Functional Dependencies and Normalization
Formal Design Standards

- Avoid Bad Design
- Check ERD Design
- Basis of some design methods
- Sometimes violate for efficiency
  - Special programming to avoid problems
Good Database Design

- Entity Relationship Semantics
- Redundancy Reduced
- Nulls Reduced
- Faulty data (spurious tuples) Avoided

Comparison:
- Look at bad designs to see problems
Formal Approach

As Overall Design method:
- Of theoretical interest
- Hard to apply to whole DB
- Conceptually like following

To Check Other Designs:
- look at each table in DB
- revise if criteria not met
- by breaking into smaller better tables
Bad Design Problems

• Anomalies Arise:
  – Database contradicts itself
  – Bad data created
  – Data lost unexpectedly
• May occur when DB is queried or modified.
Agenda

• Show various anomalies
• See what causes the problems
• How to fix them
• Fixing called ‘Normalization’
• To understand Normalization requires Mathematics: **Functional Dependency** theory.