#### **ER-Relational Notes**

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#### Read the textbook!

It is actually quite good on this topic!

#### Relational Constraints

- · Gives the DBMS a list of consistency checks
- It is run with respect to whatever data that exists in the database
  - DBMS doesn't understand anything about what application wants or intends or "should" have
  - It simply goes through each constraint one by one and checks them against the data in the database

#### Relational Constraints

Domain constraints
Foreign key constraints

Unique constraints

Primary key constraints

NOT NULL constraints

CHECK constraints

#### ER → Relational translation

Translate entities and relationships into relational tables
Translate ER constraints into relational constraints

The translation is correct if for any database instance:

Constraints violated in ER are violated in relational Constraints violated in relational are violated in ER If ER doesn't violate, neither should relational If relational doesn't violate, neither should ER

Note: some translations are not possible

#### What constraints are translatable?

A - ab - B

 $A \rightarrow ab - B$ 

 $A \rightarrow ab \leftarrow B$ 

A → ab – B

A → ab ← B

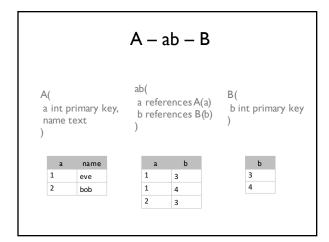
And the mirror images

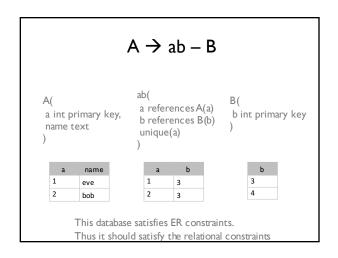
#### How to check a translation?

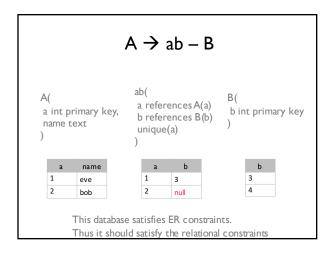
- Come up with data that satisfies the ER constraints and check that they don't violate relational version
- 2. For each ER constraint
  - I. Come up with data that violated the ER constraint. Does relational version identify the violation given the same data?
- 3. Vice Versa

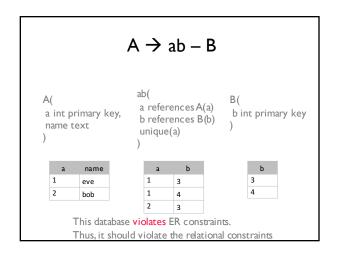
# Non-exhaustive examples (with bastardized notation!)

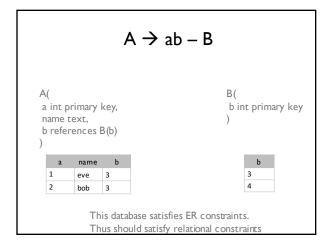
And how to check them

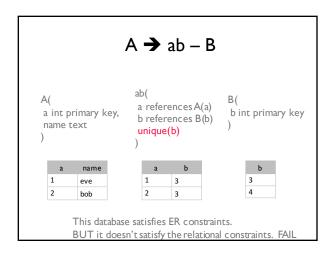


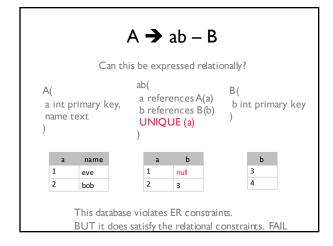


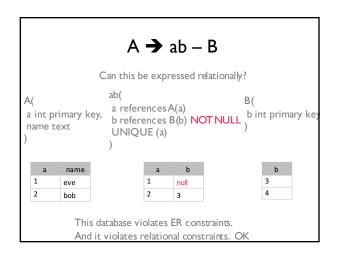


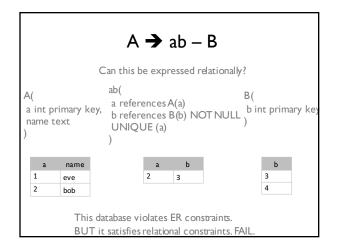


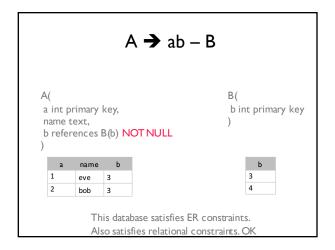


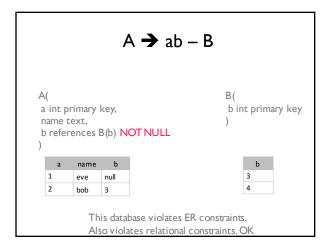


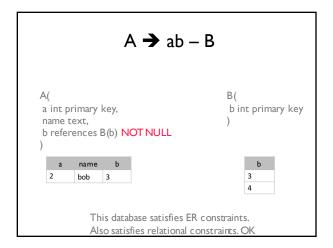












## Some tips

There are not that many ways to express a relationship between A and B for any combination of constraints

A(...), ab(...), B(...)

AB(...), B(...) // A and ab are merged

A(...), AB(...) // ab and B are merged

AB(...) // all three merged

### You should understand...

Why the following cannot be expressed or cannot be expressed without redundancy

A == ab - BA == ab == B