

Family Bookkeeping

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Subject:

57. Home expenses register: family members, regular and occasional incomes and costs.

Analysis:

- User and customer

User (admin) is an individual who want to keep accounts for his/her family. And the customers (client) will be his/her family members.

- Purpose and scenario

Database will record daily expense and income for every member of family. All money in this database should be in PLN.

User can classify different kinds of expense such as food or clothes, different kinds of income such as salary or stocks.

It will also record family member's liability. When you have a loan or borrow money from others, it will be recorded as debt. And when you shopping goods on credit, for example, your friends pay something for you and you will pay back after going home, or you forget to bring money in your relative's shop but take goods firstly, it will be recorded as credit. Of course, it can record the history of when you repay them.

It can also be used to record every member's asset, because it has entity like personal funds. Finally, every family member can do a budget plan for different kinds of expenditure.

Entity Description:

This part is to describe the entities and illustrate attributes of them which are not clear in the ERD to help with understanding and make database be more detailed. The description of attributes contain the meaning, domain and some other details.

Remark:

Because in SQL Server we cannot use "INT(3)" and "zerofill" to regular the digit of integer and if I change it into Varchar in SQL Server it will be more expensive to search. So in lab class, ID which is the key of some tables will only be INT with no limitation of digits.

1. FamilyMember:

The entity which store every family member.

ID_FM: It is a unique unsigned integer and auto_increment. It has 3 digit number, start from "001". Zero filled for the left. ~~It will start with the uppercase first letter and two digit number (starts from 01) which is used to distinguish same first letter. For example, there are family member called "David" and "Davis", then there ID_FM will be D01 and D02. The number should be unique when letter is the same.~~

Name: It should start with first name. If there is last name or middle name, there should be space between them.

Gender: 'F' or 'M'

RelationWithAdmin: It means the relationship with the admin of the database, such as

admin, father, sister and so on. And it can be null when don't want to record the relation.

2. Format of funds:

Cash, bank cards from different banks, credit card, stock and cheque and so on.

ID_FF: It is a unique unsigned integer and auto_increment. It has 3 digit number, start from "001". ~~Combine the uppercase first letter of format name and unique two digital number (start from 01).~~ For example, cash is "C01", Santander debit card is "S01", Santander credit card is "S02".

FormatName: The name of the format of personal funds. Such as "Santander credit card", "cash".

3. PersonalFunds:

It is the entity which used to record every asset fund the family member has.

Attribute:

ID_PF: It is a unique unsigned integer and auto_increment. ~~Starts with ID_FM and ID_FF, then has two digit number in case someone has two cards of the same format of funds.~~ For example, David has two Santander debit card, they are "D01S0101" and "D01S0102".

ID_FM: Foreign key which is reference from Family member.

ID_FF: Foreign key which is reference from FormatOfFunds.

Balance: The balance of the card or cash or others which are counted as money. The unit must be calculated as PLN. It can be negative number, because credit card can be used to overdraft payment.

AccountNum: The number of account which is used to bank card or cheque or other things. So it can be NULL when it is cash or something others has no account number. Because even if different bank card, it will have different length of account number and it will be long. So it will be stored as string.

4. PaymentObject:

The object paid to, such as shop name, personal name.

Attribute:

ID_PO: It is a unique unsigned integer and auto_increment. ~~Combine the uppercase first letter of object name and unique two digital number (start from 01).~~ For example, "Zabak" is "Z01", "Zoe" is "Z02".

ObjectName: The name of the payment object. It can have space in the middle of name.

5. TypeOfExpenditure:

Such as clothes, food, school supplies and so on.

Attribute:

ID_TE: It is a unique unsigned integer and auto_increment. It has 3 digit number, start from "001". ~~Contain 3 numbers, start from 001.~~

TypeName: The name of expenditure type. It can be string with space and in lower case letter. Such as "clothes", "travelling expense" and "food" and so on.

6. TypeOfIncome:

Such as salary, stock, extra income and so on.

Attribute:

ID_TI: It is a unique unsigned integer and auto_increment. It has 3 digit number, start from "001". ~~Contain 3 numbers, start from 001.~~

TypeName: The name of income type. It can be string with space and in lower case

letter. Such as “wage”, “government bonus” and “other” and so on.

7. InternalTransfer:

The transfer between different personal fund, such as transfer to pay for credit card.

ID_InTran: It is a unique unsigned integer and auto_increment.

ID_PF_From: The foreign key refers from PersonalFunds. It means which personal fund this transfer come from.

ID_PF_To: The foreign key refers from PersonalFunds. It means which personal fund this transfer will go to.

IT_Time: The time of internal transfer happened. It is also the component of primary key, because these three attribute above are enough to make every transfer be unique. And it should be in the format of “YYYY-MM-DD HH:mm:ss”.

Amount: It is the money in this transfer. It should be an unnegative number with maximum of two decimal places.

8. Expenditure:

All expenditure of different members for different types. It include the time, payment object and amount.

Attribute:

ID_EX: It is the primary key of expenditure. It should be positive integer and increase automatically. It is a unique unsigned integer and auto_increment.

E_Time: The time of expenditure happened. And it should be in the format of “YYYY-MM-DD HH:mm:ss”.

ID_PF: It is foreign key refer from PersonalFunds which is used in this expenditure.

ID_TE: It is foreign key refer from TypeOfExpenditure represents what kind of expenditure it is. It is also primary key because some time

ExAmount: It is used to record the money used in the expenditure. It should be an unnegative number with maximum of two decimal places.

ID_PO: It is foreign key refer from PaymentObject. And it can be NULL when there is no idea about the payment object.

9. Income:

All income of different members for different types.

Attribute:

ID_IN: It is the primary key of income. It should be positive integer and increase automatically. It is a unique unsigned integer and auto_increment.

I_Time: The time of income happened. And it should be in the format of “YYYY-MM-DD HH:mm:ss”.

ID_PF: It is foreign key refer from PersonalFunds which the income will go to.

ID_TI: It is foreign key refer from TypeOfIncome represents what kind of income it is.

InAmount: It is used to record the money of the income. It should be an unnegative number with maximum of two decimal places.

10. Budget:

Every member can have a budget for different type of expenditure.

Attribute:

ID_FM: Foreign key refer from FamilyMember means it is budget of which member.

ID_TE: Foreign key refer from TypeOfExpenditure means it is a budget in which field.

BudAmount: It is the money number would like to spend in. It should be an unnegative number with maximum of two decimal places.

Time_month: It should record a positive integer which means how many months this budget is planned for.

11. Debt:

It is used when member borrow money from others. Creditor is the name of creditor, and it could be a name of people or name of organization.

Attribute:

ID_Debt: The ID of the debt. It is a unique unsigned integer and auto_increment. It has 3 digit number, start from "001". ~~It is varchar start from 001 to 999.~~

Creditor: It should record the name of person or organization who members owned money to. It is string which can contain space.

ID_FM: Foreign key refer from FamilyMember means the debt is belong to whom.

BalanceDue: It is the money still need to be repaid. It should be an unnegative number with maximum of two decimal places.

Comment: It is a description text that need to be recorded. And it can be NULL.

12. Loan:

It is a process that deposit money from debt to one's funds. And every debt may deposit money to different funds.

Attribute:

ID_Loan: It is a unique unsigned integer and auto_increment.

ID_Debt: Foreign key refer from Debt. It means this process is for which debt.

ID_PF: Foreign key refer from PersonalFunds. It means this deposit will go to wick personal fund.

L_Time: The time that this process happened. it should be in the format of "YYYY-MM-DD HH:mm:ss".

LoanAmount: How much money it will deposit in this process. It should be an unnegative number with maximum of two decimal places.

13. Repayment:

It is a process that repay one's debt and some debt may cannot repay wholly only once.

Attribute:

ID_Repay: It is a unique unsigned integer and auto_increment.

ID_Debt: Foreign key refer from Debt. It means this process is repay for which debt.

ID_PF: Foreign key refer from PersonalFunds. It means this repayment used wick personal fund.

R_Time: The time of repayment happened. And it should be in the format of "YYYY-MM-DD HH:mm:ss".

RepayAmount: It is the money of this repayment. It should be an unnegative number with maximum of two decimal places.

14. Credit:

When you shopping goods on credit, for example, your friends pay something for you and you will pay back after going home, or you forget to bring money in your relative's shop but take goods firstly, it will be recorded as credit. And it will be recorded into expenditure when family members repay for it. It has attribute of type of expenditure

and time of expenditure.

Attribute:

ID_Credit: It is a unique unsigned integer and auto_increment.

ID_FM: Foreign key refer from FamilyMember means the credit debt is belong to whom.

ID_TE: Foreign key refer from TypeOfExpenditure means it is a credit shopping for which field.

C_Time: The time of credit happened. And it should be in the format of "YYYY-MM-DD HH:mm:ss".

BalanceDue: It is the money still need to be repaid. It should be an unnegative number with maximum of two decimal places.

Comment: It is a description text that need to be recorded such as the reason or who gave the convenience or whether need to repay. And it can be NULL.

- 15. Debit:** it is repayment for the shopping on credit. And it is a expenditure which means this expenses would be recorded as expenditure when you repy for the credit shopping. It has the attributes of time of expenditure and type of expentidure which refer from credit. Sometimes you cannot repay the credit wholly only once.

Attribute:

ID_EX: Foreign key refer from Expenditure.

D_Time: Means the debit happened time.

DebitAmount: It is the money of this debit. It should be an unnegative number with maximum of two decimal places.

ID_Credit: Foreign key refer from Credit. Means which credit it repays.

Relationships description

This part is to describe the relationships between entities.

Entity1	Type	Entity2	Description
FamilyMember	1:0..n	PersonalFunds	The fund belongs to which family member.
FamilyMember	1:0..n	Debt	The debt belongs to wich family member.
FamilyMember	1:0..n	Credit	The credit belongs to which family member.
FamilyMember	1:0..n	Budget	The budget is planed by which one.
Budget	0..n:1	TypeOfExpenditure	The budget is planed for which field.
PersonalFunds	1:0..n	InternalTransfer	Internal transfer from which fund.
InternlTransfer	0..n:1	PersonalFunds	Internal transfer to which fund.
FormatFunds	1:0..n	PersonalFunds	The personal fund is what format.
Expenditure	0..n:1	PersonalFunds	The expenditure use which fund.
Expenditure	0..n:1	TypeOfExpenditure	The expenditure is which type.
Expenditure	0..n:1	PaymentObject	The expenditure is pay to which object.
Income	0..n:1	PersonalFunds	The income depoosits to which fund.
Income	0..n:1	TypeOfIncome	The income is which type.
Debt	1:0..n	Loan	The debt will be deposited to funds and the process will be recorded in "Loan". "0..n"

			because sometimes it has not deposited when debt happened.
Debt	1:0..n	Repayment	Repay the debt at times.
Loan	0..n:1	PersonalFunds	The loan will deposited to which personl fund. "0..n:1" because every fund could store lots of loan or no loan to store.
Repayment	0..n:1	PersonalFunds	Repay by which fund. "0..n:1" because every fund could repay many loans or never used to repay.
Credit	0..n:1	TypeOfExpenditure	Credit shopping for which type.
Credit	1:0..n	Debit	Debit record the process of repayment to credit. "1:0..n" because every credit may repay at times.
Debit	IS_A	Expenditure	Debit is a kind of expenditure. When members repay the credit, it will be the same with expenditure for a type of expenditure.

ERD

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RDB schema:

FamilyMember(ID_FM, Name, Gender, RelationWithAdmin)
FormatOfFunds(ID_FF, FormatName)
PaymentObject(ID_PO, ObjectName)
PersonalFunds(ID_PF, ID_FM **REF** FamilyMember, ID_FF **REF** FormatOfFunds, Balance, AccountNum)
TypeOfExpenditure(ID_TE, TypeName)
TypeOfIncome(ID_TI, TypeName)
InternalTransfer(ID_InTran, ID_PF_From **REF** PersonalFunds, ID_PF_To **REF** PersonalFunds, IT_Time, Amount)
Expenditure(ID_EX, E_Time, ID_PF **REF** PersonalFunds, ID_TE **REF** TypeOfExpenditure, ExAmount, ID_PO **REF** PaymentObject)
Income(ID_IN, I_Time, ID_PF **REF** PersonalFunds, ID_TI **REF** TypeOfIncome, InAmount)
Budget(ID_FM **REF** FamilyMember, ID_TE **REF** TypeOfExpenditure, BudAmount, Time_month)
Debt(ID_Debt, Creditor, ID_FM **REF** FamilyMember, BalanceDue, Comment)
Loan(ID_Loan, ID_Debt **REF** Debt, ID_PF **REF** PersonalFunds, L_Time, LoanAmount)
Repayment(ID_Repay, ID_Debt **REF** Debt, ID_PF **REF** PersonalFunds, R_Time, RepayAmount)
Credit(ID_Credit, ID_FM **REF** FamilyMember, ID_TE **REF** TypeOfExpenditure, C_Time, BalanceDue, Comment)
Debit(ID_EX **REF** Expenditure, ID_Credit **REF** Credit)

