Contents

0.1 Description:

Our Ontology design will represent Bank domain. We will design the ontology of one branch of a bank. The bank domain will have the classes - Employee, Customer, Technician, ATM, Loan, Borrower, Utilization, Account, Manager.
Object properties like oversees and worksUnder will be used to represent transitivity.
Each account can belong to one or a specified maximum number of customers which will be represented using number restrictions and qualified number restrictions/cardinality restrictions.
The relations used for representing invertibility are:
-belongsTo/Owns
-worksUnder/Manages

0.2 Hierachy

- Person
  - Customer
    - Depositor
    - Borrower
  - Employee
    - Manager
    - CustomerCare
    - CustomerSupport
    - Technician
- Bank
  - Branch
- FinancialService
  - Payment
    - PaymentNumber
  - Transaction
  - Loan
    - VehicleLoan
    - RealEstateLoan
    - AgricultureLoan
- Account
  - Amount
  - SavingsAccount
  - BasicAccount
  - CurrentAccount
  - FixedDepositAccount
- ATM

0.3 Object Properties:

1)belongsTo: (Account, Customer)
2)owns: (Customer, Account)
3)borrows: (Customer, Loan)
4)manages: (Branch, Account)
5)worksAt: (Employee, Branch)
6)oversees: (Manager, Employee)
7)worksUnder: (Employee, Manager)
8)maintains: (Technician, ATM)
9)offers: (Branch, FinancialService)
10)asksQuery: (Customer, CustomerCare)
11)responsibleFor: (CustomerSupport, Customer)
12)answersQuery: (CustomerCare, Customer)
13)withdraw: (Customer, Cash)
14)deposits: (Customer, Cash)
15)deposits: (Customer, Cheque)
16)havingPayment: (Payment, Amount)
17)havingPayment: (Payment, PaymentNumber)
18)asksQuery: (Customer, CustomerCare)
19)hasPaymentAmount: (Payment,Amount)
20)affiliatedTo: (Branch, Bank)

0.4 Datatype Properties

1. c-name
Domain: customer
Range datatype: String

2. e-name
Domain: employee
Range datatype: String

3. accountNumber
Domain: Account
Range datatype: int

4. area
Domain: Branch
Range datatype: String

5. bank-name
Domain: Bank
Range datatype: String

5. amount-loan
Domain: VehicleLoan
Range datatype: int

0.5 TBox

Customer ⊑ Person ⊓(∃ owns.Account ⊔∃ borrows.Loan)
Borrower ≡ Customer ⊓∃ borrows.Loan
Depositor ≡ Customer ⊓(∃ deposits.Cash ⊔∃ deposits.Cheque)
Customer ⊑≥ 0 asksQuery.CustomerCare
Employee ⊑ Person ⊓∃ worksAt.Branch
Employee ≡ Manager ⊔ CustomerCare ⊔ Technician
CustomerSupport ⊑ Employee ⊓∃ responsiblefor.Customer
CustomerCare ≡ Employee ⊓∃ answersQuery.Customer
Technician ⊑ Employee ⊓∃ maintains.ATM
Manager ≡ Employee ⊓∃ oversees.Employee
Person ≡ Customer ⊔ Employee
Branch ⊑∃ manages.Account
Account ⊑∃ belongsTo.Bank
Account ⊑ ¬*Person*
SavingsAccount ⊑ Account
BasicAccount ⊑ Account
Customer ⊑ ∃ deposits.Cheque ⊔ ∃ deposits.Cash ⊔ ∃ withdraw.Cash
Transaction ⊑ Cheque ⊔ Cash
Payment ⊑ ∃ havingPayment.PaymentNumber ⊓ ∃ has.Amount
Transaction ⊑ FinancialService
Payment ⊑ FinancialService
Loan ⊑ FinancialService
VehicleLoan ⊑ Loan
RealEstateLoan ⊑ Loan
AgricultureLoan ⊑ Loan
Account ≡ SavingsAccount ⊔ CurrentAccount ⊔ FixedDepositAccount
customer1 ≡ Customer ⊔ c-name"chole"string
customer2 ≡ Customer ⊔ ∃ borrows.Loan ⊔ cname"Betty"string
branch-iitm ≡ Branch ⊔ area"IIT Madras"string
loan1 ≡ Loan ⊔ VehicleLoan ⊔ amountloan"1000000"int

o.6 ABox

Tom :Customer
Betty:Customer
Winnie :Employee(Manager)
Bob:Employee(Technician)
SBI :Bank
IIT Madras :Branch
123 :Account
(Tom,123) :owns
(Winnie,Bob): oversees
(Bob,Winnie):worksUnder
(Winnie,SBI) :worksAt
(Bob,IIT-Madras): maintains
(Betty, 1000000):borrows