Testudo Bank - Interest Rate on Savings Feature

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Problem Statement

Potential customers have limited options in terms of incentives to bring their banking business to Testudo Bank. In order to compete with other banks, customers at Testudo Bank would benefit from a feature that rewards their loyalty to the bank through applying an interest rate on their balance. This enables them to accrue yields on their balance over time. This service would help create an influx of more customers who wish to use Testudo Bank for their banking business.

Solution Requirements

- Customers should get an interest rate of 1.5% APY applied to their balance for rolling periods of time, which will last for however long they have a balance with Testudo Bank.
- Customers who are in overdraft or who have no money with the bank will be excluded from gaining interest on their balance.
- Customers should have a place on the Testudo Bank application front-end to view:
    - The history of the applied interest rates on their balance.
    - The interest rate being applied to their account.
- The interest rate application should be logged in the TransactionHistory table.

Solutions Considered

Interest Applied After a Number of Deposits

In this approach, customers will be awarded interest on their balance for every 5 deposits they make into their account, starting from the first deposit they make after the feature has been introduced. To ensure that customers aren't committing fraud by splitting up one deposit into multiple, we will only count a deposit towards the number required for interest if it is above $20.

Interest Applied Monthly

In this approach, customers will be awarded interest on their balance on a monthly time interval. The interest will be applied on the 1st of every month. Starting from the very first transaction (i.e. transfer, withdraw) a user makes, they will be eligible to earn interest on their balance.

Pro/Cons of All Considered Approaches:

Interest Applied After a Number of Deposits

Pros:

- We reward customers for consistently depositing money into their account.
    - Incentivizes customers to keep their money in Testudo Bank.
    - Incentivizes customers to build good financial habits by prioritizing depositing money rather than withdraw.
- A pretty generous interest rate with a frequent award period means the feature could be very popular. It will increase the amount of people that are willing to invest in Testudo Bank.
- No new frontend elements need to be added, as we can just use pre-existing transaction history logs to show interest being applied.

Cons:

- Very easy for a customer to accrue deposits of multiples of 5 easily.
- Customer will be able to accrue, perhaps, an overly-generous amount of interest.
- Could prove to be costly for Testudo Bank in the long run.
- Will be hard to gain as much interest on new features. Any new rewards-like feature introduced after this feature will pale in comparison of popularity.

Interest Applied Monthly

Pros:

- Follows the interest awarding paradigm followed by most commercial banks. More intuitive for customers familiar with other banking applications.
- More flexibility for Testudo Bank to apply new features/rewards that will attract more customers.
- Allows Testudo Bank to award interest on a more reasonable time interval.
- No new frontend elements need to be added, can just use pre-existing transaction history logs to show interest being applied.

Cons:

- This approach will certainly not be as popular as the other approach or differentiate us that much from other banks that also utilize interest rates on customer accounts.
- Harder to implement:
  - There will have to more logic in the backend of the application to use timestamps of last applied interest on the balance for each transaction. Also need to keep track of time between each transaction to identify if interest should be awarded.

Proposed Solution

The proposed solution is the **Interest Applied Applied Every Number of Deposits** because it enables Testudo Bank engineers to ramp up to a Minimal Viable Product (MVP) that can be quickly deployed to gauge customer interest. The fast development speed for the chosen approach makes it OK to quickly scrap the MVP in the future to build a more robust, long-lasting **Interest Applied Monthly Approach**.

Technical Architecture

MVC Logic Diagrams
Interest Applied After Every 5 Deposits
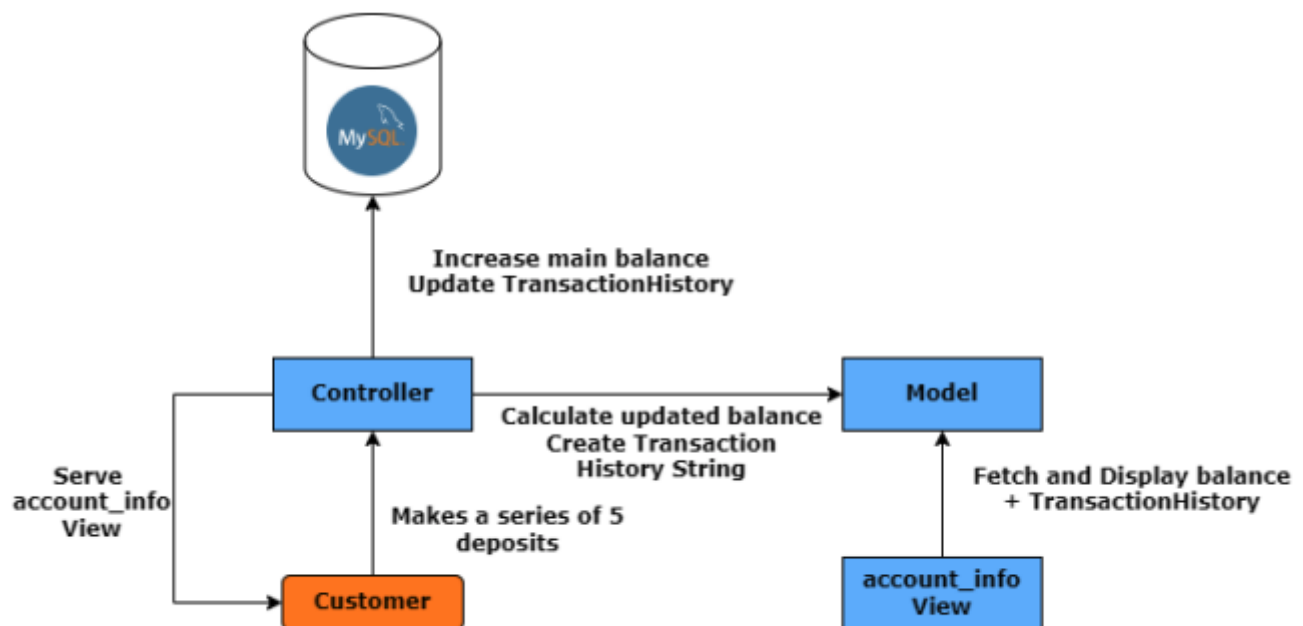
MySQL DB Schema

DB Schema Notes

`NumDepositsForInterest` will be used to keep track of how many times the customer has made a deposit, if this number is updated to be a multiple of 5 when a new deposit has been made, the customer will be awarded interest on their balance.

Test Cases

The interest rate feature will require testing as it will cost Testudo Bank a lot of money to have to make sure that everyone is gaining interest. Some test cases that need to be looked into:

- Interest is being applied every 5 transactions.
- Interest is not being applied for every transaction after the 5th. The count should reset to zero to make sure that interest is not continually applied.
- Interest is being applied only if the deposits are above $20.
- Interest is being applied if the deposit is $20.

Edge cases to potentially test:

- Deposits of $19.99 to make sure that the count is not increasing and $20.01 to make sure that it is.