BOTSWANA ACCOUNTANCY COLLEGE

ASSIGNMENT SUBMISSION COVER SHEET

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1. Introduction

This report documents the analysis and design artefacts for a proposed **Banking System**. The purpose of this document is to capture the functional and non-functional requirements, to illustrate the system structure and behaviour using UML diagrams, and to provide evidence of requirements elicitation through a mock client interview.

2. Requirements Elicitation

2.1 Mock Interview

A structured interview was conducted with a hypothetical bank representative to gather detailed requirements.
The following **20 questions** were asked to ensure a thorough understanding of both functional and non-functional needs:

Interview Questions

1. Who are the primary users of the system (e.g., customers, bank staff, administrators)?
2. What personal details must be captured when a new customer registers?
3. What authentication process should be used for customer login and logout?
4. Can one customer hold more than one account? If so, is there a maximum number?
5. What are the specific rules for opening a **Savings Account**?
6. What are the specific rules for opening an **Investment Account**?
7. Is there a minimum opening deposit for an Investment Account? If yes, what is the amount?
8. What details are mandatory when opening a **Cheque Account** (e.g., employer name, company address)?
9. Are there limits on the number or size of daily deposits?
10. Are there limits on the number or size of daily withdrawals?
11. How should **monthly interest** be calculated for Savings and Investment accounts (rate, rounding rules)?
12. On which day of the month should interest be credited?
13. Can interest transactions ever be reversed or adjusted? If so, under what conditions?

14. What information must be printed on a transaction receipt (e.g., date, time, account number, new balance)?
15. What error messages should appear if a customer tries to withdraw from a Savings Account?
16. What audit logs or reports must be generated for regulatory purposes?
17. What are the rules for **closing an account** (e.g., zero balance, pending transactions)?
18. What non-functional qualities are most important to the bank (e.g., security, performance, usability)?
19. Should administrators have override powers to waive minimum deposits or force closures?
20. What is the expected deployment environment (e.g., Java application, Codespaces, database back-end)?

The responses to these questions guided the functional and non-functional requirements described below.

2.2 Functional Requirements

The Banking System **shall** provide the following key functions:

1. **Customer Registration** – capture and store customer details.
2. **User Authentication** – secure login and logout for customers.
3. **Account Creation** – open Savings, Investment, or Cheque accounts for a registered customer.
4. **Account Rules Enforcement** –
   a. Savings: deposits only, withdrawals not permitted.
   b. Investment: deposits and withdrawals allowed; minimum opening deposit of **BWP 500**.
   c. Cheque: deposits and withdrawals allowed; employment details required.
5. **Deposits** – allow deposits into any account and issue a transaction receipt.
6. **Withdrawals** – allow withdrawals only from Investment and Cheque accounts, with balance validation.
7. **Interest Payment** – calculate and apply monthly interest (Investment 5 %, Savings 0.05 %).
8. **Balance Enquiry** – display current balances for all accounts belonging to a customer.

9. **Transaction History** – list all transactions with date, time and type.
10. **Account Closure** – close an account only when the balance is zero and all conditions are met.

2.3 Non-Functional Requirements

The system must also satisfy the following quality attributes:

- **Security:** encrypted credentials and role-based access.
- **Data Integrity:** atomic transactions to prevent partial updates.
- **Performance:** complete common actions (login, balance view) within 2 seconds.
- **Usability:** intuitive interface with clear error messages.
- **Scalability:** support growth in customers and accounts without major redesign.
- **Reliability:** automatic backup and recovery procedures.
- **Auditability:** maintain complete transaction logs for compliance.
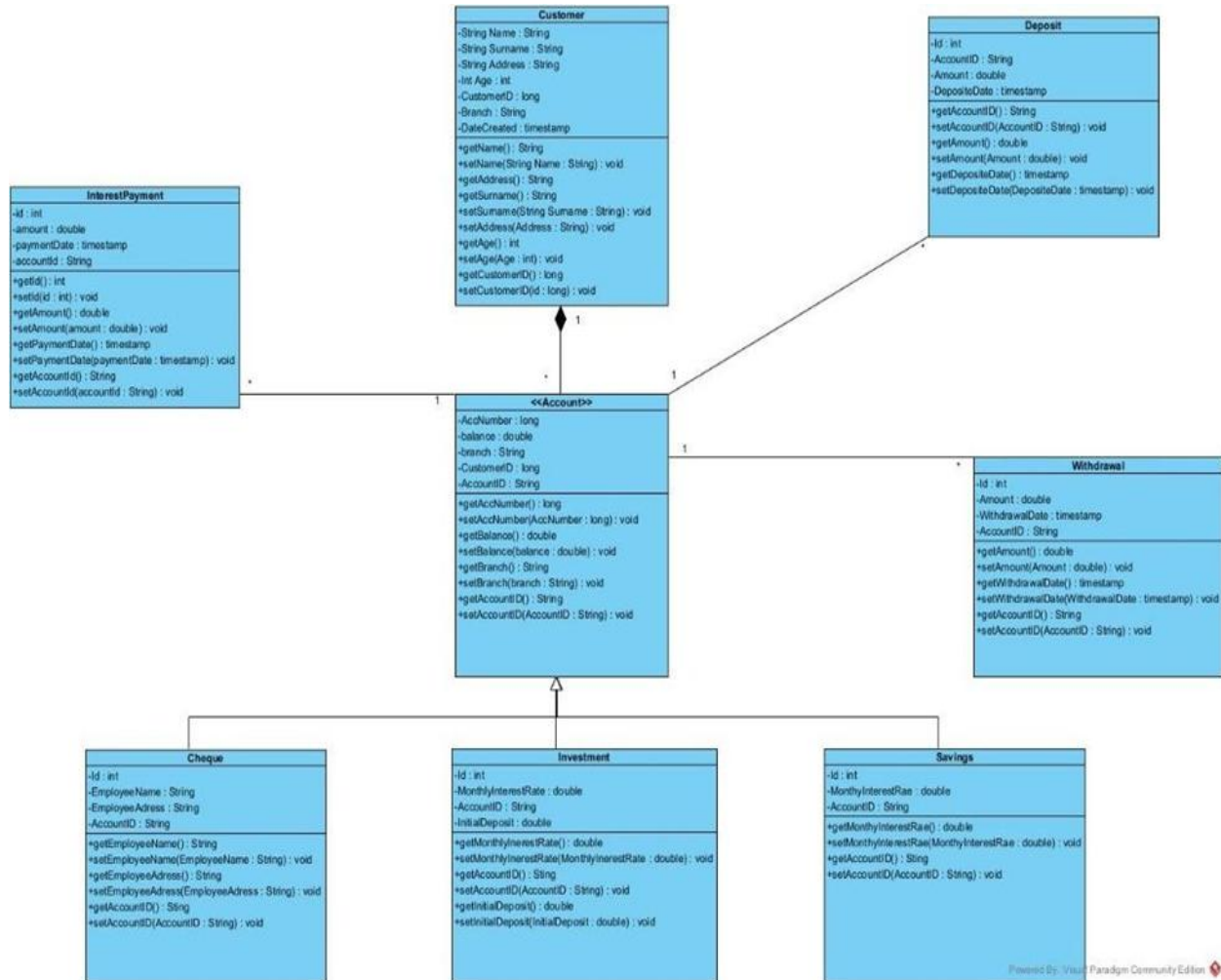
3. Use Case Diagram

The Use Case Diagram illustrates the interactions between the primary actors (Customer and Bank Staff) and the system.
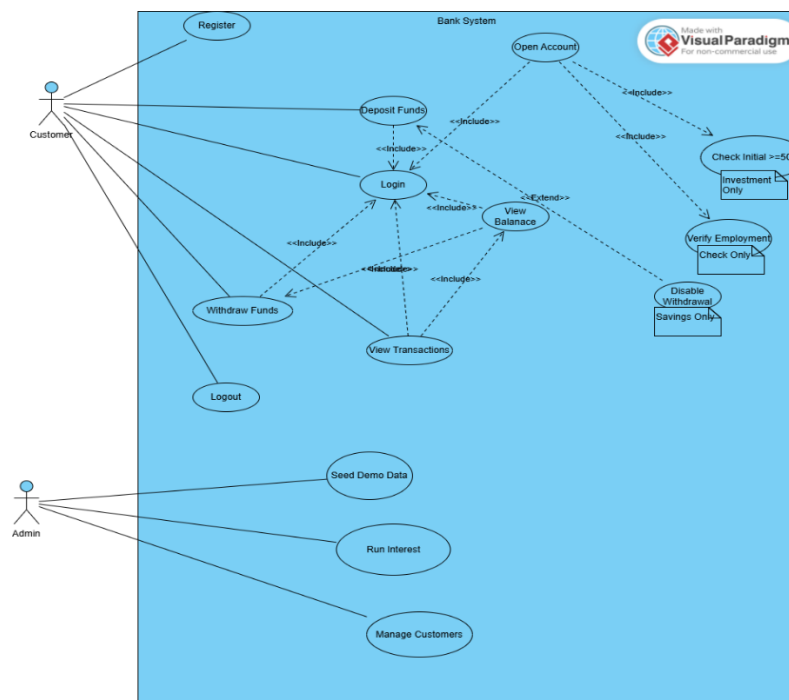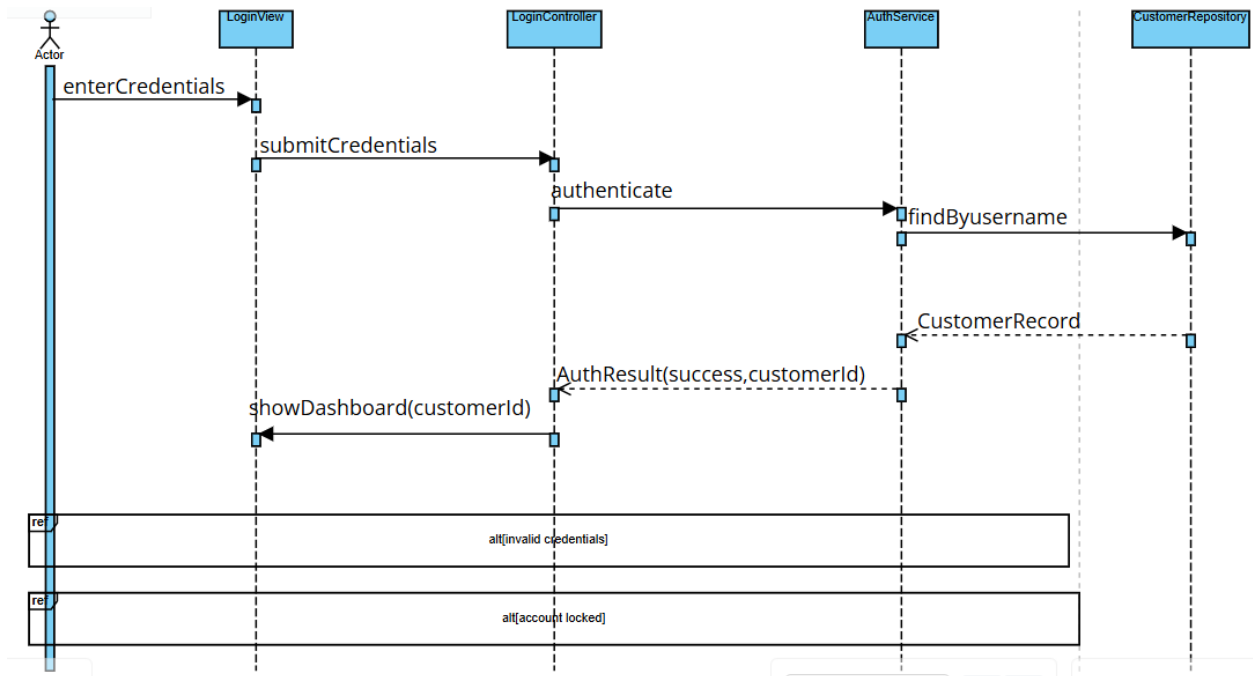
4. Class Diagram

The Class Diagram presents the structural relationships among key classes such as **Customer**, **Account** (and subclasses **SavingsAccount**, **InvestmentAccount**, **ChequeAccount**), and supporting services.
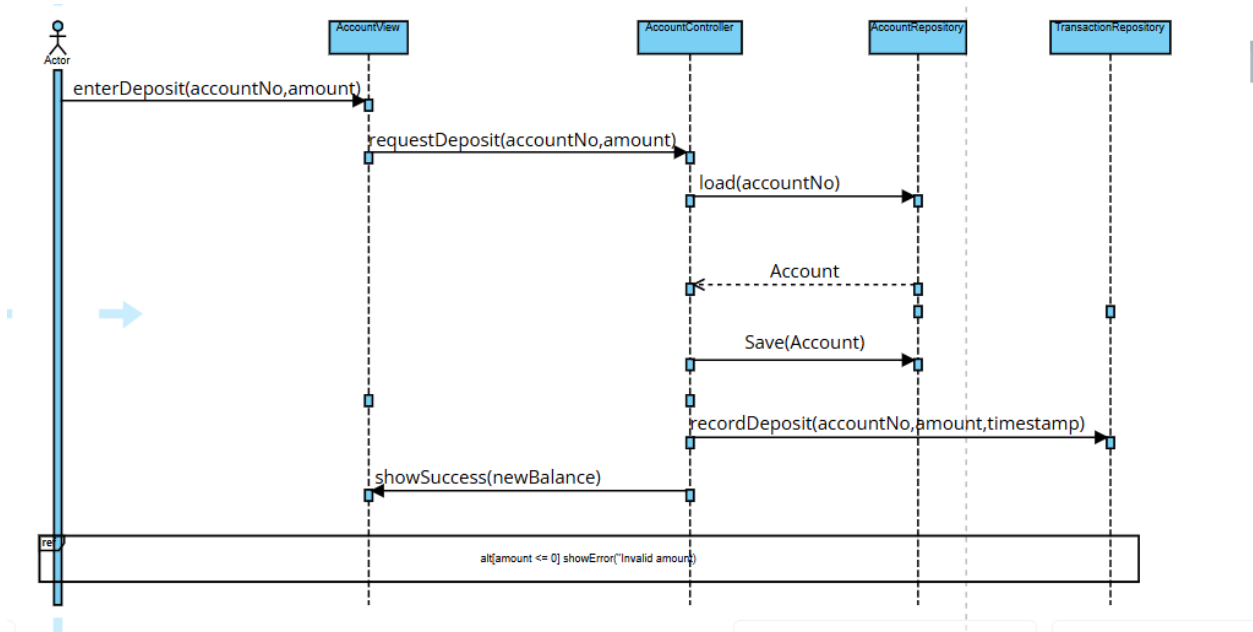

5. Sequence Diagrams

5.1 Login Sequence Diagram

This diagram shows the message flow when a customer logs into the system.

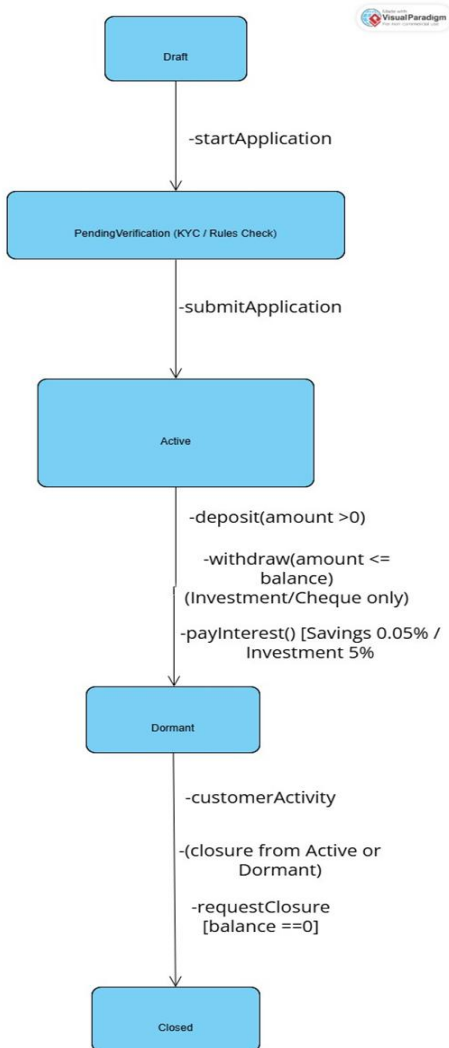## 5.2 Deposit Funds Sequence Diagram

This diagram illustrates the interaction when a customer deposits money into an account.

6. State Diagram

The State Diagram models the **Account** lifecycle, depicting how an account progresses from creation to closure.

Draft

-startApplication

PendingVerification (KYC / Rules Check)

-submitApplication

Active

-deposit(amount >0)

-withdraw(amount <= balance)
(Investment/Cheque only)

-payInterest() [Savings 0.05% / Investment 5%

Dormant

-customerActivity

-(closure from Active or Dormant)

-requestClosure
[balance ==0]

Closed

Interview Appendix – Questions and Answers

1. **Who are the primary users of the system?**
    The system will be used mainly by **Customers** who create and manage accounts and by **Bank Staff/Administrators** who oversee system operations.

2. **What personal details must be captured when a customer registers?**
    First name, surname, national ID or passport number, phone number, email address, and residential address. Employment details are required if the customer wishes to open a Cheque Account.

3. **What authentication process should be used for login?**
    Customers log in with a **username and password**. Passwords must be securely encrypted in the database.

4. **Can one customer hold more than one account?**
    Yes. A single customer can hold multiple accounts of any type with no maximum limit.

5. **What are the rules for opening a Savings Account?**
    A Savings Account can be opened with **no minimum deposit**. Deposits are allowed but **withdrawals are not permitted**.

6. **What are the rules for opening an Investment Account?**
    An Investment Account requires a **minimum opening deposit of BWP 500**. Both deposits and withdrawals are allowed.

7. **What employment details are required for a Cheque Account?**
    The employer's name, company address, and a valid employer contact number must be provided.

8. **Are there limits on daily deposits?**
    No fixed monetary limit, but each deposit amount must be **greater than zero** and will be validated by the system.

9. **Are there limits on daily withdrawals?**
    Withdrawals are allowed only on **Investment** and **Cheque** accounts and only if the **available balance** covers the requested amount.

10. **How should monthly interest be calculated for Savings accounts?**
    Savings accounts earn **0.05 % per month** on the current balance, calculated at the end of each month.

11. **How should monthly interest be calculated for Investment accounts?**
    Investment accounts earn **5 % per month** on the current balance, calculated at the end of each month.

12. **On which day of the month is interest applied?**
    Interest is credited on the **last calendar day of each month**.

13. **Can interest transactions be reversed or adjusted?**

    *Only a **bank administrator** can reverse or adjust interest transactions if a system error is detected.*

14. **What details must appear on a transaction receipt?**

    Date and time of transaction, customer name, account number, transaction type (deposit/withdrawal/interest), transaction amount, and the new account balance.

15. **What should happen if a customer attempts to withdraw from a Savings Account?**

    *The system should block the transaction and display the message **"Withdrawals are not allowed on Savings Accounts."***

16. **What audit logs or reports are required?**

    *A complete transaction log must be maintained showing **who performed each action and the timestamp** for regulatory compliance.*

17. **What are the rules for closing an account?**

    *An account may be closed only when the **balance is zero** and there are **no pending transactions**.*

18. **What non-functional qualities are most important to the bank?**

    *Top priorities are **security, reliability,** and **data integrity,** followed by performance and scalability.*

19. **Should administrators have override powers?**

    Yes. Administrators can waive the minimum deposit requirement or force account closure if authorised by bank management.

20. **What is the expected deployment environment?**

    *A **Java-based application** running with a relational database (e.g., MySQL or PostgreSQL) and hosted on the bank's secure infrastructure or GitHub Codespaces during development.*