: 0;
  padding: 0;
}

.container {
  max-width: 800px;
  margin: 50px auto;
  padding: 20px;
  background-color: #fff;
  box-shadow: 0 0 10px rgba(0, 0, 0, 0.1);
  border-radius: 8px;
}

h1 {
  text-align: center;
}

#blockchain {
  margin: 20px 0;
}

.block {
  border: 1px solid #ddd;
  padding: 10px;
  margin-bottom: 10px;
  border-radius: 5px;
  background-color: #fafafa;
}

button {
  display: block;
  width: 100%;
```

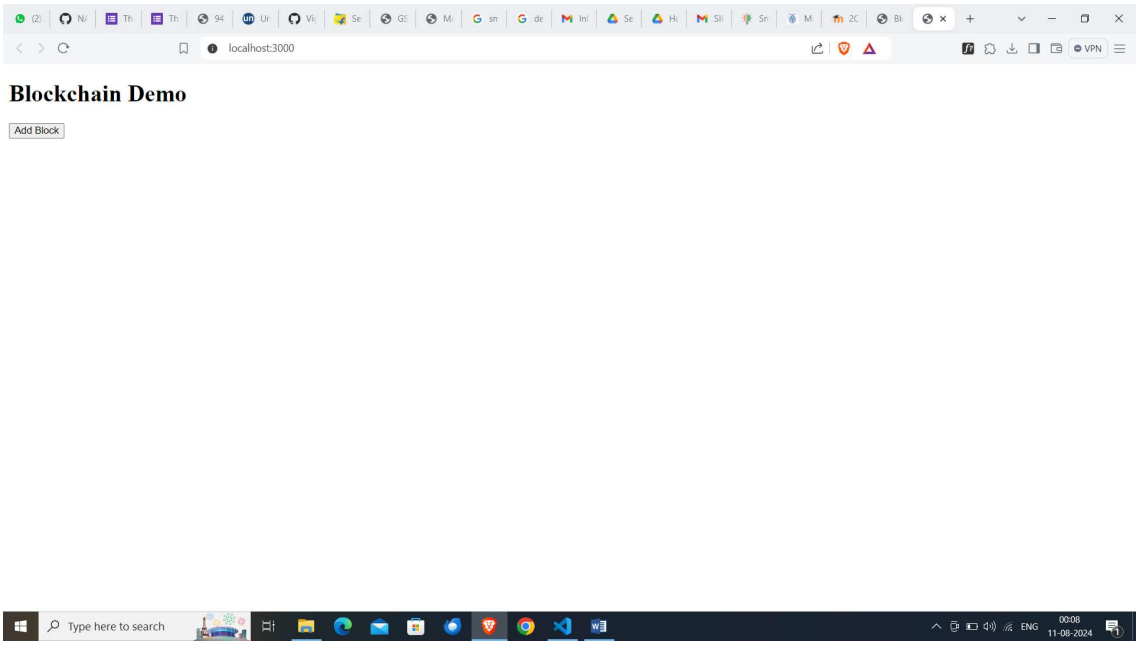
```
  padding: 10px;
  border: none;
  background-color: #28a745;
  color: #fff;
  font-size: 16px;
  cursor: pointer;
  border-radius: 5px;
}

button:hover {
  background-color: #218838;
}
```

```
document.addEventListener("DOMContentLoaded", () =>
{
  const myBlockchain = new Blockchain();
  myBlockchain.displayBlockchain();

  document.getElementById("addBlockBtn").addEventLi
stener("click", () => {
    const id = myBlockchain.chain.length;
    const data = { amount: Math.floor(Math.random()
* 100) };
    const newBlock = new Block(id, data);
    myBlockchain.addBlock(newBlock);
    myBlockchain.displayBlockchain();
  });
});
```

Output :


localhost:3000
Blockchain Demo
Add Block
Type here to search
ENG
00:08
11-08-2024