Fachbereich Wirtschaftswissenschaften
Institut für Wirtschaftsinformatik
Professur für Mobile Business & Multilateral Security

GOETHE UNIVERSITÄT FRANKFURT AM MAIN

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Exercise
Business Informatics 2 (PWIN)
Summer Term 2021

Exercise VI:
Databases & Data-oriented Modelling & SQL

Databases & Data-oriented Modelling

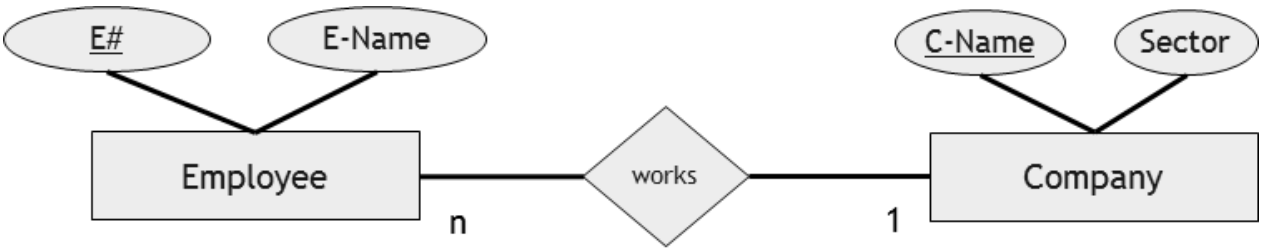
Exercise 1: Entity Relationship Model

Create an ER model which represents the structure of a university (see below). Identify and mark the primary key for each entity and avoid as far as possible artificial keys (e.g. ID). Define the cardinalities using the interval notation. Make explicitly use of weak entities.

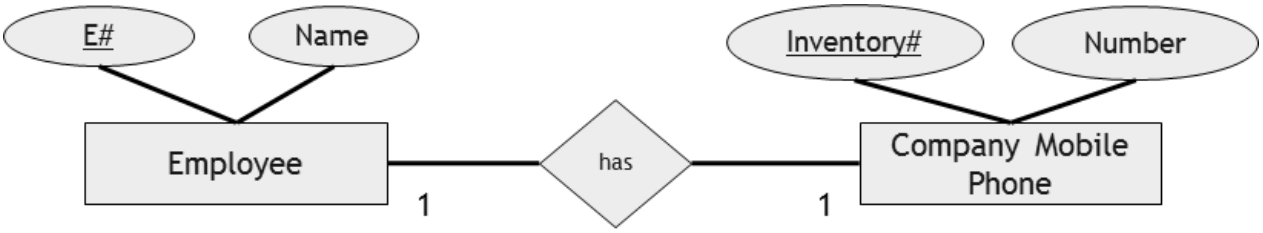
The ER model should be based on the following information:
- A university consists of different departments. Each of them has a name and a unique number.
- Departments are structured into chairs with unique names. They offer at least one lecture.
- Each chair offers a number of lectures which are described with course number, title and description.
- Exams can be distinguished by its type. For each lecture two exams are offered: One normal exam and one repeat exam. The number of participants for an exam is not limited.
- A student can register for any number of exams. Furthermore, a student is assigned to one department and has a matriculation number and a name.

Exercise 2: Deriving Relations from an ER Model

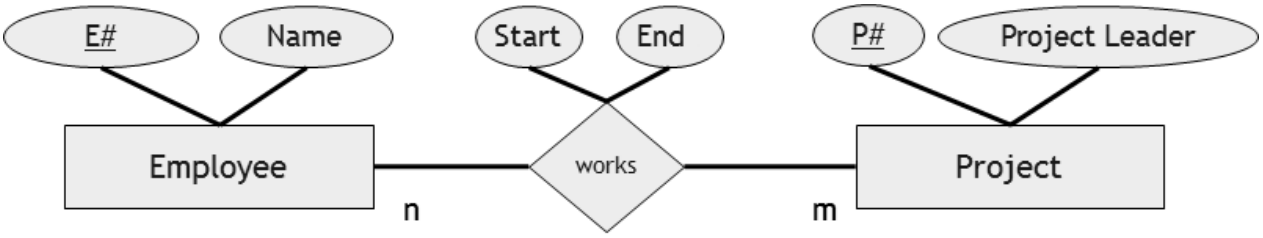
Derive the relations from the following ER models:
a) Employee – Company:



b) Employee – Company Mobile Phone:



c) Employee – Project:



SQL

Exercise 3: SQL

The database FortuneBank consists of the four tables branch, customer, loan and borrower:

Table 1: branch

branch_name	branch_city	assets
Brighton	Brooklyn	7100000.00
Downtown	Brooklyn	9000000.00
Mianus	Horseneck	400000.00
North Town	Rye	3700000.00
Perryridge	Horseneck	1700000.00
Pownal	Bennington	300000.00
Redwood	Palo Alto	2100000.00
Round Hill	Horseneck	8000000.00

Table 2: customer

customer_name	customer_street	customer_city
Adams	Spring	Pittsfield
Brooks	Senator	Brooklyn
Curry	North	Rye
Glenn	Sand Hill	Woodside
Green	Walnut	Stamford
Hayes	Main	Harrison
Jackson	University	Salt Lake
Johnson	Alma	Palo Alto
Jones	Main	Harrison
Lindsay	Park	Pittsfield
Smith	Main	Rye
Turner	Putnam	Stamford
Williams	Nassau	Princeton

Table 3: loan

loan_number	branch_name	amount
L-11	Round Hill	900.00
L-14	Downtown	1500.00
L-15	Perryridge	1500.00
L-16	Perryridge	1300.00
L-17	Downtown	1000.00
L-23	Redwood	2000.00
L-93	Mianus	500.00

Table 4: borrower

customer_name	loan_number
Adams	L-16
Curry	L-93
Hayes	L-15
Jackson	L-14
Jones	L-17
Smith	L-11
Smith	L-23
Williams	L-17

Write the appropriate SQL statements to answer the following questions and draw the table which will be returned as a result.

a) What is the average amount of loans over all branches?
b) What is the total amount of loans granted by the Fortune Bank?
c) How many branches does the Fortune Bank have?
d) How many loans were granted exceeding $1000?
e) How many borrowers are serviced by the branch “Downtown” and live in Princeton?
f) Insert a new loan in the table “loan”.
g) Delete the previously inserted entry from the table “loan”.