

Creator of the Relational Model



wikipedia.org/wiki/Edgar_F_Codd, 12.2.07

- Edgar F. Codd
- 1923 2003
- British computer scientist
- Created 1970 the Relational Model
- His most memorable achievement

 Database
 Relational
 Physical

 Model
 →
 Schema
 →
 storage

 ER Model
 Tables:
 Complex
 file organization

 rows: tuples, records
 Complex
 file organization





Integrity constraints

- Attributes have atomic values of domain dom(A_i)
- Tuples (rows, records) must not be ordered
- Null-values for some attributes are possible
- No duplicate tuples
- Distinguishable based on tuple valueskey-concept

perkey				
ubset of at	tribut	es of a relation sc	hema F	R for v
o two tuple	es ha	ve the same value	s	
Example:		Lecture		
	Lnr	title	hpw	1
	-	Interdention to Operation Opingon	5	1
	401	Introduction to Computer Science	5	
	401 501	Databases	4	
	401 501 503	Databases Introduction to Computer Science	4	



Key-Concept

Primary Key designated candidate key

Foreign Key

set of attributes FK in relation R_1 that references relation R_2 if: 1. Attributes of FK have the same domain as the attributes of primary key K_2 of R_2 2. A value of FK in tuple t_1 in R_1 either occurs as a value of K_2 for some t_2 in R_2 or is null

From ER Model to Relational Model

Step 1

- each entity *E* gets a relation with all attributes
- key attributes of *E* transform to keys of the table

Example

Lecture(<u>l_nr</u>, title, hpw) Student(<u>s_nr</u>, name, fname, mat_year, e_mail) Lecturer(<u>fname, name</u>, grade, phone)



From ER Model to Relational Model

Step 2

- for each (multiple-multiple) relationship create a new relation with all key attributes and relationship attributes

- define as key the keys from both entities

Example

examine(<u>s_nr, fname, name</u>, mark) attend(<u>s_nr, l_nr</u>)

From ER Model to Relational Model

Step 3 (alternative)

for single-single or single-multiple relationships you can create in the relation schema of the entity on the single side a new attribute with the key of the other side as foreign key

Example

Lecture(<u>l_nr</u>, title, hpw, fname, name) (fname, name) is foreign key

Result

Student(<u>s_nr</u>, name, fname, mat_year, e_mail) Lecturer(<u>fname, name</u>, grade, phone) Lecture(<u>l_nr</u>, title, hpw, fname, name) (fname, name) is foreign key examine(<u>s_nr, fname, name</u>, mark) attend(<u>s_nr, l_nr</u>)

Exercise

Transform the following ER Model into the Relational Data Model

