

INFO-H-415 Advanced Databases
Temporal Databases Part 1
Traduction of EA schema to relational
databases

23 octobre 2019

Relational model

Employee
<u>SSN</u> Name

- ▶ In this model the principal concept is the **relation** (~ table)
- ▶ The entities, the associations and multivalued attributes are translated by **relations**
- ▶ Model : Relation(Key(s), Attribute, *Optionnal Attribute*, ...)
- ▶ Translation :
Employee(SSN, Name)

(1) multivalued attributes

Livre
<u>ISBN</u> Auteur (1,n)

(1) multivalued attributes

Livre
<u>ISBN</u> Auteur (1,n)

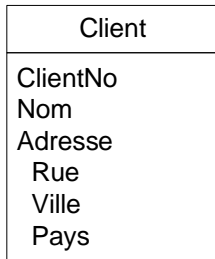
Livre(ISBN, ...)

LivreAuteur(ISBN, Auteur)

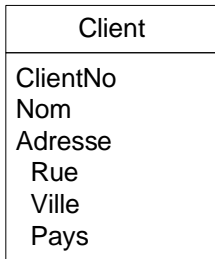
LivreAuteur.ISBN references Livre.ISBN

- ▶ Question : why (ISBN,Auteur) and not (ISBN,Auteur) ?

(2) Translation of composed attributes

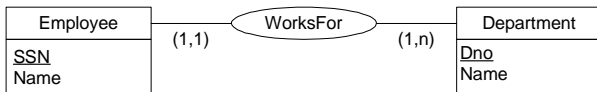


(2) Translation of composed attributes

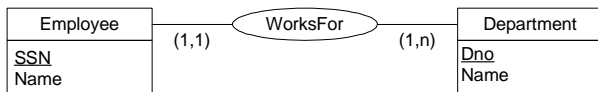


Client(ClientNo, Nom, AdresseRue, AdresseVille, AdressePays)

(3) Translation of 'one to one' or 'one to many' associations



(3) Translation of 'one to one' or 'one to many' associations



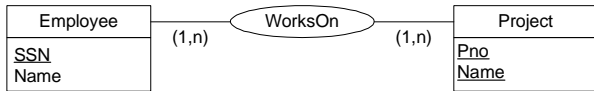
Department(DNo, Name)

Employee(SSN, Name, DNo)

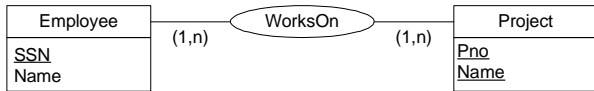
Employee.DNo reference Department.DNo

- ▶ 'one to one' association : if one is optional, the reference goes to the mandatory side !
- ▶ 'one to many' association : the reference goes to the 'one' side

(3) Translation of 'many to many' associations



(3) Translation of 'many to many' associations



Employee(SSN, Name)

Project(PNo, Name)

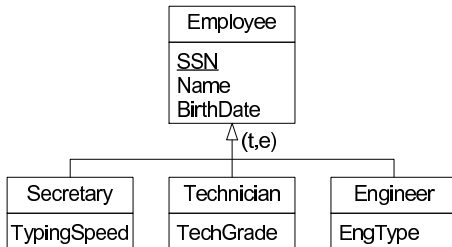
EmpProj(SSN,PNo)

EmpProj.SSN references Employee.SSN

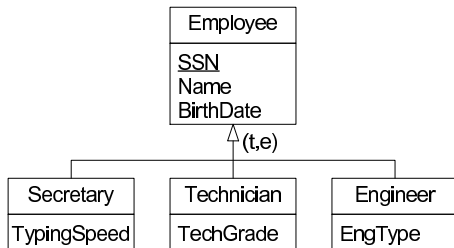
EmpProj.PNo references Project.PNo

- ▶ Careful, (SSN,PNo) \neq (SSN,PNo)

(4) Translation of generalisations : solution 1



(4) Translation of generalisations : solution 1



Employee(SSN, FName, MInit, LName, BirthDate, Address)

Secretary(SSN, TypingSpeed)

Secretary.SSN reference Employee.SSN

Technician(SSN, TechGrade)

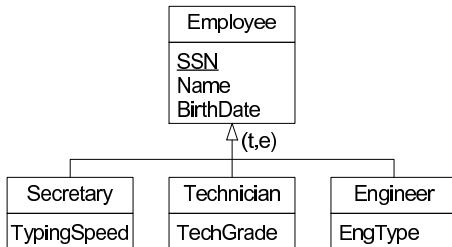
Technician.SSN reference Employee.SSN

Engineer(SSN, EngType)

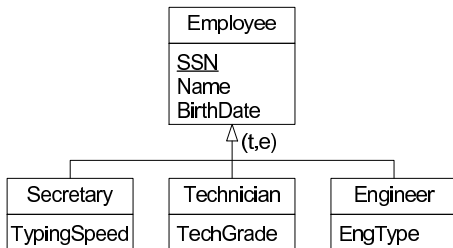
Engineer.SSN reference Employee.SSN

► + integrity constraints

(4) Translation of generalisations : solution 2



(4) Translation of generalisations : solution 2



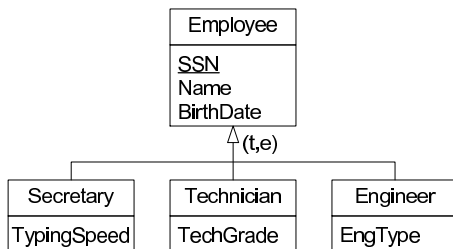
Secretary(SSN, FName, MInit, LName, BirthDate, Address, TypingSpeed)

Technician(SSN, FName, MInit, LName, BirthDate, Address, TechGrade)

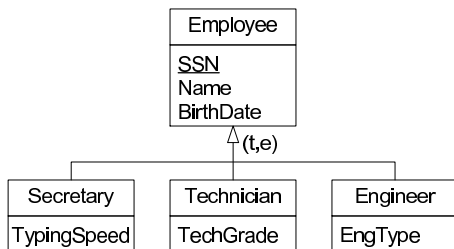
Engineer(SSN, FName, MInit, LName, BirthDate, Address, EngType)

- ▶ + integrity constraints

(4) Translation of generalisations : solution 3



(4) Translation of generalisations : solution 3



Employee(SSN, FName, MInit, LName, BirthDate, Address, TypingSpeed, TechGrade, EngType)

- ▶ + integrity constraints

(4) Translation of generalisations

- ▶ What can we say about these generalisations?
 - ▶ Total, non-exclusive?
 - ▶ Partial, exclusive?
 - ▶ Partial, non-exclusive?

(5) Translation sequences relations

Peter	[7/94-7/98]
8/9/64	
Bd St Germain	[1/85-12/87]
Bd St Michel	[1/88-12/94]
Rue de la Paix	[1/95-now]
4000	[7/94-7/95]
5000	[8/95-now]
{MADS}	[7/94-8/95]
{MADS, HELIOS}	[9/95-now]

Employee
name
birthDate
address
salary
projects (1,n)

(5) Translation sequences relations

Peter	[7/94-7/98]
8/9/64	
Bd St Germain	[1/85-12/87]
Bd St Michel	[1/88-12/94]
Rue de la Paix	[1/95-now]
4000	[7/94-7/95]
5000	[8/95-now]
{MADS}	[7/94-8/95]
{MADS, HELIOS}	[9/95-now]

Employee
name
birthDate
address
salary
projects (1,n)

Employee(name, startTime, birthDate, endTime)

EmployeeAddress(name, startTime, address, endTime)

EmployeeSalary(name, startTime, salary, endTime)

EmployeeProject(name, startTime, project, endTime)

▶ + integrity constraints