Table Definitions Document

1. USERS Table

- **Purpose**: Manages customer records and core user profiles (name, contact details, creation date).
- **Primary Key**: `user_id`
- **Foreign Keys**: None
- **Relationships**:
  - One-to-Many with **ACCOUNTS** (a user can own multiple accounts).
  - One-to-Many with **LOANS**, **INSURANCE_POLICIES**, **INVESTMENTS**, and **TAX_RECORDS** (a user can hold multiple financial products).
- **General Structure**:

  Contains user identification details (e.g., name, email) and timestamps. Acts as a central reference for linking all financial products back to the customer.

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2. ACCOUNTS Table

- **Purpose**: Represents deposit accounts (checking, savings, money market, etc.) owned by users.
- **Primary Key**: `account_id`
- **Foreign Key**: `user_id` → **USERS**.
- **Relationships**:
  - One-to-Many with **CARDS** (an account can have multiple credit/debit cards).
  - One-to-Many with **TRANSACTIONS** (each transaction often references a deposit account).
- **General Structure**:

Tracks account type, balance, status, and the date opened. Balances are updated by relevant **TRANSACTIONS**.

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3. CARDS Table

- **Purpose**: Stores credit or debit card data linked to a deposit or credit account.
- **Primary Key**: `card_id`
- **Foreign Key**: `account_id` → **ACCOUNTS**
- **Relationships**:
  - One-to-Many with **TRANSACTIONS** (if this card is used for purchases or payments).
- **General Structure**:

  Contains card number (typically encrypted), type (credit or debit), expiration, and card status.

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4. LOANS Table

- **Purpose**: Captures information about loans (personal, auto, mortgage, etc.) extended to users.
- **Primary Key**: `loan_id`
- **Foreign Key**: `user_id` → **USERS**
- **Relationships**:
  - One-to-Many with **TRANSACTIONS** (loan payments or disbursements can appear in transactions).
- **General Structure**:

  Stores details such as the principal, remaining balance, interest rate, and status (current, delinquent, etc.).

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5. INSURANCE_POLICIES Table

- **Purpose**: Records various insurance policies (life, auto, health, etc.) held by users.
- **Primary Key**: `policy_id`
- **Foreign Key**: `user_id` → **USERS**
- **Relationships**:
  - Typically independent but references **USERS**. May optionally relate to **TRANSACTIONS** if premium payments are tracked.
- **General Structure**:

  Includes policy type, coverage amount, monthly premium, dates (start/end), and policy status.

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6. INVESTMENTS Table

- **Purpose**: Represents user-owned investment or portfolio accounts (brokerage, IRA, 401K, etc.).
- **Primary Key**: `investment_id`
- **Foreign Key**: `user_id` → **USERS**
- **Relationships**:
  - Typically independent but can be linked to **TRANSACTIONS** if buy/sell orders or distributions are recorded.
- **General Structure**:

  Holds the type of investment account, current portfolio value, and key dates (date opened, last updated).

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7. TAX_RECORDS Table

- **Purpose**: Maintains tax-related information for each user, such as forms (W2, 1099) and amounts withheld.
- **Primary Key**: `tax_record_id`
- **Foreign Key**: `user_id` → **USERS**

- **Relationships**:
  - Typically independent but may combine data from **ACCOUNTS** or **LOANS** for interest reporting.
- **General Structure**:

  Includes the tax year, form type, relevant financial data (gross income, withheld), and filing date.

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8. TRANSACTIONS Table

- **Purpose**: Logs monetary movements across deposit accounts, card purchases, or loan payments.
- **Primary Key**: `transaction_id`
- **Foreign Keys**:
  - `related_account_id` → **ACCOUNTS**
  - `loan_id` → **LOANS** (if this transaction is a loan payment)
  - `card_id` → **CARDS** (if this transaction is a card transaction)
- **Relationships**:
  - Many-to-One with **ACCOUNTS**, **LOANS**, and **CARDS** (each transaction ties to one or more of these).
- **General Structure**:
  Captures transaction type (deposit, withdrawal, payment, purchase), amount, date, description, and status.

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9. AUDIT_LOGS Table (Optional)

- **Purpose**: Records database operations (INSERT, UPDATE, DELETE, SELECT) for compliance and auditing.
- **Primary Key**: `audit_id`
- **Foreign Key** (typical usage): `performed_by` → **USERS** (or system account)
- **Relationships**:

    - Indirectly references all tables by logging `table_name` and the primary key of the affected row.
- **General Structure**:

  Documents each DML or read operation, storing the table name, operation type, date/time, and user/system performing it.

Overview of Relationships

- **USERS** is the parent table for most other entities (e.g., ACCOUNTS, LOANS, INSURANCE_POLICIES, INVESTMENTS, TAX_RECORDS).
- **ACCOUNTS** ties to **CARDS** and **TRANSACTIONS**.
- **LOANS** and **CARDS** optionally link into **TRANSACTIONS** for financial events.
- **AUDIT_LOGS** is a meta-table that can reference any row's changes for compliance.

Capstone Project

Data Dictionary

1. USERS Table

Column	Data Type	Constraints	Description
user_id	INT	PK (AUTO_INCREMENT), NOT NULL	Unique primary key for the user.
first_name	VARCHAR(50)	NOT NULL	Customer’s first name.
last_name	VARCHAR(50)	NOT NULL	Customer’s last name.
email	VARCHAR(100)	UNIQUE, NOT NULL	User’s unique email address.
phone_number	VARCHAR(20)	NULLABLE	Contact phone number.
date_created	DATETIME	DEFAULT CURRENT_TIMESTAMP, NOT NULL	Timestamp of when user was created.
last_updated	DATETIME	ON UPDATE CURRENT_TIMESTAMP, NOT NULL	Timestamp of last update to the user’s record.

2. ACCOUNTS Table

Column	Data Type	Constraints	Description
account_id	INT	PK (AUTO_INCREMENT), NOT NULL	Unique primary key for the account.
user_id	INT	FK → users.user_id, NOT NULL	ID of the user who owns this account.
account_type	VARCHAR(30)	CHECK (account_type IN ('CHECKING','SAVINGS', ...))	Type of account (e.g. CHECKING, SAVINGS, MONEY_MARKET, etc.).
balance	DECIMAL(12, 2)	DEFAULT 0, NOT NULL	Current monetary balance of the account.
status	VARCHAR(20)	CHECK (status IN ('ACTIVE','FROZEN','CLOSED', ...))	Current status of the account.
date_opened	DATETIME	DEFAULT CURRENT_TIMESTAMP, NOT NULL	Timestamp when the account was opened.
last_updated	DATETIME	ON UPDATE CURRENT_TIMESTAMP, NOT NULL	Timestamp of the last update to the account record.

CARDS Table

Column	Data Type	Constraints	Description
card_id	INT	PK (AUTO_INCREMENT), NOT NULL	Unique primary key for the card.
account_id	INT	FK → accounts.account_id, NOT NULL	Links the card to its associated deposit or credit account.
card_number	VARCHAR(255)	Encrypted/Tokenized, NOT NULL	The card number (encrypted or tokenized).
card_type	VARCHAR(20)	CHECK (card_type IN ('CREDIT_CARD','DEBIT_CARD', ...))	Type of card (credit or debit).
expiration_date	VARCHAR(7)	NOT NULL	Expiration in MM-YYYY format (or separate month/year fields).

cvv_hash	VARCHAR(255)	Encrypted/Tokenized, NULLABLE	Encrypted or tokenized CVV (omit storing actual CVV if not permissible).
credit_limit	DECIMAL(12, 2)	NULLABLE	Max credit limit (only relevant for credit cards).
status	VARCHAR(20)	CHECK (status IN ('ACTIVE','BLOCKED','EXPIRED', ...))	Status of the card.

LOANS Table

Column	Data Type	Constraints	Description
loan_id	INT	PK (AUTO_INCREMENT), NOT NULL	Unique primary key for the loan record.
user_id	INT	FK → users.user_id, NOT NULL	The user who took out the loan.
loan_type	VARCHAR(50)	CHECK (loan_type IN ('PERSONAL','AUTO','MORTGAGE','STUDENT', ...))	Type of loan.
principal_amount	DECIMAL(15, 2)	NOT NULL	Original loan principal.
remaining_balance	DECIMAL(15, 2)	NOT NULL	Current outstanding balance.
interest_rate	DECIMAL(5, 2)	NOT NULL	Annual interest rate (e.g., 5.75).
status	VARCHAR(20)	CHECK (status IN ('CURRENT','DELINQUENT','PAID_OFF', ...))	Loan status (active, delinquent, etc.).
start_date	DATE	NOT NULL	Date loan funds were disbursed.
end_date	DATE	NULLABLE	Projected or actual payoff date.
last_updated	DATETIME	ON UPDATE CURRENT_TIMESTAMP, NOT NULL	Timestamp of the last update to the loan record

5. INSURANCE_POLICIES Table

Column	Data Type	Constraints	Description
policy_id	INT	PK (AUTO_INCREMENT), NOT NULL	Unique primary key for the insurance policy record.
user_id	INT	FK → users.user_id, NOT NULL	The policy holder.
policy_type	VARCHAR(30)	CHECK (policy_type IN ('LIFE','AUTO','HOME','HEALTH', ...))	Type of insurance policy.
coverage_amount	DECIMAL(15, 2)	NOT NULL	The coverage limit for the policy.
monthly_premium	DECIMAL(10, 2)	NOT NULL	Recurring premium amount due monthly.
start_date	DATE	NOT NULL	Policy effective start date.
end_date	DATE	NULLABLE	Policy expiration date, if applicable.
status	VARCHAR(20)	CHECK (status IN ('ACTIVE','CANCELED','EXPIRED', ...))	Status of the policy.
last_updated	DATETIME	ON UPDATE CURRENT_TIMESTAMP, NOT NULL	

6. INVESTMENTS Table

Column	Data Type	Constraints	Description
investment_id	INT	PK (AUTO_INCREMENT), NOT NULL	Unique primary key for the investment record.
user_id	INT	FK → users.user_id, NOT NULL	Owner of the investment account.
investment_type	VARCHAR(30)	CHECK (investment_type IN ('BROKERAGE','IRA','401K','STOCK_OPTIONS'))	Type of investment or investment account.
portfolio_value	DECIMAL(15, 2)	NOT NULL	Current total market value of this investment or portfolio.
date_opened	DATETIME	NOT NULL	Timestamp when this investment account was opened.
status	VARCHAR(20)	CHECK (status IN ('ACTIVE','CLOSED','SUSPENDED', ...))	Current status of the investment account.
last_updated	DATETIME	ON UPDATE CURRENT_TIMESTAMP, NOT NULL	Timestamp of the last update to the investment record

7. TAX_RECORDS Table

Column	Data Type	Constraints	Description
tax_record_id	INT	PK (AUTO_INCREMENT), NOT NULL	Unique primary key for the tax record.
user_id	INT	FK → users.user_id, NOT NULL	The user to whom this tax record belongs.
tax_year	INT	NOT NULL	The year for which these records apply (e.g., 2025).
tax_form_type	VARCHAR(20)	CHECK (tax_form_type IN ('W2','1099INT','1099DIV'))	The type of tax form relevant to the record.
gross_income	DECIMAL(15, 2)	NOT NULL	Gross income for that tax year.
tax_withheld	DECIMAL(15, 2)	NOT NULL	Amount withheld for that year.
filed_date	DATE	NULLABLE	When it was filed (NULL if not yet filed).
notes	VARCHAR(255)	NULLABLE	Additional remarks or references.

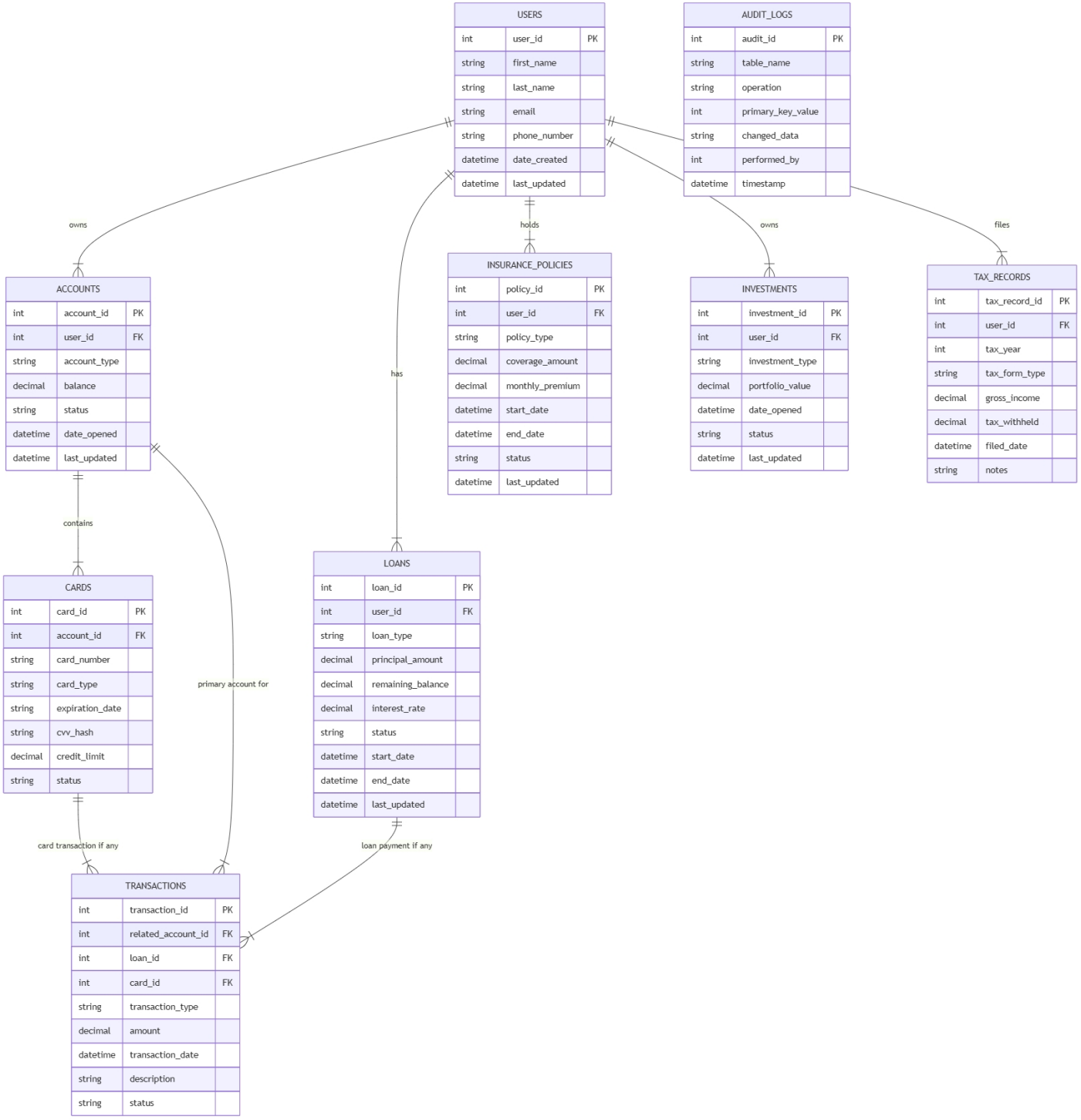
8. TRANSACTIONS Table

Column	Data Type	Constraints	Description
transaction_id	INT	PK (AUTO_INCREMENT), NOT NULL	Unique primary key for the transaction.
related_account_id	INT	FK → accounts.account_id, NULLABLE	The deposit account primarily affected by this transaction (if applicable).

loan_id	INT	FK → loans.loan_id, NULLABLE	If the transaction is a loan payment, references the associated loan.
card_id	INT	FK → cards.card_id, NULLABLE	If the transaction is a card purchase or payment, references the associated card.
transaction_type	VARCHAR(30)	CHECK (transaction_type IN ('DEPOSIT','WITHDRAWAL','PAYMENT','PURCHASE','TRANSFER',...))	Type of transaction.
amount	DECIMAL(15, 2)	NOT NULL	Monetary amount for the transaction.
transaction_date	DATETIME	DEFAULT CURRENT_TIMESTAMP, NOT NULL	The exact time the transaction occurred.
description	VARCHAR(255)	NULLABLE	Free-text description (e.g. “Mobile Deposit”, “Online Bill Pay”, etc.).
status	VARCHAR(20)	CHECK (status IN ('PENDING','COMPLETED','FAILED'))	

9. AUDIT_LOGS Table

Column	Data Type	Constraints	Description
audit_id	INT	PK (AUTO_INCREMENT), NOT NULL	Unique primary key for each audit record.
table_name	VARCHAR(50)	NOT NULL	Name of the table that was accessed or modified.
operation	VARCHAR(10)	CHECK (operation IN ('INSERT','UPDATE','DELETE','SELECT'))	Type of operation performed.
primary_key_value	INT	NULLABLE	The PK of the affected row, if applicable.
changed_data	TEXT	NULLABLE	Details on what changed (often stored in JSON).
performed_by	INT	FK → users.user_id or a system account ID, NOT NULL	Who performed the operation (or system ID).
timestamp	DATETIME	DEFAULT CURRENT_TIMESTAMP, NOT NULL	Date/time the operation occurred.


USERS
int user_id PK
string first_name
string last_name
string email
string phone_number
datetime date_created
datetime last_updated
AUDIT_LOGS
int audit_id PK
string table_name
string operation
int primary_key_value
string changed_data
int performed_by
datetime timestamp
owns
holds
owns
files
has
ACCOUNTS
int account_id PK
int user_id FK
string account_type
decimal balance
string status
datetime date_opened
datetime last_updated
INSURANCE_POLICIES
int policy_id PK
int user_id FK
string policy_type
decimal coverage_amount
decimal monthly_premium
datetime start_date
datetime end_date
string status
datetime last_updated
INVESTMENTS
int investment_id PK
int user_id FK
string investment_type
decimal portfolio_value
datetime date_opened
string status
datetime last_updated
TAX_RECORDS
int tax_record_id PK
int user_id FK
int tax_year
string tax_form_type
decimal gross_income
decimal tax_withheld
datetime filed_date
string notes
contains
primary account for
CARDS
int card_id PK
int account_id FK
string card_number
string card_type
string expiration_date
string cvv_hash
decimal credit_limit
string status
LOANS
int loan_id PK
int user_id FK
string loan_type
decimal principal_amount
decimal remaining_balance
decimal interest_rate
string status
datetime start_date
datetime end_date
datetime last_updated
card transaction if any
loan payment if any
TRANSACTIONS
int transaction_id PK
int related_account_id FK
int loan_id FK
int card_id FK
string transaction_type
decimal amount
datetime transaction_date
string description
string status