ER Diagrams to Tables

Chapter 9.1 (Old & New editions)

Step 1: Strong Entity Rule

a) table consisting of simple attributes
b) composite – convert to simple attribute
c) choose one candidate key as primary key.

EMPLOYEE : SSN, Bdate, address, Salary, Fname, Minit, Lname, Sex

DEPARTMENT : Dnumber, Dname

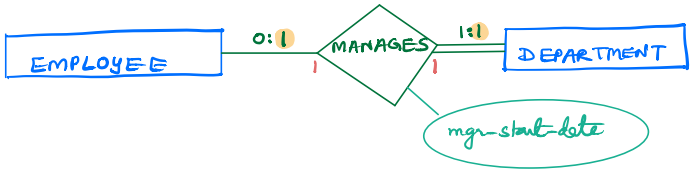
PROJECT : Pnumber, Pname, Plocation

Step 2: Weak Entity Rule

a) add simple attributes
b) include the primary key of EMPLOYEE table as a foreign key in DEPENDENT.
c) Primary key of DEPENDENT : (SSN, Depname)

DEPENDENT: Depname, Sex, Bdate, SSN

Step 3: 1:1



a) Select entity (Department) with total participation.
If neither entity has total participation, then pick either entity.

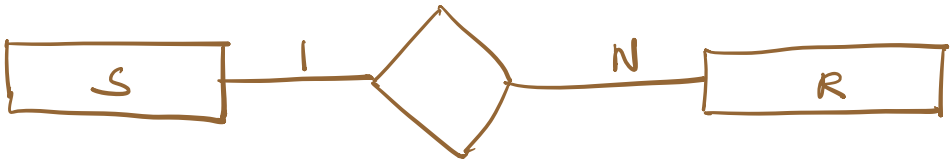
b) include SSN of manager (from Emp) as a foreign key of DEPARTMENT

c) move mgr_start_date to department.

DEPARTMENT: Dnumber, Dname, mgr_SSN, mgr_start_date

Step 4: 1:N (or N:1)

Emp —N— works_for —1— Department
Department —1— controls —N— Project
Emp —1— supervises —N— Emp
Emp —1— dependents_of —N— Dependents
↓ weak Entity Rule



a) Select the N-side entity : R
include S's primary key in R as a foreign key.

EMPLOYEE: SSN, Bdate, address, Salary, Lname, Fname, DNO, SuperSSN

PROJECT : Pnumber, Pname, Plocation, DNO

Step 5 : M : N

a) create a new table works_on
b) add primary key of Emp and Project in works_on as foreign keys
* key of work_on (SSN, PNO)

c) hours is added as an attribute of works_on

Works_on : SSN, Pno, hours

Step 6 : multi-valued attribute

a) Create a new relation R' for each multi-valued attribute of R.

b) primary key of R, A, is added to R' as its foreign key
   * primary key of R' : (A, R')

Dept_Locations : Dnumber, Dlocation

x — x — x

Normalization follows ER-to-Tables Steps:

FD : Super_SSN ⟶ Dno
Emp not in BCNF.
Decide Emp into

R1' : (SuperSSN, Dno)

R2' : (SSN, Fname, Minit, Lname, Bdate,

Salary, Sex, Super-SSN)

Example: