RELATIONAL DATABASES

OBJECTIVES

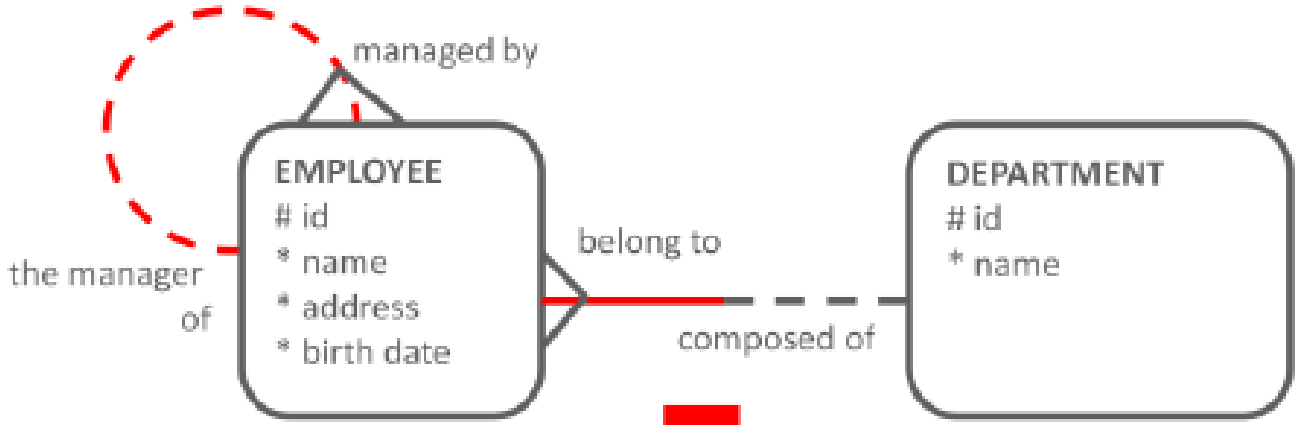
- APPLY THE RULE OF RELATIONSHIP MAPPING TO CORRECTLY TRANSFORM 1:M AND BARRED RELATIONSHIPS
- APPLY THE RULE OF RELATIONSHIP MAPPING TO CORRECTLY TRANSFORM 1:1 RELATIONSHIPS

PURPOSE

- RELATIONSHIPS ARE MAPPED BETWEEN PRIMARY KEYS AND FOREIGN KEYS TO ALLOW ONE TABLE TO REFERENCE ANOTHER.
- IF WE DON'T MAP RELATIONSHIPS THERE ARE JUST A LOT OF STANDALONE TABLES THAT DON'T CONNECT TO ANYTHING IN THE DATABASE.

RELATIONSHIPS

- A RELATIONSHIP CREATES ONE OR MORE FOREIGN KEY COLUMNS IN THE TABLE ON THE MANY SIDE OF THE RELATIONSHIP
- FOREIGN KEY COLUMN MAY BE EITHER MANDATORY OR OPTIONAL



EMPLOYEES (EPE)

Key Type	Optionality	Column Name
pk	*	id
	*	name
	*	address
	*	birth_date
fk1	*	dpt_id
fk2	o	mgr_id

DEPARTMENTS (DPT)

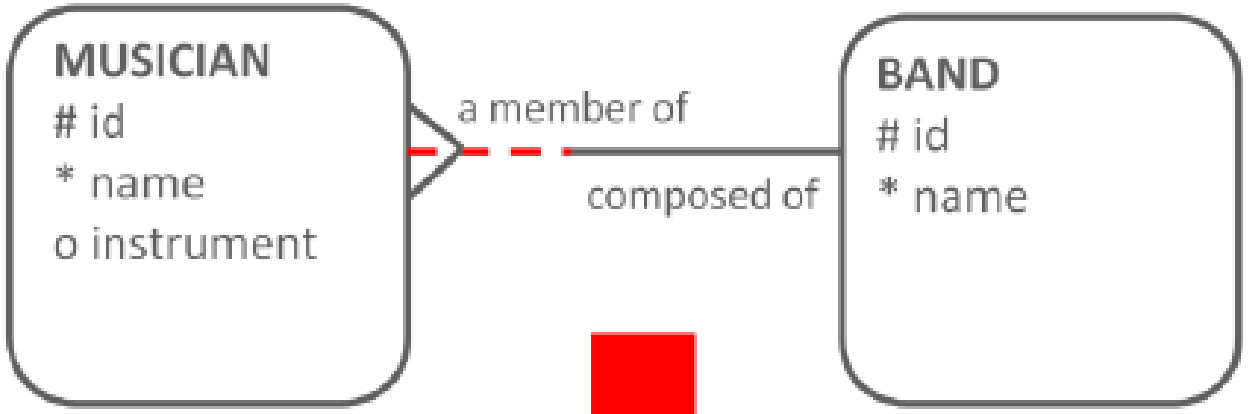
Key Type	Optionality	Column Name
pk	*	id
uk	*	name

foreign key refers to

foreign key refers to

MANDATORY ON THE ONE SIDE OF THE RELATIONSHIP

- RELATIONSHIPS THAT ARE MANDATORY ON THE ONE SIDE, OR MANDATORY ON BOTH SIDES, ARE MAPPED EXACTLY THE SAME WAY AS A RELATIONSHIP THAT IS OPTIONAL ON THE ONE SIDE.
- THE CONCEPTUAL MODEL IS RICH ENOUGH TO CAPTURE OPTIONALITY AT THE BOTH ENDS OF THE RELATIONSHIP.
- HOWEVER THE PHYSICAL MODEL IS LIMITED IN THAT A FOREIGN KEY CAN ONLY ENFORCE MANDATORY ON THE MANY SIDE.



MUSICIANS (MSN)

Key type	Optionality	Column name
pk	*	id
	*	name
	o	instrument
fk	o	bad_id

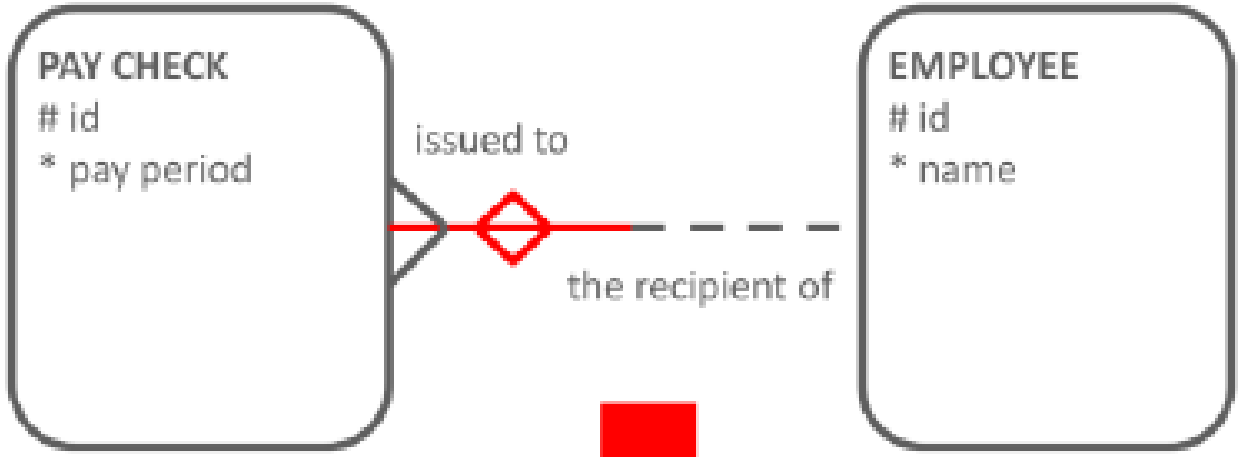
foreign key refers to

BANDS (BAD)

Key type	Optionality	Column name
pk	*	id
	*	name

MAPPING OF NONTRANSFERABLE RELATIONSHIPS

- A NONTRANSFERABLE RELATIONSHIP MEANS THAT THE FOREIGN KEY COLUMN IN THE DATABASE TABLE CANNOT BE UPDATED.
- THE FOREIGN KEY ITSELF CANNOT ENFORCE THIS IN THE DATABASE.
- ADDITIONAL PROGRAMMING IS NEEDED.



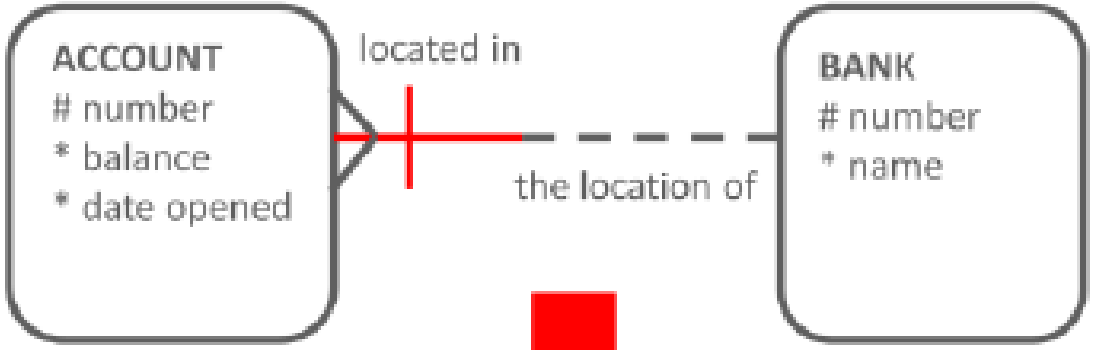
PAYCHECKS (PCK)

Key Type	Optionality	Column Name
pk	*	id
	*	pay_period
fk	*	epe_id

the value in this foreign-key column cannot be changed

MAPPING BARRED RELATIONSHIPS

- A BARRED RELATIONSHIP IS MAPPED TO A FOREIGN KEY COLUMN ON THE MANY SIDE, JUST LIKE ANY OTHER 1:M RELATIONSHIP
- IN THIS CASE THE FOREIGN KEY PLAYS A DOUBLE ROLE BECAUSE IT IS ALSO PART OF THE PRIMARY KEY



ACCOUNTS (ACT)

Key Type	Optionality	Column Name
pk	*	act_nbr
	*	balance
	*	date_opened
pk,fk	*	bak_nbr

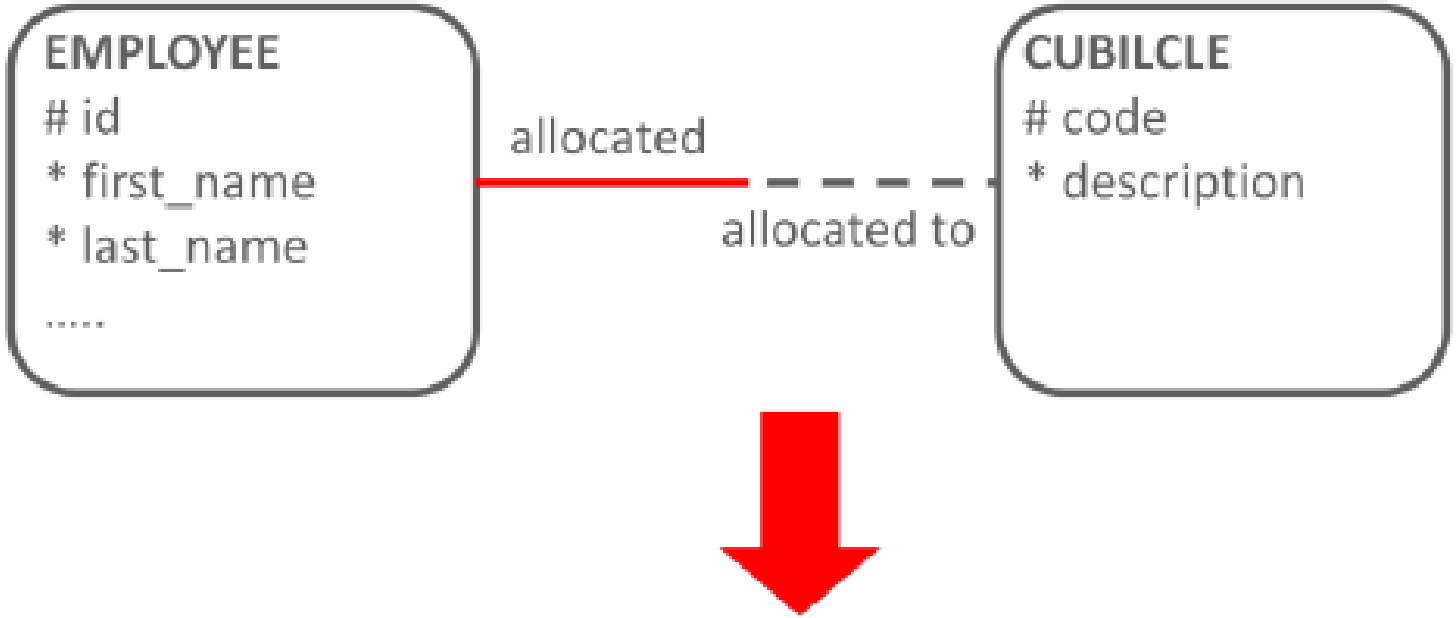
refers to

BANKS (BAK)

Key Type	Optionality	Column Name
pk	*	bank_number
	*	name

MAPPING ONE TO ONE RELATIONSHIPS

- WHEN TRANSFORMING A 1:1 RELATIONSHIP YOU CREATE A FOREIGN KEY AND A UNIQUE KEY
- ALL COLUMNS OF THIS FOREIGN KEY ARE ALSO PART OF THE UNIQUE KEY
- IF THE RELATIONSHIP IS MANDATORY ON ONE SIDE THE FOREIGN KEY IS PLACED IN THAT TABLE



EMPLOYEES (EPE)

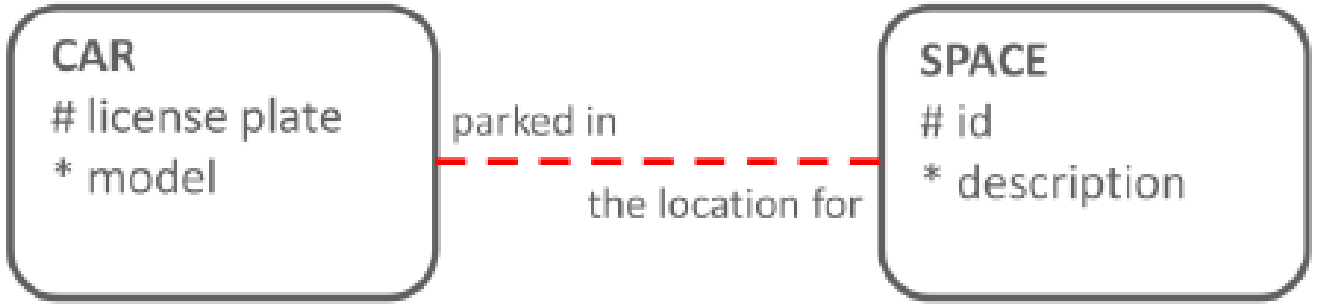
pk	*	id
	*	name
fk, uk	*	cbe_code

CUBICLES (CBE)

pk	*	code
	*	description

OPTIONAL ONE TO ONE RELATIONSHIPS

- IF THE RELATIONSHIP IS OPTIONAL ON BOTH SIDES, YOU CAN CHOOSE WHICH TABLE GETS THE FOREIGN KEY.
- THERE ARE NO ABSOLUTE RULES:
  - IMPLEMENT THE FOREIGN KEY IN THE TABLE WITH FEWER ROWS TO SAVE SPACE.
  - IMPLEMENT THE FOREIGN KEY WHERE IT MAKES MORE SENSE FOR THE BUSINESS



Car-Rental Business

CARS (CAR)

pk	*	lic_plate
	*	model
fk, uk	o	spe_id

SPACES (SPE)

pk	*	id
	*	description

Parking-Lot Business

CARS (CAR)

pk	*	lic_plate
	*	model

SPACES (SPE)

pk	*	id
	*	description
fk, uk	o	car_lic_plate

ONE TO MANY MANDATORY BOTH SIDES

- IF THE RELATIONSHIP IS MANDATORY AT BOTH ENDS, YOU HAVE THE SAME LIMITATION WHERE IT IS MANDATORY AT ONE END.
- YOU NEED TO WRITE ADDITIONAL CODE TO ENFORCE IT.