Practical 2

Blockchain Technology

2CSDE93

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

Code:

```
from hashlib import sha256
import json
import time

class Block:
    def __init__(self, index, prevHash, timeStamp, data, nonce=0):
        self.index = index
        self.prevHash = prevHash
        self.timeStamp = timeStamp
        self.data = data
        self.nonce = nonce

    def compute_hash(self):
        block_string = json.dumps(self.__dict__, sort_keys=True)
        return sha256(block_string.encode()).hexdigest()

class Blockchain:
    def __init__(self):
        self.chain = []
        self.create_genesis_block()

    def create_genesis_block(self):
        genesis_block = Block(0, "0", time.time(), "First Block")
        genesis_block.hash = genesis_block.compute_hash()
        self.chain.append(genesis_block)

    @property
    def last_block(self):
        return self.chain[-1]


    def add_block(self, block):
        previous_hash = self.last_block.hash
        block.hash = block.compute_hash()

        self.chain.append(block)

blockchain = Blockchain()

while True:
    print("1) Add Block")
```

```
    print("2) View Chain")
    print("3) Exit")
    operation = int(input("\nEnter Choice: "))
    if operation == 1:

        data = input("Enter Data: \n")
        block = Block(index=blockchain.last_block.index + 1,
                      prevHash=blockchain.last_block.hash,
                      timeStamp=time.time(),
                      data=data
                  )

        blockchain.add_block(block=block)

    elif operation == 2:
        for i in blockchain.chain:
            print(i.__dict__)

    elif operation == 3:
        break
    else:
        print("Enter valid Choice")
```

Output:

```
PS C:\Users\dhruv> & C:/Users/dhruv/AppData/Local/Programs/Python/Python311/python.exe "c:/Users/dhruv/Downloads/Practical/Practical 2/blockchainDev.py"
1) Add Block
2) View Chain
3) Exit

Enter Choice: 1
Enter Data:
Dhruv J Sonani
1) Add Block
2) View Chain
3) Exit

Enter Choice: 2
{'index': 0, 'prevHash': '0', 'timeStamp': 1667927753.426632, 'data': 'First Block', 'nonce': 0, 'hash': '56fe21b2476e3ba0e703e6a31a3a446711307c6d0a67220132e832aa4534f5ed'}
{'index': 1, 'prevHash': '56fe21b2476e3ba0e703e6a31a3a446711307c6d0a67220132e832aa4534f5ed', 'timeStamp': 1667927769.5114539, 'data': 'Dhruv J Sonani', 'nonce': 0, 'hash': '0ad6d3099903ad901ec6725a16a2
a1a1747ee6b3d2c6ba7d420a04ba926a4580'}
1) Add Block
2) View Chain
3) Exit
```

```
Enter Choice: 1
Enter Data:
Dummy Transaction
1) Add Block
2) View Chain
3) Exit

Enter Choice: 2
{'index': 0, 'prevHash': '0', 'timeStamp': 1667927753.426632, 'data': 'First Block', 'nonce': 0, 'hash': '56fe21b2476e3ba0e703e6a31a3a446711307c6d0a67220132e832aa4534f5ed'}
{'index': 1, 'prevHash': '56fe21b2476e3ba0e703e6a31a3a446711307c6d0a67220132e832aa4534f5ed', 'timeStamp': 1667927769.5114539, 'data': 'Dhruv J Sonani', 'nonce': 0, 'hash': '0ad6d3099903ad901ec6725a16a2
a1a1747ee6b3d2c6ba7d420a04ba926a4580'}
{'index': 2, 'prevHash': '0ad6d3099903ad901ec6725a16a2a1a1747ee6b3d2c6ba7d420a04ba926a4580', 'timeStamp': 1667927778.8752427, 'data': 'Dummy Transaction', 'nonce': 0, 'hash': '64c445103dfde4cdc48e033c3
7da2738e0097bf96639d2622705b43e0c8ee2e6'}
1) Add Block
2) View Chain
3) Exit

Enter Choice: 3
PS C:\Users\dhruv>
```