

## BANK\_OF\_SUCCESS APPLICATION Requirement Document

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1. Our BankOfSuccess has **only** two types of accounts : Savings and Current. They are differentiated by a AccountType which can be "Savings" or "Current".
2. An Account of our BankOfSuccess should contain methods to open and close an account as well as the following information

String accNo - The account number can be generated by the application with starting number as 1000

String name;

String pin; - To ensure security of the account holder

**boolean** active – Account Holder can withdraw and deposit only from an Active account. If an account has become inactive then the Account Holder must contact the Account Manager to activate the inactive account.

Date dateOfOpening;

**double** balance;

PrivilegeType privilegeType;

where PrivilegeType could be an enum having the following constants *REGULAR*, *GOLD*, *PREMIUM*.

3. How does a customer like you and me open an account?
  - ✓ We go to a bank and approach the AccountManager who will ask us what type of account we want (Savings or Current) and then get necessary details from us and create an account for us and probably give us a passbook.
  - ✓ So to simulate the real world, our BankOfSuccess Application also has an AccountManager
  - ✓ AccountManager performs the following duties
    - A Customer can request for Savings Account or Current Account . In accordance to the Customer request, Account manager gets the necessary information from the Customer and creates an account.
    - BankOfSuccess has been recently launched and so currently has only two types of account, but in near future the Management of BankOfSuccess plan to introduce different types of Accounts like Savings-Corporate, Savings-NRI, Current-NRI accounts. The Management also hinted that they could introduce more types of account according to the market demand and would appreciate if

the code in the Account Manager need not be frequently changed if new types of accounts were introduced.

- AccountManager should be able to deposit to an account and withdraw from an account. Before a withdrawal, Account Manager need to check if the Customer is a genuine Customer of the bank, and his account is active. He needs to validate the pin entered by him is authentic, and if so whether he has sufficient balance in his account for withdrawal to be performed. If any of the above mentioned checks are not met with then the AccountManager must handle the situation and communicate effectively to the Customer.
- An Account Manager is also authorized to **transfer funds** from one account to another. He needs information regarding **from** which account **to** which account money needs to be transferred, and **how much** to be transferred. To follow the standard procedures of the Bank, the Customer who has requested the Account Manager to transfer funds must provide the **pin** number to the Account Manager, thereby authenticating himself as a Customer and authorizing the Account Manager to transfer funds on his behalf.
- With respect to the Account Manager transferring funds, the Management of BankOfSuccess expressed their concerns regarding the changing rules and regulations imposed by Reserve Bank of India on them. They foresee that RBI in the near future could ask them to verify the Pan Card Details of the Customer who wants Fund Transfer. RBI might insists on the Banks verify the Aadhar Card No of every individual who wishes to transfer funds. They would want us to implement any new change with minimal changes to the code. For example if we propose to have a method called transferFunds() with required arguments, they would prefer not having to change the number and type of arguments frequently with any new change.
- Transfer of Funds performed by the Account Manager is a facility provided by the BankOfSuccess. The BankOfSuccess Privilege programme offers members the following benefits and privileges based on their membership tier. The amount of money a Customer can request the Account Manager to transfer is dependent on the Type of Privilege the Customer enjoys.

| Privilege Type | Daily Limit  |
|----------------|--------------|
| REGULAR        | Rs. 100000.0 |
| GOLD           | Rs. 200000.0 |
| PREMIUM        | Rs. 300000.0 |

- BankOfSuccess has authorized the Account Privilege Manager to maintain the daily limit of each Privilege Type. He prefers to read the configuration file called DailyLimits which stores the latest limit and privilege type and passes it to the Account Manager.
- Having got the dailyLimit from AccountPrivilegeManager, how will the AccountManager check whether the dailyLimit is exceeded?

- To check the daily limit he needs to know all the transactions done by the account in the day like deposits, withdraw, transferFunds
- He would need the common details from the above transactions like fromAcc, amount , dateTime
- He may prefer to record all the **Transactions like Withdrawal, Deposit, Transfer Of Funds** done by the Customer with details such as
  - int transID; - Can generate using IDGenerator
  - From Account
  - Date of Transaction
  - amount transferred
- One Customer can perform **Transactions like Withdrawal, Deposit, Transfer Of Funds** and the BankOfSuccess has many Customers. So BankOfSuccess suggests us to log all the transactions of every Customer in a **Transaction Log**. We need to store the AccountNo of the Customer . For every Account No, the different types of Transactions done by him like Deposit, Withdrawal, TransferOfFunds and the List of Transactions done by him.
- Using the Transaction Log, the Account Manager should be able to
  - ✓ Get all Transactions
  - ✓ Get all Transactions for an Account
  - ✓ Get all Transactions for an Account and type of transaction
  - ✓ A method to log a transaction
  - ✓ If a requested transaction is not found or if the given transaction type is invalid, then appropriate messages needs to be communicated to the Account Manager
- After checking all the transactions performed by the Customer on a single day and if he has not exceeded his daily limit, then the Account manager can transfer the funds as requested by the Customer.
- The Management of BankOfSuccess would want every transaction like Withdraw, Deposit, Transfer to have a unique TransactionID. When the Transaction Type is a Transfer, then Withdraw ,Deposit and Transfer should have the same TransactionId. (This is because, in a transfer of funds, we need to withdraw from the From Account and Deposit in the To Account)

4. BankOfSuccess also wants to introduce Policy regarding the min balance to be maintained by every account and the rate of interest earned by the account based on the Account Type and Privilege Type. Every **Account** in BankOfSuccess **has a Policy**. **Policy** has minimum Balance to be maintained and the rateOfInterest applicable.

| Account Type | Privilege Type | Min Balance to Maintain | Rate Of Interest |
|--------------|----------------|-------------------------|------------------|
| Savings      | REGULAR        | Rs.5000                 | 4%               |
| Savings      | GOLD           | Rs. 25000               | 4.25%            |
| Savings      | PREMIUM        | Rs. 100000              | 4.75%            |
| Current      | REGULAR        | Rs. 25000               | 2%               |
| Current      | GOLD           | Rs.100000               | 2.25%            |
| Current      | PREMIUM        | Rs.300000               | 2.75%            |

5. AccountManager should modify the **createAccount** method to include the Policy for that Account. He needs to ensure that the amount remitted by the Customer at the time of account opening adheres to the minimum balance criteria to be maintained for that Account . If all the criteria are satisfied then the Account Manager should open the account else pass on an appropriate message to the Customer.
6. AccountManager should modify the **withdraw, transferFunds** method to check if min Balance is maintained before and after withdrawal and transferFunds else communicate to the Customer.
7. With a strong Conviction to grow and succeed, BankOfSuccess plans to introduce ExternalTransfer facility which will help us transferFunds to other banks.
- ExternalTransfer **IS A** Transaction having
    - toExternalA/c
    - fromAcPin
  - ExternalAccount to which the money is going to be transferred has
    - String AccNo
    - String BankCode - ICICI, CITI
    - String BankName
  - A new TransactionType EXTERNALTRANSFER has been included.
  - Once an External Transfer is initiated, the TransactionStatus is set as OPEN, and once the transfer to the concerned account in the External Bank like ICICI or CITI Bank is successful, the Transaction Status is set as CLOSED.
  - It was suggested to add TransactionStatus while recording a **Transaction**

8. BankOfSuccess wants us to implement Database Integration. Let us create a new database. The following are the tables in the database

**1. TABLE : ACCOUNT**

1. accNo– Varchar(15) (PK)
2. name– Varchar(30)
3. pin– Varchar(4)
4. active– boolean
5. dtOfOpening–Date
6. balance– Double
7. privilegeType– Varchar(15) – use Check Constraint to check if privilegeType IN (*REGULAR, GOLD, PREMIUM*)
8. accType– Varchar(15) – use Check Constraint to check if AccountType IN (*SAVINGS, CURRENT*)

**2. TABLE: TRANSACTION**

1. TransID (pk) – INT
2. TransactionType – use Check Constraint to check if TransactionType in (Withdraw, Deposit, Transfer, ExternalTransfer)
3. accNo– Varchar(15) (FK)
4. TransDate–Date
5. amount– Double

**3. TABLE : HCLBANK**

1. AccId – Varchar(15)
2. amt - double

**4. TABLE :CITIBANK**

1. AccId – Varchar(15)
2. amt - double

**5. TABLE :ICICIBANK**

1. AccId – Varchar(15)
  2. amt - double
9. When an EXTERNALTRANSFER request comes in, we have to invoke a method of the Class provided by External Bank say CITI or ICICI or SBI and deposit the money in the toAccount of that respective bank.

If each of these banks expose their own classes with different method names , we first need to create objects of these classes and call the methods.

In order to have an external bank transfer, our bank has to liaise with CITI, ICICI to start with and many other banks in due course. If we had liaised with around 25 banks, then we would have to check which external bank our transfer is for and create an object of that class and call its respective deposit method. This scenario becomes so tedious. With respect to coding , the external transfer method would have an unending if else if ladder.

Bank Of Success suggests that we expose a Contract to these Banks. Interested Banks should adhere to the Contract exposed by us.

The Banks (CITI, ICICI) would provide implementation for the contract exposed by us, which on invocation would update the respective table (CITIBANK, ICICIBANK) in the database.

10. In our BankOfSuccess Appln we are doing a role play. We play both the roles, i.e of BankOfSuccess and of CITIBank and ICICI Bank... So we need to create necessary classes to provide implementation for the Contract.
11. By exposing our Contract, we have ensured the method name is the same for all the External Banks. But we still have to create objects of these individual banks and call their respective methods. Can this situation be avoided? Can we have a class with a method to accept bankCode and create an object of the respective class?
12. AccountManager will now also be able to perform transfer of funds to External Banks

He would have to check the following

1. Check if FromAcc is active
2. Check if given Pin is valid
3. Check Sufficient Balance is available
4. Check if min balance is maintained after transfer
5. Check if the transaction is within the permissible daily limits
6. After all checks, the transaction has to be added to the transactionLog and the status of the transaction should be set as OPEN.

13. ExternalTransfer to other banks take varying no. of days. We need a **periodical check** to see if we have successfully transferred the amount to the ExternalBank successfully and to debit the fromAcc of our Bank and set the status as CLOSED.

To do a periodical check if any external transfers done have the status as OPEN and to do a transfer by calling the deposit method of the respective Bank Class, we create have an

ExternalTransferService which executes indefinitely till the status is CLOSED.

ExternalTransferService should get the List of EXTERNALTRANSFER from the TransactionLog, iterate thro the transactionLog, if a transaction is found with status OPEN then try to deposit the required amount in the respective bank and once successful, set the status as closed, if not keep trying periodically till the deposit is successful. The respective tables also need to be updated.

Also update the tables of our Bank (Account, Transaction)

14. Create a Class ResultGenerator – a utility class and have the following static methods

1. void PrintAllLogTransactions()
2. void PrintAllLogTransactions(AccountId)
3. void PrintAllLogTransactions(TransactionType)
4. int getTotalNoOfAccounts() - To get the total number of accounts in the bank and display the same
5. void displayNoOfAccTypeWise() -To get the total number of accounts for each type in the bank and display the same

To display the report like

| Account Type | No Of Accounts |
|--------------|----------------|
| Savings      | 15             |
| Current      | 12             |

6. void DispTotalWorthOfBank() - Total amount available in the bank

To display – Total balance available : Rs 12,23,23,344.00

7. void dispPolicyInfo() - To get the minimum balance and rate of interest for each type and privilege of accounts available in the bank and display the same

a. To display the report like

| Policy Type     | Minimum Balance | RateOfInterest |
|-----------------|-----------------|----------------|
| SAVINGS-REGULAR | 5000.00         | 5.0            |

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8. To get the list of all transfers done, with their account information and display the same

- a. To display the report like

| From | To | Date | Amount |
|------|----|------|--------|
|------|----|------|--------|

9. To get the list of all withdrawals done, with their account information and display the same

- a. To display the report like

| From | To | Date | Amount |
|------|----|------|--------|
|------|----|------|--------|

10. To get the list of all deposits done, with their account information and display the same

- a. To display the report like

| From | To | Date | Amount |
|------|----|------|--------|
|------|----|------|--------|

11. To get all the transactions done for the day from the log

- a. To display the report like

| From | To | Date | Amount |
|------|----|------|--------|
|------|----|------|--------|

15. One more enhancement that can be done is to create an AccountDAO class and log all the data when the Account is created and all the Transactions done to the database.

16. No project can be signed off as complete and any project is open to more enhancements. So till we await new ideas we put a pause on this Banking Application Requirement Document, only to be continued later....