**Account**

This is an abstract class. Other classes will inherit from this class.

This class has been built for you. Do not make any changes to this class.

Fields

* ID is a random four-digit ID number generated at account creation.
* Balance represents the amount of money in the account.

Public abstract methods

deposit

* Argument(s): double amount
* Return type: none

Withdraw

* Argument(s): double amount
* Return type: none

Reconcile

* Argument(s): none
* Return type: none

Public non-abstract methods

getID

* Argument(s): none
* Return type: integer
* Return the ID associated with this Account

getBalance

* Argument(s): none
* Return type: double
* Return the balance of this Account

**Checking**

This class should inherit from the Account class.

Fields

Create a constant field that sets a minimum balance of $100

Constructor

* Accept one double argument and set the balance to this value.
* Throw exception if argument is not a positive value

Methods

Deposit

* Argument(s): double amount
* Return type: none
* Add amount to balance
* ~~Print message to console that states amount and account ID~~
  + ~~e.g. “Deposit $50.00 to checking account 1234”~~
* Throw exception if amount is not a positive value

Withdraw

* Argument(s): double amount
* Return type: none
* Subtract amount from balance
* Throw exception if amount is not a positive value

Check

* Argument(s): double amount
* Return type: none
* Processing a check is the same as a withdrawal
* Throw exception if amount is not a positive value

Reconcile

* Argument(s): none
* Return type: none
* Apply ONE of these fees, in order of precedence, if applicable
  + Overdraft fee $35, if balance is less than zero
  + Minimum balance fee $14, if balance is less than minimum balance

toString

* Overrides the toString() method inherited from the Object class
* Argument(s): none
* Return type: String
* Display the account type, ID number, and balance on one line
  + e.g. “Checking 1234 | Balance $5,678.90”

**Savings**

This class should inherit from the Account class.

Fields

Create a double field that holds the interest rate as a decimal (e.g. 5% = 0.05)

Constructors

* Accept one double argument, set the balance to the argument value, and set the annual interest rate to 2%
* Accept two double arguments, set the balance to the first argument value, and set the annual interest rate to the second argument value
* Throw exception if either argument is not a positive value

Methods

deposit

* Argument(s): double amount
* Return type: none
* Add amount to balance
* ~~Print message to console that states amount and account ID~~
  + ~~e.g. “Deposit $75.00 to savings account 2468”~~
* Throw exception if amount is not a positive value

withdraw

* Argument(s): double amount
* Return type: none
* Subtract amount from balance only if the account has enough money
  + i.e. savings account cannot be overdrawn
* ~~Print appropriate message to console~~
  + ~~e.g. “Withdraw $35.00 from savings account 2468”~~
  + ~~e.g. “Insufficient funds in savings account 2468”~~
* Throw exception if amount is not a positive value

reconcile

* Argument(s): none
* Return type: none
* Add one month’s worth of interest to the balance
  + e.g. if the balance if $5,000 and the interest rate is 6%,   
    the monthly interest is $25 (5000 \* 0.06 / 12)

toString

* Overrides the toString() method inherited from the Object class
* Argument(s): none
* Return type: String
* Display the account type, ID number, and balance on one line
  + e.g. “Savings 2468 | Balance $3,579.01”

Bank Demo

Create an array (or ArrayList) of accounts in this order

* Checking account with $500
* Savings account with $1,000
* Checking account with $250
* Savings account with $5,000 and 5% interest rate

Display each account to the console.

~~There are three text files with transactions. Each transaction has the following pattern:~~

Open the text file named transactions.txt. Read and process each transaction.   
Note: Each transaction has the following pattern:

* ~~Relative position in your array 1-4, the transaction type, and the transaction amount~~
* ~~e.g. “1,deposit,75.25”~~
* ~~e.g. “4,withdraw,54.11”~~
* ~~e.g. “3,check,84.95”~~
* 7/8/2024,1,deposit,75.25
* 7/14/2024,4,withdraw,54.11
* 7/29/2024,3,check,84.95

Notes:

* The date should be saved as a String.
* The number after the date refers to the position in the array but is off by one.   
  In other words, 1 refers to the first element in the array, 2 refers to the second element, etc. This is common as non-technical users start counting at 1, not 0.
* The transaction type will either be “deposit”, “withdraw”, or “check”.
* There will be no “check” transactions on a savings account.
* If a transaction has a negative amount, the program is expected to handle the exception gracefully and continue processing any remaining transactions.

~~Starting with the first text file (july.txt), read and process each transaction.~~

~~Open the text file named transactions.txt. Read and process each transaction.~~

After each transaction, display an appropriate message to the console. Remember that processing the check is the same as a withdrawal. Examples:

* “Deposit $50.00 to checking account 1234 on 7/1/2024”
* “Withdraw $35.00 from savings account 5678”
* “Deposit $152.00 to checking account 1234”
* “Insufficient funds in savings account 2468”

Extra credit: send the transaction messages to an output file and display a single message to the console. Example: “Transaction log saved to banklog.txt”. Do not save any other output to the output file.

After processing all the transactions, reconcile each account then display each account to the console.

~~Repeat the previous step after processing the transactions in august.txt, and again after september.txt. Hint: if you save the file names to an array, you can use a for loop to read each text file then reconcile and display the accounts.~~

Here are the final account balances in the order they should appear in your array. Note that your account numbers will be different.

* Checking 1234 | Balance $3,579.01
* Savings 5678 | Balance $3,579.01
* Checking 2468 | Balance $3,579.01
* Savings 7531 | Balance $3,579.01

Submit the entire package as a .zip file to Blackboard.