CS 217 Data Management and Information Processing

Relational Database Design Examples

Last Lecture: Relational Database Design

- *Primary* and *unique keys* prevent rows from repeating certain columns.
- *Foreign keys* link tables and point to primary/unique keys.
  - Create *parent/child* table relationships. Must fill in parent before child.
  - Parent rows cannot be deleted unless default foreign key behavior is changed.
    - Must kill children first!
- Tables can represent *Objects*, *Events* (have time), and *Relationships*:
  - *One to many* relationships allow multiple child rows referencing one parent row
    - Implemented with a single foreign key.
  - *Many to many* relationships link two or more rows
    - Implemented with a linking table
  - *One to one* relationships create subset tables
    - Implemented with a single foreign key that is also a unique key.

Database Schema Design Steps

1. **List tables**
   - (Objects, events, relationships)
2. Choose **primary key** for each table
3. Choose **foreign keys** to link tables
4. Add unique keys and/or optional columns
5. Refine the design, revisiting decisions made above
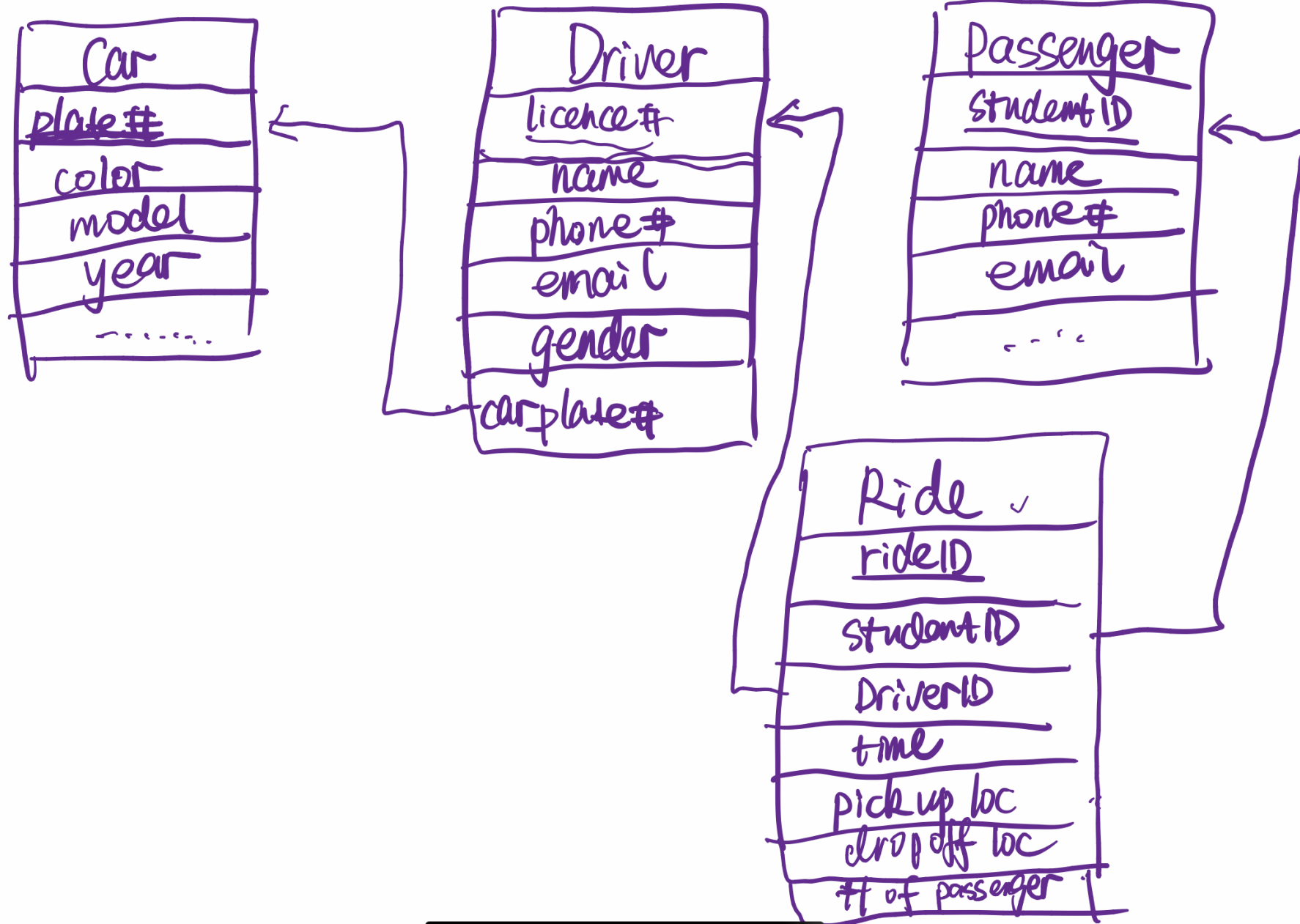
More examples

Safe Ride

Safe Ride

Design a database schema for the safe-ride service (or think of Uber). It should contain:

- ▶ Cars

- ▶ Drivers

- ▶ Passengers
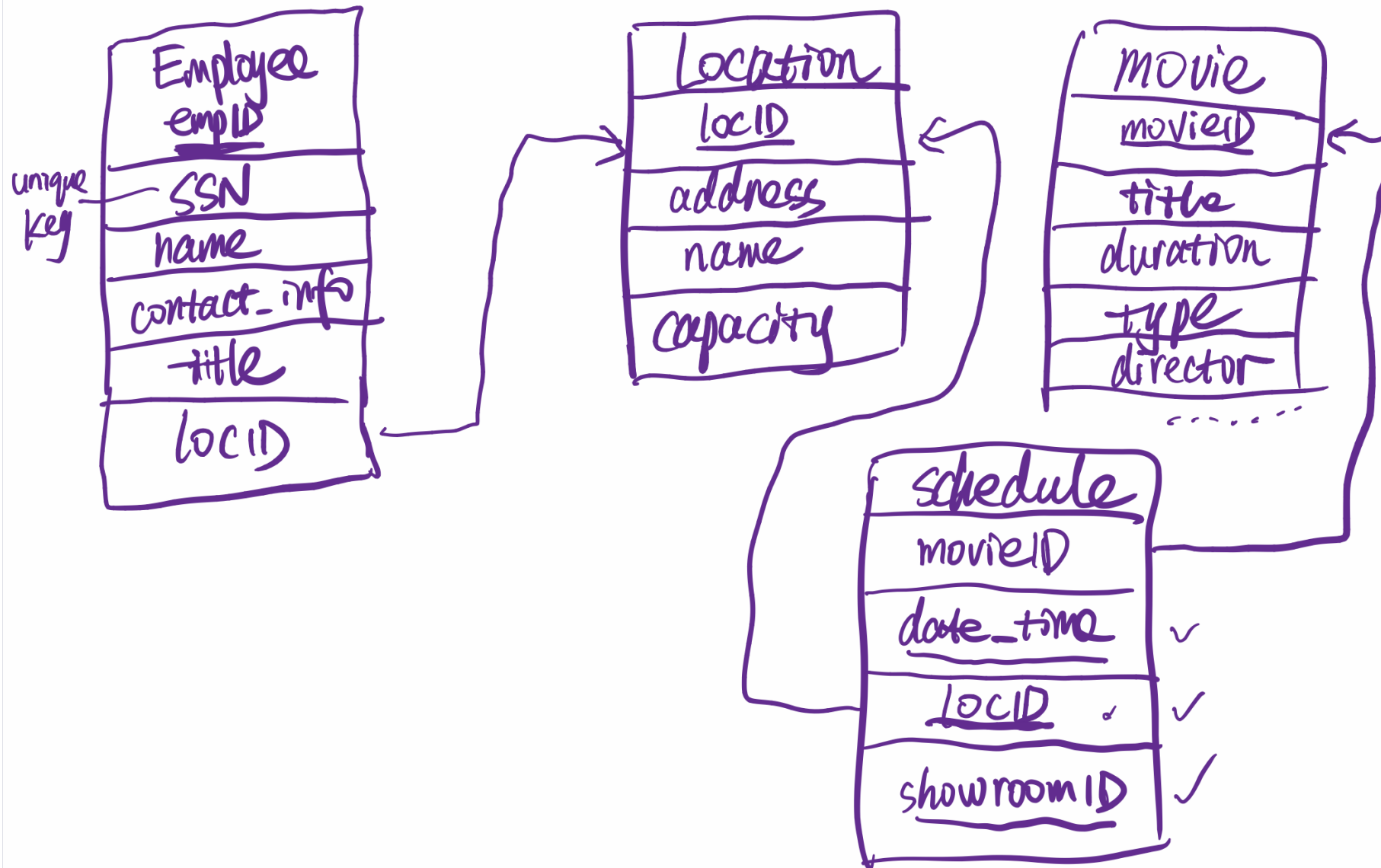
- ▶ Rides

- ▶ ...

Safe Ride

Movie Theater Chain

Movie Theater Chain

Design a database schema for a movie theater chain. It should contain:

- Locations/branches

- Employees

- Movies

- Schedule of movies

- ...

A Movie Theater Chain

Lending Library

Lending Library

Design a database schema for a lending library. It should contain:

- Item (books, DVD, ...)
- Students
- Loan/rental
- Donation
- ...

Lending Library