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

13 octobre 2021

Relational model

Employee
<u>SSN</u> Name

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

(1) multivalued attributes

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

(1) multivalued attributes

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

Livre(ISBN, …)
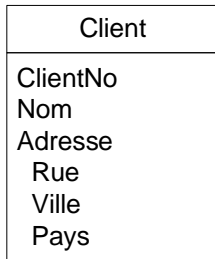LivreAuteur(ISBN, Auteur)
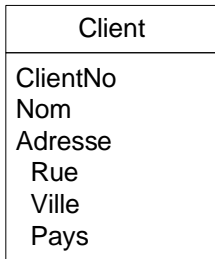   LivreAuteur.ISBN references Livre.ISBN

▶ Question : why (<u>ISBN</u>,<u>Auteur</u>) and not (<u>ISBN</u>,Auteur) ?
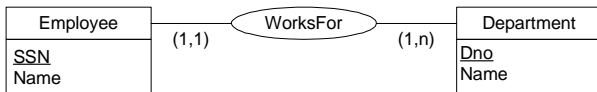
(2) Translation of composed attributes

Client

ClientNo
Nom
Adresse
  Rue
  Ville
  Pays

(2) Translation of composed attributes

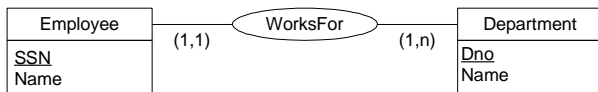| Client |
| --- |
| ClientNo |
| Nom |
| Adresse |
| Rue |
| Ville |
| Pays |

Client(<u>ClientNo</u>, 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
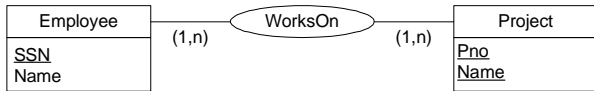

Department(<u>DNo</u>, Name)
Employee(<u>SSN</u>, Name, DNo)
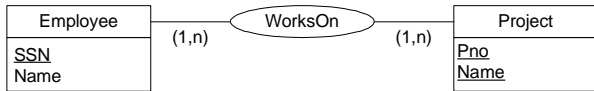   Employee.DNo reference Department.DNo

- ▶ '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

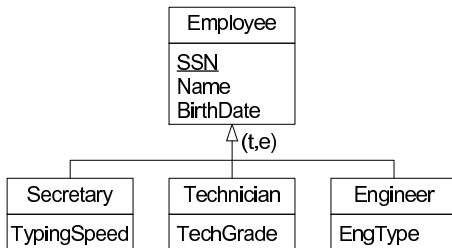
Employee(<u>SSN</u>, Name)
Project(<u>PNo</u>, Name)
EmpProj(<u>SSN,PNo</u>)
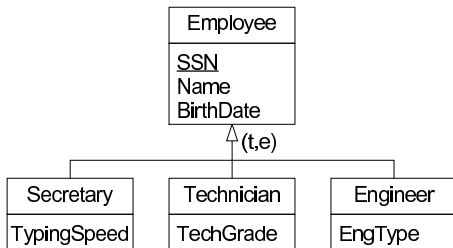   EmpProj.SSN references Employee.SSN
    EmpProj.PNo references Project.PNo

▶ Careful, (<u>SSN</u>,PNo) $\neq$ (<u>SSN</u>,<u>PNo</u>)

(4) Translation of generalisations : solution 1

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Employee(<u>SSN</u>, FName, MInit, LName, BirthDate, Address)
Secretary(<u>SSN</u>, TypingSpeed)
    Secretary.SSN reference Employee.SSN
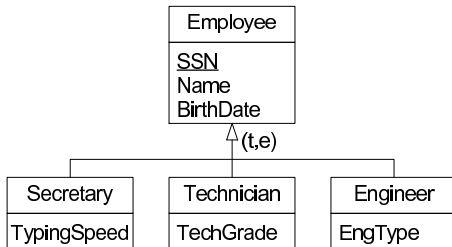Technician(<u>SSN</u>, TechGrade)
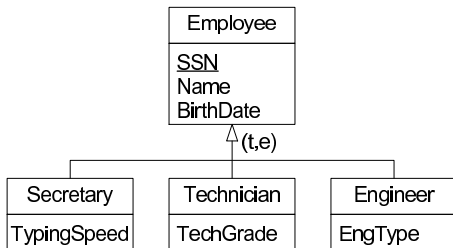   Technician.SSN reference Employee.SSN
Engineer(<u>SSN</u>, EngType)
    Engineer.SSN reference Employee.SSN

► + integrity constraints

(4) Translation of generalisations : solution 2

Employee
SSN
Name
BirthDate

(t,e)

Secretary — TypingSpeed
Technician — TechGrade
Engineer — EngType

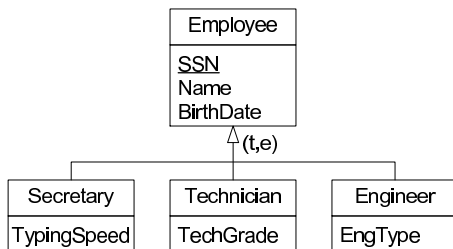# (4) Translation of generalisations : solution 2

Secretary(<u>SSN</u>, FName, MInit, LName, BirthDate, Address, TypingSpeed)

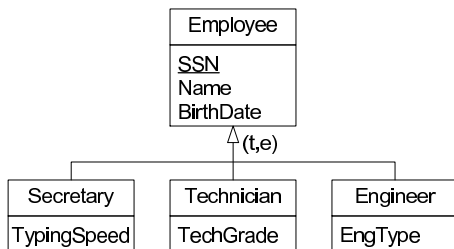Technician(<u>SSN</u>, FName, MInit, LName, BirthDate, Address,, TechGrade)

Engineer(<u>SSN</u>, FName, MInit, LName, BirthDate, Address, EngType)

► + integrity constraints

(4) Translation of generalisations : solution 3

Employee
- SSN
- Name
- BirthDate

(t,e)

Secretary
- TypingSpeed

Technician
- TechGrade

Engineer
- EngType

(4) Translation of generalisations : solution 3

Employee(<u>SSN</u>, 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
8/9/64 [7/94-7/98]

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

Employee(<u>name</u>, <u>startTime</u>, birthDate, endTime)

EmployeeAddress(<u>name</u>, <u>startTime</u>, address, endTime)

EmployeeSalary(<u>name</u>, <u>startTime</u>, salary, endTime)

EmployeeProject(<u>name</u>, <u>startTime</u>, project, endTime)

▶ + integrity constraints