Roll No: 22BCE501

Course Code and Course Name: 2CSDE93 Blockchain Technology

Practical No. 3

Aim: **To perform thorough study and installation of Anaconda 5 0 1 and Python 3 6 and perform proof of work ( consensus mechanism Also, notice the changes in mining rewards and nonce requirement.**

*//imported hash algorithm from the crypto-js package*

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

*//created a class to represent a Block*

class Block{

constructor(index, timestamp, data, previousHash){

this.index = index;

this.timestamp = timestamp;

this.data = data;

this.previousHash = previousHash;

this.hash = this.generateHash();

this.nonce = 0;

}

mine(difficulty) {

while (!this.hash.startsWith(Array(difficulty).join("0"))) {

this.nonce++;

this.hash = this.generateHash();

}

}

generateHash(){

return SHA256(this.index + this.timestamp + this.nonce +this.previousHash + JSON.stringify(this.data)).toString()

}

}

class Blockchain{

constructor(){

this.blockchain = [this.createGenesisBlock()];

this.difficulty = 6;

}

createGenesisBlock(){

return new Block(0, "11/04/2022", "This Is Genesis Block", "0");

}

getTheLatestBlock(){

return this.blockchain[this.blockchain.length - 1];

}

addNewBlock(newBlock){

newBlock.previousHash = this.getTheLatestBlock().hash;

newBlock.hash = newBlock.generateHash();

newBlock.mine(this.difficulty);

this.blockchain.push(newBlock);

}

*// testing the integrity of the chain*

validateChainIntegrity(){

for(let i = 1; i<this.blockchain.length; i++){

const currentBlock = this.blockchain[i];

const previousBlock = this.blockchain[i-1];

if(currentBlock.hash !== currentBlock.generateHash()){

return false;

}

if(currentBlock.previousHash !== previousBlock.hash){

return false;

}

}

return true;

}

}

*// Create an instance to test our blockchain*

let MyCoin = new Blockchain();

console.log("Mining MyCoin in Progress...");

MyCoin.addNewBlock(

new Block(1, "08/08/2023", {

sender: "Dhyan",

recipient: "Parth",

quantity: 25

})

);

console.log("First Block Mined Successfully");

console.log(JSON.stringify(MyCoin, null, 5));

MyCoin.addNewBlock(

new Block(2, "08/08/2023", {

sender: "DhruvilPatel",

recipient: "ParthPatel",

quantity: 34

})

);

console.log("Second Block Mined Successfully");

console.log(JSON.stringify(MyCoin, null, 5));

MyCoin.addNewBlock(

new Block(3, "08/08/2023", {

sender: "ParthPatel",

recipient: "DhyanPatel",

quantity: 34

})

);

console.log("Third Block Mined Successfully");

console.log(JSON.stringify(MyCoin, null, 5));

Output:





