Aspects of Relational Modelling

Data Management and Business Performance Management

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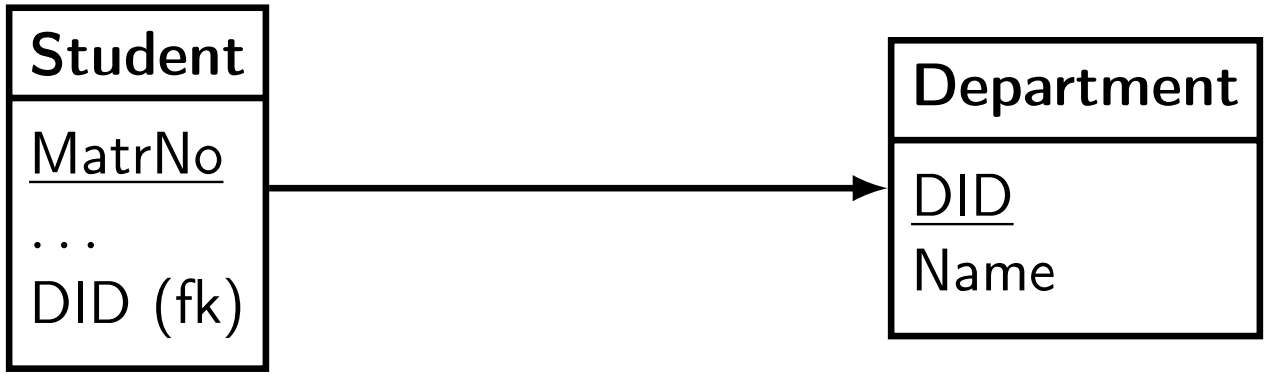
Cardinalities

Model Quality

Model Flexibility

Many-to-One

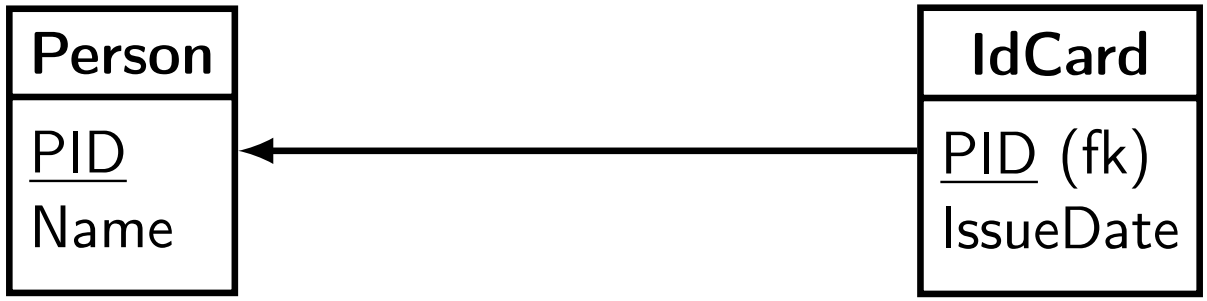


Student		
MatrNo	...	**DID**
100	...	10
101	...	20
102	...	10

Department	
DID	**Name**
10	MBAE
20	BC

- Foreign key represent many-to-one and one-to-many
- Mandatory (not null) or optional (no not null constraint)

One-to-One

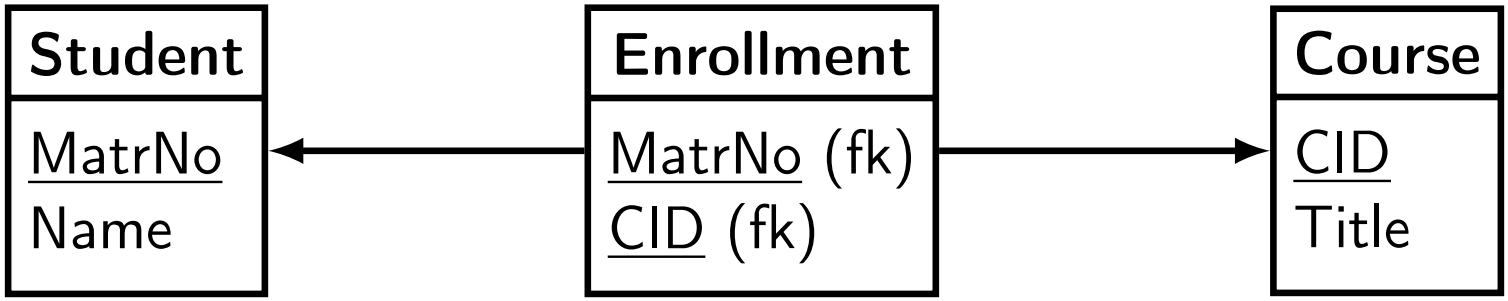


Person	
PID	**Name**
1000	Patil
1001	Miller
1002	Nguyen

IdCard	
PID	**IssueDate**
1001	12.01.2020
1002	23.04.2020

- Combined foreign key + primary key represent one-to-one
- IdCard must belong to Person
- Persons must not have IdCards (e.g. minors)

Many-to-Many



Student	
MatrNo	**Name**
100	Patil
101	Miller
102	Nguyen

Enrollment	
MatrNo	**CID**
100	1
101	1
100	2

Course	
CID	**Title**
1	Finance
2	Controlling
3	Math

- In-between table
- Compound primary key
- Optional on both sides (non-optionalilty must be checked by program)

Mixture of Concepts

Student			
MatrNo	**Name**	**DID**	**Department**
100	Patil	10	MBAE
101	Miller	20	BC
102	Nguyen	20	BC
103	Mantilla	30	ME

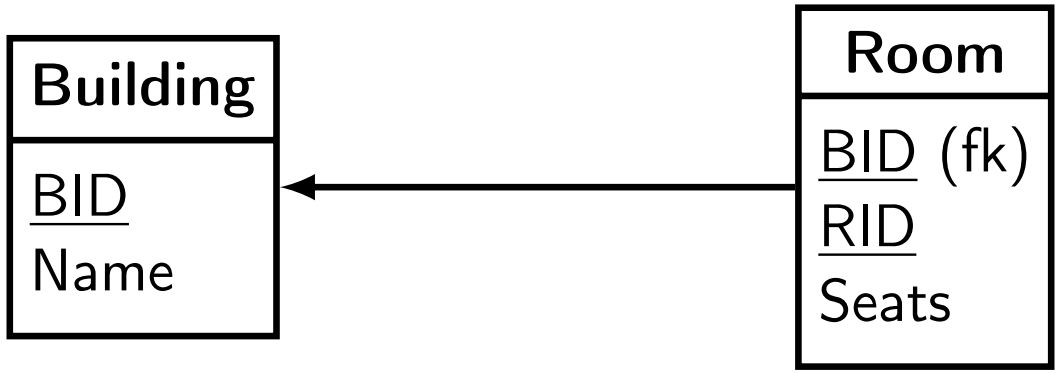
- *Student* and *Department* mixed within one table
- Update inconsistency – update department name of record 102 into *Business Computing*
- Insert inconsistency – insert new student with DID 10 and department name `'MABE'` (typo)
- Delete inconsistency – delete record 103 (information about department `'ME'` lost)
- Problem – functional dependeny not regarded
- Solution – see many-to-one slide

Repeating Concepts

Building						
BID	**Name**	**RID1**	**Seats1**	...	**RID1**	**Seats100**
1	A	A001	20	...	A100	40
2	B	B001	35	...	null	null

- Concept *Room* repeated
- Building have different nummber of rooms
- What's about Building with more than 100 rooms?
- SQL not applicable
  - Find rooms with minimum number of seats
  - Count number of rooms per building

Solution



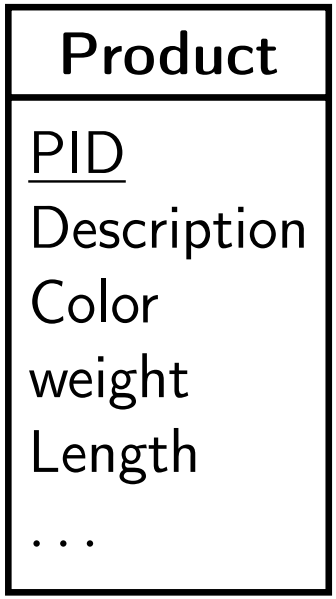
- One-to-many – arbitrary number of rooms can be connected to one building
- Compound primary key – room identified by building
- SQL applicable
  - `select * from room where seats >= 40`
  - `select bid, count(*) from room group by bid`

Product Attributes

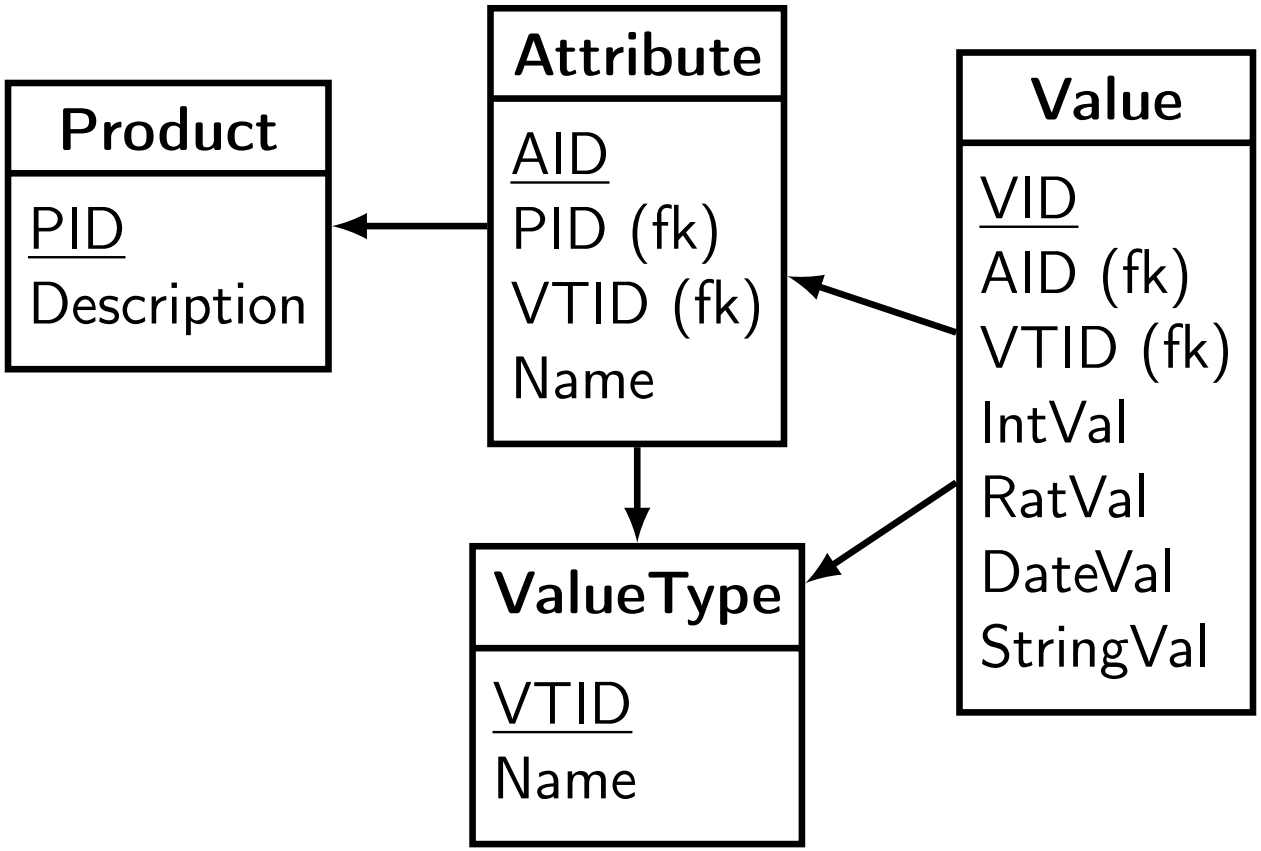
Quite diverse for different product categories

- Shoes: size, fit, fabric sole, insole material
- Books: number of pages, language, cover material
- Beds: size (small, king size), frame material
- Games: age level, number of players

Standard modelling no viable solution



Solution – Attributes as Table



- Product doesn't contain columns for attributes
- Attributes aren't columns anymore, they are records
- Value and ValueType responsibe to store correctly typed values