

Software Engineering Spring 2023
Online Banking System Relational Schema
Team 14

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Text color in black is the schema body

Text color in blue is a reference

Text color in red is a note

1- User(ID, first_name, last_name, full_name, address, country, city, phone_number, fax_number, email, passport, date_of_birth, age)

2- Client(ID, income, IBAN)

Where ID references User

3- Banker(ID, department, hiring_date, job_title, salary)

Where ID references User

4- Admin(ID, Salary)

Where ID references User

5- Notification(**ID**, content, method_id, status_id, date_sent, date_recieved, type_id, sender_id, receiver_id)

Where sender_id references User

Where reciever_id references User

Where status_id references NotificationStatus

Where type_id references NotificationType

Where method_id references NotificationMethod

6- NotificationStatus (**ID**, value)

value is either (sent , received) will be represented as an enum for example

7- NotificationType (**ID**, value)

value is either (confirmation, rejection, reminder , bank-announcment, warning, alert, issue-resolution) will be represented as an enum for example

8- NotificationMethod (**ID**, value)

value is either (email, SMS, in-app) will be represented as an enum for example

9- ApplicationAccount(**username**, password, user_id)

Where user_id references User

10- OTP(**ID**, time_span, usage_limit, generation_time, owner_id, status_id)

Where owner_id references Client

Where status_id references StatusOTP

11- StatusOTP(**ID**, value)

value is either (sent , used , expired , cancelled) will be represented as an enum for example

12- BankAccount(**ID**, balance, minimum_balance, interest_rate, early_withdrawal_penalty, account_transaction_limit, currency, type_id, status_id, opening_date, closing_date, owner_id, handler_id)

Where handler_id references Banker

Where owner_id references Client

Where type_id references AccountType

Where status_id references AccountStatus

13- AccountType(ID, value)

value is either (savings , current , debit , credit) will be represented as an enum for example

14- AccountStatus(ID, value)

value is either (active , inactive , disabled , closed, pending) will be represented as an enum for example

15- Loan(ID, amount, currency, interest_rate, start_time, loan_term, status_id, monthly_payment, late_payment_fees, isMortgage, owner_id, handler_id, account_id)

Where handler_id references Banker

Where owner_id references Client

Where status_id references LoanStatus

Where account_id references BankAccount

16- LoanStatus(ID, value)

value is either (accepted , rejected , pending , received) will be represented as an enum for example

17- Transaction(ID, amount, currency, type_id, status_id, date_occured, associated_fees, region_id, is_future_dated, from_account_id, to_account_id, client_id, method_id)

Where from_account_id references BankAccount

Where to_account_id references BankAccount

Where client_id references Client

Where status_id references TransactionStatus

Where type_id references TransactionType

Where region_id references Region

Where method_id references TransactionMethod

18- TransactionStatus(ID, value)

value is either (pending , completed , failed , cancelled) will be represented as an enum for example

19- TransactionType(ID, value)

value is either (deposit , withdrawal , transfer , refund) will be represented as an enum for example

20- Region(ID, value)

value is either (internal , domestic , international) will be represented as an enum for example

21- Payment(ID , type_id)

Where id references Transaction

Where type_id references PaymentType

22- PaymentType(ID, value)

value is either (partially , fully) will be represented as an enum for example

23- Charity(ID, name, contact)

24- Donation(ID, charity_id, client_id, payment_id)

Where charity_id references Charity

Where client_id references Client

Where payment_id references Payment

25- TransactionMethod(ID, value)

value is either (third-party-app , bank-transfer) will be represented as an enum for example

26- Card(ID, CVV, PIN, type_id, credit_limit, remaining_credit, annual_fees, interest_rate, status_id, activation_date, owner_id, handler_id, account_id)

Where handler_id references Banker

Where owner_id references Client
Where type_id references CardType
Where status_id references CardStatus
Where account_id references BankAccount

27- CardType (**ID**, value)

value is either (debit , credit) will be represented as an enum for example

28- CardStatus (**ID**, value)

value is either (pending, active , inactive, disabled, expired) will be represented as an enum for example

29- Bill(**ID**, amount, due_date, status_id, date_of_payment, payment_id, client_account_id, category_id)

Where payment_id references Payment
Where client_account_id references BankAccount
Where category_id references Category
Where status_id references BillStatus

30- BillStatus (**ID**, value)

value is either (pending, scheduled , paid, disabled, failed, cancelled, refunded) will be represented as an enum for example

31- CreditPoints(**ID**, balance, expiry_date, date_earned, redemption_value, cashback_taxes, redeemer_id, account_id)

Where redeemer_id references Client
Where account_id references BankAccount

32- Expenses(**ID**, name, owner_id)

Where owner_id references Client

33- Cheque(**ID**, amount, date_submitted, scanned_image, status_id, submitter_id, account_id, handler_id)

Where submitter_id references Client
Where handler_id references Banker

Where account_id references BankAccount

Where status_id references ChequeStatus

34- ChequeStatus (**ID**, value)

value is either (pending , delivered, cancelled, rejected) will be represented as an enum for example

35- Category(**ID**, name, budget_limit, owner_id)

Where owner_id references Client

36- InvestmentCertificate(**ID**, duration, interest_rate, initial_amount, early_withdrawal_penalty, status_id, applier_id, associated_account_id, handler_id)

Where applier_id references Client

Where associated_account_id references BankAccount

Where status_id references CertificateStatus

Where handler_id references Banker

37- CertificateStatus(**ID**, value)

Value is either (ACTIVE, MATURITY, CLOSED, EXPIRED, REDEEMED, RENEWED)

38- Issue(**ID**, type_id, content, method, reporter_id, handler_id)

Where reporter_id references Client

Where handler_id references Admin

Where type_id references IssueType

39- IssueType (**ID**, value)

value is either (technical , security, fraudulent-activity, card theft/loss/damage) will be represented as an enum for example

Note:

We handle the type/status of entities such as

(Loan,notification, payment.....etc) as an entity that will be mapped to the owner entity in order to make sure that it will take specific values and no invalid values will be specified for it. For example let us think of the status of a notification it has to be either sent or received and no other options except these so we represent it as an enum in java for example. On the other side if we leave the status as an attribute for the notification entity then it will be assigned to any value which does not make sense.