Miner ID: asaba091

Block Class
- Empty constructor so that block can be instantiated without knowing its parameters yet
- Actual constructor so that block can be instantiated with all its parameters
- Getters and setters for all of block's attributes

Transaction Class
- Empty constructor so that transaction can be instanitiated without knowing its parameters yet
- Actual constructor so that transaction can be instantiated with all its parameters
- Getters and setters for all of transaction's attributes

BlockChain Class
fromFile method:
- Requires textfile as parameter
- Textfile must be formatted identically to "bitcoinBank.txt"
- Assigns previous hash for first block to "00000"
- Reads line by line, reading all of block's attributes using FileReader and BufferReader
- Creates the block with the obtained information
- Sets previous hash to current hash
- Adds block to blockchain

toFile method:
- Requires textfile as parameter
- Loops through blockchain and prints each of each block's attributes using PrintWriter
- Catches IOException if specified file cannot be found

validateBlockchain method:
- Loop through blockChain
- Gets current and next block, gets the next block's previous hash and gets expected hash value
- Verifies index values match
- Verfies transaction is feasible using getBalance method
- Verifies the expected hash matches the hash in the block
- Verifies the previous hash of the next block is the hash of the block

getBalance method:
- First method gets balance of user for all transactions in blockchain
  - Requires user's name as parameter
- Second method to get balance of user until specific transaction number
  - Requires user's name and transaction number as parameters
- Both methods function in the same manner by subtracting money from sender and adding money to receiver

generateNonce method:
- Requires block as parameter
- Hash starts with 00000
- Give nonce a random length between 1 and 18
- Add random ASCII table value between [33, 126]

- Math.min() makes sure substring doesn't go out of bounds
- Keeps a counter value to keep track of number of hash trials

Add method:
- Simply add block to block chain

Main method:
- Asks for name of the file that contains the blocks that will be added to the blockchain
  - Uses Scanner to process user's input
- Calls fromFile method to read given textfile
- Validates blockChain using validateBlockchain method
- Allows for user to add transactions to blockchain
  - Makes sure transaction is valid using getBalance method
- Creates nonce for block using generateNonce method, then prints the number of trials it took to generate the nonce as well as the blockchain now including the new block
- Asks user if they would like to add more transactions and loops until they specifically specify 'yes' or 'no'
- Writes the blockchain to a textfile in the directory using toFile method
  - Catches IOException is file is not available

Transaction Number	Number of hash trials
1	708130
2	671495
3	455064
4	97780
5	2112646
6	212660
7	1092722
8	235630
9	1557036
10	594078

Average number of hash trials = 773724.1