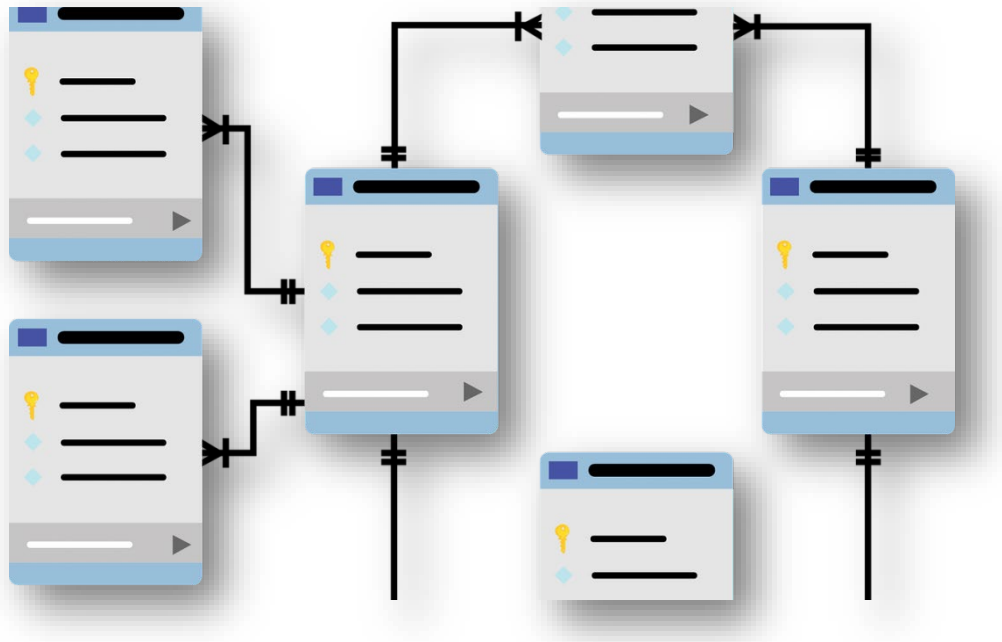
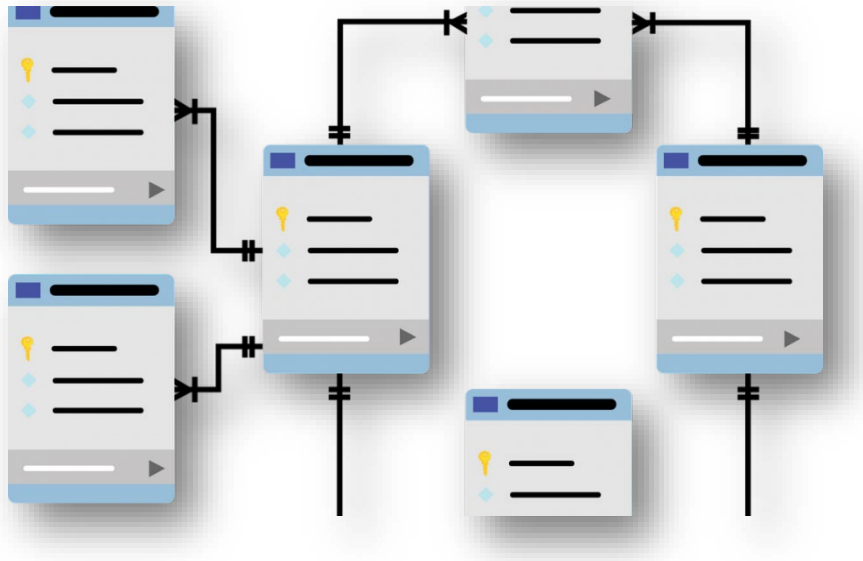
Entity-Relationship-Model



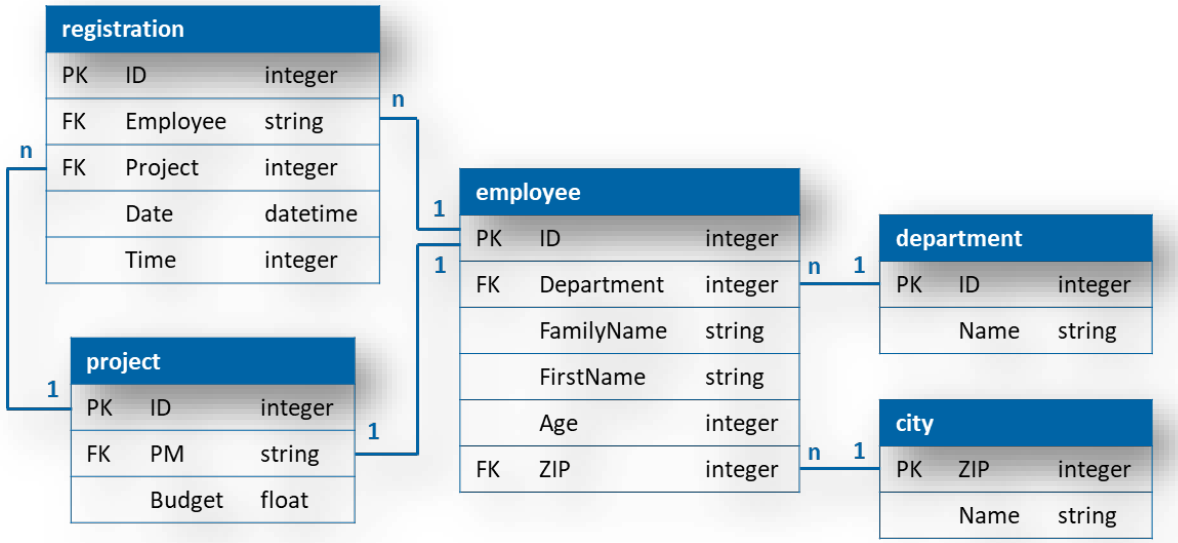
Content

- The Model
- One-to-One
- One-to-Many
- Many-to-Many



Content

- The Model
- One-to-One
- One-to-Many
- Many-to-Many



The Model

Tables are not very well suited for an overview of the database architecture

employee

ID	Department	FamilyName	FirstName	Age	ZIP
MN0345	1	Smith	John	52	8008
SE2376	2	Johnson	Peter	29	8006
SE8568	2	Winter	Alice	32	9000
MN3785	1	Jones	Mary	24	3002
MN9448	2	McAlister	Peter	47	3004

city

ZIP	Name
3002	Bern
3004	Bern
8006	Zürich
8008	Zürich
9000	St.Gallen

registration

ID	Employee	Project	Date	Time
1001	SE2376	P870	2/4/17	8.25
1002	SE2376	P870	2/5/17	9.00
1003	SE2376	P870	2/6/17	7.75
1004	SE8568	P348	2/4/17	10.50
1005	SE8568	P348	2/6/17	9.75

project

ID	PM	Budget
P870	MN3785	50’000
P348	MN0345	120’000
P101	MN0345	1’000

department

ID	Name
1	MN
2	SE

When it comes to architecture, single records are not of interest. It is important what tables exist, what the records of each table look like, and what relationships between records exist.

The Model

Entities

Each table becomes an entity

employee

ID	Department	FamilyName	FirstName	Age	ZIP
MN0345	1	Smith	John	52	8008
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SE8568	2	Winter	Alice	32	9000
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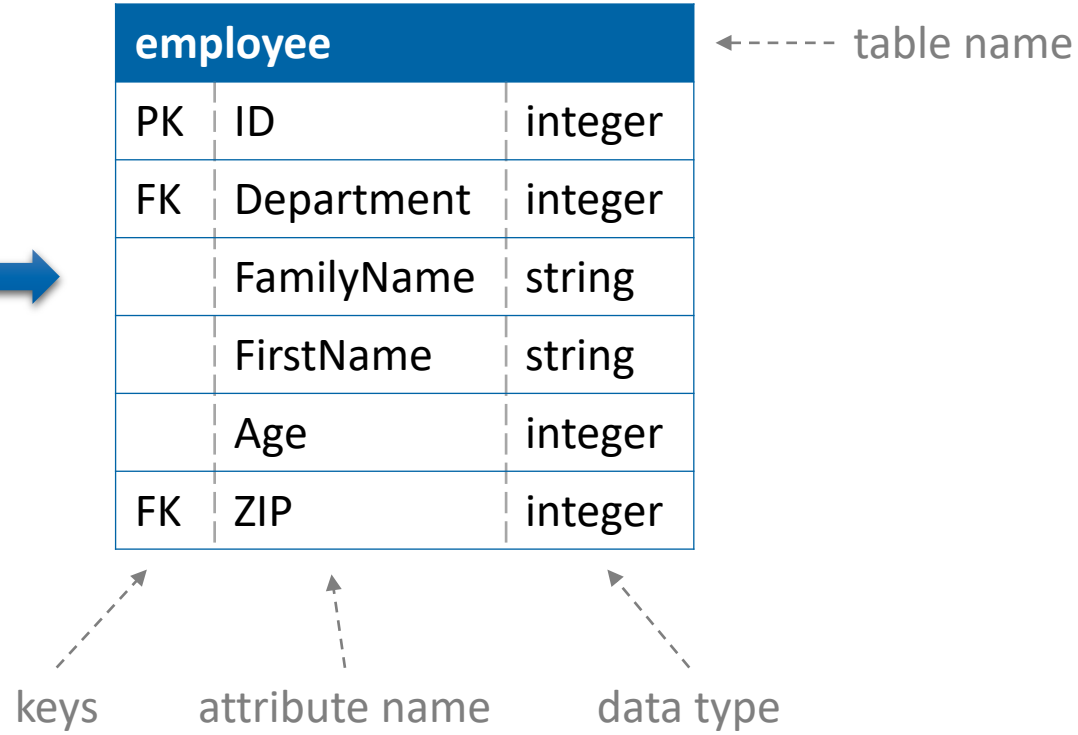

The Model

Entities

employee

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MN0345	1	Smith	John	52	8008
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registration

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department

ID	Name
1	MN
2	SE

The Model

Entities

employee		
PK	ID	integer
FK	Department	integer
	FamilyName	string
	FirstName	string
	Age	integer
FK	ZIP	integer

city		
PK	ZIP	integer
	Name	string

registration		
PK	ID	integer
FK	Employee	string
FK	Project	integer
	Date	datetime
	Time	integer

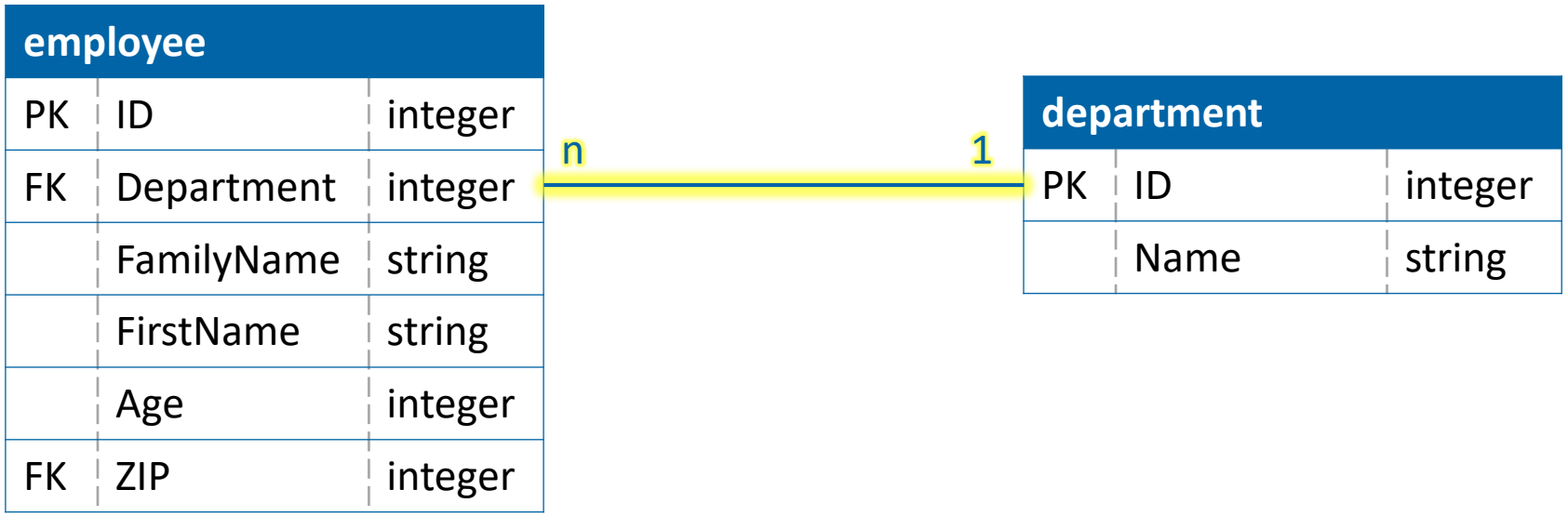
project		
PK	ID	integer
FK	PM	string
	Budget	float

department		
PK	ID	integer
	Name	string

The Model

Relationships

Relationships are visualized as connecting lines between entities



The Model

Relationships

employee		
PK	ID	integer
FK	Department	integer
	FamilyName	string
	FirstName	string
	Age	integer
FK	ZIP	integer

city		
PK	ZIP	integer
	Name	string

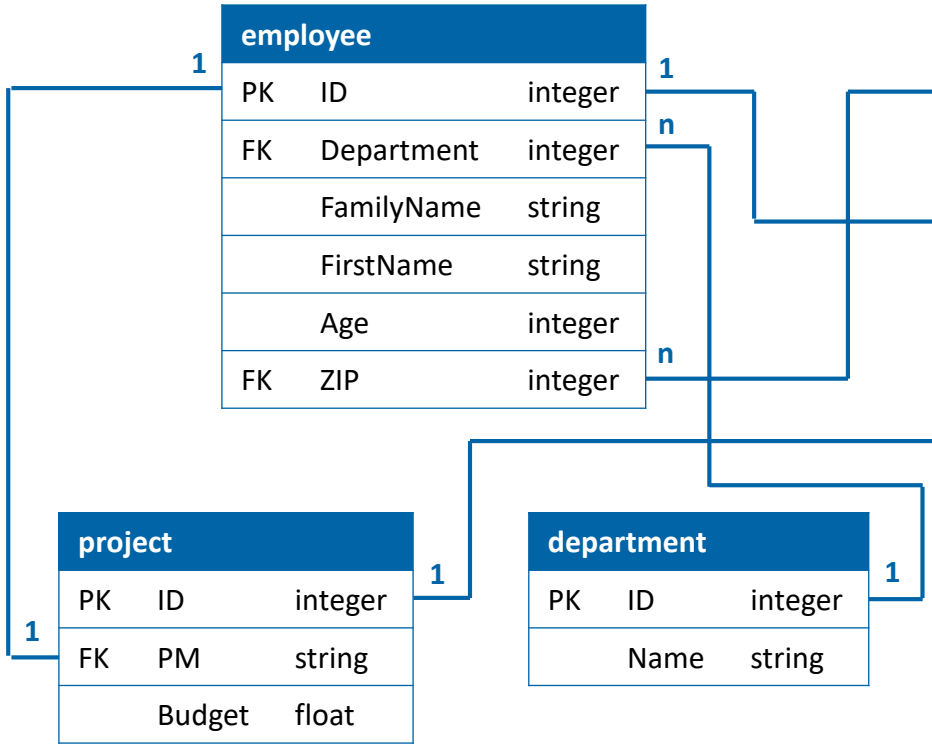
registration		
PK	ID	integer
FK	Employee	string
FK	Project	integer
	Date	datetime
	Time	integer

project		
PK	ID	integer
FK	PM	string
	Budget	float

department		
PK	ID	integer
	Name	string

The Model

Relationships



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project

ID	PM	Budget
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ID	Name
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The Model

Relationships

employee

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1005	SE8568	P348	2/6/17	9.75

project

ID	PM	Budget
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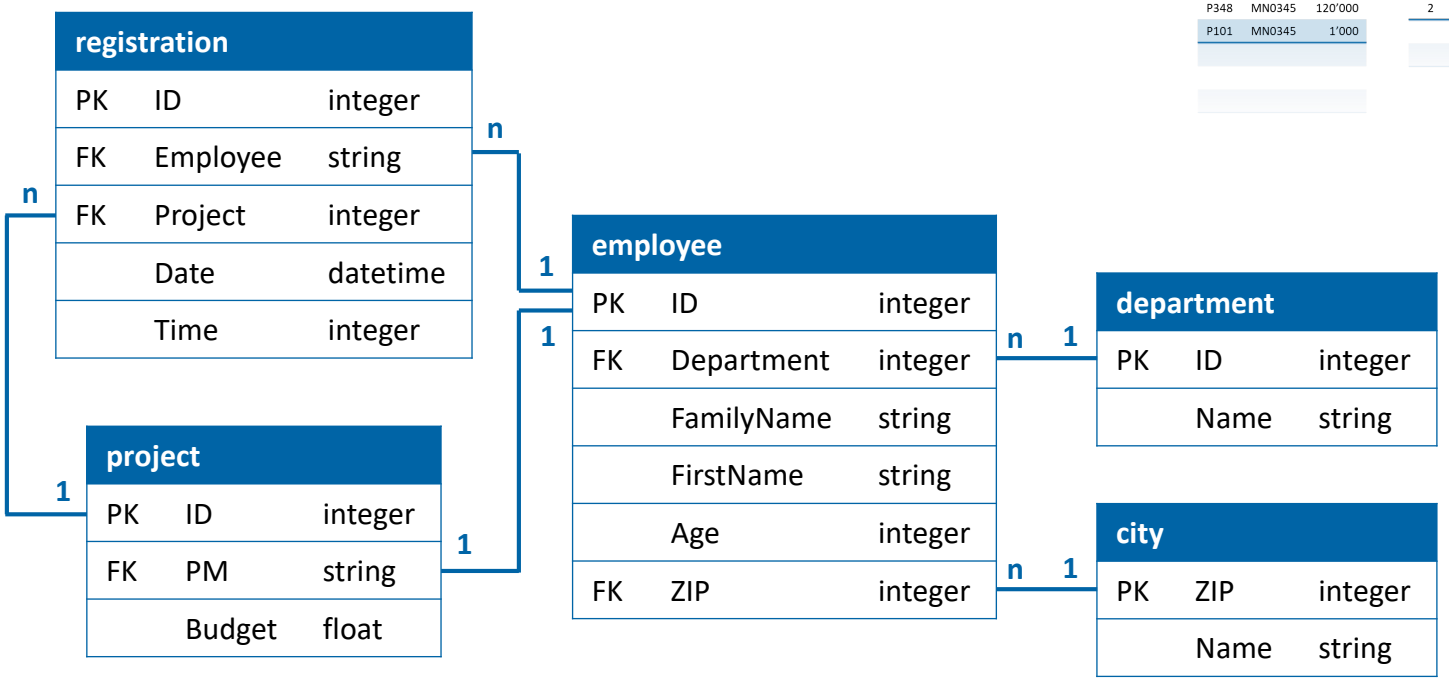
P348	MN0345	120'000
P101	MN0345	1'000

department

ID	Name
1	MN
2	SE

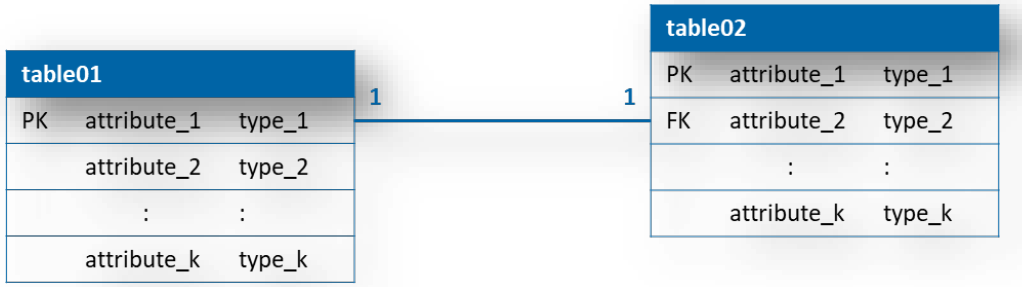


There are three types of relationships:

- One-to-One
- One-to-Many
- Many-to-Many

Content

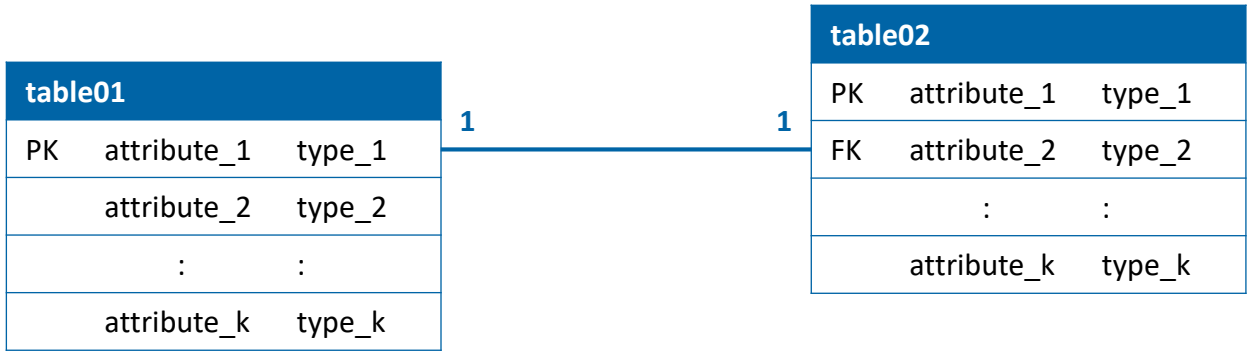
- The Model
- One-to-One
- One-to-Many
- Many-to-Many



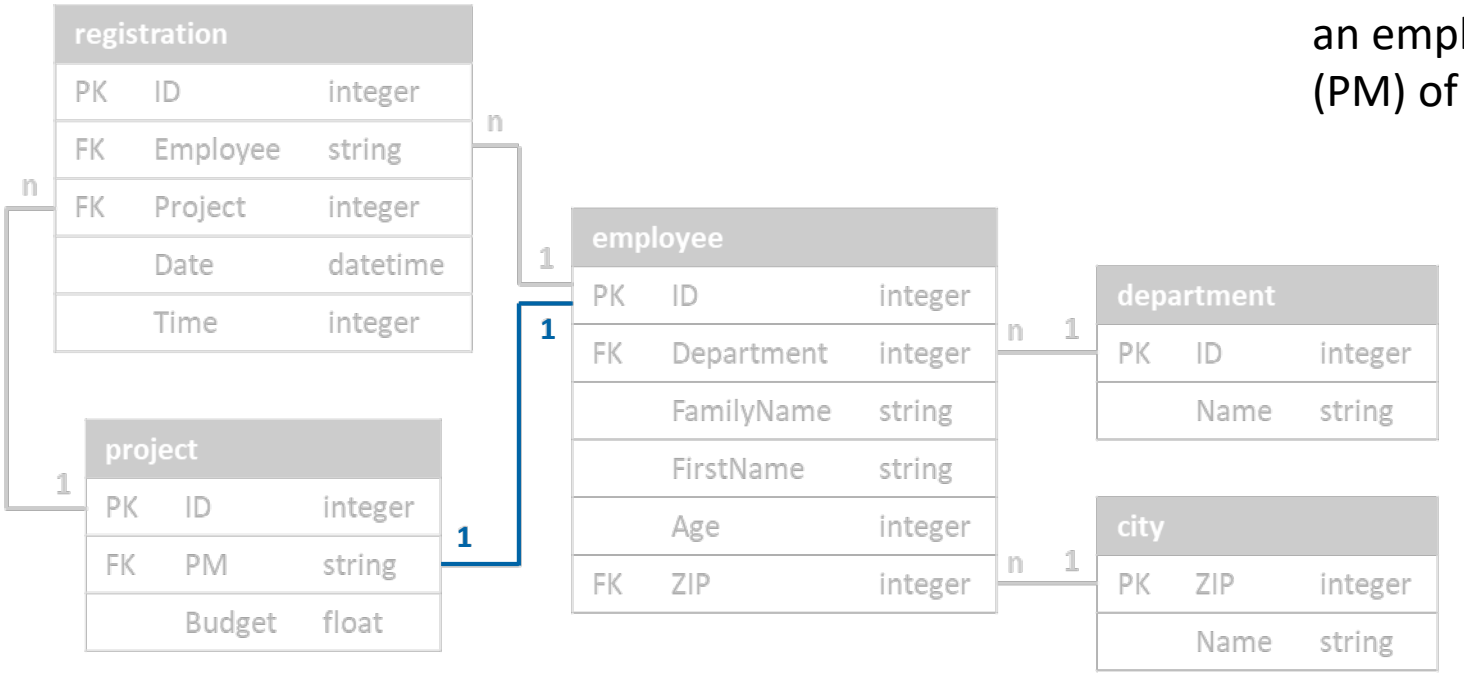
One-to-One

The most simple relationship

The One-to-One relationship describes a connection between two records, which can occur only once. This means the relationship is in both directions limited to a single record.



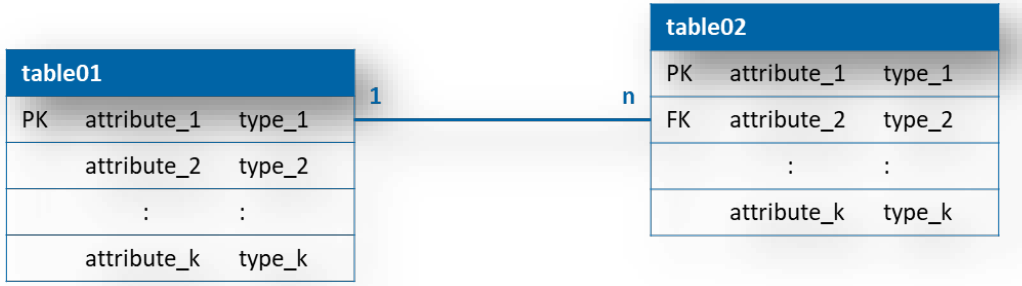
1-to-1



This One-to-One relationship actually means an employee can be the project manager (PM) of only on single project.

Content

- The Model
- One-to-One
- One-to-Many
- Many-to-Many

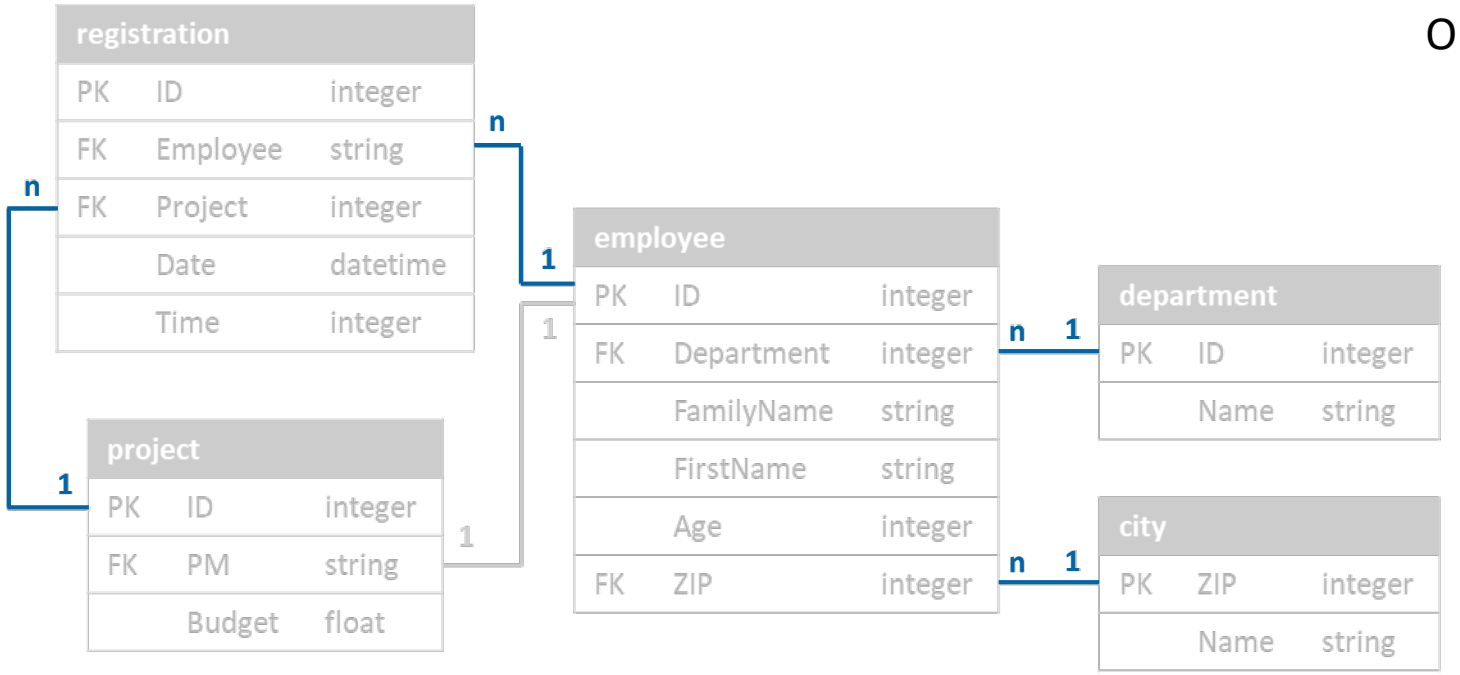


One-to-Many

The most common relationship

In a One-to-Many relationship, the record containing the FK as an attribute is linked only to one record of the related table (only one value per attribute is allowed). On the other hand, the record who's PK is used in the other table as a FK can be linked to many records in that table.

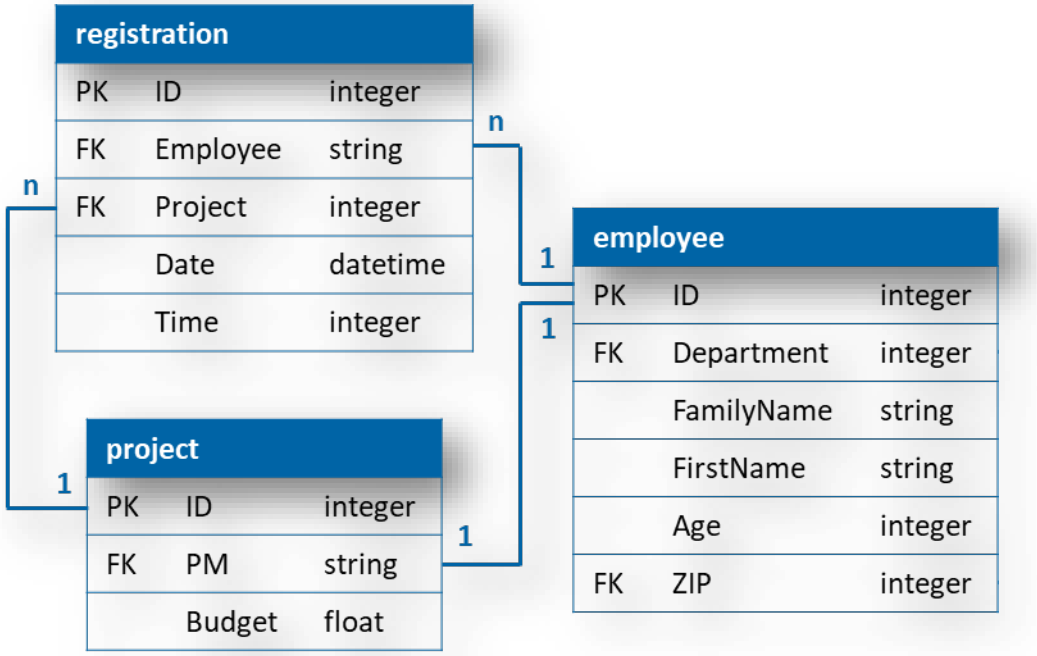
1-to-Many



Almost every look-up works with a One-to-Many relationship.

Content

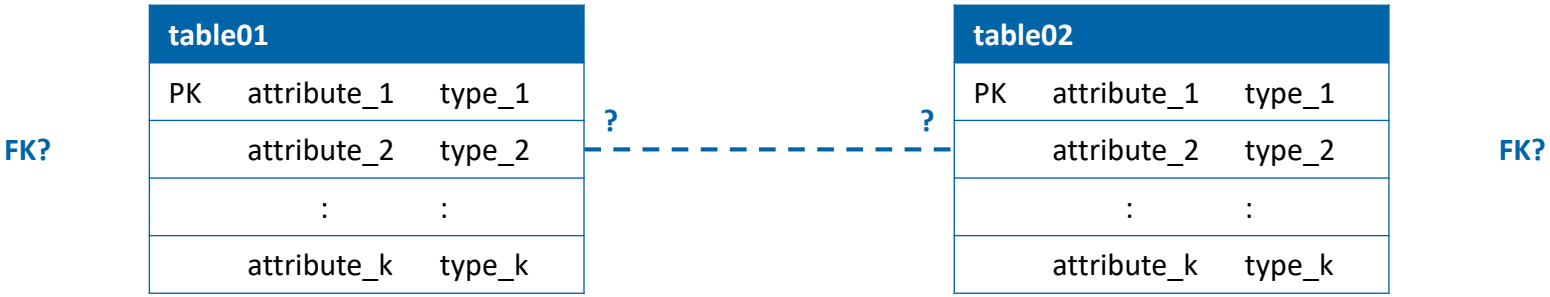
- The Model
- One-to-One
- One-to-Many
- Many-to-Many



Many-to-Many

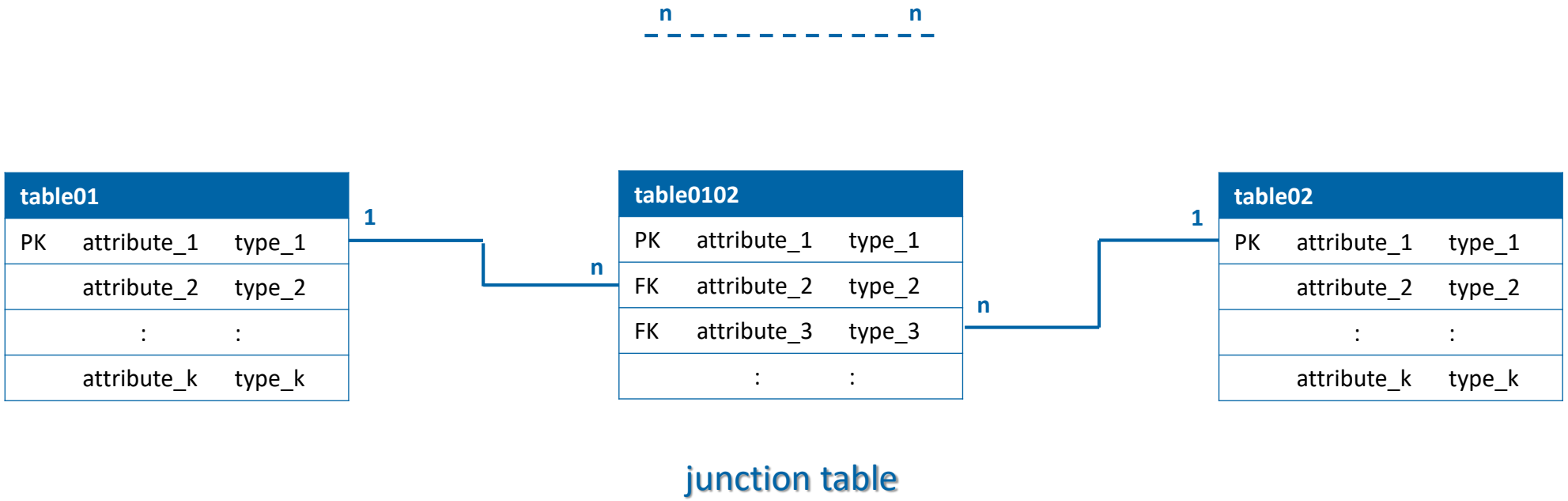
The most interesting relationship

Many-to-Many relationships seem to be impossible in a relational database satisfying 1NF (one value per attribute). However, there is a simple but very effective way to establish Many-to-Many relationships in a relational database.



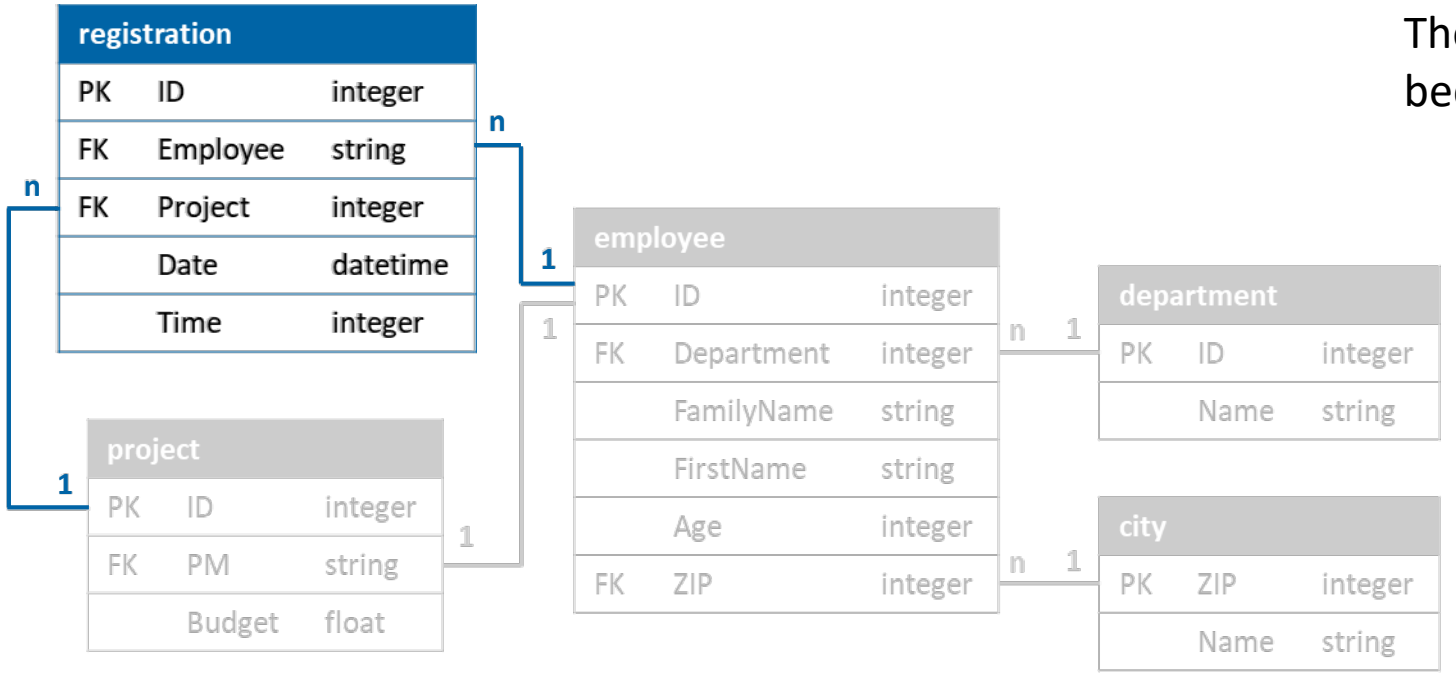
Many-to-Many

The most interesting relationship



junction table

1-to-Many



Many-to-Many relationships manifest in additional tables.
These so-called junction tables can become very large.