CS1083 Assignment # 10 - Fall 2024

Due: Friday, 27 November before 4:30 pm in the Desire2Learn dropbox. (See submission instructions below).

The purpose of this assignment is:

- Implement a doubly linked list

This assignment is to be done individually. If you have questions, direct them to a tutor/assistant during an extra help session. If your question is not answered during an extra help session, you may contact your course professor.

Bank Account Management System

You have been given a file labelled as "AccountData.txt" which contains a variety of requests relating to bank accounts. The file will always contain an even number of lines as each request is broken across two lines. The first line of a request will contain the specific command and the second line with contain a comma-delimited list of all data needed to complete the command. See table below for list of commands and the required data for each:

Command	Description	Additional Data
OPEN	Opens a new account with name, initial deposit and information about interest (if applicable). Interest rates may not be negative or 0.	Account Name, Initial Deposit, Interest Rate*, Term (in years)*
CLOSE	Closes an account and transfers funds to a pre-existing account. No fees apply here.	Account Number to close, Account Number to Transfer Funds
DEPOSIT	Deposits funds to an account.	Account Number, Amount
WITHDRAW	When withdrawing from an account that is in the middle of a term apply a 5% penalty on the account. Withdrawals should not allow an account to go negative (after penalty applied).	Account Number, Amount
TRANSFER	Transfers money from current account to another given account. Same rules apply as withdrawing; however, penalty	Account Number to transfer from, Account Number to transfer to,

	is 2.5% rather than 5%.	Amount
COMPLETE	Year completed. All accounts should have interest rate applied and reduce the term year by 1.	Next line simply has the year #, this is not important for the system you are building.

*If applicable. If an account is opened and only gives account name and initial deposit, still open the account.

You must use a doubly linked list that you have programmed to store account information. Read in one request at a time and complete it by alter the doubly linked list accordingly. After every 4 requests processed, print out an account summary in the following format (money must be in money format):

```
ID: 8000   SAVINGS    $XXXX.XX   Interest Rate: X.XX%  (Term: X Years)
```

Do not print interest rate or term if not applicable. Printing of accounts must be in order based on ID (lowest to highest). Account IDs are automatically generated when each account is opened and start with the value of 8000. The list should be sorted and do **not** assume that all accounts will be passed to the bank list in the correct order.

If a withdraw or transfer is requested for more than the account has, throw an "InsufficientFundsException". If an account is opened with a negative or zero interest rate value, throw a "PositiveInterestException". After throwing either exception, print an error message to the command line, and move onto the next request.

Sometimes, there will be a mistake in the data given such as values missing, data in the wrong place, etc. If a mistake is made when reading in, skip the command and move onto the next one. An error message should also be printed.

If any account IDs are given that are not in the list, print an error message, and skip to the next command.

Example Output

The following output is the expected output from the file given on D2L:

```
Account ID does not exist for request 3 (on lines: 5 or 6)
ID: 8000     CHEQUE   $2,500.50
ID: 8001     SAVING   $3,225.00    Interest Rate: 6.0%  (Term: 3 Years)
ID: 8002     TFSA     $1,500.00    Interest Rate: 5.8%  (Term: 1 Years)

ID: 8000     CHEQUE   $0.50
ID: 8001     SAVING   $3,225.00    Interest Rate: 6.0%  (Term: 3 Years)
ID: 8002     TFSA     $1,500.00    Interest Rate: 5.8%  (Term: 1 Years)
ID: 8003     FHSA     $1,800.00    Interest Rate: 5.2%  (Term: 1 Years)

InsufficientFundsException: Not enough funds to complete transaction
Error on reading in data from request 12 (on lines: 23 or 24)
ID: 8000     CHEQUE   $0.50
```

```
ID: 8001     SAVING   $5.25        Interest Rate: 6.0%  (Term: 2 Years)
ID: 8002     TFSA     $4,917.00    Interest Rate: 5.8%  (Term: 0 Years)
ID: 8003     FHSA     $1,893.60    Interest Rate: 5.2%  (Term: 0 Years)

InsufficientFundsException: Not enough funds to complete transaction
ID: 8000     CHEQUE   $0.50
ID: 8002     TFSA    $6,816.17   Interest Rate: 5.8%   (Term: 0 Years)
```

Your electronic submission (submitted via Desire2Learn) will consist of two files. Name your files YourName-fileName.extension, e.g. JohnSmith-as10.zip, JohnSmith-as10.pdf:

1. A single pdf file containing a listing of the code for your program.
2. A zip file containing all your Java classes.