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CSI 2110

Assignment 2

Class: Block.java
   Method: Block(index, transaction, nonce, previousHash, hash)
      This method is used to create an instance of class block from a text file.

   Method: Block(index, transaction, previousHash)
      This method is used to create an instance of class block from user input.

   Method: nonceGenerator(block)
      This is the proof of work method. It works by creating an array of ints from a
   randomized intstream created by java.random.ints(size, lowerbound, upperbound) and
   then it converts each element of the array of ints into a character and adds it to a new
   nonce which is then manually set to the parameter block. This will loop until the nonce
   manually set to the block results in the block producing a hash that begins with five 0's.
   After which it sets the hash and the nonce of the block and terminates.

   Method: setHash(hash)
      Manually sets the hash of the block. This is used by the proof of work method.
   Method: setNonce(nonce)
      Manually sets the nonce of the block. This is used by the proof of work method.

   Method: getIndex()
      Getter for the index attribute of class block.

   Method: getTimestamp()
      Getter for the timestamp attribute of class block.

   Method: getTransaction()
      Getter for the transaction attribute of class block.

Method: getNonce()
>   Getter for the nonce attribute of class block.

Method: getPreviousHash()
>   Getter for the previousHash attribute of class block.

Method: getHash()
>   Getter for the hash attribute of class block

Class: Transaction.java

Method: Transaction(sender, receiver, amount)
>   Initializes an instance of class Transaction given a sender, receiver, and amount.

Method: getSender()
>   Getter for sender attribute of class Transaction.

Method: getReceiver()
>   Getter for receiver attribute of class Transaction.

Method: getAmount()
>   Getter for amount attribute of class Transaction.

Method:toString()
>   Returns a string representation of class Transaction.

Class: BlockChain.java

Method: BlockChain()
>   Default constructor, creates arraylist with default size (10).

Method: BlockChain(size)
>   Constructor that initializes the arraylist with the parameter size.

Method: fromFile(fileName)
>   Method that reads a given text file and returns an instance of class BlockChain
>   with the blocks that are in that text file.

Method: nextInt(scanner)

     Helper method that reads the next int from a text file. Used by fromFile.

Method: nextLong(scanner)

     Helper method that reads the next long from a text file. Used by fromFile.

Method: toFile(blockchain, fileName)

     Writes an instance of blockchain to a text file.

Method: validateBlockchain()

     Validates current instance of blockchain by checking for inconsistencies with the hash, previousHash, and index values of the blockchain.

Method: getBalance(username)

     Returns as an integer the bitcoin balance of user specified by parameter username.

Method: add(block)

     Adds a block to this instance of class Blockchain

Method: getPeak()

     Returns the index of the current front of the blockchain

Method: main(args)

     Creates a blockchain from a text file, validates it, and then prompts the user to add more blocks to the chain until finally writing the instance of blockchain to a new text file.

Block Number	Number of trials
1	786,514
2	63,417
3	700,994
4	679,439
5	489,567
6	80,777
7	549,041
8	953,403
9	1,275,939
10	566,988
Average Trials:	**614,607**