

Midterm Review

Lecture 6



Format

- 5 problems, with multiple sub-parts
- No notes, calculators, books, computers, phones, etc. may be used
- Your responses must be written in pen



Content

Everything, including...

- General database knowledge
- ER diagrams
- The relational model
- Mapping ER diagrams to relations
- Normalization



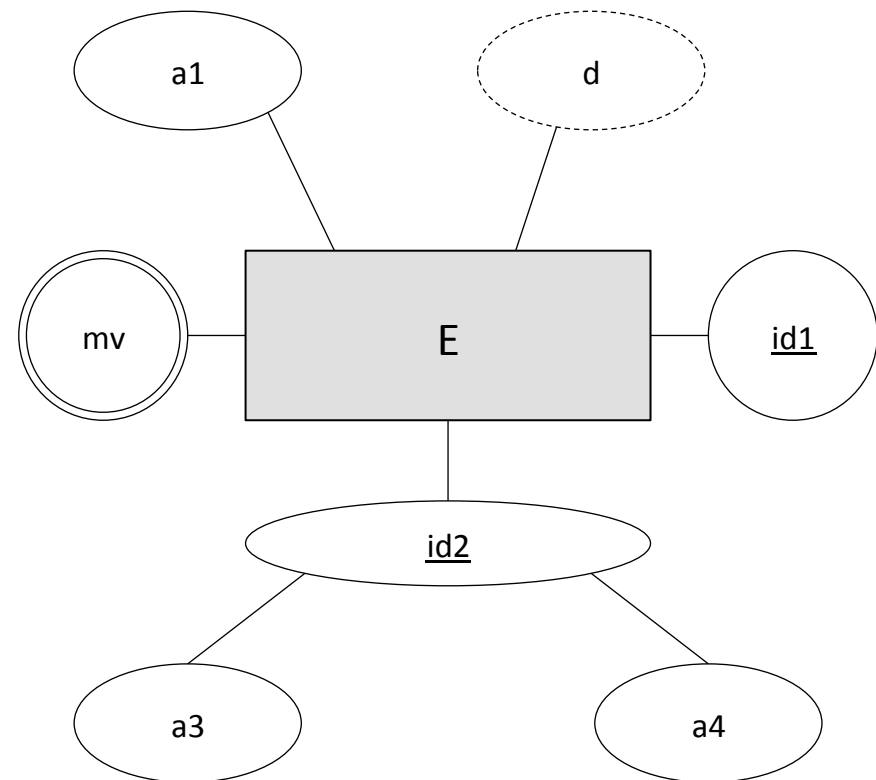
General Database Knowledge

- What is a transaction?
 - What are the properties that should hold for effective transaction processing?
- What is SQL?
- What are the major phases of database design?
 - How do these apply to the material we've discussed thus far: ERDs, relations, normalization, denormalization, indexes, views



ER Diagrams + Mapping (1)

- Describe in words the following ERD
 - How can you identify an instance of E ?
- Map E to relation(s)
 - What are the primary key(s)?
 - What happens to other key(s)?



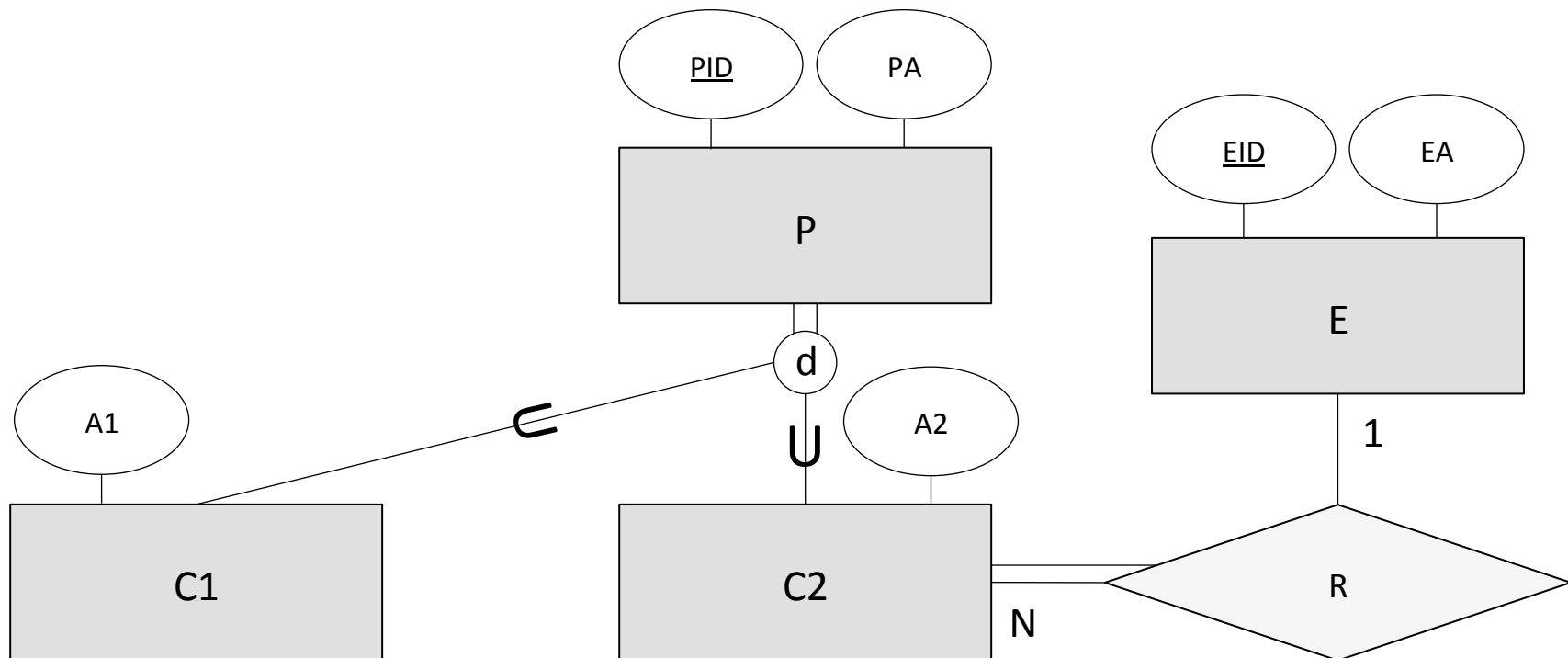
ER Diagrams + Mapping (2)

- An **S** has an **sa** and can be uniquely identified by its **sid**
- Each **S** must **R2** with a single **O2**, whereas each **O2** may **R2** with any number of **S**'s. When an **S** **R2**'s an **O2**, it is important to note the corresponding **RA2**
- An **O2** has an **x** and can be uniquely identified by its **o2_id**, which is comprised of **p1** and **p2**
- A **W** is identified by its corresponding **S**, in combination with its own **wid**, consisting of a **wa** and **wb**
- Each **W** can **R1** with any number of **O1**'s, and likewise each **O1** can **R1** with any number of **W**'s. Each **R1** interaction has a corresponding **ra1**
- An **O1** is uniquely identified by its **o1_id** and also has an **x**



ER Diagrams + Mapping (3)

Map this ERD to relations in **two** different ways. Pros and cons of each?



Relational Model

- A database is composed of?
- A table schema is composed of?
- Each [schema component] has a _____ of valid _____ values?
- What is the difference between a set vs. bag of tuples?
 - In what context does each apply?
- What are the broad categories of constraints?
- What kinds of constraints that can be defined in the schema?
 - What is a superkey vs. a key?
 - How do you identify a primary key? What happens to other super keys?
 - How do foreign keys fit in?



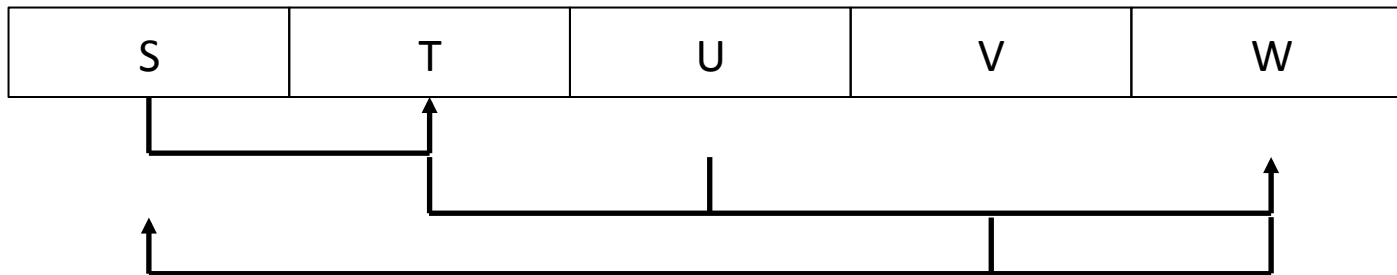
Normalization (1)

- What are spurious tuples?
- What is a modification anomaly?
Example?
- What is an FD?
 - How is a key defined w.r.t. FD's?
- What does 2NF require? 3NF?



Normalization (2)

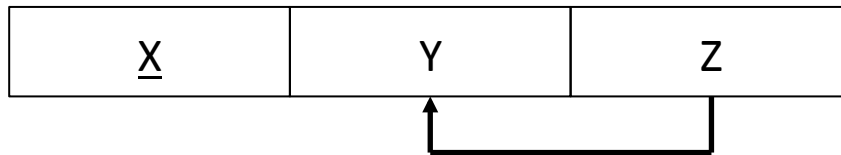
List all FDs, identify all key(s):



Normalization (3)

Which NF? Why? Decompose to 3NF.

Foo



Bar

