

King Saud University
College of Computer and Information Sciences
CSC111 – Fall 2021
Lab Bonus HW

Question 1 (10 points):

Bank	7.5 points
- names: String[] - balances: double[] - nClients: int	0.25
+ Bank() + Bank(size: int) + findIndexByName(name: String): int + addClient(name: String, balance: double): boolean + deleteClient(name: String): boolean + deposit(name: String, amount: double): boolean + withdraw(name: String, amount: double): boolean + transfer(fName: String, tName: String, amount: double):boolean + display(name: String): void + findMax(): String	0.25 0.5 1 1 1 0.5 0.5 1 1 0.5

TestBank	2.5 points
+ main(): void * Print and loop menu * Option "Add a client" * Option "Close a client account" * Option "Deposit" * Option "Withdraw" * Option "Transfer" * Option "Display balance" * Option "Find the richest client" * Option "Exit"	0.5 0.25 0.25 0.25 0.25 0.25 0.25 0.25 0.25

The Class: Bank

As shown in the UML diagram, write the class Bank that has the attributes:

- **names**: An array containing the clients names (no duplicates).
- **balances**: An array containing the clients balances.
- **nClients**: the number of clients.

The methods of this class are:

- **Bank(size)**: A constructor that sets the banks nClients to 0, initializes both arrays names and balances to be of size *size*.
- **findIndexByName(name)**: returns the index of *name* in the array *names*. If *name* is not found, return -1.

- **addClient**(name, balance): adds **name** to the array of names and **balance** to the array of balances in the same index, then returns true. If there is no space in the arrays, it returns false. If there was a client with the same name, it doesn't add the client and returns false.
- **deleteClient**(name): removes a client by replacing his/her name and balance with the last client's name and balance, then returns true. Returns false if **name** was not found.
- **deposit**(name, amount): adds the **amount** to the balance of **name**, then returns true. Then prints the name, previous balance, and current balance. If **name** is not found, return false.

Ali was 1900.0, now 2000.0

- **withdraw**(name, amount): takes the **amount** from the balance of **name**, then returns true. Then print the name, previous balance, and current balance. If **name** is not found or the balance is not enough, return false without changing the balance.

Ali was 1900.0, now 1000.0

- **transfer**(fName, tName, amount): takes the **amount** from **fName**'s balance and adds it to **tName**'s balance, then returns true. Then prints the name, previous balance, and current balance for both clients. If either **fName** or **tName** are not found or the balance is not enough, return false without changing the balance:

Ali was 1900.0, now 1000.0

Ahmad was 100.0, now 1000.0

- **display**(name): prints **name** information. If **name** is not found, print "Not found."

Ahmad 134567.88 SR

- **findMax**(): returns the name of the richest client in the bank. If the bank has no clients, returns null.

The Main Class: TestBank

- **main**: the main method does the following:
 1. Create a **Bank** object **b1** with the size of 5.
 2. Print the following menu:
 - 1- Add Client.
 - 2- Close a client account.
 - 3- Deposit.
 - 4- Withdraw.
 - 5- Transfer.
 - 6- Display balance.
 - 7- Find the richest client.
 - 8- Exit.

3. When option 1 is selected "Add Client." Ask the user to enter the name and balance of the new client. Print "DONE" if completed or "ERROR" not completed.
4. When option 2 is selected "Close a client account." Ask the user to enter the name of the client you want to close his/her account. Print "DONE" if completed or "ERROR" not completed.
5. When option 3 is selected "Deposit." Ask the user to enter the name and amount of money to add to name's account. Print "DONE" if completed or "ERROR" not completed.
6. When option 4 is selected "Withdraw." Ask the user to enter the name and amount of money to take from name's account. Print "DONE" if completed or "ERROR" not completed.
7. When option 5 is selected "Transfer." Ask the user to enter the name to transfer from, the name to transfer to, and the amount. Then, print "DONE" if completed or "ERROR" not completed.
8. When option 6 is selected "Display balance." Ask the user to enter the name of the client you want to check his/her account.
9. When option 7 is selected "Find the richest client." Display the name of the richest client or "No clients" if no clients are in the bank.
10. When option 8 is selected "Exit", print a goodbye message.
11. Make sure the menu loops until option 8 is selected.

Sample run:

```
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 1
Enter name and balance: Ahmad 1000
DONE
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 1
Enter name and balance: Ahmad 2000
ERROR
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 1
Enter name and balance: Ali 100
DONE
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 1
Enter name and balance: Khalid 3000
DONE
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
```

```

* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 1
Enter name and balance: Hesham 400000
DONE
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 1
Enter name and balance: Saad 1500.5
DONE
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 1
Enter name and balance: Mansoor 900
ERROR
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 7
Hesham 400000.0 SR
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 2
Enter name: Hesham

```

DONE

```
*****
* 1- Add Client.                *
* 2- Close a client account.    *
* 3- Deposit.                   *
* 4- Withdraw.                  *
* 5- Transfer.                  *
* 6- Display balance.           *
* 7- Find the richest client.   *
* 8- Exit.                      *
*****
```

=> 7

Khalid 3000.0 SR

```
*****
* 1- Add Client.                *
* 2- Close a client account.    *
* 3- Deposit.                   *
* 4- Withdraw.                  *
* 5- Transfer.                  *
* 6- Display balance.           *
* 7- Find the richest client.   *
* 8- Exit.                      *
*****
```

=> 2

Enter name: Hesham

ERROR

```
*****
* 1- Add Client.                *
* 2- Close a client account.    *
* 3- Deposit.                   *
* 4- Withdraw.                  *
* 5- Transfer.                  *
* 6- Display balance.           *
* 7- Find the richest client.   *
* 8- Exit.                      *
*****
```

=> 3

Enter name and amount: Ahmad 200000

Ahmad was 1000.0, now 201000.0

DONE

```
*****
* 1- Add Client.                *
* 2- Close a client account.    *
* 3- Deposit.                   *
* 4- Withdraw.                  *
* 5- Transfer.                  *
* 6- Display balance.           *
* 7- Find the richest client.   *
* 8- Exit.                      *
*****
```

=> 7

Ahmad 201000.0 SR

```
*****
* 1- Add Client.                *
* 2- Close a client account.    *
* 3- Deposit.                   *
* 4- Withdraw.                  *
* 5- Transfer.                  *
```

```

* 6- Display balance.          *
* 7- Find the richest client.  *
* 8- Exit.                    *
*****
=> 4
Enter name and amount: Hesham 10
ERROR
*****
* 1- Add Client.              *
* 2- Close a client account.  *
* 3- Deposit.                 *
* 4- Withdraw.                *
* 5- Transfer.                *
* 6- Display balance.         *
* 7- Find the richest client. *
* 8- Exit.                    *
*****
=> 4
Enter name and amount: Ahmad 1000
Ahmad was 201000.0, now 200000.0
DONE
*****
* 1- Add Client.              *
* 2- Close a client account.  *
* 3- Deposit.                 *
* 4- Withdraw.                *
* 5- Transfer.                *
* 6- Display balance.         *
* 7- Find the richest client. *
* 8- Exit.                    *
*****
=> 4
Enter name and amount: Ahmad 123456789
Ahmad was 200000.0, now 200000.0
ERROR
*****
* 1- Add Client.              *
* 2- Close a client account.  *
* 3- Deposit.                 *
* 4- Withdraw.                *
* 5- Transfer.                *
* 6- Display balance.         *
* 7- Find the richest client. *
* 8- Exit.                    *
*****
=> 5
Enter from name, to name, and amount: Ahmad Ali 100
Ahmad was 200000.0, now 199900.0
Ali was 100.0, now 200.0
DONE
*****
* 1- Add Client.              *
* 2- Close a client account.  *
* 3- Deposit.                 *
* 4- Withdraw.                *
* 5- Transfer.                *
* 6- Display balance.         *
* 7- Find the richest client. *

```

```

* 8- Exit.                                     *
*****
=> 5
Enter from name, to name, and amount: Ahmad Hesham 200
ERROR
*****
* 1- Add Client.                             *
* 2- Close a client account.                 *
* 3- Deposit.                               *
* 4- Withdraw.                              *
* 5- Transfer.                              *
* 6- Display balance.                       *
* 7- Find the richest client.               *
* 8- Exit.                                  *
*****
=> 5
Enter from name, to name, and amount: Hesham Ali 200
ERROR
*****
* 1- Add Client.                             *
* 2- Close a client account.                 *
* 3- Deposit.                               *
* 4- Withdraw.                              *
* 5- Transfer.                              *
* 6- Display balance.                       *
* 7- Find the richest client.               *
* 8- Exit.                                  *
*****
=> 5
Enter from name, to name, and amount: Ahmad Ali 123456789
Ahmad was 199900.0, now 199900.0
Ali was 200.0, now 200.0
ERROR
*****
* 1- Add Client.                             *
* 2- Close a client account.                 *
* 3- Deposit.                               *
* 4- Withdraw.                              *
* 5- Transfer.                              *
* 6- Display balance.                       *
* 7- Find the richest client.               *
* 8- Exit.                                  *
*****
=> 4
Enter name and amount: Ahmad 500
Ahmad was 199900.0, now 199400.0
DONE
*****
* 1- Add Client.                             *
* 2- Close a client account.                 *
* 3- Deposit.                               *
* 4- Withdraw.                              *
* 5- Transfer.                              *
* 6- Display balance.                       *
* 7- Find the richest client.               *
* 8- Exit.                                  *
*****
=> 6

```



```
Enter name: Ahmad
Ahmad 199400.0 SR
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 6
Enter name: Hesham
Not found
*****
* 1- Add Client. *
* 2- Close a client account. *
* 3- Deposit. *
* 4- Withdraw. *
* 5- Transfer. *
* 6- Display balance. *
* 7- Find the richest client. *
* 8- Exit. *
*****
=> 8
Goodbye
```