Ontology (CS6852)
Assignment 1

Team: G10

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Domain: Banking

Description:

Our Ontology design will represent the Banking domain. We will design the ontology of one branch of a bank.The bank domain will have the classes - Employee, Customer,Machines, Loan, Borrower, Utilization, Account, Technician ,Manager.
Object properties like overseas 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.

Concepts:

People

- Customer
- Branch Manager
- Employee
- Cashier
- Teller
- Person
- Borrower
- Technician
- Securities
- CustomerCare
- Depositor

Places

- Branch

- GoldStorage (storage vaults)

Money
- Cash
- Loan (Personal, gold, house, car)
- Deposit
- Withdrawal
- Cheque

FinancialService
- Payment
- PaymentNumber
- Transaction

Machines
- Machine
- ATM
- ChequeDepositMachine
- CashDepositMachine
- PassbookPrinter

Other
- Account
- Redressal (complaint)

Roles :

belongsTo : An account belong to customer
owns: Customer can owns multiple accounts
Manages: A Manager manages the branch . Branch manage account
offers: A branch offers many financial services.
worksAt: Employees work at the branch.
overseas: Manager overseas employees.
worksUnder: Various employees work under manager.
borrows: Borrower borrows loan.
withdraw: Customer withdraws cash.
deposits: Customer deposits cash and cheques.
havingPayment: Every payment has a payment number.
hasPaymentAmount: Every payment has some non zero payment amount.
asksQuery: Customer asks query to customer care.
answersQuery: Customer care answer query to customer.

maintains: Technician maintains ATM/Cheque deposit machine/Cash deposit machine/Passbook printer.

Object Properties:

1)belongsTo: (Account, Customer)
2)owns: (Customer, Account)
3)manages: (Branch, Account)
4)offers: (Branch, FinancialService)
5)worksAt: (Employee, Branch)
6)overseas: (Manager, Employee)
7)worksUnder: (Employee, Manager)
8)borrows: (Customer, Loan)
9)withdraw: (Customer, Cash)
10)deposits: (Customer, Cash ⊔ Cheque)
12)havingPayment: (Payment, Amount)
13)hasPaymentAmount: (Payment,Amount)
14)asksQuery: (Customer, CustomerCare)
15)answersQuery: (CustomerCare, Customer)
16)maintains: (Technician, ATM ⊔ Cheque deposit machine ⊔
Cash deposit machine ⊔
Passbook printer)

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

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

T-Box:

Person

1. Customer ⊑ Person ⊓ (∃ owns.Account ⊔ ∃ borrows.Loan)
2. BranchManager ⊑ Person ⊓ ∃manages.Branch
3. Employee ⊑ Person ⊓ ∀worksAt.Branch ⊓ ∀worksUnder.BranchManager
4. Technician ⊑ Employee ⊓ (∃maintains.Machine)
5. CustomerCare ⊑ Employee ⊓ ∀answersQuery.Customer
6. Borrower = Customer ⊓ ∃borrows.Loan
7. Depositor ≡ Customer ⊔ (∃ deposits.(Cash ⊔ Cheque))
8. Person ≡ Customer ⊔ Employee
9. Customer ⊑ ∃ deposits.(Cash ⊔ Cheque) ⊔ ∃ withdraw.Cash

Places

1. Branch ⊑ ∃offers.GoldStorage ⊔ ∃offers.Loan ⊔ ∃processes.Withdrawal ⊔ ∃processes.Cheque ⊔ ∃processes.Payment

Money

1. Loan ⊑ FinancialService
2. VehicleLoan ⊑ Loan
3. RealEstateLoan ⊑ Loan
4. AgricultureLoan ⊑ Loan
5. GoldLoan ⊑ Loan

FinancialService

1. Transaction ⊑ Cheque ⊔ Cash
2. Payment ⊑ ∃ havingPayment.PaymentNumber ⊔ ∃ has.Amount
3. Transaction ⊑ FinancialService
4. Payment ⊑ FinancialService

Machines

1. Machine ≡ ATM ⊔ CashDepositMachine ⊔ ChequeDepositMachine ⊔ PassbookPrinter

Other

1. Account ⊑ ∃belongsTo.Customer

2. Account $\sqsubseteq \neg$Person
3. SavingsAccount $\sqsubseteq$ Account
4. Account $\equiv$ SavingsAccount $\sqcup$ CurrentAccount $\sqcup$ FixedDepositAccount