CS 585 Homework Solutions -1

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The following pages are the solutions to the homework assignment posted due on 27th September. It contains a CIOM schema, and a EER diagram and the answer to the third question about ontologies.

Question 3:

Ontologies provide several advantages over scheme of modeling used by the CIOM.

An ontology represents, essentially knowledge as a set of concepts within a particular domain, and the interworking/relationships between these set of concepts that it explains. In essence, what the ontology is doing is providing a higher level of abstraction, and almost, in a way provides a more general representation of the concepts involved. It is a continuous process which keeps learning, as the abstraction between the concepts get more defined and different as we learn more about it. What it does is, in a more general way, give more information about the particular domain and the knowledge gained thus far.

The CIOM on the other hand, is more specific in nature, covering topics in the current context within which we are working. It has class attributes, which help in more explicitly defining the class, and gives a more detailed explanation about how the concepts are defined with relation to each other.

Structurally, the two concepts have a number of different components. Although both make the use of classes, and operations, the CIOM has a more defined vocabulary, with the use of attribute mappings, and different types of cardinality. It also makes use of predicate defined subclasses and operationally defined subclasses and set-operator defined subclasses. The ontology representation largely comprises of function terms, restrictions, axioms and events. Further, the development of ontologies has led to a specific subset of human-selected ontologies, such as Protégé Ontology library and DAMN Ontology library. The CIOM still has a long way to go to get there.

Further, the Ontology has a specific problem is its inability to separate its meaning from a philosophy and a computer science point of view. (Source:Wikipedia)

The CIOM gives a greater amount of detail about the classes, with class defined attributes, as compared to the ontological way of class representation.

Assumptions made:

There exists a project management company. So the cardinality can never be 0.

The cardinality is represented in Martin style, which means, N in this case is multiple instead of M.

Every tenant can sign just one lease. Multiple tenants can sign one a lease, but the number of leases that a single tenant can sign is restricted to one.

The lease agreement has seven components, beginning with rent, which becomes the primary key based on which the lease is identified.

A manager can have multiple offices if, in case he is charge or more than one building. Hence, this means that his office will be in each of the buildings that he is managing.

Every project management company has at least one building, and every building has at least one apartment, even if the entire apartment complex is not leased, the assumption is that there is still a building manager’s office.

The union of the technicians and the managers is represented with a D symbol in the EER diagram.

The project management company also manages at least one person, this may be the manager in charge. So, it can never have 0 people managed. (tenant or employee)

Notes to self:

Building Addresses

* Contains several apartments
* Each of the apartments has a number of bedrooms and a number of bathrooms

People

* SSN
* First name
* Last name
* Phone numbers

(could be employees or tenants)

For each tenant

* + - * Bank account number
      * Name and Phone number of next of kin for emergencies
      * Lease agreement must be signed(by one or more)

-Must include start date /expected duration

- Monthly rent

- security deposit

For each employee

Monthly salary

Managers of Technicians (or both)

If manager – address of building

If employee – carpentry, plumbing or electrical

Classes needed to represent the data:

* Strings (names, next of kin name, managers name and all that)
* Numbers (SSN, bank account, rent, security deposit, phone number, number of bedrooms and bathrooms)
* Strings and numbers(address of building) (actually both so just link it to both)

Question 2: ER Diagram for the apartment schema

(1,N)

Manages

Project Management Company

People

(1,N)

(1,N)

Quest

U

(1,N)

(1,N)

(1,1)

(1,N)

(1,N)

(1,N)

(1,N)

(1,1)

(1,1)

(1,1)

(1,N)

(1,N)

(1,1)

(1,N)

(0,N)

Skill

HAS

Has\_office

Managed

D

Technicians or Managers

C

rents

Plumbing

Carpentry

Electrical

Sign

Employees

Tenants

Managers

Technicians

Lease Agreement

has

Apartments

Contains

Owns

Buildings

Name(m)

Has\_name(1,NN)

Has\_phone(m)

Phone\_no(m)

Salary(1,NN)

Has\_salary(m)

Has\_name(m)

Name(1,NN)

Manages(m)

U

Manager\_sign(1,NN)

Sign\_man(1)

Def\_sec\_deposit(m)

Sec\_dep\_amt(1,NN)

Def\_start\_date(m)

Start\_date(1,NN)

Duration(1,NN)

Defines \_dur(m)

Tenant\_sign(1,NN)

Signed\_tenat(1)

Signs(1,NN)

Is\_signed\_by(m,NN)

Has\_office\_no(1)

Defines\_rent(1,,NN)

Rent\_amt(m)

Has\_agreement(1,NN)

Bound\_to(1)

Lives\_in(1,NN)

Possess(1,NN)

Is\_done\_by(m)

Managed\_by(1,NN)

Manages(m,NN)

Num\_bed(1)

Has\_bed(m)

Num\_bathrooms(1)

Has\_bathrooms(m)

Apart\_with\_num(1)

Has\_num(1,NN)

Has(m)

Is\_in(1,NN)

Owns(m)

Owned\_by(1,NN)

Address\_in\_no(1,NN)

Has\_Address(m)

Has\_kin\_name(1,NN)

Kin\_name(m)

Bank\_acc(m)

Has\_acc\_no(1,NN)

No-of\_kin(m)

Kin\_number(m)

Last\_name(1,NN)

Has\_name(m)

SSN(1,NN)

Person\_with\_ssn(m)

Managed\_by(1,NN)