Early Withdrawl From Certificates of Deposit (Stretch Goal)

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Problem Statement

Among the stretch goals in the Certificate of Deposit program is to allow customers to redeem their CDs before the maturity date. This would come at the expense of forfeiting the interest the asset is earning and incurring a fee.

Note that I also proposed

- Automatic CD redemption
- Multiple CD rates

but I decided not to implement those features.

Solutions Requirements

- Customers can redeem an immature CD for a penalty.

Solutions Considered

Option 1: Store penalty in `CertificateOfDepositLogs` table

In this approach each CD stores its own early withdrawal penalty
Pros:

- This is very high flexibility. It easily enables implementing different rate packages in the future
    Cons:
- This approach is slightly more complicated because it requires modifying `TestudoBankRepository.java` where the application interfaces with the SQL DB.

Option 2: Make the Early withdrawal penalty a static constant of `MvcController`.

In this approach all penalties are uniform.

Pros:

- This is the simplest possible implementation
    Cons:
- Multiple CD rate options are ultimately a goal, so this just kicks the can down the road for implementing that.

Proposed solution

The `CertificateOfDepositsLog` table will now have a column `EarlyWithdrawlPenaltyRate` (**Option 1**).
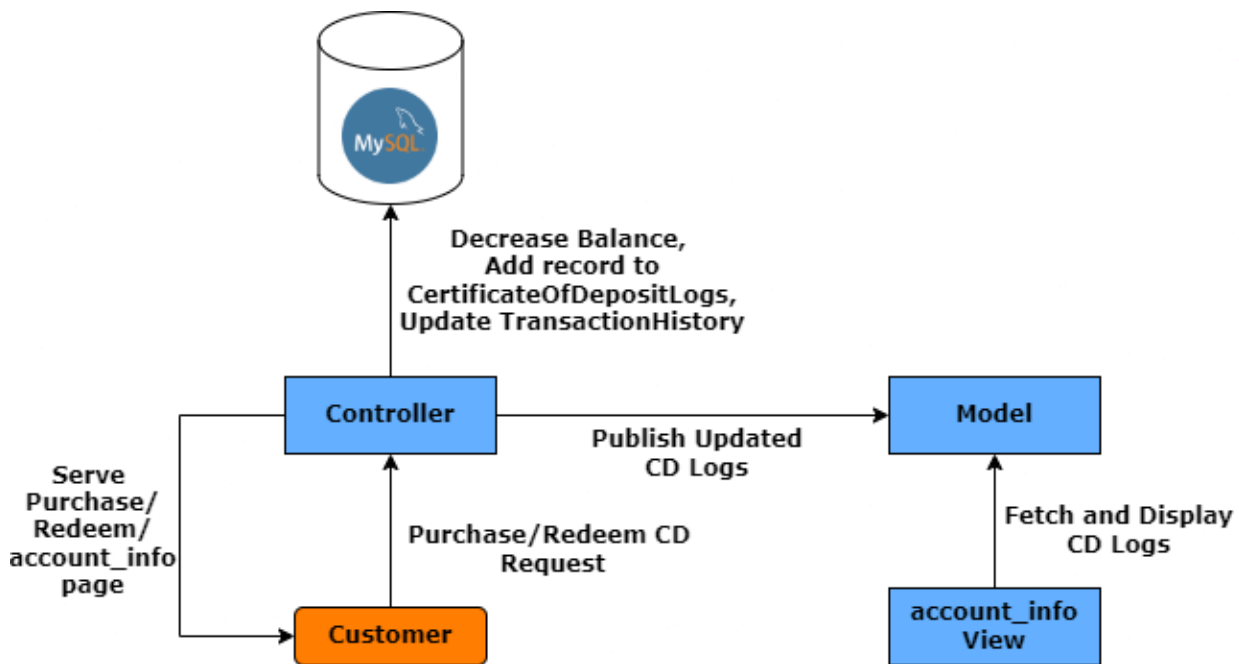
- For now, this will be populated by referencing a static constant of `MvcController`
- This minimizes the complexity of this update while still responsibly preparing for the roll-out of multiple rates.

Parameter setting

We want to disincentivize early withdrawals, while still giving the customers to make a withdrawal in an emergency.

- I will set the `EarlyWithdrawlPenaltyRate` at 10% of the original balance, and no interest will be accrued.

MVC Diagram

MySQL DB Schema

DB Notes

I add the `CertificateOfDepositLogs` table.

- `EarlyWithdrawlPenaltyRate` is an attribute of the CD. Including them in the database
will make it easy to add more options in the future

Testing

Test Cases:

- CD Redemption before the maturity deadline will result in the initial deposit being repayed less an early withdrawl penalty of 10%
- Other features unaffected, i.e., the minimum deposit still applies, and after the maturity date, customers still earn interest.