# Group 4

# Database Foundations Group Project Report Step 1

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# Introduction

This project is compiled and submitted to Dr. Gasan Elkhodari for the course Database Foundations taken at University of Texas at Dallas, Naveen Jindal School of Management. The report is the first step in defining the elements of an effective database design. The report covers the database design for the Rich Bank Corporation. The Rich Bank Corporation caters to the high-net-worth individuals with a high capacity to spend and deposit. The business rules are defined to maximize revenue generation from the clients by providing high deposit amount security that the bank provides.

The report covers a wide range of topics including Entities and their descriptions, attributes of the entities and their descriptions, business rules that define relationships and cardinality in Crow's Feet format and an encompassing ER Diagram.

This database provides a solid grounding for the massive amounts of data that the corporation will acquire during its years of operation. The database allows the corporation to expand its operations across the demographics with a robust handling mechanism. This project report for the Step 1 is scoped to work with the design and implementation of the database.

# Requirements Definition Document

**Business Rules:**

1) A BANK must hire only one AUDITOR.
2) An AUDITOR can be hired by atleast one BANK.
3) A BANK must maintain atleast one ACCOUNT.
4) An ACCOUNT must be maintained by only one BANK.
5) A CUSTOMER must hold atleast one ACCOUNTS.
6) An ACCOUNT must be held by only one CUSTOMER.
7) An ACCOUNT may manage zero or many DEBIT CARDS.
8) A DEBIT CARD must be managed by only one ACCOUNT.

**Entity and Attribute Descriptions:**

**Entities**

Entity Name: CUSTOMER

Entity Description: A person who has an account with a bank.

Main Attributes of CUSTOMER:

cust_id: (Primary Key) Unique identifier for each customer.

cust_fname: First name of the customer.

cust_lname: Last name of the customer.

cust_contact: Email address and Phone number of the customer.

cust_address: Address of the customer.

Entity Name: BANK

Entity Description: Intermediaries branches of Rich Bank Corporation between depositors and borrowers.

Main Attributes of BANK:

bank_code: (Primary Key) Unique code for each bank branch.

bank_name: Name of the bank branch.

bank_contact: Email address and Phone number of the bank branch.

bank_timings: Opening hours of bank branch.

bank_address: Address of the bank branch.

Entity Name: ACCOUNT

Entity Description: Accounts opened by customers with bank branch.

Main Attributes of ACCOUNT:

acc_number: (Primary Key) Unique code for each account.

cust_ID:(Primary & Foreign Key) The ID of the customer who owns the account.

bank_code: (Primary Key & Foreign Key) The code of the bank branch that manages the account.

acc_type: Types of the account.

acc_balance: Balance in the account.

acc_validity: Validity of the account.

acc_status: Status of the account.

Entity Name: AUDITOR

Entity Description: A person who inspects or examines the various books of the bank branch.

Main Attributes of AUDITOR:

aud_ID: (Primary Key) Unique identifier for the auditor.

aud_fname: First name of the auditor.

aud_lname: Last name of the auditor.

aud_contact: Email address of the auditor.

aud_address: Address of the auditor.

bank_code: (Foreign key) The code of the bank branch that the auditor audits.

Entity Name: DEBIT CARD

Entity Description: A payment card lets customers pay for purchases by deducting money from their account. The supertype of Platinum Card.

Main Attributes of DEBIT CARD:

card_number: (Primary Key) Unique number of the Debit Card.

card_type: Type of Debit Card.

card_provider: The provider of the Debit Card.

card_expiry: Expiry of the Debit Card.

card_CVV: The CVV of the Debit Card.

acc_number: (Foreign Key) Account number tied to the Debit Card.

Entity Name: PLATINUM CARD

Entity Description: A subtype of Debit Card classified by card_type.

Main Attributes of PLATINUM CARD:

card_number: (Primary Key) Unique number of the Platinum Card.

cardholder_name: Name of the cardholder.

card_expiry: Expiry of the Platinum Card.

atm_withdrawal limit: A limit on atm withdrawals.

reward_points: Reward points earned after spending with Platinum Card.

**Relationship and Cardinality Description:**

Relationship: Hire between BANK and AUDITOR.

Cardinality: M:1 between BANK and AUDITOR.

Business rule: A BANK must hire only one AUDITOR; an AUDITOR must be hired by atleast one BANK.

Relationship: Maintain between BANK and ACCOUNT.

Cardinality: 1:M between BANK and ACCOUNT.

Business rule: A BANK must maintain atleast one ACCOUNT; an ACCOUNT must be maintained by only one BANK.

Relationship: Hold between CUSTOMER and ACCOUNT.

Cardinality: 1:M between CUSTOMER and ACCOUNT.

Business rule: A CUSTOMER must hold alteast one ACCOUNT; an ACCOUNT must be held by only one CUSTOMER.

Relationship: Manage between ACCOUNT and DEBIT CARD.

Cardinality: 1:M between ACCOUNT and DEBIT CARD.

Business rule: An ACCOUNT can manage zero or many DEBIT CARDS; a DEBIT CARD must be managed by only one ACCOUNT.

**Specialization Hierarchy:**

Inheritance: PLATINUM CARD inherits PK from DEBIT CARD.

Cardinality: 1:1 between DEBIT CARD and PLATINUM CARD.

Subtype: Disjoint; one DEBIT CARD appears in only one subtype, of which one can be, PLATINUM CARD.

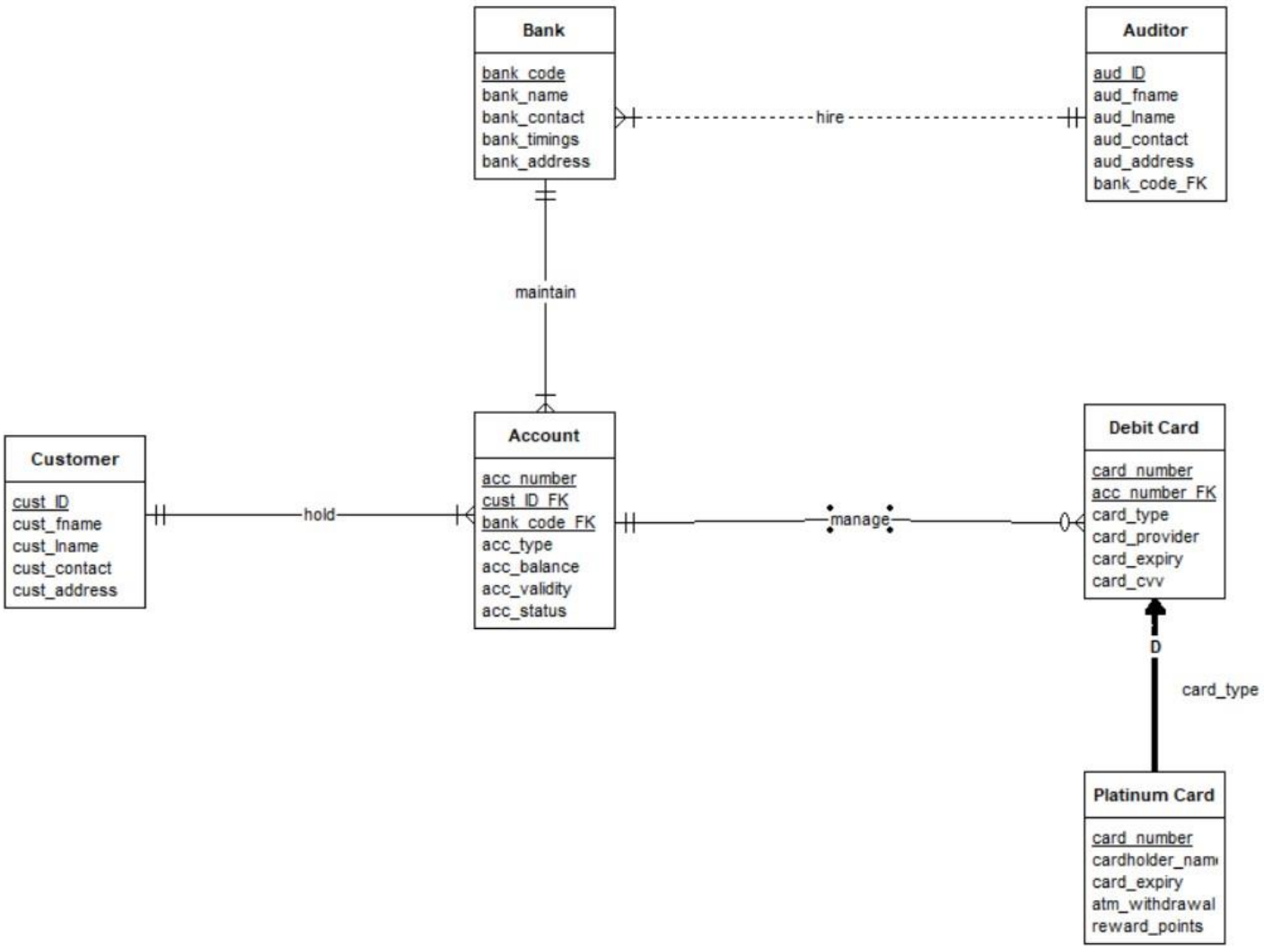
Constraint: Partial; some DEBIT CARDS may not be PLATINUM CARDS.

Subtype discriminator: Card Type

# Detailed Database Design:

## Entity Relationship Diagram

(Disclaimer: Due to resizing limitations of the ER Assistant Software, there may be truncation of the attribute name)



# Assumptions & Constraints

## Assumption:

A Bank branch can hire only one Auditor so, that the auditor can audit frequently and keep a record of history of audits.

## Constraints:

Multiple card_types can be considered under Debit card, but Platinum card is chosen as the only subtype to meet the lab requirement of maximum six entities.